Association of Environmental Professionals (AEP)

Beyond 2020: The Challenge of Greenhouse Gas Reduction Planning by Local Governments in California

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Comments on the Draft Whitepaper will be accepted through May 23, 2015. Comments can be email to: aepccc@googlegroups.com

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AEP White Paper
Beyond 2020: The Challenge for Greenhouse Gas Reduction Planning by Local Governments in California
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Prepared by members of the AEP Climate Change Committee. The AEP Climate Change Committee consists of leaders of climate action planning practices from consulting firms that have lead many of the local greenhouse gas reduction planning efforts across California. The Committee focuses on advancing the professional practice of local climate action planning through periodic publication of white papers and conference presentations, as well as interaction with state, regional and local agencies.

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Executive Summary

Rich Walter, ICF International

The Post-2020 Challenge for Climate Action Planning in California

Local greenhouse gas (GHG) reduction planning by California's cities and counties has been primarily focused on adopting local measures that are supportive of reaching the GHG reduction target established in The Global Warming Solutions Act of 2006 (Assembly Bill (AB) 32), which calls for reducing emissions to 1990 levels by the year 2020. Similarly, GHG analysis and mitigation for discretionary projects reviewed under the California Environmental Quality Act (CEQA) has been conducted under the rubric of thresholds that are based on consistency with the AB 32 reduction target for 2020.

AB 32 is only a start for GHG reduction planning given that the long-term global imperative to limit the more extreme effects of global warming on climate change will require much more substantial reductions than required by AB 32. Some national governments have identified a long-term goal to reduce their 2050 emissions to a level 80 percent below 1990 levels. This goal is reflected in Governor Schwarzenegger's Executive Order (EO) S-03-05, although not through legislation to date. As 2020 approaches, California legislative attention is starting to turn to the post-2020 period. In addition, legal challenges brought under CEQA to the San Diego Association of Governments (SANDAG) Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) and the San Diego County Climate Action Plan (CAP)[1] have successfully raised consistency with the EO S-03-05 2050 goal as an issue for CEQA review.

In 2008, the California Air Resources Board (ARB) adopted a Scoping Plan that detailed the main strategies California would use to achieve the AB 32 2020 target, and from which local jurisdictions could identify their role in emissions reduction through 2020. However, there are no true GHG reduction plans anywhere in the world that have adopted enforceable measures to meet the ambitious 2050 targets. Thus, if cities and counties in California intend to prepare GHG reduction plans and conduct CEQA analysis of projects with emissions that go beyond 2020 out to 2050, they will face substantial challenges with long-term emissions forecasting, regulatory uncertainty, reduction target determination, fair-share mitigation determination, and feasibility.

Based on research into pathways to deep GHG emissions reductions by 2050, the changes needed statewide are substantial and severe and would require fundamental changes in California's energy system, many of which are outside the jurisdiction of individual cities and counties. Scenario analysis and a case study presented in this paper highlight how achieving deep GHG emission reductions within California will require a coordinated effort across all sectors of the economy. In nearly all the deep reduction scenarios, the rate of transition—such as deployment of better vehicles, or renewable electricity—far exceeds the historical rate of change in California (State) to date. This adds a measure of uncertainty for local jurisdictions seeking to understand their role in GHG reductions within a context of shifting technologies, energy/technology prices, and regulations.

[1] "Climate Action Plan" or "CAP" is a term of art commonly used to refer to a local greenhouse gas reduction plan. Some CAPs also include a plan for adaptation to expected climate change. Some jurisdictions use "Greenhouse Gas Reduction Plan" instead. In this white paper the terms are used interchangeable in relation to greenhouse gas reductions.

Given these uncertainties—which increase as one proceeds from 2020 out to 2050—local GHG reduction planning will need to include a range of potential scenarios to help civic entities better understand the varying role of local GHG reductions compared to GHG reductions from State and federal policy.

The Role of CEQA

The CEQA Guidelines offer two paths to evaluating GHG emissions impacts in CEQA documents:

- Projects can tier off a "qualified" GHG Reduction Plan that establishes thresholds of significance (CEQA Guidelines Section 15183.5)
- Projects can determine significance by utilizing a model to calculate GHG emissions and assess their significance (CEQA Guidelines Section 15064.4)

The reduction target embodied in AB 32 for 2020 is the most common thread among the significance thresholds developed to date. AB 32 and ARB's 2008 AB 32 Scoping Plan provide a state-level plan for achieving the statewide GHG emissions target for 2020. The project-level CEQA significance threshold utilized by lead agencies will need to be updated to address post-2020 targets. The logical timing for updating thresholds will be when the State adopts its first post-2020 legislated reduction target, and when ARB has developed a statewide plan to achieve the adopted target.

This paper makes the following recommendations concerning CEQA:

- **Limit CEQA GHG Analysis to the State GHG Planning Horizon based on a State Legislatively Mandated Target.** This paper presents substantial evidence for the infeasibility for a local jurisdiction to meet the 80 percent below 1990 levels by 2050 in the near-to-medium term absent a real post-2020 State plan of action. Thus, requiring compliance with the 2050 goal in EO S-03-05 as a *de facto* significance threshold in CEQA documents is impractical. Nothing is served by establishing an impossible threshold or analyzing impacts so far in the future that they require substantial speculation. Instead, the limit of GHG analysis for CEQA documents should be the current State GHG planning horizon. At present, the only true State reduction plan is the AB 32 Scoping Plan, which only has a verified and quantified reduction plan to 2020. Once the State has a defined plan for 2030, then CEQA analysis and thresholds should shift from the current 2020 horizon to the 2030 horizon. When a post-2030 plan is in effect, the horizon should shift again.
- **Establish "Substantial Progress" as the CEQA significance criteria.** All the thresholds used in CEQA documents in California and all qualified GHG reduction plans used for CEQA tiering are based on meeting or exceeding the reduction targets in AB 32 requiring overall State reductions to 1990 levels by 2020. There are no local GHG reduction plans that have an actual plan to meet a 2050 target of 80 percent below 1990 levels. This paper recommends that Appendix G of the CEQA Guidelines be amended to provide the following new CEQA significance threshold for GHG emissions:
    - "*Does the project impede substantial progress in local, regional, and State GHG emissions reductions over time toward long-term GHG reduction targets adopted by the State Legislature?*"
- **Allow CEQA Tiering from GHG Reduction Plans that make "Substantial Progress" in Reducing GHG Emissions.** The recent (2014) San Diego court rulings have the potential to

deter local jurisdictions from preparing and implementing GHG reduction plans because, effectively, the rulings took away the "carrot" for CEQA streamlining, and created too much uncertainty. To promote CEQA streamlining and encourage local agencies to prepare GHG reduction plans for communitywide GHG emissions, legislation should require that CEQA Guidelines Section 15183.5 be amended to allow for tiering off GHG Reduction Plans that make "substantial progress" toward reducing GHG emissions on a path toward long-term reduction targets, without requiring such plans to meet a 2050 reduction target. This concept is not new and is similar to the language referring to tiering off infill developments using development standards that "substantially mitigate" impacts added to the CEQA Guidelines under Senate Bill 226 (SB 226).

- **Allow Partial CEQA Exemption for CAPs.** There is no exemption or streamlining for Climate Action Plans (CAPs) under CEQA. The analysis within the CEQA documents associated with CAPs is usually highly programmatic and non-location specific, meaning that those CAP elements which do result in potentially significant environmental impacts would still require a project-level CEQA document regardless of the programmatic level analysis. A better planning approach would be to provide a partial CEQA exemption for the CAP adoption. This should be a statutory exemption limiting the scope of CEQA compliance to addressing GHG emissions only, and would eliminate the need to analyze other environmental impacts at the programmatic level, while mandating CEQA evaluation on the project-level elements from the CAP that may have environmental effects of their own. This would retain the ability for CEQA tiering from a qualified GHG reduction plan, and would eliminate an impediment to local CAP development while still ensuring that project level secondary environmental impacts are fully disclosed and mitigated, as required by CEQA compliance.

How then to analyze GHG emissions in CEQA documents for the post-2020 world? Pragmatically, this can be broken down into several different eras. The suggested approaches would depend upon the State enacting enabling legislation along the following lines:

- **The Uncertain Interim: From San Diego rulings (2014) to "AB 32+1" to the "AB 32+1" Scoping Plan**
  - For general plans and multi-phase large projects with post-2020 phased development, CEQA analyses need to consider consistency with the 2020/AB 32 based framework, but also analyze the consequences of post-2020 GHG emissions in terms of their impacts on the reduction trajectory from 2020 toward 2050. A significance determination, as argued in this paper, should be based on consistency with "substantial progress" along a post-2020 trajectory, but should not be based on meeting the 2050 target.
  - CEQA analysis for most land use projects can continue to rely on the current thresholds and current CAPs with 2020 horizons for the immediate future, especially if there is action by the State legislature and ARB in the next few years. The closer we come to 2020 without legislative and ARB action on the post-2020 targets and planning, the more CEQA project analysis will need to analyze post-2020 emissions consistent with "substantial progress" along a post-2020 reduction trajectory toward meeting the 2050 target.
- **The Next Normal: With "AB 32+1" and an "AB 32+1" Scoping Plan**
  - When the Legislature adopts a post-2020 target and ARB develops a detailed, specific, and feasible scoping plan addressing the adopted target, a new framework will be established

for CEQA GHG analysis similar to that which exists in relation to AB 32 and the 2020 reduction target.

- CEQA GHG analyses will need to be completed using thresholds based on the new post-2020 target.
- CEQA tiering of GHG analysis will need to be conducted using CAPs that are consistent with the adopted post-2020 target.
- CEQA GHG analysis of general plans (and large multi-phased projects with long-term future horizons) will need to analyze horizons beyond the adopted target which are similar to the current conditions described above.

- **The Future: A 2050 Legislated Target and a 2050 Target Scoping Plan**
  - The Legislature could adopt a 2030 target in the near-term, but will also adopt a dedicated, long-range 2050 target at some point.
  - In the near-term, any ARB scoping plan for meeting a 2050 target will likely be a general phased approach that will not constitute a detailed, specific, and feasible plan of action like that which exists in the current AB 32 Scoping Plan. Lacking such a State action plan for 2050, CEQA GHG analyses should be based on evaluating project emissions out to the horizon year of state action planning (which may be sooner than 2050), and, as necessary, evaluation of "substantial progress" toward longer-term reduction targets.
  - In time, ARB will develop a feasible and specific plan of action for 2050, though it may be years in coming. At that point, CEQA GHG analysis will need to make adjustments in order to be based on fully evaluating project emissions for consistency with a 2050 plan of action.

The Role of General Plans

In the post-2020 period, there will be increasing pressure to include ambitious policies to reduce GHG emissions within general plans. Given past history, it is likely that pressure groups will continue to use CEQA lawsuits, GHG emissions, and the need for long-term reductions to gain leverage in an attempt to force local jurisdictions to modify general plans to reflect their desired outcomes. As we shift from 2020 targets to 2030 targets and beyond, many people will be looking to general plans to ensure that land use planning reflects the current State target(s) and milestones for GHG emission reductions.

This paper makes the following recommendations concerning general plans:

- **Coordinate General Plans and Climate Action Plans**. With ever-increasing GHG emissions reduction ambitions, general plans and CAPs must be brought into better and closer alignment in order for local GHG reduction measures to have sufficient rigor, support, enforcement, and monitoring to ensure that they are effectively implemented.
- **Limit Planning Horizons to 20 years for General Plan CEQA Analysis to Better Match Regional Planning Horizons**. Legislation should require the CEQA Guidelines to be amended specific to general plans, to allow for impacts to be analyzed over the same planning horizon required for other regional planning tools such as water supply/demand, and transportation planning.

The Role of Climate Action Plans

The local target setting process for CAPs for 2020 has provided important lessons that can be applied to setting targets in coming years. Most CAPs have included targets for 2020, and some discuss reductions to achieve a trajectory for 2050, but 2020 has been the primary focus on identifying reduction measures.

The 2014 AB 32 Scoping Plan Update states the following:

> "*Local government reduction targets should chart a reduction trajectory that is consistent with, or exceeds, the trajectory created by statewide goals. Improved accounting and centralized reporting of local efforts, including emissions inventories, policy programs, and achieved emission reductions, would allow California to further incorporate, and better recognize, local efforts in its climate planning and policies.*"

Achieving a reduction trajectory that is consistent with or exceeds a statewide trajectory is not a straightforward process. The circumstances in each community vary tremendously due to differing growth rates, climate, existing built environment, economic health, and local community and political preferences.

Currently, it is extremely difficult for a lead agency or project to fully achieve a local post-2020 target in the absence of a statewide plan to achieve a post-2020 target. While there are GHG reduction plans that do include a post-2020 target, those emissions reductions are subject to uncertainty and speculation about the amount of reductions that can be attributed to State and federal reductions beyond 2020. In the absence of a post-2020 target passed by the Legislature, the question that will become increasingly important for local GHG reduction planning is whether showing progress to achieve post-2020 goals is sufficient, or whether the GHG reduction plan must actually achieve the 2050 target even in the absence of a State legislative target or plan for a particular milestone.

This white paper provides sector-by-sector considerations for local GHG emissions reduction measures in the post 2020 period. While not comprehensive, this review is intended to provide ideas for different strategies that can be applied in a post-2020 world.

This paper makes the following recommendations concerning Climate Action Plans:

- **Adopt Post-AB 32 Targets**. The California Legislature should take action to adopt 2030 (or 2035) and 2050 GHG reduction targets that have the force of law throughout the State. There is no State plan to achieve 80 percent below 1990 levels by 2050 (or an interim goal for 2030), and consequently there is no guidance on a framework by which a local jurisdiction can understand its fair share to be addressed through local GHG reduction planning.
- **Initiate ARB Planning for 2030 and 2050**. Concomitant with legislative action, ARB should prepare a plan to achieve the selected legislative target for 2030 with a detailed analysis by measure and sector of the GHG reductions achievable through State policy and initiative. This extended scoping plan can create the context within which local and regional governments can evaluate and identify their fair-share role.
- **Create 2030 to 2050 Scenarios/Calculators**. California should create a 2050 California calculator to inform Californians as they face the 2050 challenge in the coming years. Such a calculator should be prepared not only for the State as a whole, but should be extended to allow jurisdictions to examine their local emissions, as well applying different scenarios. Given

the need for interim target planning toward 2050, the models should also include interim year markers of 2030, 2040, and 2050.

"Walking to Run"

This paper argues that the prudent approach for local GHG reduction planning is to focus on realistic and achievable GHG reductions under the control and/or substantial influence of local governments themselves, and to do so in the current context of State (and in the future possibly federal) GHG reduction planning. Local GHG reduction planning will need to become increasingly more ambitious on a phased basis. CAPs should be updated and expanded periodically to reflect the emerging broader framework for deeper future reductions. The test for local CAPs and associated CEQA practices concerning GHG project analysis should be whether local action and project mitigation is resulting in reasonable local fair-share of GHG reductions over time, and which show "substantial progress" toward the long-term State reduction targets.

I. Introduction

Rich Walter, ICF International

Problem Definition

Local GHG reduction planning by cities and counties in California has been primarily focused on adopting local GHG reduction measures that are supportive of reaching the 2020 GHG target established in Assembly Bill (AB) 32 to limit emissions to 1990 State levels. Similarly, GHG analysis and mitigation for discretionary projects reviewed under CEQA has been conducted under the rubric of thresholds that are based on consistency with AB 32 reduction goals for 2020.

AB 32 is not the end but the beginning of GHG reduction planning, given that the long-term global imperative to limit the more extreme effects of global warming on climate change will require much more substantial reductions out to 2050. Those goals are most commonly defined as reducing developed world emissions to a level 80 percent below 1990 levels (as reflected in Executive Order S-03-05).

As 2020 approaches, legislative attention is starting to turn to the post-2020 period. In addition, legal challenges brought under CEQA to the San Diego Association of Governments (SANDAG) Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), and the San Diego County Climate Action Plan (CAP)[2], have successfully raised consistency with 2050 reduction goals as an issue for CEQA review.

There are no true GHG reduction plans anywhere in the world that have adopted enforceable measures to meet the ambitious 2050 targets.

As local cities and counties in California prepare GHG reduction plans and conduct CEQA analysis of projects with emissions that go well beyond 2020 out to 2050, they will face substantial challenges which include, but are not limited to, the following:

- **Long-term Emissions Forecasting**. Forecasting for a point 35 years in the future is fraught with issues, uncertainties, and potentially large margins of error. One need only look at the pre-2008 forecasts for population, housing, and economic conditions (compared to actual conditions during and after the following recession) to understand how profoundly socioeconomic forecasts can change. Forecasting to 2050 requires numerous assumptions about the energy and transportation systems related to energy use and related GHG emissions. For example, how GHG-intensive will electricity be? What will energy prices be? What will the regional transportation network look like? Assumptions must also be made about technology: What types of vehicles will be in use? What kinds of transportation fuels will be readily available? What will be the feasibility of local-level renewable energy generation and storage technologies?
- **Regulatory Uncertainty**. With the passage of AB 32, a legally enforceable statewide goal for GHG emissions reductions was established. The AB 32 Scoping Plan defined how the State

[2] "Climate Action Plan" or "CAP" is a term of art commonly used to refer to a local greenhouse gas reduction plan. Some CAPs also include a plan for adaptation to expected climate change. Some jurisdictions use "Greenhouse Gas Reduction Plan" instead. In this white paper the terms are used interchangeable in relation to greenhouse gas reductions.

would meet that goal. A framework of analysis was then developed using the AB 32 target to make significance determinations under CEQA. The development of California's plan to achieve 2020 reduction targets provided a critical context for understanding how the GHG emissions of local projects and plans fit into the overall picture. No such clarity exists for post-2020 since there are no actual plans for achieving 2050 reduction targets, or any milestone between 2020 and 2050.[3] In other words, there is no comprehensive approach (like the AB 32 Scoping Plan) that establishes a framework for collaborative actions by State, local, and regional agencies to meet GHG reduction goals. A local or regional CEQA lead agency is therefore left on its own to ascertain what the State or federal government may (or may not) implement to achieve a post-2020 reduction goal.

- **Target Determination.** The "zero threshold" approach of considering any new GHG emission to result in a cumulatively considerably impact has been rejected by nearly all CEQA lead agencies and practitioners. Instead, current CEQA analyses are examining project GHG emissions in the context of their potential to adversely affect the State's ability to meet AB 32 for 2020. That approach is feasible given that lead agencies can evaluate the State's plan to implement AB 32 for 2020. Those lead agencies can also evaluate their jurisdiction's contributions to GHG emissions and identify the reductions needed on a local level that would meet the AB 32 goal, using the combined effect of State and local action. It would be speculative to predict the impacts of a State or federal action to 2050. Accordingly, one cannot readily complete such a gap analysis for 2050 without massive speculation, and such speculation would further hinder determination of an informed target to guide local actions for 2050.

