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## California's Climate Change Planning: Policy Innovation and Structural Hurdles

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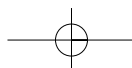
### Introduction

In the absence of national-level action in the United States during most of the 2000s to plan for climate change, states, regions and local governments have taken the lead. In the US system of federalism, states can adopt a wide range of policies that go well beyond those of the national government. The State of California, for example, has air quality regulation substantially stronger than the US as a whole, and many states have passed environmental quality acts and energy policies tougher than those approved in Washington. Local governments for their part have great authority over land use planning, building codes, transportation systems, recycling, water systems and other areas of activity important to reducing greenhouse gas (GHG) emissions and adapting to climate change.

As of 2008, 29 states had prepared some sort of climate change plan, and more than 170 local governments had joined the Cities for Climate Protection (CCP) campaign which requires that a plan be developed. However, most of these plans are only a first step towards addressing the

problem (Wheeler, 2008). They typically establish policy to green the public sector by requiring public buildings to be certified under the Leadership in Energy and Environmental Design (LEED) standards, public fleets to be energy efficient or to use alternative technologies or fuels, and public agencies to use energy audits to improve the efficiency of their facilities. Most states and a few cities have also adopted renewable portfolio standards for utilities, requiring that a certain percentage of electricity sold in their jurisdiction be generated from renewable sources.

However, neither states nor cities have developed or implemented the full range of programmes needed to reduce GHG emissions. Few have adopted regulation for private sector activities or allocated substantial resources towards climate change programmes. Additional legislative approval is needed for many proposed actions, and this will be politically difficult to obtain. Almost no jurisdictions have adopted programmes for adapting to a changed climate. Existing US state and local climate change plans are in short largely aspirational, setting out ambitious goals and developing initial invento-



ries of GHG emissions, but without the regulatory changes, funding or political backing needed to begin actually reducing emissions.

Still, some jurisdictions are beginning to put together the sort of sustained, ongoing planning effort needed to address the global warming problem in the long run. California is among these leaders at the state level. Many other states are following its lead, for example by adopting California requirements for reduced motor vehicle emissions. Given that state programmes have often been a laboratory for future national efforts (Rabe, 2002), California's climate change initiatives may well influence future federal actions. California's programmes are still in the early stages of implementation, with most relevant policy and legislation having been established only in 2005 and 2006. But, as with efforts to address local air pollution in recent decades, it looks likely that the state will become a trendsetter on climate change planning.

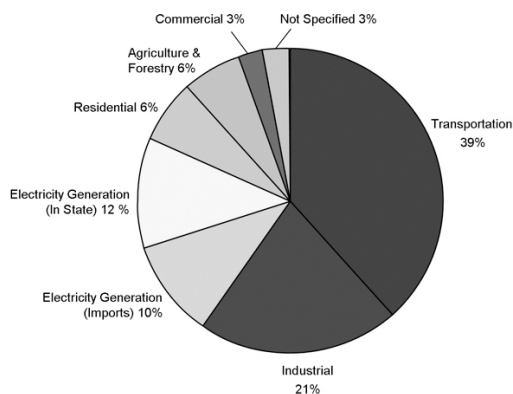
This chapter analyses California's climate change planning framework, seeking to identify elements that are particularly innovative or promising as well as obstacles to implementation and achievement of the state's GHG reduction goals. This analysis is based on review of planning documents, research reports, staff presentations and third-party comments, as well as interviews with state and local officials and a review of the broader literature on climate change policy nationally and internationally. It builds upon a previous project in which the author reviewed climate change plans of 29 states and more than 50 municipalities around the US, seeking to identify characteristics and limitations of American climate change planning through 2008 (Wheeler, 2008).

## The California context

It should be said at the outset that California is different from other US states in ways that affect its ability to plan for climate change. In terms of climate, most parts of the state have milder winters than most of the rest of the country, reducing structural heating needs. The state also tends to have abundant sunshine, making solar

energy a more viable option, and has benefited from extensive hydropower, geothermal and wind resources. These factors lower per capita energy consumption and increase the renewable portion of the state's electric generation portfolio relative to other states. Since adoption of its Title 24 energy efficiency codes in 1978, California has also had the nation's strictest regulations for building construction, further lowering GHG emissions per capita.

However, California is also known for sprawling, automobile-oriented urban form, epitomized by Los Angeles, and for high levels of motor vehicle use. Some 40 per cent of GHG emissions in the state come from transportation (California Energy Commission (CEC), 2006), compared with 28 per cent in the rest of the country (United States Environmental Protection Agency (USEPA), 2007). In some jurisdictions, more than 50 per cent of GHGs arise from transportation. The state's development has also depended on pumping enormous volumes of water long distances, a very energy intensive activity with corresponding GHG emissions. Such factors reduce the energy savings gained from the mild climate and tough building regulation, and skew the source distribution relative to other states. Overall, Californians produce fewer GHG per capita than other Americans, an average of about 14 tons of CO<sub>2</sub> equivalent gases each year, only 59 per cent of the national average (23.4 tons).



Source: California Air Resources Board (2009)

**Figure 10.1** GHG emissions sources in California

Politically the state's electorate and legislature have been Democratic in recent years. However, since the early 1980s governors have been Republican, with the brief exception of former Governor Gray Davis in the early 2000s, a Democrat who was recalled in a special election in 2003 and replaced by Republican Arnold Schwarzenegger. California is known for a history of proactive environmental policy, especially regarding air quality, and is widely considered a trendsetter on political, cultural and economic issues. This unique culture has made the state a fertile ground for development of climate change policy.