- **Fair-Share Determination**. Setting aside the challenges with forecasting, regulatory uncertainty, and target determination described above, it is both speculative and problematic to determine what a local jurisdiction's "fair share" of GHG reductions should be for 2050 at this time. Constitutional limitations (*Nollan*, *Dolan*, etc.) mandate that mitigation must be proportional to a project's level of impact. As noted above, absent an actual State plan to reduce emissions for 2050, it is hard to see how a local or regional plan or project can be fairly assigned the majority of the mitigation burden and still be called "proportional." Local jurisdictions would be flying blind if they were to individually speculate what their fair-shares would be at this point, and would risk unduly burdening their citizens and businesses with disproportionate mitigation responsibilities if they imposed additional mitigation beyond that needed to meet AB 32.

- **Feasibility.** In addition to the fair-share burden issue is the question of feasibility. Technically, there are numerous ways to reduce GHG emissions for new development (see discussion later in this paper). But there are also severe technical challenges to fully achieving substantial emissions reduction. Furthermore, the feasibility of achieving substantial reductions on the order of 80 to 90 percent through local action only is questionable given limitations on local municipality authority. No city or county is completely autonomous in matters of energy and transportation systems. While a municipality can influence certain matters, many decisions about the electricity and transportation systems are under the control of the State and federal government, and/or are controlled by market determinations. To achieve a 2050 goal will require major shifts in how we obtain and use energy, transport ourselves and goods, and how

[3] Executive Order S-03-05 is an executive department goal and is neither a legally enforceable target for private development or local governments nor is it a plan.

we live and build. These transformations would require implementation across all levels of the economy, not just what local jurisdictions have authority over; placing the 2050 burden predominantly on local jurisdictions would thus be highly disproportional, costly, and potentially subject to litigation. Even if offsets are included to overcome potential local mitigation limitations, the purchase and use of offsets would be fraught with uncertainty in terms of how they should be applied and what the legal basis would be for imposing mitigation to be consistent with a 2050 target,

Progress vs. Perfection

"*For every problem there is a solution that is simple, elegant, and wrong.*" - H. L. Mencken

The simplistic answer to the challenges described above is that GHG reduction plans and CEQA documents should use the 80 percent below 2050 target as the metric of evaluation, and should mandate compliance accordingly. This line of reasoning is the subtext of the two CEQA legal challenges in San Diego noted above.

While easy to understand, this point of view is wrong on many levels; notably regarding feasibility, jurisdictional control, economic efficiency, and common sense. As will be explained in detail later in this paper, in order to reach the 2050 reduction target, the California economy would have to undergo a radical transformation in energy usage and control of non-energy emissions. Such a transformation is not feasible in the short run. The reality is that California cities and counties have only limited regulatory tools by which to effect change, not the broader regulatory control over vehicle technology, fuels, and energy systems that is exerted by the State and the federal government. GHG reduction planning to date has shown that relative portfolios of reduction methods employed by local, State, federal governments vary widely. To require that most of the reductions come only from measures within the control of local governments—rather than seeking cost-effective measures over time from every level of control— would result in enormous economic costs. As shown in GHG reduction planning to meet the AB 32 target to date, the amount of expected reductions from State measures fundamentally influences the gap that local jurisdictions often seek to fill through local action. Finally, it makes no sense to insist on a solution to a global problem by pursuing remedies at the smallest levels of organization, i.e., the local jurisdiction for GHG reduction plans and the project by project under CEQA.

Instead, this paper argues that for the 2020 to 2050 period, the fundamental metric for local GHG reduction plans and for project analysis under CEQA should be *substantial progress toward the 2050 target*, rather than *achievement of the 2050 target*. A metric based on steady progress toward a 2050 target will be a better foundation for local support and commitment over time, and would be a key source of support for continued State GHG reduction efforts. Conversely, a metric requiring radical and highly disruptive change over a short period will be much more likely to engender substantial local resistance and organized opposition to local GHG reduction action, resulting in less local support for State GHG reduction plans in the long run.

Be Careful What You Wish For: The Limitations and Perils of CEQA

CEQA is primarily intended to provide disclosure to the public and to decision-makers about the environmental effects of new projects, and to create opportunities for consideration of public input on environmental impacts. CEQA is a poor planning tool for finding and implementing solutions to cumulative impacts that operate on a landscape level, as it is inherently bound to the individual

project circumstances of each CEQA review. For example, CEQA review has not resulted in effective solutions to existing regional traffic solutions in congested parts of California, nor has it resulted in effective solutions to existing air quality challenges. The solutions to those problems will be found outside of CEQA.

One of the premises of the San Diego CEQA challenges noted above is that the solutions to regional GHG reductions can and will be found within the CEQA process, which is highly unlikely. Rather than obtaining the long-term results desired by those who brought forward the San Diego challenges, a more likely result is that CEQA processes, if faced with infeasible mitigation and/or alternative demands, will be forced to use larger documents (more EIRs), and make more statements of overriding circumstances. Further, if the opposition to additional GHG reduction mandates were to compel further action on a statewide political level, one could see legislative changes to CEQA to prevent such demands.

While CEQA can be a supporting tool for GHG reductions, it is the premise of this paper that local and regional GHG reduction planning, coordinated and in phase with State planning and action, focused on actions that are realistically under the control and influence of local government, is a preferred approach to ever-increasing and ultimately ineffective CEQA lawsuits.

Slow and Steady Wins the Race

Environmental policy (and most public policy) operates in a dynamic tension between radical change and incremental reform. While there is an unmistakable appeal to bold and rapid change when faced with a profound challenge, like that posed by climate change, that urgency needs to be tempered with the ability of society, the economy, and government entities to adapt to and embrace that change. In the experience of the authors of this paper—who lead GHG reduction planning practices at professional firms that conduct many of the GHG reduction plans, as well as CEQA analysis of GHG emissions in California—local governments will take action when there is 1) a clear context for planning, 2) a balanced and reasonable burden on local jurisdictions (compared to that taken on by the State and federal government), and 3) realistic expectations that have a favorable chance of success.

The CEQA lawsuits in San Diego are the equivalent of hitting a bee hive with a stick to remove the bees and obtain honey. Conversely, leveraging local support and action, with a steady and consistently coordinated approach with State and federal support, is equivalent to the more cautious approach of an experienced beekeeper who understands bee behavior, prepares carefully, and moves slowly and steadily to complete the tasks at hand.

II. Climate Science Background

Rich Walter, ICF International

Scientific studies have demonstrated a causative relation between increasing man-made GHG emissions and a long-term trend in increasing global average temperatures. This conclusion is the consensus of the vast majority of climate scientists who publish in the field. The effects of past increases in temperature on the climate and the earth's resources are well documented in the scientific literature, which is best summarized in the Intergovernmental Panel on Climate Change (IPCC)'s periodic reports, the latest of which is the Fifth Assessment Report, released in 2014 (http://www.ipcc.ch/report/ar5/).

Modeling of future climate change with continued increase in GHG emissions indicates that net substantial adverse effects to both the human environment and the physical environment will increase with the rise in temperatures. Many scientific bodies around the world have concluded that avoiding the most severe outcomes of projected climate change will require keeping global average warming to no more than 2°C (3.5°F), relative to pre-industrial levels (or ~1 °C (2°F) above present levels). While remaining below these levels does not guarantee avoidance of substantial adverse effects, if these levels are exceeded impacts are projected to become more severe, widespread, and irreversible. It should be noted that a global average rise of 2°C means that the center of large continents, including North America, will see temperature increases twice this rate, with even larger increases in the Polar Regions.

In order to have an even[4] chance at keeping global average temperatures to these levels, the concentrations of GHGs in the atmosphere would likely need to peak below 450 ppm carbon dioxide equivalent (CO2e) (IPCC 2014). In order to have an even chance to stabilize GHG concentration at this level, global emissions would have to decline by about 50 percent (compared to 2000 levels) by 2050. Given the more limited capability of developing countries to limit their emissions in this period of rapid economic growth and expansion, estimates are that greenhouse gas emissions in industrialized countries, including the United States, would have to decline by approximately 80 percent (compared to 2000 levels). For the U.S., this target would correspond to approximately 78 percent below 1990 levels (Union of Concerned Scientists 2007). Some estimates assert that industrialized countries may have to reduce emissions by 80 to 95 percent compared to 1990 levels to provide for stabilization at the 2°C increase threshold (IPCC 2007).

The policy shorthand for these estimates has most commonly been a target for industrial countries to reduce their emissions by 80 percent below 1990 levels. This is the level referenced in Executive Order S-03-05, for example, for 2050 (see discussion below). The more short-term GHG reduction targets, such as the AB 32 State reduction target of reaching 1990 levels by 2020, are intended as interim steps to reverse the trend of ever-increasing GHG emissions, and to make substantial progress on the decades-long effort to reach long-term reductions needed by 2050.

[4] "Even" as in a 50 percent chance. In general, a variety of scientific studies, as summarized in the IPCC 2014 Fifth Assessment Report conclude that there is a 50:50 chance of keeping temperature increases below the 2°C/3.5°F increase threshold with GHG concentrations of 450 ppm CO2e.

III. Regulatory Setting

Rich Walter, ICF International; Cheryl Laskowski, Atkins.

In setting expectations for local GHG reduction planning beyond 2020, it is important to review the existing regulatory setting and how it may affect local GHG reductions from 2020 to 2050.

Legislation, Regulation and Other Guidelines

Executive Order S-03-05 (2005)

EO S-03-05 established the following GHG emission reduction targets for California's State agencies:

- 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.

Executive orders are binding only on State agencies and are not binding on local governments or the private sector. Accordingly, EO S-03-05 guides State agencies' efforts to control and regulate GHG emissions, but has no direct binding effect on local governmental or private actions. The Secretary of the California Environmental Protection Agency (CalEPA) is required to report to the Governor and State Legislature biannually on the impacts of global warming on California, on mitigation and adaptation plans, and on progress made toward reducing GHG emissions to meet the targets established in this executive order.

As described below in discussion of GHG litigation, EO S-03-05 has played a role in recent CEQA court cases in terms of determining the adequacy of GHG project analysis.

Assembly Bill 32-California Global Warming Solutions Act (2006)

AB 32 codified the State's GHG emissions target by requiring that California's global warming emissions be reduced to 1990 levels by 2020. Since its adoption, the ARB, CEC, CPUC, and the Building Standards Commission have all adopted regulations that will help meet the goals of AB 32.

The 2008 Scoping Plan for AB 32 identifies specific measures to reduce GHG emissions to 1990 levels by 2020, and requires ARB and other State agencies to develop and enforce regulations and other initiatives for reducing GHGs. Specifically, the Scoping Plan articulates a key role for local governments, recommending that they establish GHG reduction goals for both their municipal operations and their communities, consistent with those of the State.

The 2014 Update of the AB 32 Scoping Plan reviewed the status of progress toward meeting the AB 32 target for 2020, and it also presented priorities and recommendations for achieving longer-term emission reduction objectives. The 2014 Update includes discussion of a potential GHG reduction target for 2030 of 35 to 40 percent below 1990 levels, but does not specifically recommend a 2030 target, nor does it present an actual plan to achieve such reductions. The Update stipulates that emissions from 2020 to 2050 will have to decline several times faster than the rate needed to reach the 2020 emissions limit (from approximately 1 percent decline per year between 2010 and 2020 to over 5 percent per year between 2020 and 2050).

AB 32 also established the legislative intent that the statewide GHG emissions limit should endure, and should be used to maintain and continue reductions in GHG emissions beyond 2020. ARB is required to make recommendations to the Governor and the Legislature on how to continue reductions of GHG emissions beyond 2020; but it will take an act of the Legislature to legally establish binding statewide GHG emissions targets for the period beyond 2020.

Assembly Bill 1493: Pavley Rules (2002, Amendments 2009, 2012)

Known as "Pavley I," AB 1493 set the nation's first GHG standards for automobiles. AB 1493 required ARB to adopt vehicle standards that lowered GHG emissions from new light duty autos to the maximum extent feasible, beginning in 2009. Additional strengthening of the Pavley standards (previously referred to as "Pavley II," now commonly called the "Advanced Clean Cars" measure) has been adopted for vehicle model years 2017-2025. Together, the two standards are expected to increase average fuel economy to roughly 43 miles per gallon by 2020, and reduce GHG emissions from the transportation sector in California by approximately 14 percent. In June 2009, the EPA granted California's waiver request enabling the State to enforce its GHG emissions standards for new motor vehicles beginning with the current model year.

EPA and ARB worked together on a joint rulemaking effort to establish GHG emissions standards for model-year 2017-2025 passenger vehicles which would lead to a fleet average of 54.5 mpg in 2025.

There are currently no adopted standards for passenger vehicles for after 2025. However, the 2017 mid-term review for Advanced Clean Cars—where ARB, USEPA, and NHTSA will conduct a technical assessment of vehicle technology trends—will inform future light-duty vehicle standards targeted at continuing to achieve GHG emission reductions of about five percent per year through at least 2030.

Senate Bills 1078/107 and Senate Bill 2 (2011): Renewables Portfolio Standard

Senate Bills (SB) 1078 and 107, California's Renewables Portfolio Standard (RPS), obligates investor-owned utilities (IOUs), energy service providers (ESPs), and Community Choice Aggregations (CCAs) to procure an additional 1 percent of retail sales per year from eligible renewable sources until 20 percent is reached, no later than 2010. The California Public Utilities Commission (CPUC) and CEC are jointly responsible for implementing the program. Senate Bill 2 (2011) set forth a longer range target of procuring 33 percent of retail sales by 2020. There is no current RPS requirement for the period after 2020 and thus the 33 percent requirement would remain in place after 2020 pending additional legislation. The current policy affects only the proportion of energy derived from renewables and does not set absolute GHG emission reduction goals. If the other 67 percent of a provider's portfolio is derived from static sources, emissions should reduce over time, but there is no emissions reduction mandate from this standard.[5]

Executive Order S-01-07: Low Carbon Fuel Standard (2007)

EO S-01-07 mandates that (1) a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020; and (2) a Low Carbon Fuel Standard (LCFS) for transportation fuels be established in California. There is no LCFS requirement for the period after 2020 and thus the 10 percent requirement would remain in place after 2020 pending

[5] Since nuclear and large hydroelectric power are not considered renewable, variations in procurement of these sources of energy relative to fossil fuel-based sources could affect the total emissions from energy, even while achieving the RPS.

additional legislation. However, ARB has identified a priority in the 2014 AB 32 Scoping Plan Update to propose more aggressive long-term targets, such as a 15 to 20 percent reduction in average carbon intensity of transportation fuels below 2010 levels by 2030.

Senate Bill 375: Sustainable Communities Strategy (2008)

SB 375 establishes a planning process that coordinates land use planning, regional transportation plans, and funding priorities that would help California meet the GHG reduction goals established in AB 32. SB 375 requires regional transportation plans developed by metropolitan planning organizations (MPOs) to incorporate a "sustainable communities strategy" (SCS) in their Regional Transportation Plans (RTPs). The goal of the SCS is to reduce regional vehicle miles traveled (VMT) through land use planning and consequent transportation patterns. The regional targets were released by ARB in September 2010. SB 375 also includes provisions for streamlined CEQA review for some infill projects, such as transit-oriented development.

The current goals for VMT-GHG reductions identified by ARB are for 2020 and 2035. However, SB 375 calls for adopting additional goals periodically through 2050, which provides a mechanism for requiring future RTP/SCSs to continue reducing VMT-related GHG emissions all the way out to 2050. The current goals identified for VMT-GHG reductions are focused on reducing per capita VMT-related GHG emissions compared to a nominal 2005 baseline, but they do not mandate an absolute reduction in GHG emissions.

California Energy Efficiency Standards for Residential and Non-Residential Buildings: Green Building Code (2011), Title 24 Update (2014)

California has adopted aggressive energy efficiency standards for new buildings and has continually updated them for many years. In 2008, the California Building Standards Commission adopted the nation's first green building standards, which include standards for many other built environment aspects besides energy efficiency. The California Green Building Standards Code (proposed Part 11, Title 24) was adopted as part of the California Building Standards Code (24 California Code of Regulations [CCR]). Part 11 established voluntary standards that became mandatory in the 2010 edition of the code, including planning and design for sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and internal air contaminants. The voluntary standards took effect on January 1, 2011. The latest update of the Title 24 energy efficiency standards was adopted in 2012 and took effect on January 1, 2014. While there is no legal mandate that the energy efficiency standards be updated, given past practice, it is probable that Title 24 standards will be periodically updated up to and beyond 2020.

California Public Utilities Commission's Energy Efficiency Strategic Plan

The CPUC has adopted Zero Net Energy (ZNE) goals as part of its long-term energy efficiency strategic plan calling for ZNE for all new residential buildings by 2020, and ZNE for all new commercial buildings by 2030. While not a legal mandate, these goals will heavily influence the periodic updates of the California Building Standards under Title 24.

Greenhouse Gas Cap-and-Trade Program (2013)

On October 20, 2011, ARB adopted a cap-and-trade program for California, which has created a market-based system with an overall emissions limit for affected sectors. The program proposes to regulate more than 85 percent of California's emissions, and will stagger compliance requirements according to the following schedule: (1) electricity generation and large industrial sources (2013); (2) fuel combustion and transportation (2015). The first auction occurred in late 2012 with the first compliance year in 2013. The cap-and-trade program is implemented in support of AB 32. Beyond 2020, the cap-and-trade program is likely to continue to be implemented. Without additional legislation, the legal authority for the cap-and-trade program would be limited to maintain State GHG emissions levels at 1990 levels.

CEQA Guidelines (2010)

The CEQA Guidelines require lead agencies to describe, calculate, or estimate the amount of GHG emissions that result from discretionary projects in their CEQA document. Moreover, the CEQA Guidelines emphasize the need to determine potential climate change effects of a given project and propose mitigation as necessary. The CEQA Guidelines confirm the discretion of lead agencies to determine appropriate significance thresholds, but require the preparation of an environmental impact report (EIR) if "there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with adopted regulations or requirements" (Section 15064.4).

The guidelines were updated in 2010 to address GHG emissions. CEQA Guidelines Section 15126.4 includes considerations for lead agencies regarding feasible mitigation measures to reduce GHG emissions, which may include (1) measures in an existing plan or mitigation program for the reduction of emissions that are required as part of the lead agency's decision; (2)implementation of project features, project design, or other measures which are incorporated into a project to substantially reduce energy consumption or GHG emissions; (3) offsite measures, including offsets that are not otherwise required, to mitigate a project's emissions; (4) measures that sequester carbon or carbon-equivalent emissions, and/or (5) other possible measures.

CEQA GHG Thresholds

A number of air districts have adopted CEQA guidelines including GHG thresholds used for stationary source permitting. Some air districts have also adopted guidelines with recommended (but not binding) GHG thresholds for use in jurisdictions within the air district for land use projects. The County of San Diego has also developed GHG thresholds for use by the County for projects under its jurisdiction.

The methodologies for the different thresholds vary, and may include some or all of the following: (1) mass emissions "bright-line" thresholds; (2) percent reductions below a Business as Usual (BAU) level; (3) efficiency-based thresholds; (4) compliance with a qualified GHG reduction strategy; and (5) Best Management Practices (BMP). Some of the district thresholds include multiple options.

All of the adopted CEQA GHG thresholds are based on the reduction targets in AB 32. None of the adopted CEQA GHG thresholds address reductions targets beyond 2020 or out to 2050.

General Plan Guidelines

The existing California General Plan Guidelines were last comprehensively updated in 2003. A supplement on Community and Military Compatibility Planning was published in 2009 and updated in 2013, and a supplement on Complete Streets and the Circulation Element was published in 2010. The existing 2003 guidelines and military compatibility supplement are silent on the subject of GHG emissions and climate change. The complete streets and circulation element supplement does mention that reducing VMT is an important aspect of meeting the State's GHG reduction effort, but does not elaborate on or describe any specific GHG reduction efforts.

The Office of Planning and Research (OPR) is presently working on an update to the General Plan Guidelines. The update was planned for release in 2014 for public review, but as of March 2015 it has not yet been released. The update is expected to include an extensive overview of the required general plan elements including tips for compliance, best practices, and data resources. In addition to the currently required mandatory elements, the update will reportedly focus on four key areas: Economics, Equity, Climate Change, and Healthy Communities.

OPR-recommended policies in the update will reportedly focus on implementing the vision of the State's "California's Climate Future"—the Governor's Environmental Goals and Policy Report (EGPR)—for which a discussion draft was released 2013. The EGPR acknowledges the AB 32 target and the EO S-03-05 2050 target, and calls for a mid-term emissions reduction target. The EGPR asserts that comprehensive policy approaches are needed to achieve the State's climate change emission reduction and readiness goals, and it identifies five key elements that will make up the State's plan to meet the challenge of climate change.

- Decarbonize the State's energy and transportation systems;
- Preserve and steward the State's lands and natural resources;
- Build sustainable regions that support healthy, livable communities;
- Build climate resilience into all policies; and
- Improve coordination between agencies and improve data availability.

As the General Plan Guidelines update is intended to help implement the EGPR, one can expect additional policy recommendations for general plans in terms of each of these five areas. For example, the EGPR calls for alignment of local general plans with regional sustainable communities strategies (where they exist). The EGPR also calls for environmental metrics to be incorporated at the State, regional, and local level.

OPR also includes a web portal on a "Climate Change/Global Warming Element" that is identified as optional.[6] OPR describes that existing general plan law provides many opportunities for local governments to address climate change, and that many existing general plan policies already reduce GHG emissions and prepare for the impacts of climate change. These existing policies and programs can provide a starting point for communities as they develop comprehensive plans to reduce GHG emissions and consider adaptation strategies. OPR also describes that the general plan structure allows cities and counties to align GHG emission reduction efforts with other community goals, thereby strengthening the long-term sustainability and resiliency of the community and the State.

[6] http://www.climatechange.ca.gov/action/cclu/output2.php?gpElmt=climateChngGlbl

Another resource for city and county planners is the CAPCOA report on Model Policies for Greenhouse Gases in General Plans (CAPCOA 2009). It discusses general plan structure and options for including GHG policies in existing general plan elements, or for creating a separate GHG Element and/or GHG Reduction Plan. The Model Policies Report contains a menu of model language for inclusion in the general plan element(s). The report does not dictate policy decisions; rather, it provides cities and counties with an array of options to help them address GHGs in their general plans.

There have been rumors that the General Plan Guidelines will include much more ambitious recommendations for local jurisdictions in terms of integrating climate change concerns (both mitigation and adaptation), but the extent to which such efforts are required or merely optional within future general plans remains to be seen.

Recent San Diego CEQA Court Rulings

Two 2014 decisions by the California Fourth Appellate District underscore the uncertainty of analyzing GHG emissions under CEQA, and the need for additional guidance in the post-2020 period.

Cleveland National Forest Foundation et al. v. SANDAG

In October 2011, SANDAG adopted the 2050 Regional Transportation Plan and Sustainable Communities Plan (RTP/SCS). The RTP/SCS was the first Regional Transportation Plan that included a Sustainable Communities Strategy, and the first to include the regional per capita VMT-related GHG reduction targets for the passenger and light-duty vehicle sector required under Senate Bill 375 for 2020 and 2035. Subsequently, Cleveland National Forest and the Center for Biological Diversity filed a petition claiming that the SANDAG EIR certifying the RTP/SCS was inadequate.

The petitioners claimed that SANDAG failed to properly analyze (among other issues) GHG impacts. The EIR analyzed GHG emissions and concluded that the RTP/SCS would meet the per capita reduction goals identified by the SB 375 mandate. The EIR concluded that the RTP/SCS would result in a net reduction in VMT-related GHG emissions for 2020, and would not conflict with AB 32. The RTP/SCS included projects beyond 2020 and the EIR disclosed an increase in GHG emissions post-2020.[7] However, the EIR claimed that there were no adopted targets or plans beyond those in AB 32 and SB 375, and therefore concluded that the RTP/SCS did not conflict with any plans to reduce GHG emissions. In 2012, the trial court ruled that the EIR was "impermissibly dismissive of Executive Order S-03-05" in failing to analyze how the RTPs/SCS 2050 GHG emissions related to the 2050 goal of the Executive Order, and in failing to adequately consider transportation mitigation measures accordingly.

SANDAG appealed the lower court decision and in November 2014, a three-judge panel from the Fourth Appellate District issued a two-to-one finding upholding the lower court decision, concluding that the EIR violated CEQA. The majority opinion held that the EIR failed to analyze the impact of the RTP/SCS GHG emissions over time (including its increase over baseline emissions by 2050) on the ability of the State to meeting the 2050 GHG reduction target in EO S-3-05. Of particular interest, the

[7] The EIR indicated that transportation emissions were 14.33 million MT CO2e in 2010 (baseline) and would be 12.04 MMTCO2e in 2020, 12.94 MMTCO2e in 2035, and 14.74 MMTCO2e in 2050 with implementation of the RTP/SCS and State adopted transportation regulations (LCFS + Pavley). The EIR actually disclosed a significant and unavoidable impact for 2050 emissions but did not specifically make any findings relative to consistency with Executive Order S-3-05 which the court took issue with.

majority opinion stated that it did not intend to suggest that the RTP/SCS must achieve the EO's 2050 goal, or any other specific numeric goal, but rather that the EIR should have analyzed consistency with the 2050 goal, including consideration of mitigation. The minority opinion asserted that the EO S-3-05 does not, as argued by SANDAG, constitute a mandate or threshold of significance, as it was not passed by the Legislature. The minority opinion asserted that EO S-3-05 does not have an "identifiable foundation in the constitutional power of the Governor or in statutory law." The minority opinion also described the substantial difficulties in determining a regional fair-share of GHG emissions in the absence of a legislative GHG reduction target for 2050, or without a State plan to achieve any such target.

In December 2014, SANDAG voted to appeal the decision to the California Supreme Court and the Supreme Court decided in March 2015 that it would hear the appeal.

San Diego CAP Lawsuit

In 2011, the County of San Diego prepared and adopted a General Plan Update and Programmatic EIR (PEIR). In the PEIR, mitigation measure (MM) CC-1.2 stated that the County would prepare a CAP to reduce emissions to a less than significant finding. In June 2012, the County of San Diego Board of Supervisors adopted a CAP and GHG significance thresholds, and prepared an addendum to the PEIR as its environmental document. The Sierra Club sued, arguing that the CAP did not comply with MM CC-1.2; that it failed to meet the requirements for adopting thresholds of significance for GHGs; and that it should have been reviewed in a separate EIR document, not an addendum.

In 2013, the Superior Court (the same judge as presided in the trial court of the SANDAG case) ruled in favor of the petitioners, stating that a supplemental EIR was the appropriate environmental document and the CAP did not contain sufficient enforcement rigor for reducing GHG emissions. The County appealed the ruling and in 2014 the Fourth Appellate District affirmed the earlier finding, agreeing the CAP was inadequate by not complying with the requirements of MM CC-1.2. The decision notes that "[t]he County cannot rely on unfunded programs to support the required GHG emissions reduction by 2020;" the "CAP contained no detailed deadlines…acknowledg[ing] that it will not be effective unless it is updated;" and that "the County made an erroneous assumption that the CAP and Thresholds project was the same project as the general plan update." Further, the Court noted that 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." This conclusion, in the Court's opinion, was based in part on the fact that the CAP, which was limited to meeting a 2020 reduction target, did not address the need to further reduce emissions after 2020 sufficiently to support meeting the 2050 target in EO S-3-05.

In December 2014, the County voted to appeal the decision to the California Supreme Court. The Supreme Court decided, in March 2015, to not hear the appeal. Thus the appellate court ruling can be cited as precedent in other CEQA cases. However, since the Supreme Court decided to hear the SANDAG appeal, the Supreme Court may rule on the issue surrounding EO S-3-05 and the 2050 target which could overrule the precedent in the appellate court ring in the San Diego CAP ruling.

Implications of the San Diego Court Rulings

The SANDAG decision marked the first time a California court held that a CEQA lead agency must analyze consistency with EO S-03-05 to have an adequate analysis of GHG emissions; however, this

goal was reaffirmed in the San Diego County CAP case. The SANDAG ruling raises a number of questions, including:

- *How should plans analyze emissions beyond 2020?* The court decision did not explicitly state that the EO constituted a threshold, but suggested that the increase in emissions beyond 2020 would be inconsistent with the EO. There is ambiguity in whether maintaining emissions at 2020 levels, ongoing reductions post-2020, or strict compliance with a 2050 target would demonstrate consistency with the intent of State policy through 2050. In the opinion of the dissenting judge in the SANDAG case, this is a role for the Legislature, not the courts.
- *If a plan is consistent with AB 32 but cannot conclude consistency with the EO, can that plan conclude a significant impact?* For CAPs currently being developed, jurisdictions usually demonstrate compliance with AB 32. Some also show reductions beyond 2020, but none have a fully funded plan to achieve 2050 reductions consistent with the EO. If the plan is not consistent with the EO, can the CAP be considered a GHG reduction plan under CEQA Guidelines Section 15183.5? If not, jurisdictions may be dissuaded by the cost of preparing a CAP without the incentive of CEQA tiering from the CAP for individual projects.
- *What are the implications for long-term planning?* As noted by the court, SANDAG was not required to plan out to 2050 in its RTP/SCS. Should agencies avoid long-term planning to avoid the uncertainty in GHG emissions? Near-term GHG reduction goals are easier to attain, due to State and federal legislation to reduce emissions from energy and transportation sectors. Agencies preparing general plans, CAPs, RTPs, and other programmatic documents may opt for shorter planning horizons to feasibly analyze GHG impacts and identify reasonable mitigation measures. For certain documents this approach may work well; however, long-range planning has been used in California to identify goals and policies that guide the physical, economic, and social development of communities or agencies. Identifying major development goals and projects can be beneficial, even for long-term GHG reduction planning, and shortening a planning time could be detrimental. What horizon year would be appropriate is not clear.

The San Diego CAP decision reiterates these questions and also brings new questions to light:

- *What level of enforcement must be demonstrated for GHG reduction measures included in a CAP?* Many CAPs rely solely or primarily on voluntary actions to be taken in conjunction with education and outreach programs, financially incentivized programs, and coordination with agencies that affect emissions within a jurisdiction. Numerous studies demonstrate that reductions can be attained through non-mandatory participation; however, the decision suggests that these may not constitute sufficient evidence for assuring GHG reductions. In addition, suggesting that a CAP cannot rely on unfunded programs would likely eliminate many of the anticipated projects included in a CAP. Certainly this impedes conducting an analysis for reducing emissions over the long term, as most jurisdictions do not have funding identified over the span of several approaching decades.
- *What level of monitoring would be adequate to demonstrate enforceability?* The CAP recognized that some measures may fall short of their anticipated reductions, and therefore the CAP should be updated to account for shortfalls. The CAP also included an annual monitoring and reporting program. However, the CAP did not set a specific timeline for revision, should shortfalls be found. Many CAPs do include language to update the CAP "prior to 2020," but this may be open to scrutiny if the update is not completed adequately prior to 2020 to ensure a 2020 target can be met.

IV. The 2050 Reduction Challenge

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In order for a local jurisdiction to understand its role in reducing GHG reductions, it is fundamental to understand the potential economic, technological, and regulatory scenarios shaping GHG reductions in the post-2020 period. Academic, government agency, and other research on potential pathways for California to achieve 2050 reduction goals are summarized in this section.

2050 Scenarios

Potential 2050 scenarios from a variety of studies are summarized below. One study (Greenblatt and Long 2012) is reviewed in detail to illustrate some of the variables that drive future scenarios. A comparison of future scenarios overall is then provided based on a recent UC Davis study (Morrison et al. 2014). Subsequent scenarios are reviewed more briefly than the more detailed presentation of Greenblatt and Long (20120), but similar discussion of key drivers can be found in the source study documentation.

California's Energy Future: The View to 2050

Greenblatt and Long (2012) analyzed changes in California's energy systems that would be necessary to reduce emissions to 60 percent and 80 percent below 1990 levels by 2050.

The authors first analyzed what would be needed to achieve a level 60 percent below 1990 levels using energy systems technologies that are available or in demonstration today as summarized below.

- **Increase Efficiency**. All buildings would either have to be demolished, retrofitted, or built new to very high efficiency standards. Vehicles of all sorts would need to be made substantially more efficient. Industrial processes would need to advance beyond technology available today.
- **Require Electrification**. Widespread electrification wherever technically feasible would be required, through the use of hybrid or all-electric vehicle drivetrains, heat pumps for space and water heating, and specialized electric heating technology (microwave, electric arc, etc.) in industrial applications.
- **Use Low Carbon Electricity**. The demand for electricity generation would have to be met with combinations of nuclear energy, fossil fuels with carbon capture and sequestration (CCS), and renewable energy. Emissions from balancing supply and demand at all temporal and spatial scales would also need to be considered.
- **Use Low Carbon Fuels**. As much as possible, the demand for fuel would need to be met with low net lifecycle GHG biofuels.

The authors concluded that with these four strategies it would be technically possible to achieve reductions approximating 60 percent below 1990 levels. However, there are some substantial challenges to implementing these strategies, as explained below:

- **Electricity Supply**. At present, it is illegal to expand nuclear power in California unless a solution to the permanent storage of nuclear waste is resolved. CCS has not been successfully deployed at scale, and is best considered experimental at this time. Scenarios with high fractions of wind and solar energy create more severe challenges for load balancing (i.e., providing power when the wind isn't blowing or the sun isn't shining).
- **Electricity Load Balancing**. Load balancing becomes a more critical issue with increased electrification and increased use of intermittent renewable energy sources. At present, the most feasible load balancing source is natural gas. As a fossil fuel, increased use of natural gas will frustrate emission reduction goals in time. Zero emissions load balancing (ZELB) technologies include electricity storage, flexible demand management, and possibly other strategies. Greenblatt and Long did not analyze the likelihood of achieving any particular technology for accomplishing ZELB, and this issue was identified as clearly deserving of further study.
- **Biomass Fuel Supply**. For transportation and stationary uses that cannot be electrified, Greenblatt and Long state that a substantial increase of biomass-produced fuels will be needed. They estimate that perhaps 13 to 42 percent of the median supply needed could be met from California waste products, crop residues, and use of marginal lands with the remainder from out-of-state and out-of-country sources. The authors note there is substantial uncertainty as to the worldwide supply of biomass fuels and also in calculating GHG intensities for biofuels.

In analyzing what would be needed to achieve a level 80 percent below 1990 levels, Greenblatt and Long examined more radical measures beyond those discussed above in the 60 percent scenario. They list the following ten strategies that could reduce emissions by 80 percent:

- Develop the technology to make CCS 100 percent effective and economical.
- Eliminate fossil fuels with CCS from the electricity mix, and rely only on nuclear energy, renewable energy, or a combination of these sources for making electricity.
- Increase the amount of load balancing that is achieved without emissions from 50 percent to 100 percent.
- Produce biomass with net zero carbon emissions by eliminating net emissions from land use change.
- Reduce energy demand through ubiquitous behavior change.
- Produce hydrogen fuel (from coal with CCS) and use it to reduce fuel and electricity use.
- Burn all domestic biomass with CCS to make electricity with net negative GHG emissions, creating an offset for the required fossil fuel use.
- Increase the supply of sustainable biomass twofold, and use it to make low-carbon biofuels, using feedstocks that best fit efficient conversion to the needed energy mix.
- Gasify coal and biomass together with CCS, and use it to make low-carbon fuels plus some electricity.
- Using CCS, convert biomass to fuels (plus some electricity) with net negative GHG emissions, creating an offset for the required fossil fuel use.

Only the last three strategies are sufficient, on their own, to achieve the 80 percent reduction target (on top of the 60 percent measures). There are myriad theoretical combinations that could achieve the 80 percent reduction target. The authors stress that "the challenges are great for implementing even one of these strategies, let alone several." As an example of the magnitude of challenges, the authors note that, "It is possible to conceive of biomass-derived energy without disastrous impacts on food supply, if the biomass for energy production is limited to marginal lands, wastes and off-season cover crops, but this is not something to take for granted." Another example of challenges the authors describe is that "the widespread availability of CCS is not a foregone conclusion; much development work remains to be done."

As should be evident from this review above, the changes needed statewide are substantial and severe and would represent fundamental change in California's energy system—many of which are outside the jurisdiction of individual cities and counties.

Summary of Other 2050 Scenario Studies

Several other research groups have built integrated energy planning models for California that estimate the future trajectories of technologies, fuels, infrastructure, and/or economic impacts (ARB-VISION – ARB 2012; BEAR-Roland-Holst 2008; CCST – Greenblatt and Long 2012; PATHWAYS - Williams et al. 2012; CALGAPS - Greenblatt 2014; WWS - Jacobson et al. 2014; SWITCH - Nelson et al. 2014; LEAP - Wei et al. 2014; and CA-TIMES - Yang et al. 2014). Morrison et al. (2014) reviewed these studies in detail and the summary below draws directly from their work.

Across models, the BAU 2050 scenarios have a wide range of emissions. The models with the highest BAU GHG emission are those with the highest population and income assumptions. Higher BAU GHG emission means more effort would be necessary to reach the 2050 goals. In scenarios that achieve deep reductions in GHGs by 2050, the GHG emissions with policy interventions also vary widely. Achievable emissions for 2030 in these studies ranged from 8 to 49 percent below 1990 levels and 2050 emissions ranged from 59 to 84 percent below 1990 levels (Morrison et al. 2014).

There are various factors driving the differences between the scenario results. For example, forecasts for market adoption of technologies are based on a diversity of methods. The adoption rate is typically related to an underlying technology review of the literature or forecasts, but the method of application varies. Optimization models also have an additional set of factors that drive their GHG reductions, including the relative costs of mitigation, discount rate, the design of optimization algorithms, and other factors.

Power Sector

Between 2001 and 2013, electricity generation in California (including both in-state and net imports) increased from 267 Terrawatt-hours (TWh) to 296 TWh, and the corresponding renewable fraction of generated energy increased from 14 to 20 percent. Across BAU scenarios modeled in the various long-term scenario studies noted above, the total power generation from in-state and imported electricity ranges from 356 to 389 TWh by 2030, and 429 to 518 TWh by 2050 (Morrison et al. 2014). These results reflect both an increased demand for electricity as well as increased electrification of uses, such as an increased transportation use of electricity.

Renewables

A common result across the long-term reduction scenarios is that the electricity grid shifts towards renewable generation—particularly after 2030—and most end-uses are electrified by 2050. Because some sectors cannot be electrified or are difficult to decarbonize (such as aviation, marine, heavy duty road freight, etc.), GHG emissions from the electricity grid will likely need to be reduced beyond 80 percent to support an overall goal for all sectors of 80 percent below 1990 levels. Across different scenarios, the renewable portion of total generation ranges from 30 to 85 percent by 2030, and 38 to 100 percent by 2050, with the majority of new generation coming from wind and solar. In general, the lower values in these ranges reflect scenarios with greater nuclear and/or CCS use (Morrison et al. 2014).

Nuclear and CCS

California has only one operational nuclear power plant (Diablo Canyon) providing 2.1 GW of power to the State. The permit for the facility expires in 2024 but can be renewed. No new nuclear power plants are under construction or planned. Scenario models differ in their representation of future nuclear power. CCS also has diverse representation across models. All models have at least one scenario with natural gas CCS and some also have coal CCS (Morrison et al. 2014).

Growth Rate of Power Grid

Across scenarios, the implied buildout rate of in-state plus imported renewable electricity (mostly solar and wind) ranges between 0.2 to 4.2 GW per year from 2013 until 2030, with an average of 0.8 GW per year. The renewable build-out rate increases to between 1.5 to 10.4 GW per year from 2030 until 2050, with an average of 3.9 GW per year (Morrison et al. 2014). For perspective, from 2001 to 2013 the renewable capacity used by the State (in-state and imported electricity) expanded by 0.7 GW per year, while non-renewable capacity expanded by 1.6 GW per year (CEC 2014).

Electricity Imports

Models vary in their assumptions about imports, with some assuming California remains a net electricity importer, and others assuming electricity imports are phased out; still others make assumptions about the electricity mix out of State or are neutral regarding the locations of electric generation plants needed to meet California's demand (Morrison et al. 2014).

Passenger Transportation Sector

A standard practice among transportation energy models is to make assumptions about future energy service demand (e.g., statewide VMT) and then allow the model to estimate future fuel mix, vehicle/technology mix, and emissions. The models reviewed by Morrison (2014) all follow this practice. The lower the future demand assumptions, the less the need for low-GHG emitting fuels (Morrison et al. 2014).

For example, in the reduction scenarios cited above, statewide VMT for light-duty vehicles is assumed to change from 293 billion miles per year in 2010 to 226 to 600 billion miles per year in 2050. The range of the various VMT assumptions is a resultant wide variation in the projected energy mix (Morrison et al. 2014).

Total light-duty vehicle energy drops from 2010 to 2030 and again from 2030 to 2050 in deep reduction scenarios in most scenarios due to (1) underlying assumptions about energy service

demand decreases in future years, and (2) the improved efficiency of light duty vehicle technology. Across the studied scenarios, petroleum consumption declines 39 to 59 percent by 2030 and 58 to 100 percent by 2050 as the light-duty-vehicle fleet moves primarily to battery electric, plug-in hybrid electric, and hydrogen fuel cell vehicles (although the composition and magnitude of change varies between scenarios). Regardless of the exact fleet composition, hydrogen and electricity with near-zero life-cycle GHGs (e.g., from wind, solar, biomass, natural gas with CCS) is needed to power virtually all of the light-duty vehicle fleet by 2050 (Morrison et al. 2014).

Local jurisdictions have a key role in influencing VMT outcomes given their control over local land use and their influence over placement of new development relative to transit systems.

Contribution from Bioenergy

Across most models reviewed by Morrison et al. (2014), between 4 to 15 billion gallons of gasoline equivalent (BGGE) are available in 2050, up from about 1.0 BGGE today. Most models make simple assumptions regarding the carbon content of bioenergy. Across the scenarios reviewed, bioenergy accounts for a maximum of about 40 percent of transportation energy in 2050. Not all long-term energy modeling assumes that large quantities of biofuels are needed in the transportation sector. The WWS model, for example, presents a vision of 2050 without bioenergy, relying instead on battery electricity and hydrogen for the transportation sector (Morrison et al. 2014).

Non-CO2 Emissions

The relative contribution of non-energy and High Global Warming Potential (HGWP) GHGs to overall emissions levels is likely to increase in the coming decades. Greenblatt (2014) and Wei et al. (2013) find that, absent further policy, these emissions could exceed the 2050 emission goal even if all other emissions are zero (Morrison et al. 2014).

Economic Impacts of Deep GHG Reductions

The economic impact of deep GHG reductions varies greatly across the studies reviewed both in terms of what is assumed and of what is estimated. For those studies that include an estimate of technology costs, the results vary due to assumptions regarding technology availability, costs, learning curves, discount rates, and policy actions. In general, while initial technology and energy infrastructure investment costs are expected to increase in some sectors, the statewide investment in energy efficiency is expected to provide financial savings that can be invested back into the State economy, providing overall economic benefits. Improving energy efficiency also reduces costs to the State by reducing the need to build new power plants or new refineries (Morrison et al 2014).

Estimates of average carbon mitigation cost in dollars per ton of CO2e ($/tCO2e), all converted to 2013 dollars) vary between models, across sectors, and over time. For example, in the CA-TIMES mitigation costs are estimated by technology and year, and range from -$75/tCO2e to +$124/tCO2e between 2010 and 2050. Williams et al. (2012) estimated an average mitigation cost across from 2010 to 2050 of $90/tCO2e (Morrison et al. 2014). For perspective, in California's cap-and-trade program, prices since inception of the program have ranged from $12 to $24/tCO2e.

Valuable co-benefits (e.g., improved air quality, health benefits, etc.) are not captured in many of these estimates. For models that include macro-economic feedback, calculate net savings, or include full accounting of social costs, savings have the potential to offset most or all of the increased technology costs (Morrison et al. 2014).

Case Study of Local 2050 "Gap Analysis:" Sonoma County

ICF International, working for the Sonoma County Regional Climate Protection Authority (RCPA), has completed GHG inventories, forecasts, and future scenario analysis for Sonoma County jurisdictions for potential county GHG emissions from 1990 out to 2050, as part of RCPA's Climate Action 2020 initiative.

1990 and 2010 emissions are based on GHG inventories for those years. 2020 BAU emissions are based on trends in GHG emissions local to the county including the local and regional GHG reduction measures already in place by 2010, as well as on the effect of adopted State emission reduction measures. Future 2040 and 2050 BAU GHG emissions projections are based on forecasted population, employment, and other socioeconomic factors beyond 2020 but exclude any additional State measures beyond those already adopted and any local and regional reduction measures.

ICF conducted a scenario analysis for 2040 and 2050 using two different reduction scenarios based on the work of Greenblatt (2013). The first scenario includes only committed State policies that have been adopted based on Greenblatt (2013) Scenario 1. The second scenario includes State policies that have been considered but are not yet adopted, as well as potential technology and market futures based on current proven technologies, based on Greenblatt (2013), Scenario 3. The second scenario does not rely on any unproven technologies or assumptions about markets or personal behavioral shifts that are thought to be infeasible.

As shown in Figure 1 below, in 2050, based on current committed State policies alone, Sonoma County would have emissions approximately 20 percent below 1990 levels, leaving an additional 60 percent reduction to reach the 80 percent below 1990 level target. As shown in Figure 2 below, in 2050, based on uncommitted State policies and assumptions about technology and market futures, Sonoma County jurisdictions would have emissions approximately 65 percent below 1990 levels, leaving an additional 15 percent reduction to reach the 2050 target.

Based on GHG reduction planning experience with local cities and Counties to date, the local gap beyond State policies to meet the AB 32 2020 target is usually somewhere between 25 and 33 percent, depending on the jurisdiction. What the Sonoma County scenario analysis shows is that the local gap for 2050 is highly dependent on future State (and/or federal) policy actions as well as technological development and market conditions, which will vary substantially from current conditions.

The RCPA and Sonoma County as a whole are examining a regional goal of 25 percent below 1990 for 2020 as part of the current Climate Action 2020 effort. In both Figure 1 and Figure 2 below, the "Sonoma County Path to 2050" shows the effect of the regional goal for 2020 and the substantial contributions that will need to be made by local measures to meet such a goal. Achieving such a goal would place the County in a better position on the path toward 2050 than would simple compliance with the AB 32 goal of 1990 emission levels by 2020.

1

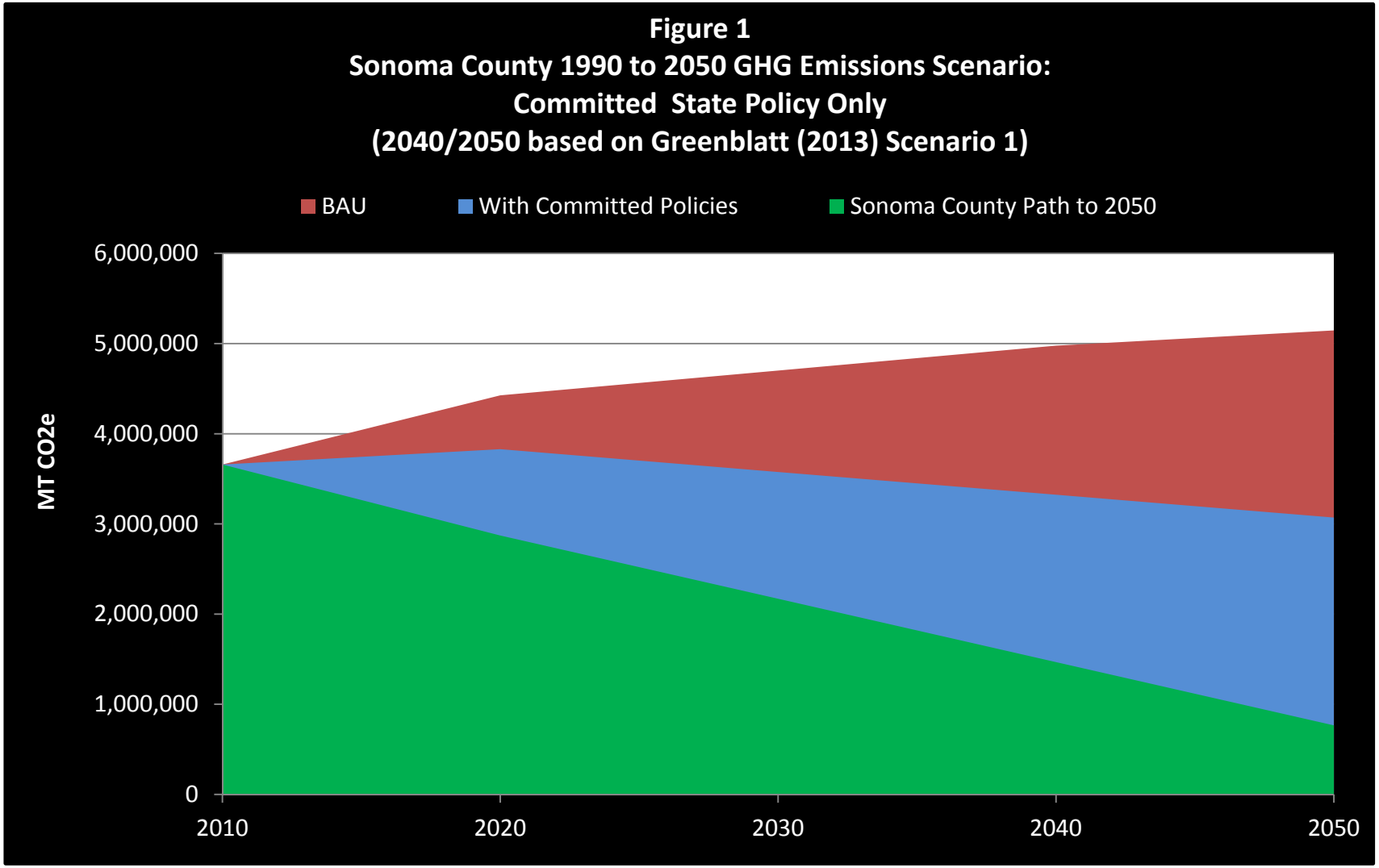
Figure 1
Sonoma County 1990 to 2050 GHG Emissions Scenario:
Committed State Policy Only
(2040/2050 based on Greenblatt (2013) Scenario 1)
BAU
With Committed Policies
Sonoma County Path to 2050
MT CO2e
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
2010
2020
2030
2040
2050

2
3

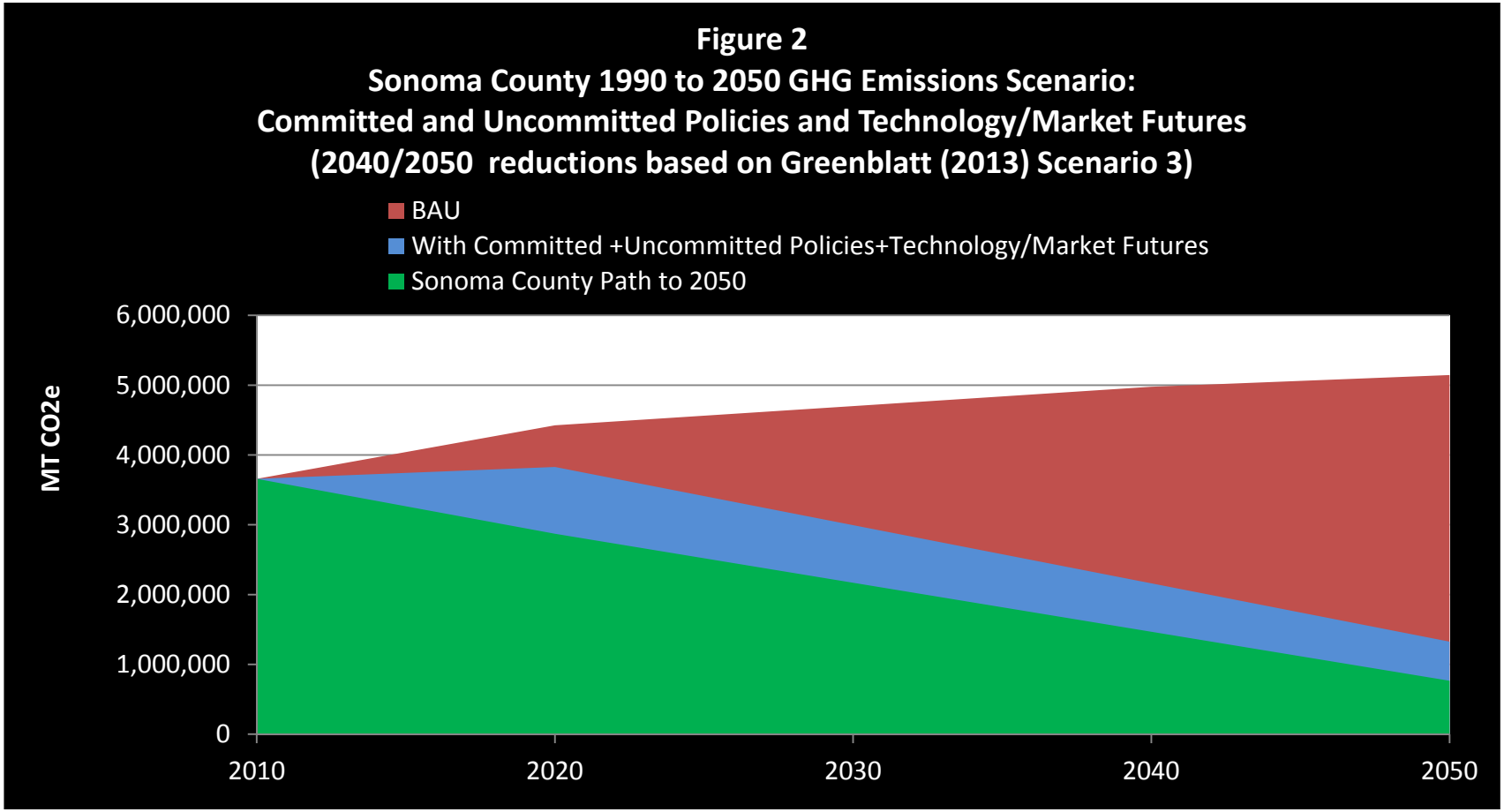
Figure 2
Sonoma County 1990 to 2050 GHG Emissions Scenario:
Committed and Uncommitted Policies and Technology/Market Futures
(2040/2050 reductions based on Greenblatt (2013) Scenario 3)
BAU
With Committed +Uncommitted Policies+Technology/Market Futures
Sonoma County Path to 2050
MT CO2e
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
2010
2020
2030
2040
2050

Post-2020 Transportation Considerations

Regional and local transportation agencies routinely engage in the analysis of post-2020 scenarios in conjunction with long-range planning efforts. Regional agencies such as Metropolitan Planning Organizations (MPOs) plan infrastructure 20 to 30 years in advance using a variety of analytical tools. These long-range infrastructure plans are reflected in the RTPs that guide long-term transportation investment. Local government agencies engage in similar forecasts at the city-level through activities such as the preparation of general plans.

Agencies preparing these long-range forecasts often face three challenges, which introduce a high-level of uncertainty in the process:

- Uncertainty in the preparation of long-term demographic forecasts, which are a key input into any long-range transportation forecasts. Population and employment forecasting, particularly at the citywide level, often require assumptions with a high potential for substantial error.
- Uncertainty regarding transportation costs, which is a key input for travel forecasting. As an example, one can simply look at the history of fuel costs over the past 10 years. In 2008, the national average gas price increased to over $4 per gallon, decreasing in the subsequent year to $1.50, and then increasing to almost $4 again in 2011, with late 2014/early 2015 decreases to close to $2, and a following steady increase in gas prices. Given these changes, it is challenging for any agency to forecast one of the major inputs towards transportation behavior.
- Uncertainty regarding technological innovation. For much of the past 100 years, transportation technology has been focused on automobiles that are manually driven. Within the last 5 years, there have been substantial innovations related to the use of technology for ride sharing through companies like Uber and Lyft. These riding sharing applications have the potential to affect decisions to own and operate automobiles. Another change with an even larger potential for disruption relates to the deployment and use of autonomous and connected vehicles. All of the current automobile manufacturers are currently testing autonomous vehicles for retail sale. The Victoria Transportation Policy Institute (VTPI) predicts that by 2050 nearly half of the total vehicle fleet will be autonomous vehicles. This change is important since autonomous vehicles have the potential to substantially change travel patterns and infrastructure performance. Autonomous vehicles have the potential to operate with substantially reduced headways and increased travel speeds, resulting in far greater roadway capacities.

The typical approach within a transportation study when faced with uncertainty is to develop well-reasoned and documented assumptions for all key input variables. These input variables are then evaluated using robust mathematical models to produce long-range demand forecasts. This same general approach has been applied for 50 years, but only recently have planners made a substantial effort to verify the accuracy of their forecasts. A study of nearly 100 forecasts for roadway, tunnel, and bridge projects commissioned by Standard & Poor (published in Traffic Technology International) determined that the travel forecasts were generally off by an average of 20 to 25 percent when compared to the post-construction traffic counts (Bain 2011). In some instances, the forecasts were less than 80 percent of the observed post-construction traffic volumes based on this same study (Bain 2011)

Because of the uncertainty noted above, it may be tempting to treat post-2020 transportation forecasts in a cursory manner. This approach could be justified by citing the challenges and difficulties in developing reasonable forecasts, but it would be an attempt to sidestep uncertainty rather than embrace it. An alternative approach would be to embrace uncertainty through the use of alternative scenarios that reflect possible changes in variables. Rather than generate a single future estimate of travel demand, a study would instead produce some variation of a low, medium, and high forecast. This approach would provide a range of results which would essentially bracket potential outcomes.

Implications of Post-2020 Scenario Analysis for Local Climate Action Planning

2050 scenario analysis, the Sonoma County case study, and review of transportation forecasting challenges summarized above highlights how achieving deep GHG emission reductions in the State will require a coordinated effort across all sectors of the economy. In nearly all the deep reduction scenarios, the rate of transition—such as deployment of better vehicles or renewable electricity—exceed the historical rates of change in the State.

Potential rates of progress overall (as well as by sector) vary widely in the studies completed to date. In addition, there are inherent uncertainties associated with long-term forecasting. This adds uncertainty for local jurisdictions seeking to understand their role in GHG reductions in a context of changing technologies, energy/technology prices, economic conditions, and regulations.

There is no uniformly accepted source for GHG forecast assumptions and methodology. Future regulations beyond those adopted to support the AB 32 target are uncertain, and thus local jurisdictions at this time can only guess at the actual regulations that may or may not be adopted.

Given this range of uncertainty, which increases as one proceeds further in the post-2020 period, local GHG reduction planning will need to include a range of potential scenarios in order to understand the varying role of local GHG reductions compared to those due to State and federal policy.

Local Climate Action Planning Examples beyond 2020

There are a number of jurisdictions that have already begun planning for GHG reductions beyond 2020. A few examples are presented below.

San Diego County Climate Action Plan

San Diego County adopted a CAP in 2012 that included an analysis and GHG reduction measures to reduce County emissions to 17 percent below 2005 levels by 2020 (San Diego County 2012). Although the CAP has been put on hold reflecting the court ruling in the CEQA lawsuit related to the CAP, the analysis in the CAP of emissions out to 2035 is illustrative.

The CAP included an analysis of GHG emissions and reductions out to 2035, as the CAP was intended to also address buildout of the County's general plan out to 2035. The County developed an emissions target for 2035 that would put the County on a path toward the 2050 goal of 80 percent below 1990 levels, which would be the equivalent for the County of 49 percent below 2005 levels by 2035. Similar to the 2020 analysis, the County developed a framework for reducing emissions by 2035 that worked within the context of the unincorporated County. The measures developed for the 2020 scenario were also used in the 2035 scenario but with increased rates of participation. The

CAP assumes that technology will improve and/or will lower in cost, making measures more feasible for a greater percentage of the population. For example, the residential building retrofit measure, which assumed a feasible participation rate of 15 percent by 2020, was increased to 90 percent participation rate by 2035.

Assuming aggressive but feasible goals, the local actions analyzed by the County showed that they could achieve emissions 14 percent below 2005 levels by 2035. While this does not achieve the 49 percent below 2005 levels reduction target, the assumptions for the 2035 scenario included only current technology and existing State and federal regulations. The CAP described that State and federal actions account for more than 55 percent of the reductions needed to achieve the 2020 goal, but since they are frozen to existing actions, they only account for 34 percent of the reductions needed to achieve the 2035 goal. The CAP identifies that meeting GHG reduction goals beyond 2020 will require even greater participation in existing measures, inclusion of additional measures, guidance from State and federal authorities, additional State and federal regulation, improved technology, and infrastructure changes. The CAP included an alternative 2035 scenario analysis (as an appendix) to demonstrate that the 49 percent reduction target could only be met with additional federal, State, and local measures. Additional measures included achieving 44 miles per gallon average fuel efficiency among *all* on-road vehicles (not just new model years), a 50 percent RPS, and retrofitting all pre-2005 residential units to achieve 35 percent greater energy efficiency. San Diego County intends to revisit the CAP periodically, and update and expand beyond the adopted measures for 2020 over time to support meeting the 2035 target.

San Bernardino Regional Greenhouse Gas Reduction Plan

Twenty-one partnership cities in San Bernardino County working through the San Bernardino Associated Governments (SANBAG) collaborated to create the San Bernardino Regional GHG Reduction Plan (SANBAG 2014) that included customized GHG reduction plans for each participating city to reach city-identified 2020 GHG reduction targets. Collectively, the individual city commitments would result in the region returning to 1990 emissions (approx. 11.5 MMT CO2e) or lower in 2020.

The Regional Plan also includes recommendations for post-2020 GHG reduction planning and action. Beginning in 2018, it is recommended that the partnership cities and SANBAG commence planning for the post-2020 period. At this point, the partnership cities would have implemented the first phases of their local CAPs, and would have a better understanding of the effectiveness and efficiency of different reduction strategies and approaches. The new post-2020 reduction plan should include a specific target for GHG reductions for at least 2030, and if supported by long-term planning at the State level, should also include preliminary planning for 2040 and 2050. The targets should be consistent with broader State and federal reduction targets and with the scientific understanding of the reductions needed by 2050. It is recommended that partnership cities adopt the post-2020 reduction plan by January 1, 2020, which would require cities to start a new inventory/assessment process by 2017 or 2018 at the latest.

The regional plan also included an analysis of emission trajectories for the participating cities out to 2030. To stay on course toward the 2050 target (2.3 MMT CO2e), the region's GHG emissions need to be reduced to approximately 8.4 MMTCO2e by 2030. This translates to an average reduction of 2.9 percent per year between 2020 and 2030, or an additional 3.3 MMTCO2e in reductions during the period 2020 to 2030. An additional challenge comes from the fact that the population in the region (sum of participating cities considered in this analysis) will continue to grow between 2020

and 2030 (estimated population growth in the study is from approximately 1.73 million in 2020 to 1.96 million in 2030). Taking into account population growth, per-capita emissions would need to decrease at an average rate of approximately 0.2 MTCO2e per person per year during the 2020 to 2030 period. The measures needed are logical expansions of the programs recommended in the AB 32 Scoping Plan at the State level, and the measures included in the Regional Plan at the local level. By building on planned State efforts during this period, and ramped up efforts in the local building energy and transportation (and other) sectors on the part of the local governments, the region can be on track to reach a 2050 goal through 2030.

Assumptions about State action were based on an ARB scenario analysis for 2030 included in the 2008 AB 32 Scoping Plan, as follows:

- Expand vehicle efficiency regulations to achieve a 40 percent fleet-wide passenger vehicle reduction by 2030 (approximately double the almost 20 percent expected in 2020).
- Increase California's use of renewable energy in electricity generation (beyond the 33 percent planned for 2020).
- Reduce the carbon intensity of transportation fuels by 25 percent (a further decrease from the 10 percent level set for 2020).
- Increase energy efficiency and green building efforts (so that the savings achieved in the 2020 to 2030 timeframe are approximately double those accomplished in 2020).
- Use a regional or national cap-and-trade system to further limit emissions from the 85 percent of GHG emissions in capped sectors (Transportation Fuels and other fuel use, Electricity, Residential/Commercial Natural Gas, and Industry).

Partnership cities in San Bernardino can do their part to be on track through 2030 to meet the 2050 goal by implementing the following:

- Increase energy efficiency and green building efforts (for city municipal buildings as well as private buildings in the region) so that the savings achieved in the 2020 to 2030 timeframe are approximately 81 percent those accomplished in 2020.
- Continue to implement land use and transportation measures to lower VMT and shift travel modes (assumed improvement of 8 percent compared to the unmitigated condition, which is within SCAG's assumed range of 8 to 12 percent of GHG reductions for 2035).
- Capture more methane from landfills receiving regional waste, move beyond 75 percent local waste diversion goal for 2020, and utilize landfill gas further as an energy source.
- Continue to improve local water efficiency and conservation.
- Continue to support and leverage incentive, rebate, and other financing programs for residential and commercial energy efficiency, and renewable energy installations to shorten payback period and costs and to develop programs that encourage increased use of small-scale renewable power as it becomes more economically feasible.

The conceptual effects of these strategies would represent an approximate doubling of effort for most cities from that planned at the State and city level for 2020. In total, the measures described above would produce reductions to bring the region's GHG emissions to an estimated 8.4 $MMTCO_2e$. While the potential mix of future GHG reduction measures presented in the Regional Plan scenario analysis is only a conceptual example, it serves to demonstrate that the current measures in the AB

32 Scoping Plan and the Regional Plan can not only move the region to its 2020 goal, but can also provide an expandable framework for much greater long-term GHG emissions reductions.

Examples from Outside California

NYC Pathways to Deep Carbon Reductions

New York City (NYC) has committed to reduce its GHG emissions by 30 percent below 2005 levels by 2030 ("30 by 30") as part of its long-term sustainability agenda, PlaNYC. As of 2013, emissions have been reduced by 19 percent and thus the city is approximately two-thirds of its way to the "30 by 30" goal.

NYC conducted a study of potential to achieve deep long-term carbon reductions that is feasible and mindful of economic impacts (NYC 2013). The goal of the study was to examine if it was possible to achieve a reduction to 80 percent below 2005 levels by 2050 ("80 by 50"), and if feasible to identify the lowest cost pathways and highest priority near-term actions needed to reach the 2050 goal. The analysis focused on existing and emergency technologies rather than future technologies. The study also assumed no meaningful price on carbon and a continued lack of comprehensive federal policy.

A summary of the study results are as follows:

- New York City could achieve "80 by 50" but it would be exceptionally difficult.
  - This would require change at an unprecedented and technologically-untested scale.
  - It would require large investments in energy efficiency, cleaner energy sources, wholesale transition to low-carbon transportation technologies, and the transformation of the solid waste sector.
  - Up to two-thirds of the investment could be cost effective, but the rest would yield little to no payback.
  - Market barriers would need to be overcome every step of the way.
- Action on all fronts would be needed.
  - Every section, market segment, and technology application would require action.
- Accelerating near-term action would increase the likelihood of achieving "80 by 50."
  - Meeting the 2050 target would require consistent progress year-in and year-out.
  - Meeting the "30 by 30" target 10 years earlier in 2020 would put the city on the trajectory to meet the 2050 target.
- Abatement potential from 2050 BAU emissions were split among measures as follows:
  - new building energy efficiency (5 percent);
  - existing building energy efficiency (33 percent);
  - building fuel switch from fossil fuels to renewable or low-carbon energy (10 percent);
  - clean power (12 percent);
  - distributed generation (5 percent);

- transportation reductions through expanded transit and accelerated adoption of cleaner technologies for private and public vehicles (13 percent); and
- solid waste reductions through source reduction diversion, recycling, and improved waste processing infrastructure (7 percent).

The study describes that although it is theoretically possible, the city could not realistically achieve "80 by 50" by acting alone. Federal and /or regional action would be needed to create a level playing field and send a price signal to the entire marketplace. Unilateral actions, in contrast, could create market distortions and inefficient outcomes. The study also notes that the "80 by 50" target may not be the right goal for New York City, as it is already far more energy efficient than most parts of the United States already.

United Kingdom Pathways to 2050

The 2008 Climate Change Act in the United Kingdom (UK) established a legally binding climate change target to reduce the UK's GHG emissions by at least 80 percent (from the 1990 baseline) by 2050.

The UK government is trying to achieve this reduction through action nationally and internationally. Moving to a more energy efficient, low-carbon economy will help them meet this target. It will also help the UK become less reliant on imported fossil fuels and less exposed to higher energy prices in the future.

To make sure that its government policies contribute effectively to our GHG reduction targets, the UK is[8]:

- setting carbon budgets to limit the amount of GHGs the UK is allowed to emit over a specified time;
- using statistics on GHG emissions and further evidence, analysis, and research to inform energy and climate change policy;
- using the European Union Emissions Trading Scheme (EU ETS) to deliver a substantial proportion of the UK's carbon emission reductions between 2013 and 2020;
- using a set of values for carbon to make sure project and policy appraisals account for their climate change impacts; and
- using the 2050 Calculator to let policy makers and the public explore the different options for meeting the 2050 emissions reduction targets.

The UK is also seeking to reduce the demand for energy by helping people and businesses to use energy more efficiently through the following means by:

- reducing demand for energy with smart meters and other energy-efficient measures for industry, businesses, and the public sector;
- reducing emissions by improving the energy efficiency of properties through the Green Deal[9];

[8] Summary from: https://www.gov.uk/government/policies/reducing-the-uk-s-greenhouse-gas-emissions-by-80-by-2050#background.

- providing incentives for public and private sector organizations to take up more energy-efficient technologies and practices through the CRC Energy Efficiency Scheme[10];
- reducing GHGs and other emissions from transport;
- reducing GHG emissions from agriculture; and
- investing in low-carbon technologies.

Low-carbon technologies will also make an important contribution to UK GHG reduction targets through the following actions:

- taking action to increase the use of low-carbon technologies and creating an industry for CCS;
- reducing emissions from the power sector and encouraging investment in low-carbon technologies by reforming the UK's electricity market;
- providing over £200 million of funding for innovation in low-carbon technologies from 2011 to 2015; and
- Publicly reporting carbon emissions from businesses and the public sector.

Public reporting of carbon emissions helps to encourage organizations to become more energy efficient, and enables us to assess the progress that's being made through:

- measuring and reporting environmental impacts;
- guidance for businesses; and
- asking English local authorities to measure and report their GHG emissions.

While the UK, along with Germany, is one of the international leaders in GHG reduction planning on a national level, even the UK does not have a definitive plan for how to achieve their 2050 target. As noted above, the Department of Energy and Climate Change (DECC) has created a key educational tool, the 2050 Calculator[11], to allow decision makers, the public, and stakeholders to conduct their own evaluation of potential pathways to 2050. The 2050 Pathways work presents a framework through which to consider some of the choices and trade-offs the UK will have to make over the next 40 years. It is system wide, covering all parts of the economy and all GHG emissions released in the UK. It is rooted in scientific and engineering realities, looking at what is thought to be physically and technically possible in each sector. It allows users of the Calculator to explore all the available options and some of their key implications.

It is a key recommendation of this paper that California needs to create a 2050 California Calculator to inform Californians as they face the coming 2050 challenge. Furthermore, this paper recommends

[9] The Green Deal is an ambitious and long term initiative designed to upgrade the energy efficiency of Britain's homes. It lets householders and businesses pay towards the cost of energy-saving improvements to their properties, over time, through savings on their energy bills, using suppliers they can trust

[10] The CRC Energy Efficiency Scheme (or CRC Scheme) is designed to incentivize energy efficiency and cut emissions in large energy users in the public and private sectors across the UK, together responsible for around 10 percent of the UK's greenhouse gas emissions. Participants include supermarkets, water companies, banks, local authorities and all central government departments

[11] The 2050 Calculator is available online here: https://www.gov.uk/2050-pathways-analysis

that such a calculator be prepared not only for the State as a whole, but that the model be extended to allow local jurisdictions to examine their local emissions as well using different scenarios.

V. CEQA, General Plans, and Climate Action Plans for the Post-2020 Horizon

Nicole Vermillion, Placeworks; Rich Walter, ICF International; Dave Mitchell, First Carbon

CEQA Project Analysis in a Post-2020 World

For the purpose of this section, a "project-level" analysis is considered an analysis for any CEQA project with the exception of a CEQA document prepared for a general plan. This white paper includes a separate section on GHG emissions analyses for general plan projects.[12]

The CEQA Guidelines offer two paths to evaluating GHG emissions impacts in CEQA documents.

- Projects can tier off a qualified GHG Reduction Plan (CEQA Guidelines Section 15183.5).
- Projects can determine significance utilizing a model to calculate GHG emissions and assess the significance (CEQA Guidelines Section 15064.4).

This section discusses potential changes in CEQA practice for the post-2020 world.

Tiering Off a Qualified GHG Reduction Plan

CEQA Guidelines Section 15183.5 identifies that programmatic documents such as general plans, long-range development plans, or separate plans (e.g., GHG reduction plans/CAPs) can be prepared by lead agencies to mitigate the GHG emissions impacts within a jurisdiction. If a jurisdiction has adopted a qualified GHG Reduction Plan, then individual CEQA projects that are consistent with the GHG Reduction Plan may have less than significant GHG emissions impacts.

Plans that meet the following criteria are defined as "qualified" GHG reduction plans, eligible to be the basis for CEQA streamlining, as follows:

- Quantify GHG emissions, both existing and projected, over a specified time period, resulting from activities within a defined geographic area;
- Establish a level, based on substantial evidence, below which the contribution to GHG emissions from activities covered by the plan would not be cumulatively considerable;
- Identify and analyze the GHG emissions resulting from specific actions or categories of actions anticipated within the geographic area;

[12] General plans are a long-range planning tool that typically goes beyond the target year for AB 32 of 2020. In addition, a lead agency may integrate the general plan with a GHG reduction plan. Therefore, while specific plans, area plans, and general plans are typically treated as "program" level CEQA documents under CEQA Guidelines Section 15168, CEQA significance thresholds have been developed for general plans separately under a "plan-level" approach.

- Specify measures or a group of measures, including performance standards, that substantial evidence demonstrates would collectively achieve the specified emissions level, if implemented on a project-by-project basis;
- Establish a mechanism to monitor the plan's progress toward achieving the target level, and to require amendment if the plan is not achieving specified levels; and
- Be adopted in a public process following environmental review.

Current CEQA Significance Thresholds Types

Methodology to evaluate GHG emissions impacts in CEQA documents have evolved considerably since GHG emissions became a mandatory component of environmental documents. Yet, there is no single statewide uniformly-applied significance metric used by CEQA practitioners for evaluating GHG emissions. Rather, individual air districts and other agencies, primarily in the larger metropolitan areas, have offered guidance on how to address GHG emissions impacts in CEQA documents.

Although there is no single metric used statewide, there are common themes utilized by air districts/agencies to substantiate the significant thresholds developed. In general, there are three significance metrics that have been developed to identify the threshold at which project-level GHG emissions impacts may be substantial, and therefore, significant:

- **Bright-Line Thresholds.** These are numeric thresholds that assess total GHG emissions generated by a project. The bright-line threshold is typically based on a "capture" rate and a gap analysis, which is tied back to AB 32 targets at a regional level. Projects that generate GHG emissions which exceed this bright-line threshold are typically considered to have a significant GHG emissions impact. Projects that fall under it (with or without mitigation) are less than significant. The bright-line threshold compares the net increase in project-related emissions with existing conditions. The bright-line threshold does not consider the potential efficiencies of large projects or the inefficiencies of small projects. As emissions decline with implementation of GHG regulations, the number of projects below the bright line will increase.
- **Performance Based Thresholds.** These are quantitative thresholds that are based on a percent reduction from a future, projected emissions inventory, without any GHG reduction measures compared to the future, projected emissions inventory with project-specific GHG reduction measures in place.[13] Because the BAU scenario is based on a "future" condition, the level of significance conclusions are not based on the increase in GHG emissions from existing conditions. However, the percent reduction from BAU considers the potential increase in efficiency integrated into a project's design and operation. The performance-based significance threshold stems from the GHG reduction targets of AB 32, and the inventory and/or targets identified in the AB 32 2008 Scoping Plan.
- **Efficiency Thresholds.** These are quantitative thresholds that are based on a per capita efficiency metric. Projects that attain the per capita efficiency target, with or without mitigation, would result in less than significant GHG emissions. The efficiency metric is typically defined as a "service population" (SP), which means people who live and work in the project site. The efficiency metric considers the GHG reduction measures integrated into a

[13] Performance-based thresholds vary on accounting for various federal and State policies that would result in project-level GHG reductions. Some include certain federal and State measures as "baseline".

project's design and operation, and is based on the net increase in emissions, but the significance conclusion is not based on the magnitude of the increase. Like the performance-based threshold, the efficiency-based significance threshold also stems from the GHG reduction targets of AB 32, and the inventory and/or targets identified in the AB 32 2008 Scoping Plan. Most individual projects are not mixed-use and hence often score poorly in terms of SP efficiency, even in mixed-use walkable neighborhoods, unless the analysis accounts for the benefits from neighboring existing and planned development.

As identified above, the target embodied in AB 32 for year 2020 is the most common thread among the significance thresholds developed. Consequently, while quantitative significance criteria differ among air districts/agencies in California, the significance metrics are derived using a similar methodology.

Post-2020 Considerations for CEQA Thresholds

Current California guidance and goals for reductions in GHG emissions are generally embodied in Executive Order S-03-05 and AB 32.

While EO S-03-05 provides a long-term goal for the State for 2020, unlike AB 32, EO S-03-05 is not a Legislative action. Therefore, the long-term goal for 2050 identified in EO S-03-05 has not, to date, carried the same weight in project-level CEQA analyses because the Legislature has not directed the State to provide a plan to reach the 2050 goal, or an interim goal. As noted above, this was a key issue in the SANDAG CEQA lawsuit, which found that the SANDAG EIR should have assessed the project's impact on meeting the EO S-03-05 2050 goal.

CEQA significance criteria for GHG emissions for both projects that identify significance based on consistency with a GHG reduction plan, and projects that utilize the bright-line, performance, or efficiency significance thresholds, are mainly derived from the GHG reduction target embodied in AB 32. However, AB 32 and the AB 32 Scoping Plan only provide a statewide plan for achieving the statewide GHG emissions target for 2020. While AB 32 is the only State legislated reduction target, the GHG thresholds that utilize the AB 32 targets are likely to remain defensible under CEQA, unless the reasoning in the SANDAG ruling becomes widespread practice.

In order to develop post-2020 GHG significance thresholds, the Legislature would need to direct the State to identify an interim goal, and draft and implement a plan to achieve it. This post-2020 plan would be a critical tool in the development of post-2020 GHG reduction targets.[14] Without this tool, it would be difficult for lead agencies to substantiate post-2020 GHG significance criteria. Regardless, at some point the project-level CEQA significance threshold utilized by lead agencies will need to be updated to address post-2020 targets because the current significance thresholds for GHG emissions impacts and GHG reduction plans are primarily based on 2020 targets. The logical timing for updating thresholds will be when the State adopts its first post-2020 legislated reduction target.

[14] Senate Bill 32 (Pavley), Assembly Bill (AB) 33 (Quirk), and AB 21 (Perea) will be considered in the 2015-2016 legislative session. As introduced, these bills propose to require ARB to approve a statewide GHG emission limit that is equivalent to 80 percent below the 1990 level to be achieved by 2050 and authorize ARB to adopt interim GHG emissions level targets to be achieved by 2030 and 2040.

CEQA GHG Analysis Should Change in Concert with State GHG Reduction Planning

In order to identify how to best analyze GHG emissions going forward from 2015, it is useful to review how CEQA GHG analysis has developed since 2006.

- **A Chaotic Beginning: From AB 32 (2006) to the AB 32 Scoping Plan (2008)**
  - With the passage of AB 32 in 2006, CEQA analyses increasingly began to consider GHG emissions, but the method of analysis was somewhat haphazard, inconsistent, and often without any framework for determining significance or developing mitigation.
  - Some early GHG reduction plan developers, including San Francisco (2004) and Marin County (2006), pioneered climate action planning but outside of a context of connecting CAPs to CEQA.
  - Practitioners started to evaluate options for CEQA practice through the AEP White Paper (2007), the CAPCOA White Paper (early 2008), conference presentations, and other methods.
- **Creating the New Normal: From the AB 32 Scoping Plan (2008) to SB 97 (2010)**
  - The adoption of the AB 32 Scoping Plan in 2008, with a specifically articulated role for local jurisdictions in GHG emissions reductions and a framework of State reductions, solidified a foundation for both CEQA analysis and local climate action plans.
  - Using the prior development of methods in the AEP and CAPCOA white papers, CEQA GHG analysis became much more widespread, and more and more CAPs were developed and began to be seen as an alternative path to CEQA compliance.
  - Key lawsuits were filed calling for GHG analysis, including the San Bernardino (2008) and Stockton (2008) general plans.
- **Solidifying the Practice: From SB 97 (2010) to "AB 32+1"**
  - The adoption of SB 97 resolved any lingering doubts as to whether GHG analysis was required under CEQA, and appellate court rulings confirmed this conclusion.
  - Thresholds were further developed and adopted by many air districts, including BAAQMD (2010), SJVAPCD (2010) and others.
  - CAPs were developed in many jurisdictions throughout California. The use of thresholds was upheld in court rulings. GHG analysis became universal for CEQA documents and CAPs became increasingly used for CEQA tiering.

How then to analyze GHG emissions in CEQA documents for the post-2020 world? Pragmatically, this can be broken down into several different eras, as follows:

- **The Uncertain Interim: From San Diego Rulings (2014) to "AB 32+1" to the "AB 32+1" Scoping Plan**
  - CEQA GHG analysis practice is now entering another period of change. The San Diego rulings have introduced the question of post-2020 analysis. The Legislature is considering the next set of State GHG reduction targets.

- For general plans and multi-phase large projects with post-2020 phased development, CEQA analyses need to take into account consistency with 2020/AB 32 based frameworks, but they must also analyze the consequences of post-2020 GHG emissions in terms of their impacts on the reduction trajectory from 2020 toward 2050. A significance determination, as argued in this paper, should be based on consistency with "substantial progress" along a post-2020 trajectory, but should not be based on meeting the 2050 target.
- CEQA analysis for most land use projects can continue to rely on the current thresholds and current CAPs with 2020 horizons for the immediate future, especially if there is action by the State Legislature and ARB in the next few years. The closer we come to 2020 without legislative and ARB action on the post-2020 targets and planning, the more CEQA project analysis will need to analyze post-2020 emissions consistent with "substantial progress" along a post-2020 reduction trajectory toward meeting the 2050 target.

- **The Next Normal: With "AB 32+1" and a "AB 32+1" Scoping Plan**
  - When the Legislature adopts a post-2020 target and ARB develops a detailed, specific, and feasible scoping plan addressing the adopted target, a new framework will be established for CEQA GHG analysis that is similar to what exists in relation to AB 32 and the 2020 reduction target.
  - CEQA GHG analyses will need to be completed using thresholds based on the new post-2020 target.
  - CEQA tiering of GHG analysis will need to come from CAPs that are consistent with the adopted post-2020 target.
  - CEQA GHG analysis of general plans (and large multi-phased projects with long-term future horizons) will need to analyze horizons beyond the adopted target.
- **The Future: A 2050 Legislated Target and a 2050 Target Scoping Plan**
  - The Legislature may adopt a 2030 target in the near term, but will also likely adopt a 2050 target, at some point.
  - In the near-term, any ARB scoping plan for meeting a 2050 target will likely be a general phased approach that will not constitute a detailed, specific and feasible plan of action such as that in the current AB 32 Scoping Plan. Lacking such a State plan of action for 2050, CEQA GHG analyses should be based on evaluating project emissions in light of the horizon of State action planning (which may be less than 2050), and, as necessary, based on evaluation of "substantial progress" toward longer-term reduction targets.
  - In time, ARB will develop a feasible and specific plan of action for 2050, though it may be years in coming. At that point, CEQA GHG analysis will need to change again in order to be based on fully evaluating project emissions for consistency with a 2050 plan of action.

General Plans in a Post-2020 World

General plans often have roughly 20 year planning horizons; so contemplating the need for policy actions two decades in the future is not new to California planners. Some general plans already include post-2020 actions to reduce GHG emissions within their local jurisdiction. Many recently adopted general plans, for example, include substantial land use policy frameworks designed to reduce VMT by promoting infill development, TOD, transit, and alternatives to vehicle travel such as

bicycle and pedestrian linkages. Land use approaches to reducing VMT are by their nature long-term efforts that will, in most cases, deliver only small absolute reductions in the short run (e.g., by 2020), but can deliver much more substantial VMT reductions in the longer term (e.g., by 2035). The general plan is absolutely essential to GHG reduction strategies that involve land use form and spatial planning, and long-term transportation planning. Some recent general plans have included the adoption of a CAP as part of an update, and others have included a GHG reduction target and have called for adoption of a CAP to meet the locally adopted reduction target by a date certain. Conversely, some CAPs call for revisions to local general plans in order to implement CAP-related GHG emission reduction strategies.

While there hasn't been a mandatory requirement to consider climate change in general plans from the State's General Plan Guidelines to date (although this may change soon), CEQA challenges to general plan EIRs have created pressure to include consideration of GHG emissions through both policy measures and target setting in general plans, and/or via requirements to do the same through development of a CAP.

In the post-2020 period, there will be increasing pressure to include ambitious policies to reduce GHG emissions within general plans, with the greater reduction effort necessary to achieve long-term reduction targets beyond AB 32. Given past history, it is likely that pressure groups will continue to use CEQA lawsuits, GHG emissions, and the need for long-term reductions to gain leverage in an attempt to force local jurisdictions to modify general plans.. As we shift from 2020 targets to 2030 targets and beyond, many different stakeholders will be looking to general plans to ensure that land use planning reflects contemporary State target milestones for GHG emissions.

Optimal planning happens in a social and community context in which the public, planners, stakeholders, and decision-makers can address issues of broad concern in a balanced way. CEQA lawsuits can effectively distort that delicate balancing process by interveners attempting to gain a broader, often political, outcome that are outside of the scope and capacity of the planning process. This paper takes the position that planning is best done free of such pressure. In order to keep general plans focused on doing the hard work of planning for the future, the recommendations below seek to reasonably limit the horizon of GHG analysis under CEQA. If this proposed change were put into effect, it would enable general plans to focus on realistic and achievable reduction timeframes and targets, rather than spending unproductive time engaged in speculative exercises about the distant future.

Climate Action Plans in a Post-2020 World

CAP Target Setting

The local target setting process for 2020 has provided important lessons that can be applied to setting future targets. Most CAPs have included targets for 2020, and some discuss reductions to achieve a trajectory toward 2050; but the primary focus on identifying reduction measures has been on 2020. Early targets adopted prior to the AB 32 Scoping Plan completion in 2008 were generally overly optimistic about the amount of reductions that would be achieved by those jurisdictions. Changes to CEQA adopted by OPR in 2010 provide guidance for using CAPs for CEQA streamlining and for addressing GHG emissions in CEQA documents. Legal challenges and decisions on general plan and project-level CEQA documents have provided some guidance, but with sometimes contradictory results. The following discussion attempts to bring some clarity to how to move beyond 2020.

The 2014 AB 32 Scoping Plan Update states the following:

> "*Local government reduction targets should chart a reduction trajectory that is consistent with, or exceeds, the trajectory created by statewide goals. Improved accounting and centralized reporting of local efforts, including emissions inventories, policy programs, and achieved emission reductions, would allow California to further incorporate, and better recognize, local efforts in its climate planning and policies.*"

Achieving a reduction trajectory that is consistent with or exceeds a statewide trajectory is not a straightforward process. The circumstances in each community can vary due to differing growth rates, climate, existing built environment, economic health, and local politics. The SB 375 Regional Targets process took local circumstances into account and resulted in a wide range of targets for areas around the State.

Currently, it is extremely difficult for a lead agency or project to achieve a local post-2020 target in the absence of a statewide plan to achieve a post-2020 target. While there are GHG reduction plans that do include a post-2020 target, those emissions reductions are subject to uncertainty and speculation about the amount of reductions that can be attributed to State and federal reductions beyond 2020. In the absence of a post-2020 target passed by the Legislature, the question that will become increasingly important for GHG reduction planning is whether showing progress to achieve post-2020 goals is sufficient, or whether the GHG reduction plan must actually achieve the post-2020 target even in absence of a State legislative target or plan for a particular milestone. The logical steps in setting post-2020 Targets for CAPs are to:

- Prepare a baseline inventory.
- Forecast GHG emissions for future milestone years based on growth forecasts for the community.
- Identify reductions from existing regulations such as Title 24, the RPS, Pavley I/Advanced Clean Cars, and the LCFS that apply to prepare an adjusted forecast with State measures. Include federal actions (such as CAFE fleet vehicle standards) where appropriate.
- Determine potential reductions from current scoping plan measures with a definitive schedule for adoption in the near-term future. Scoping plan programs without a reasonable certainty for implementation by a date certain should not be included.
- Determine the difference in emissions between the current legislated State target(s)[15] and the adopted and planned State regulations. This number is the amount of reductions needed from either additional unplanned State regulations or local measures.
- Identify the feasible strategies and measures available to close the gap, after considering the benefits of regulations on the future year emission inventory. Note that more distant milestone years are likely to produce a larger gap because the effect of current regulations may be offset partially or entirely by the emissions resulting from cumulative economic and population growth over time.

[15] The current legislated State target is for 2020 from AB 32. The next likely legislated State target will be for 2030. The Executive Order S-03-05 includes a target for 2050 that should also be considered but it is an argument of this white paper that CAPs do not necessarily need to achieve a 2050 target to qualify for tiering under CEQA Guidelines Section 15183.5 or to support a less-than significant finding under CEQA. Instead, this paper argues that "substantial progress" toward post-2020 GHG reductions should be the threshold for both tiering and less than significant findings.

- The reduction from feasible strategies and measures may or may not exceed the amount required to close the gap with the legislated State target(s).

Different CAP Target approaches are reviewed below in light of post-2020 considerations.

- **Percent below 1990 Approach.** At present, the most clearly consistent target with AB 32 is 1990 emissions by 2020. In the post-2020 period, consistency with State target(s) will depend on how the State decides to articulate post-2020 targets. If the State adopts a "percent below 1990" basis (such as 30 or 40 percent below 1990 by 2030), then local jurisdictions could identify the same percentage below their own 1990 jurisdictional emissions as their CAP target.
- **Percent below Alternative Baseline Approach.** Many jurisdictions do not have 1990 inventories and have been using "proxy" inventory years as a baseline, with an alternative reduction target to provide the functional equivalent of reducing to 1990 emissions levels. For example, the original 2008 AB 32 Scoping Plan identified a goal for local jurisdictions to reduce emissions by 15 percent below "current" (usually defined as 2005 – 2008 emissions) levels to support the AB 32 goal of reaching 1990 emissions by 2020. Thus, jurisdictions that have used a non-1990 baseline inventory will need to calculate the additional reductions needed to reach a post-2020 reduction target. For example, if a city's 2005 inventory was 500,000 metric tons of CO2e, and their current CAP target was 15 percent below 2005 levels, then the "proxy" 1990 emissions level would be 425,000 MT CO2e. Assuming a new statewide reduction target is 30 percent below 1990 levels, then the example city's 2030 target could be 297,500 MT CO2e (40.5 percent below the city's 2005 emissions).
- **Percent below 2020 Approach.** As noted above, many jurisdictions don't have a 1990 inventory but have adopted a reduction target for 2020 in their current CAP that is considered functionally equivalent to 1990 emissions. If that rationale is sufficiently grounded, then a post-2020 reduction target could be used in future CAP updates. Using our example city from above, with 2005 emissions of 500,000 MTCO2e and a 2020 reduction target of 425,000 MTCO2e that is presumed equivalent to 1990 emissions, then a 2030 target could be 30 percent below the 2020 target, or 297,500 MT CO2e.
- **Percent below Future Business as Usual (BAU) Approach.**
  - There has been confusion regarding the concept of BAU emission forecasts (and targets based on reductions from BAU) among agencies and opposition groups involved with general plans and CAPs. BAU forecasts are used by ARB in developing criteria pollutant emission inventories for Air Quality Attainment Plans. BAU represents emissions forecasts for projected growth without the reductions expected from the implementation of regulations. ARB applied this concept in the AB 32 Scoping Plan.
  - The benefit of a BAU analysis is that it clearly shows the impact of growth, and the amount of reductions required, to offset growth and reach the emission target level. The percentage reduction from BAU required to achieve AB 32 targets has been used in many CAPs to demonstrate consistency with AB 32. CAPs that show emission reductions from BAU at least as great as what is required by the State are considered consistent with AB 32.
  - Using a BAU approach beyond 2020 will require a new Scoping Plan with State targets that will be determined in coming years. State Legislation is currently being introduced[16] that

[16] SB 32 (Pavley), AB 33 (Quirk), and AB 21 (Perea).

would set targets for 2030, 2040, and 2050, and would require ARB to update the Scoping Plan to identify a strategy to achieve the new targets. A new statewide BAU forecast would be developed and the percent reduction from BAU necessary to meet a new State target could then be determined. This new percentage reduction could be applied to local GHG forecasts to develop new post-2020 CAP targets.

- One problem with the BAU approach can be characterized as "target shift." As time passes and new regulations are implemented, the amount of reduction required to achieve the original percentage reduction from BAU is reduced. For example, in 2020, a 40 percent reduction from 2030 BAU may be required, but in 2025 new regulations and the retirement of higher emitting equipment may achieve a 20 percent reduction from 2030 BAU. Therefore in 2025, a local plan would need to deliver only the reduction of 20 percent from 2030 BAU. To keep a stable target, one must maintain the same starting year until new targets are adopted by the State. Otherwise, new targets would need to be determined every year based on progress in implementing regulations in effect up to that point. As long as the calculations used to determine progress are transparent, a fixed past year baseline is the simplest approach. However, a periodic CAP update based on progress reported in State Scoping Plan updates is preferable to more accurately define and account for the amount of reduction that remains to be achieved.

Climate Action Plan GHG Reduction Measures for a Post-2020 World

Below we review some considerations for local GHG emissions reduction measures in the post-2020 period. This is not a comprehensive review of potential reduction measures, but is rather intended to give an idea of several different strategies that can be applied in a post-2020 world.

Building Energy Sector

The building energy sector is normally the second largest emission sector after motor vehicles in city GHG emission inventories. Reductions from the building energy sector are obtained through increased energy efficiency and through transition to energy sources with lower GHG emission intensities.

Energy Efficiency

Programs to Exceed State Energy Efficiency Standards for New Development

One of the primary measures encouraged by the State for local government implementation is to require new development to exceed State energy efficiency standards. While this measure is commendable, cities adopting it must be prepared for nearly continuous updates to match the State's update schedule, or to consider it only a temporary measure pending the next State standards update.

Factors for local governments to consider in adopting regulations that go beyond State regulations include:

- **Will builders be able to meet the efficiency levels set by the local government policy or regulation?** CEC is tightening energy efficiency regulations every three years, so it is difficult to get ahead of the regulations for any length of time. CEC conducts an extensive feasibility assessment when it adopts new regulations and works closely with industry to ensure that changes to standards can be implemented without undue burden and disruptions.

- **Adoption of ZNE will eventually limit local opportunities for additional reductions**. The CPUC and CEC are working toward requirements for new residential buildings achieving ZNE consumption starting in 2020. Once ZNE is achieved, there will be limited opportunities for local governments to require residential development to go beyond State standards. The CPUC and CEC are working toward ZNE for commercial buildings by 2030, thus from 2020 to 2030 there may be more local opportunities for reductions in the commercial sector.
- **Does the city have resources to train staff on complying with its own standards that are different from those of Title 24?** Will compliance software developed for Title 24 be transferrable to the local program? With Title 24 being updated about every three years, is the city willing to update its standards on the same schedule, or will exceeding Title 24 be a temporary measure pending the next State update?
- **Communities must consider whether they are placing themselves at a competitive disadvantage for attracting high GHG producing development**. The Uniform Building Code helps provide a level playing field for building standards including those that relate to energy efficiency. Communities with hot real estate markets may be able to push the envelope towards efficiency because it is easier for developers to absorb capital costs in an escalating market. Conversely, energy efficiency will provide value to whoever is paying the utility bills, so the extent to which energy efficiency is reflected in property values is an important factor. If all nearby communities are pushing the envelope beyond current Title 24 minimums as part of their CAPs, then they could avoid artificial distortions in their regional building market.
- **One size doesn't fit all communities**. California coastal communities have milder climates requiring relatively low amounts of energy for heating and cooling. Inland areas of California have hotter summers and colder winters and commensurately higher energy consumption for cooling and heating. Locations with high energy use have faster paybacks on energy conservation investments compared to places with milder climates.

Building energy technology is changing quickly. The State is pursuing technology-forcing regulations that are anticipated to speed implementation of new technologies. Although industry consistently complains that higher standards will be impossible to meet, when it comes time for implementation the technology is nearly always ready for the market at a lower cost than was estimated when the regulation was adopted.

The bottom line is that striving to achieve greater energy efficiency is part of any GHG post-2020 reduction strategy, but given the relatively rapid shift toward ZNE requirements for new buildings, this is a strategy that will have diminishing net returns as 2030 approaches.

Energy Efficiency Retrofit Programs for Existing Development

The existing built environment currently provides a large potential source of emission reductions in California cities. Existing homes and businesses have opportunities to improve energy efficiency by incorporating new technologies when remodeling or when replacing aging equipment. In some cases, energy savings can justify energy efficiency upgrades while current systems are still functional.

There have been substantial retrofit efforts across California through programs like California Energy Upgrade and other local, regional, and State efforts. While these programs have resulted in implementation of several "low-hanging fruit" strategies such as lighting replacements, there remains a substantial portfolio of potential retrofits still to be used.

Continued efforts to incorporate the cost of GHG emissions into the price of energy (electricity, natural gas) through the California cap-and-trade system will help individual consumers to better account for the total social costs of GHG emissions, which have not been adequately included in energy prices in the past. Thus, there will likely be cost-effective retrofits in the post-2020 world that may not exist today.

A further consideration for the post-2020 building sector is that with the highly ambitious ZNE strategies for new development, there could be a widening divergence between new development and existing development, in terms of building user energy costs. This could add market pressure on existing development that would support demand for more energy-efficiency retrofits.

Renewable Energy

The second part of any building energy emissions reduction strategy is the supply side of energy. Local governments can consider measures that support switching to lower GHG intensity fuels or renewable energy for electricity to help meet post-2020 targets.

Fuel Switching for Building Heat

According the 2014 AB 32 Scoping Plan Update, meeting a long-term 2050 goal will require eventual transformation of the energy sources for heating used by nearly all homes and businesses in California. Natural gas is currently the preferred fuel for heating most structures in California due to its relatively low cost and high efficiency. Over 80 percent of the energy used in natural gas heaters is converted to usable heat during combustion in central heating applications.

The emissions associated with electric heaters, although considered 100 percent efficient in generating heat, are impacted by the efficiency (or inefficiencies) of the power plant (and its associated emissions), as well as by transmission and distribution losses. Electricity for space heating has not achieved substantial market share because it has been more costly to operate than natural gas. According to the US DOE Heating Fuel Comparison Calculator, the fuel price of electricity averages $35.14 per million Btu, while natural gas costs $10.02 per million Btu. This is a major constraint to potential fuel switching to electric heating.

For climates with moderate heating and cooling needs, heat pumps offer an energy-efficient alternative to furnaces and air conditioners. Like a refrigerator, heat pumps use electricity to move heat from a cool space to a warm space, making cool spaces cooler and warm spaces warmer. Heating and cooling seasons alternate between moving air from the inside to the outside of homes, or vice-versa, as needed. Because they move heat rather than generate heat, heat pumps can provide equivalent space conditioning at as little as one quarter of the cost of conventional heating or cooling appliances. As a result, this may be a strategy that is increasingly used for emissions reduction.

Furthermore, as the grid contains more and more renewable fractions, and as cap-and-trade increasingly internalizes GHG emission costs, the price differential between electrical heating and natural gas heating is likely to get smaller. At present, with the relatively large disparity in cost, large-scale fuel switching does not appear to be a feasible short-term strategy and is not included in most CAP documents. However with approaching ZNE requirements in the 2020 to 2030 period, changing energy prices, and an ever-decreasing GHG intensity in California electricity, fuel switching could be a viable strategy in the post-2020 period.

Utility-Scale and Distributed Renewable Energy

The State has a primary role in increasing the renewable portfolio in the major electrical utility power generation mix. Governor Brown has called for increasing the current 33 percent RPS standard to a 50 percent standard for 2030, and legislation is being developed in 2015 to implement such a standard. Thus, the State is expected to contribute substantially to increased reductions in building energy emissions.

Some jurisdictions, such as cities in Marin County and Sonoma County, have decided to and implement community choice aggregation (CCA), which gives local jurisdictions control over their electricity supply choice. Where CCA is determined to be viable, those jurisdictions can benefit from a potential lower GHG intensity than what might be otherwise provided by their utility company under the State-mandated RPS. However, CCAs need to pay careful attention not only to their qualified renewable fraction (as defined by CEC regulation), but also to their overall GHG intensity, as the non-renewable fraction is critical to determining the CCAs overall relative GHG reduction benefits.

Self-generation and distributed generation of renewable electricity via solar or wind, and having a low GHG emitting utility scale electricity system that provides power at a reasonable cost, comprise critical elements in any strategy to efficiently achieve net zero energy new buildings between 2020 and 2030. In addition, distributed renewable generation can be utilized for existing buildings to increase the net renewable energy beyond what might be achieved by a local utility, or even a CCA.

As increasing amounts of variable renewable energy (such as solar and wind) come to fruition, there will be new challenges faced by utilities in balancing their electrical loads. If electricity storage solutions and demand management solutions (such as advanced smart grids) are not sufficiently developed, then load balancing may need to be achieved by natural gas generation, at least in the short run, which can reduce the GHG reduction effects of adding more renewable generation. This will become a larger concern in the post-2020 period, depending on the load balancing and energy storage solutions that prove to be viable and cost-effective. Local jurisdictions will need to be cognizant of these issues to ensure that the GHG reduction effectiveness of local measures supporting renewable energy are not being overestimated, especially if there are "debits" to account for in load balancing. Local jurisdictions can also be supportive in this regard by promoting and piloting smart grids along with utility companies, including deployment of smart meters and similar technologies.

Transportation

GHG reduction strategies in the transportation sector are threefold: (1) changing fuels to lower GHG-intensity alternatives; (2) increasing transportation vehicle efficiency; and (3) reducing vehicle miles traveled.

Governor Brown has called for a 50 percent reduction of petroleum consumption by 2030.

Fuel Strategies

The State has led the effort to promote alternative fuels for transportation primarily through the LCFS. The LCFS will nominally reduce the GHG intensity of transportation fuels by 10 percent by 2020. An expansion of the current LCFS target for 2030 is included in the 2014 AB 32 Scoping Plan Update, and is considered likely. The State also seeks to promote zero emissions vehicles (ZEVs) such as electrical vehicles (EVs) through a number of programs. The State also incentivizes purchase

of alternative vehicles through measures such as allowing certain vehicles to use HOV lanes with only a single occupant.

Many local jurisdictions currently support alternative fuel vehicles for their municipal fleets. Some local jurisdictions also promote alternative fuel vehicles through programs such as local installations of EV charging stations at public facilities, preferential parking for alternative fuel vehicles, and other measures. Some local jurisdictions promote replacement of landscaping equipment with electrical equipment where feasible. However, some of these measures have been suboptimal to date; for example, the business model for private EV charging stations has met only limited success at current market electricity and charging prices.

Looking at the post-2020 period, local jurisdictions can continue to replace municipal vehicles, promote alternatively fueled off-road equipment, and support infrastructure for electric and other alternatively fueled vehicles. Local measures in the post-2020 world will likely have greater cost-effectiveness and feasibility than in the pre-2020 era due to changing energy prices and State incentives.

Vehicle Strategies

Federal and state governments have been the primary actors in promoting greater efficiency for fossil-fueled transportation vehicles, through the CAFÉ standards at the federal level and through the Pavely 1/Advanced Clean Car programs at the state level. Current programs include a goal of an average efficiency of 54.5 miles per gallon for light duty vehicles by 2025. Thus, local jurisdictions will be able to count on continuing GHG reductions in the transportation sector from 2020 to 2025. It is also likely that the State will expand vehicle efficiency beyond 2025 at some point in the future.

Local government actions in regard to vehicle efficiency have primarily been focused on municipal purchasing policies requiring greater efficiency as a major consideration in fleet replacement planning. While these types of programs can and should continue in the post-2020 period, given State and federal regulation of vehicle technology, the State will remain the primary actor for vehicle efficiency in the foreseeable future.

VMT Reduction Strategies

From the 1960s to the beginning of this century, VMT and VMT per adult in the U.S. have increased at approximately the same rate as Gross Domestic Project (GDP). However since 2007 vehicle miles traveled per adult nationwide has declined, while California witnessed a similar decline beginning in 2005. The cause of this change has been debated. Commonly cited explanations include changing economic conditions (the recent recession); changing fuel prices; aging of the baby boomer generation; reductions in teen driving; changing lifestyle preferences (e.g., urban living, public transit); increased smartphone use; a rise in telecommuting; and other factors. While many of these explanations are plausible, other than a focus on fuel prices there is little research to support alternative explanations. California's long-run trend in VMT per adult has mirrored that of the country as a whole. In recent years, however, the trend lines have diverged: Californians drive fewer miles annually than the average American. California's high fuel prices, high automobile insurance rates, and severe traffic congestion are thought to explain most of the divergence (Hymel 2014). The current economic recovery, if sustained, may have a substantial effect on VMT trends in the near-term. It is uncertain whether the recent drop in fuel prices will be sustained. A sustained drop in fuel prices could also have an effect, if it were to occur.

One lesson learned from CAPs, project-level CEQA reviews, and SB 375 implementation is that changes in VMT will not be easy to achieve on a large scale in the near-term. Built out communities have few opportunities to substantially change their land use. Some urban areas are pursuing higher density uses that are supported by transit as a VMT–reduction strategy. This push for higher density has met substantial opposition in some parts of the Bay Area and San Diego. Fast growing localities often have large greenfield areas that allow more suburban low-density development with limited prospects to reduce VMT. Some fast growing areas have committed to infill and higher density to achieve objectives such as reduced farmland conversion, lower service costs, and support for alternative transportation. It remains to be seen whether these initiatives will achieve their desired results in the long term.

Local jurisdictions, through general plans and CAPs, have often included support for infill, transit-oriented development, mixed use development, expansion of transit, and expansion of pedestrian and bicycle facilities as local strategies to reduce VMT. Local jurisdictions are also coordinating with transportation agencies through SB 375 Regional Transportation Plan/Sustainable Communities Strategies, which are prioritizing transportation funding toward infrastructure that can support long-term reductions in VMT.

In the post-2020 period, local jurisdictions can continue to expand their support for lower-VMT land uses through continued efforts using the strategies noted above, many of which will only show their actual VMT reduction potential on a decadal scale.

As vehicle efficiency continues to increase and transportation fuels with lower GHG intensities come into wider use, the effectiveness of lowering VMT as a GHG reduction strategy will decrease. For example, the fleet average mpg of 2013 cars is approximately 24 mpg. With CAFÉ standards requiring a fleet average for new cars of 54 mpg in 2025, the GHG effectiveness of VMT reduction on a per-mile basis will be lowered by 56 percent. While VMT reduction strategies will continue to be important for congestion management and access, local jurisdictions will see smaller reductions from VMT strategies as vehicle efficiencies and fuel GHG intensities change over time.

A further challenge in the post-2020 period is that increasing vehicle efficiency could lower the cost of driving, depending on what happens with transportation fuel prices. As a general rule, reduced driving costs can incentivize increases in VMT. Reduced driving costs could result in a renewed demand for housing in more outlying areas, which if authorized, could undermine VMT reduction efforts.

Solid Waste

Waste reduction strategies by local jurisdictions focus on reducing the amount of waste placed in landfills, and reducing the amount of methane released to the atmosphere from landfills.

Waste Reduction

Nearly all CAPs include waste reduction as a standard GHG reduction strategy, particularly since waste reduction has been a long-standing policy for most California jurisdictions. Source reduction, reuse, and recycling programs all fit under the rubric of waste reduction. A common goal in many CAPs has been to divert approximately 75 percent of local waste from the landfill, and many CAPs include food waste, composting and other supporting measures to help in this effort. Some municipalities have adopted near-future targets of zero waste to landfills (= 100 percent diversion).

In the post-2020 period, it is expected that common waste diversion targets will exceed 75 percent, with more communities adopting zero waste goals along with expansion of programs for construction and demolition waste, food waste composting, reuse requirements, and other measures.

Methane Capture

Current State law (AB 449) requires larger landfills to capture at least 75 percent of the methane generated. Some waste authorities, such as San Bernardino County, have adopted measures in their GHG reduction plan to exceed 75 percent methane recovery at some of their key landfills. Waste to energy technology has been improving over time but community concerns about emissions have hindered implementation of some proposed plants. If those concerns can adequately be addressed, local jurisdictions that own landfills may seek to expand waste to energy facilities. Methane digesters for high organic waste (such as food waste) have also been implemented by some waste management authorities. In the post-2020 period, local jurisdictions that control landfill facilities may be looking to accelerate many of these strategies as part of local GHG reduction planning.

Other Sectors

While building energy, transportation, and solid waste usually constitute the dominant sources of emissions under the control of a local jurisdiction, most CAPs address other sectors as well. Potential post-2020 considerations for these other sectors are noted below.

Water

Many local jurisdictions in California have had a long-standing policy role concerning water conservation due to (1) the inadequacy of local water supplies to water demands in many parts of the State, (2) the costs in transporting water over long distances, and (3) the susceptibility to drought. Most studies of the effects of climate change in California indicate that the water supply in many parts of California will be adversely affected. Thus, separate from concern over GHG emissions, there are important societal goals achieved by water conservation.

In the post-2020 period, water supply will continue to be a critical issue, and it is expected that most local jurisdictions will examine and implement tougher water conservation measures. SB X7 7 requires urban retailers to reduce urban water conservation by 20 percent per capita below nominal 2005 levels by 2020. It is likely that the State or local entities will go further than these requirements in the post-2020 period. The range of measures to reduce water use is well known to local jurisdictions (including landscape efficiency, conservation of local sources, efficient appliances, water pricing, use of grey water, etc.), but their application is expected to increase. Several water supply technologies, such as recycled water and desalination, are expected to come into wider use , and are associated with increased energy demands that could offset some of the energy reductions from water conservation measures.

Wastewater

Local jurisdictions that own and operate wastewater facilities often include improvements in plant equipment efficiency in their CAPs, with some jurisdictions considering methane capture and/or waste-to-energy schemes. In the post-2020 period, these measures may become more common throughout the State.

Industrial Point Sources

Most local jurisdictions do not include industrial point sources in their local GHG reduction planning, although many will disclose point source emissions in local inventories. Given State and federal regulation of large industrial point sources, it is unlikely that local jurisdictions will want to add local GHG reduction regulation to avoid duplicating or interfering with State or federal regulations. State and federal regulation—under California's cap-and-trade system and/or federal source permitting under the Clean Air Act—will continue, and is highly likely to become more stringent over time. Since most local jurisdictions exclude such large industrial sources from their local GHG reduction planning, this is not a likely source of additional reductions for local GHG reduction planning in the post-2020 era.

Some jurisdictions operate utility point sources of GHG emissions and include such emissions in municipal CAPs. These facilities are usually subject to State and federal regulation, and utilities are subject to RPS requirements as well. For these jurisdictions, some may find it cost effective to exceed regulatory mandated minimums and achieve additional GHG reductions, but this is a case- by-case determination and will depend on how deep reductions are mandated by the State and federal government.

Agriculture

Most cities have limited agricultural sector emissions, but non-urban counties such as Central Valley counties, some central coast counties, and Monterey County, Napa County, Sonoma County, and Imperial County have substantial agricultural sector emissions. To date, most local CAPs have been limited in their approach to agricultural emissions, especially in light of limited attention on the agricultural sector in the 2008 AB 32 Scoping Plan. In the 2014 Scoping Plan Update, ARB indicated its intention to focus more on agricultural emissions in the next round of State level GHG reduction planning, including establishing agricultural sector GHG reduction targets for both the mid-terms and 2050. As such, it is expected that counties with substantial agricultural sector emissions will also have a greater focus on developing agricultural GHG reduction measures for post-2020 targets. Most agriculture is allowed by right, with the exception of confined animal facilities, so there is limited local governmental ability to apply conditions. Given that regulation of the agricultural sector is very different from other land use sectors, such as housing and commercial, it is expected that counties will approach agricultural sector reductions with increased reliance on voluntary partnerships with the agricultural industry, more so than with specific regulatory approaches for other land use sectors. Sequestration in agricultural landscapes is addressed separately below.

Carbon Sequestration

To date, there has been limited focus on carbon sequestration in local CAPs other than urban forestry measures focused on tree planning. However, there is a substantial potential for GHG reductions through increasing soil carbon in agricultural landscapes (both in cropped fields as well as rangelands). Some local efforts, such as the Marin Carbon Project[17], are demonstrating methods and developing protocols to support increased soil carbon in working landscapes, and to identify the potential to scale up practices to cover larger areas within the State. With State planning focusing more attention on agriculture in the next few years, it is expected that carbon sequestration will become a larger component of agricultural county GHG reduction planning in the post-2020 era.

[17] See: http://www.marincarbonproject.org/

Outside of urban forestry, carbon sequestration in working forests and natural landscapes has been included in local GHG reduction planning on only a limited basis to date. Some CAPs call for restoration of riparian corridors and other priority areas for habitat conservation purposes as well as GHG reductions. The 2014 AB 32 Scoping Plan Update called for development of a "Forest Carbon Plan" by 2016 which will include quantitative targets to increase net forest carbon storage. Thus, for counties with substantial forested areas, there may be increasing pressure and opportunities for local GHG reduction planning to support State efforts to increase forest carbon sequestration.

VI. Recommendations

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The Role of CEQA in a Post-2020 World

The following recommendations are made in light of maintaining and enhancing the role of CEQA in supporting, not hindering, post-2020 GHG reduction efforts.

Limit CEQA GHG Analysis to the State GHG Planning Horizon based on a State Legislatively Mandated Target

This paper points to the infeasibility of requiring compliance with the goals in EO S-03-05 as a *de facto* significance threshold in CEQA documents. Nothing is served by establishing an impossible threshold, or by analyzing impacts so far in the future that they require speculation. Instead, the limit of GHG analysis for CEQA document should be the current State GHG planning horizon. At present, the only true State reduction plan is the AB 32 Scoping Plan, which has a verified and quantified reduction strategy only to 2020.

ARB is presently considering feasible GHG reduction strategies for 2030 and beyond, but lacks the legislative authority to mandate such reductions for the private sector or local governments absent further legislative action to mandate reductions beyond 2020. The next likely step for the Legislature and for ARB is adoption of a 2030 target and the creation of a new Scoping Plan laying out the State's plan for achieving the 2030 target. As we have seen with AB 32 implementation, local action is an important part of achieving the State's target and this will likely continue to be true in the post-2020 world. Thus, only when the State has a plan for 2030, should CEQA analysis and thresholds then shift from the current 2020 horizon to the 2030 horizon. When a post-2030 plan is in effect, the horizon should shift again.

Set "Substantial Progress" as the Significance Threshold

Current practice for evaluation of GHG emissions in project-level documents is to use a comparison to a threshold, or to evaluate consistency with the "qualified" GHG reduction plan. All the thresholds used in CEQA documents in California, and all "qualified" GHG reduction plans in use for CEQA tiering, are based on meeting (or exceeding) the AB 32 reduction targets, but there are no local GHG reduction plans that have an actual plan to meet a 2050 target of 80 percent below 1990 levels.

Given the collective impact of (1) the scientific imperative for reducing GHG emissions globally, (2) the existence of the 2050 goal in EO S-03-05, (3) the SANDAG CEQA Appellate Court ruling, and (4) possible State legislative action to adopt a 2050 goal, there were be substantial pressure to change the framework for CEQA analysis of GHG emissions to account for the need to move beyond the 2020 AB 32 goals.

As argued in this paper, currently, local jurisdictions cannot on their own develop feasible plans to deliver jurisdiction-level emission reduction all the way to the 2050 goal because the effort to change the economic activity and technology in use will require the action of the federal and State governments, as well as the financial ability (through market means or government funding) to implement the necessary changes. While local jurisdictions can and should contribute to and support this long term effort, on their own they will be limited in their ability to deliver the full

amount of reductions needed. Furthermore, solving a large cumulative problem like GHG emissions entirely at the smallest levels of government is very likely to result in inefficient, cost-ineffective, piecemeal, and/or inconsistent solutions that will tax the financial and political will of local communities.

Even if some municipalities were to agree to a demanding future threshold based on the 2050 goal, as some advocates desire, given the difficulties in achieving such substantial reductions on a project-level basis, the end result is likely to be increasing numbers of EIRs with more statements of overriding considerations, which (1) would not result in additional GHG reductions, (2) would consume more local government time, effort, and cost, and (3) would not inspire motivation for local governments to engage in holistic local GHG reduction efforts.

Instead, this paper recommends that a new CEQA significance threshold for GHG emissions should be the following:

> *"Does the project impede substantial progress in local, regional, and State GHG emissions reductions over time toward long-term GHG reduction targets adopted by the State Legislature?"*

Allow CEQA Tiering from GHG Reduction Plans that Make "Substantial Progress" Toward Reducing GHG Emission Impacts

The recent San Diego cases detailed earlier in this paper have the potential to deter local jurisdictions from seeking to prepare and implement a GHG reduction plan because, essentially, they remove the "carrot" for CEQA streamlining and create too much uncertainty.

While CEQA Guidelines allow lead agencies to prepare GHG reduction plans for the purpose of CEQA streamlining of GHG emissions impacts, the recent San Diego rulings, taken at face value, could be interpreted to mean that no GHG reduction plan as currently written would meet the criteria set forth in CEQA Guidelines Section 15183.5.

To promote CEQA streamlining and encourage local agencies to prepare GHG reduction plans for communitywide GHG emissions, the Legislature should require a change to the CEQA Guidelines that will allow for tiering when a jurisdiction shows "substantial progress" toward meeting State legislatively-adopted GHG reduction goals.

This concept is not new and is similar to the language added to the CEQA Guidelines under Senate Bill 226 (SB 226) for infill development. SB 226 (2011) amended the CEQA Guidelines to provide a streamlined review process for infill projects. As stated in CEQA Guidelines Section 15183.3, the purpose of this section is to streamline review where the effects of an infill project have been addressed in a planning decision or by uniformly applicable development policies. This is directly comparable to the purpose and intent of GHG reduction plans, and is similarly written in CEQA Guidelines Section 15183.5. It is clear that GHG emissions reductions are best handled at a citywide, regional, or statewide level in order to attain the applicable GHG reduction goals, rather than on a project-by-project basis. Thus it is most beneficial for a jurisdiction to prepare a GHG reduction plan that addresses emissions on a communitywide level, rather than on a project-by-project basis. The purpose of a GHG reduction plan directly aligns with the intent of the Legislature when adopting SB 226.

Because the intent of the CEQA streamlining offered under SB 226 is so closely aligned with the purpose of the GHG reductions plans and CEQA Guidelines Section 15183.5, it important to note that

SB 226 allows lead agencies to tier off development standards that would "substantially mitigate" the environmental effects(CEQA Guidelines Section 15183.3 (b)(c)). If CEQA Guidelines Section 15183.5 was afforded the same flexibility by allowing tiering off a GHG reduction plan that made "substantial progress" toward reducing GHG emissions over time, it would provide lead agencies with additional flexibility, as well as provide more incentive for utilizing this kind of planning and implementation tool.

The CEQA Guidelines already allow for CEQA streamlining of impacts when there are programs, plans, and regulations that substantially mitigate impacts for infill projects. Therefore, it would make sense that a similar application should be applied for GHG Reduction Plans under CEQA Guidelines Section 15183.5.

Allow Partial CEQA Exemption for CAPs

One of the more absurd applications of CEQA is to require CEQA documents on CAPs. Many of the actions included in CAPs, such as energy-efficient retrofits or energy efficiency for new development, are unlikely to result in significant environmental impacts. However, some of the actions included in local CAPs can certainly have impacts on the environment, such as utility-scale solar energy facilities that might be proposed within sensitive habitat areas. On the other hand, project specific impacts from siting solar or similar facilities such as habitat impacts would be speculative unless specific locations were proposed in a CAP and would be subject to their own CEQA review. There is no exemption or streamlining for CAPs under CEQA. The analysis within the CEQA documents associated with CAPs is usually highly programmatic and non-location specific, meaning that those CAP elements that do result in potentially significant environmental impacts would require a project-level CEQA document regardless of the programmatic level analysis. As a result, the CEQA documents for CAPs by and large do not provide useful disclosure or consequential environmental mitigation.

A more productive approach would be to establish a partial CEQA exemption for the CAP adoption. The exemption would limit the scope of CEQA compliance to addressing GHG emissions only, and would eliminate the need to analyze other environmental impacts at the programmatic level, while mandating CEQA evaluation on the project-level elements from the CAP that may have environmental effects of their own. This approach would retain the ability for CEQA tiering from a qualified GHG reduction plan, and would eliminate an impediment to local CAP development, while still ensuring that project -level secondary environmental impacts are fully disclosed and mitigated as required by CEQA.

The Role of General Plans in a Post-2020 World

The following recommendations are made in light of maintaining and enhancing the role of local general plans in supporting post-2020 GHG reduction efforts.

Improve General Plan/CAP Coordination

There has been debate in the planning world about whether or not CAPs should be integrated into general plans. This is best decided on a case-by-case basis in order to respect the particular preferences, style, and local considerations that go into each general plan. Given that jurisdictions are limited in how many general plan amendments can be made in a year, and the amount of effort associated with such amendments and updates, some communities see advantages in having a

separate CAP process and CAP document; arguing that it can be more responsive to fast-changing conditions while maintaining the general plan as a more broad policy "charter" for the community. Other communities prefer a full integration of the general plan with the CAP to ensure that GHG reduction measures permeate all necessary aspects of local planning.

The post-2020 GHG reduction challenge should not dictate a local jurisdiction's choice unless the State mandates that climate change becomes a required general plan element. Such legislation would be reflected in future General Plan Guideline updates.

In any case, general plans and CAPs must still be brought into closer and better alignment for GHG reduction measures under the control of a local jurisdiction to be effective. However, the manner in which that alignment is conducted should be left to local discretion, provided that there is sufficient rigor, support, enforcement (where necessary), and monitoring to ensure that local GHG initiatives can be and are effectively implemented.

Establish 20-year Planning Horizons for General Plan CEQA Analysis to Better Match Regional Planning Horizons

As identified in this paper, GHG reduction plans are often prepared concurrently with general plan updates. GHG reduction plans seek to identify measures that would be implemented by a jurisdiction over in the near- and long-term to achieve GHG reduction goals. Therefore, a GHG reduction plan is tied to a clear timeline with a defined horizon year.

General plans typically have long-term timeframes, and many do not link general plan development to any timetable at all. This is because general plans guide growth and development based on development standards set forth in the land use plan, and on goals and policies identified in the general plan elements. Although the land use plan guides growth and development within a jurisdiction, actual growth is based on market conditions and demographic changes over time. While some GHG reduction plans go beyond 2020, most GHG reduction plans prepared since the arrival of AB 32 were drafted to achieve the 2020 target. As a result, the timeline identified in a GHG reduction plan may not have always been consistent with the general plan timeline.

The time horizon for environmental impact analysis for a general plan is another important sticking point, because under CEQA one must analyze the "whole of an action," per CEQA Guidelines Section 15378(a). For a general plan, this means the analysis must consider the reasonably foreseeable direct and indirect physical changes associated with the underlying land use plan, including reasonable buildout of all the parcels based on the land use designations. Many jurisdictions are unlikely to be built out by 2100, much less by the year 2050.

Furthermore, not all regional governments and transportation agencies have forecasted out to year 2050. This presents difficulties when drafting general plan CEQA analyses and can add to the confusion over "buildout" versus "horizon year." For example, long-range transportation plans, including the RTPs prepared by MPOs and congestion management plans (CMPs) prepared by local congestion management agencies, only forecast out to a 20-year planning horizon. Transportation modeling for a general plan usually depends on the circulation network and the cumulative traffic growth assumptions outside the jurisdiction, based on these regional transportation tools. Consequently, the horizon year for the traffic analysis in a general plan is typically capped based on the latest forecast year available from the regional/sub-regional transportation agencies. Other regional planning tools, such as urban water management plans (UWMPs), are also forecasted out to

only a 20 year planning horizon, and are becoming increasingly more important in light of the increasing drought concerns throughout the State.

General plans rely heavily on these various types of regional planning tools, most of which are forecasted out to a 20-year planning horizon. Yet, there is no cut-off date or mandate that the general plan impact analysis be required to consider growth and associated physical environmental impacts for only a 20-year planning horizon. As a result, there is a disconnect between how we analyze impacts for CEQA, and the regional planning objectives/forecasting data available.

To bridge this gap in how we plan for growth and how lead agencies must analyze impacts under CEQA, legislation should require that the CEQA Guidelines be amended to recommend that general plans analyze impacts over the same planning horizon required for other regional planning tools, such as water supply/demand, and transportation planning. If the CEQA Guidelines specifically redefined the planning horizon for a general plan as being on a 20-year basis, then it would link growth analyzed in the EIR to a clear and consistent planning horizon. Furthermore, nothing would preclude a jurisdiction from extending the planning horizon to a longer timeframe. Linking the analysis of the general plan EIR to a clear planning horizon would also provide benefits for GHG reduction planning by allowing the horizon analyzed in the general plan to be the same as the horizon analyzed for measures to achieve GHG reduction goals for the jurisdiction.

The Role of Climate Action Plans in a Post-2020 World

The following recommendations are made in light of maintaining and enhancing the role of local CAPs in supporting post-2020 GHG reduction efforts.

The Need for Legislative Action on Post-AB 32 Targets

The California Legislature needs to take action to adopt 2030 and 2050 GHG reduction targets that have the force of law throughout the State. A 2030 target is needed to inform State policy efforts for the RPS, vehicle standards, transportation fuel policy, the cap-and-trade program, and other regulations. In addition, a 2030 target would inform the next generation of local GHG reduction plans and would support CEQA thresholds and evaluation. The 2030 target should represent an ambitious target to keep the State on track for 2050 reductions, but should also be an achievable target based on available technologies and a realistic rate of social and economic change. A 2050 target from the Legislature is also needed to replace the limited legal applicability of the 2050 target in EO S-03-05.

As identified earlier in this paper, a critical issue facing planners and CEQA practitioners is that there no mandate that the State, as a whole, must achieve the long-term GHG reduction goals established in Executive Order S-03-05. As a result, there is no plan to achieve 80 percent below 1990 levels by 2050 (or an interim goal for 2030), and there is no guidance available on how local jurisdictions can address post-2020 GHG reduction goals. Yet, there is case law and substantial pressure from advocacy groups to go beyond 2020 when establishing GHG reduction programs. Without a mandate for post-2020 reductions for State agencies, local jurisdictions in California would have an insurmountable task in meeting the criteria outlined in CEQA Guidelines Section 15183.5. As a result, there would be little incentive for preparing local GHG reduction plans to achieve post-2020 GHG reduction goals.

In light of the rulings in *Sierra Club v. the City of San Diego* (2014) and *Cleveland v. SANDAG* (2014), it is clear that at some point the Legislature will need to consider interim targets to align the long-term

goals of Executive Order S-03-05 with the statewide plans and programs being considered. At the time of this white paper (March 2015), there were three separate proposals in front of the Legislature that would provide an interim target between 2020 and 2050, and that would ensure that State agencies begin to plan for policies, programs, and regulations to achieve the interim target.

- **Senate Bill 32 (SB 32)** was introduced by Senator Pavley and would require that (1) ARB approve a GHG emissions limit that is equivalent to 80 percent below 1990 levels by 2050, (2) an interim GHG reduction target be achieved by 2030 and 2040, and (3) State agencies adopt policies that ensure long-term emissions reductions in advance of the criteria for 2030, 2040, and 2050.
- **Assembly Bill 33 (AB 33)** was introduced by Assembly Member Quirk and would require that ARB—on or before January 1, 2017—submit an Update to the Scoping Plan that includes a GHG reduction goal for 2030, 2040, and 2050. This bill would require that ARB include quantified statewide goals and strategies to achieve the 2030 target.
- **Assembly Bill 21 (AB 21)** was introduced by Assembly Member Perea and would require that ARB—on or before January 1, 2018—recommend to the Governor or Legislature a specific target of statewide emissions reductions for 2030.

ARB Needs an Actual Plan for 2030 (and a Later One for 2050)

If the Legislature moves forward with any of these proposals and establishes a GHG reduction target for 2030, 2040, and/or 2050, then ARB should be required to draft a plan to achieve the new interim/long-range target(s), and State agencies should be required to adopt programs and regulations to support the statewide target(s). Adoption of a post-2020 target by the Legislature would go a long way toward supporting jurisdictions in their GHG reduction efforts, because local actions alone are insubstantial compared to the top-down reductions that could occur if GHG reduction mandates are implemented at the State level. This would create the context within which local and regional governments could evaluate and identify the fair-share role of local governments to help the State meet its overall targets.

ARB should also conduct ever-more detailed scenario analysis for pathways to meet the selected legislative target for 2050. This will help the public and decision makers to understand how near-term policy and regulation to support the 2030 target will relate to the further effort necessary to meet the identified 2050 target.

Create 2030, 2040 and 2050 Scenarios/Calculators

Building on the groundbreaking work in the UK for their 2050 Calculator, the State needs to create a 2050 California Calculator to inform Californians as they face the coming 2050 challenges. ARB would be the logical author of the statewide calculator. Furthermore, a calculator should be prepared not only for the State as a whole, but should be extended to allow jurisdictions to examine their local emissions as well to apply different scenarios. Given the need for interim target planning in the lead-up to 2050, the models should also include interim years of 2030, 2040 and 2050.

In order to develop statewide and local-use calculators, there will be a need to create a rough consensus about acceptable assumptions for modeling population and economic growth, BAU conditions, and reduction strategy effectiveness.

Ideally, such calculator efforts would be coupled with economic and cost-effectiveness modeling, in order to best inform the public and decision makers as to the economic implications of different pathways to 2050.

"Walking to Run"

As demonstrated throughout this paper, without either a State legislative reduction target and a realistic State plan for reducing GHG emission beyond 2020, it will not be feasible in the foreseeable future for local jurisdictions on their own to adopt enforceable GHG reduction strategies to meet a 2050 reduction target consistent with EO S-03-05 2050 goals, or to achieve progress toward the 2050 goal for interim years.

Instead, the prudent approach is for local GHG reduction planning to focus on the realistic and achievable GHG reductions that are under the control or substantial influence of local governments themselves. Local GHG reduction planning will need to become increasingly more ambitious on a phased basis. CAPs should be updated and expanded periodically to reflect the emerging State (and possibly federal) framework for deeper future reductions.

The test for local CAPs and associated CEQA practices concerning GHG project analysis should be whether local action and project mitigation results in reasonable local fair-share of GHG reductions over time, showing substantial progress toward the long-term State reduction targets.

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