## California's climate change planning to date

Building on the state's tradition of cutting-edge environmentalism, California policy makers have expressed concern about global warming for the best part of three decades (Franco et al, 2008). In 1988 a pioneering state law, Assembly Bill (AB) 4420 (Sher), led to a study of global warming risks and early efforts to develop a GHG inventory. The resulting 1991 report by the California Energy Commission helped move the climate change issue into public discussion. During the 1990s individual cities such as San Francisco, San Jose and Santa Monica initiated sustainable city programmes, and the state was home to the CCP campaign initiated by the International Council on Local Environmental Initiatives (ICLEI; recently renamed ICLEI – Local Governments for Sustainability). This campaign assisted local governments across the nation and internationally in developing climate change policy. Study of policy options for GHG mitigation was conducted at the staff level within state government (CEC, 1998), although until Schwarzenegger leadership did not exist in the governor's office or legislature to take action on such analysis.

The state's climate change planning efforts moved to another level in the early 2000s. In 2000, Senate Bill (SB) 1771, authored by long-time environmental legislator Byron Sher, established the California Climate Action

Registry. This non-profit agency enables public and private entities throughout the state to voluntarily record their emissions and has played a key role in standardizing emissions reporting protocols. Such standardization is essential to future implementation of any market-based emissions trading framework. In 2002, AB 1493 (Pavley) set forth lower standards for CO<sub>2</sub> emissions from motor vehicles sold in the state, a step that was widely seen as a way around the federal government's long-time refusal to raise mileage standards for cars and light trucks. Sixteen other states then announced that they would implement the California standard. To enter into effect, this regulatory measure required a waiver from the US Environmental Protection Agency (EPA). The Bush Administration stalled this request and eventually declined it in late 2007. However, the state litigated the Bush decision, and standards similar to California's were eventually endorsed by the Obama administration.

In 2005 Governor Schwarzenegger's Executive Order S-3-05 set emissions reduction targets of 2000 levels by 2010, 1990 levels by 2020 (approximately 30 per cent below 2020 business-as-usual levels and 15 per cent below 2008 levels), and 80 per cent below 1990 levels by 2050. This trajectory of reductions went far beyond the Kyoto goal (for the US, 7 per cent below 1990 levels by 2008–2012) that had been widely promoted in US public discourse, for example through the Mayor's Agreement on Climate Protection initiated by Seattle Mayor Greg Nickels in 2005. The California targets can be seen as heralding a new generation of climate change planning in the US, stemming from international acknowledgement during the mid-2000s that far greater GHG reductions are necessary in order to avoid dangerous climate change. The 2005 Executive Order also directed the Secretary of the California Environmental Protection Agency (Cal EPA) to convene meetings with seven other agencies to coordinate actions on this topic, and to issue biannual reports on progress towards reducing the state's emissions as well as the impacts of global warming on the state. The resulting Climate Action Team (CAT) now includes representatives

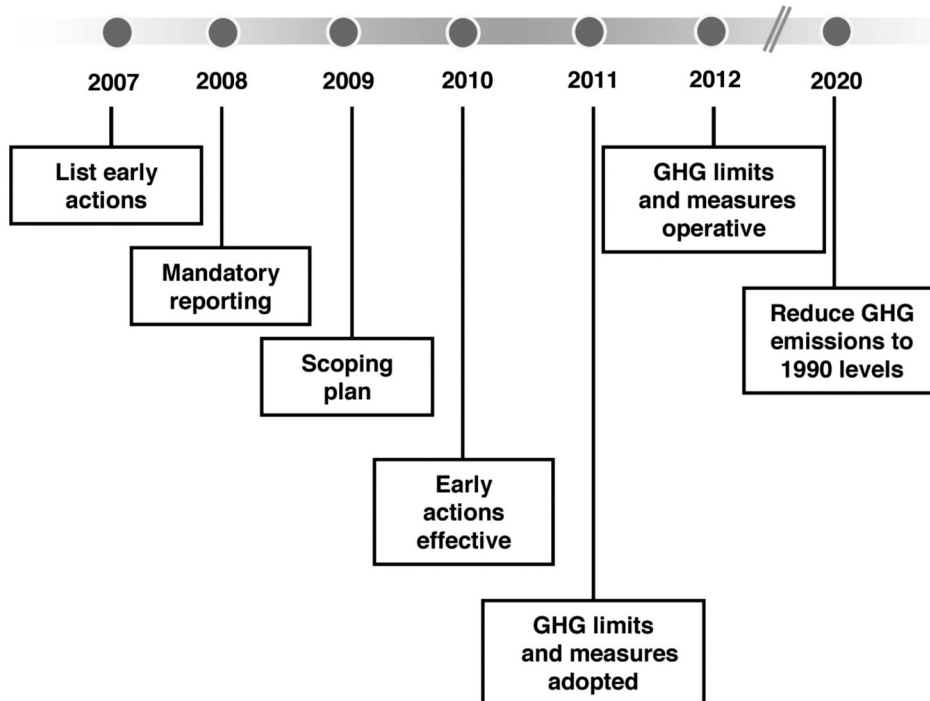
from 19 agencies, and has been the central coordinating body for the state’s climate change planning.

In 2006 two pieces of legislation addressed electricity generation in the state, in particular SB 107 (Simitian) that established a renewable portfolio standard of 20 per cent by 2010 for the state’s investor-owned utilities. Most public utilities have announced that they will meet or surpass this target. But the biggest breakthrough was AB32 (Nunez), the California Global Warming Solutions Act of 2006, which set the governor’s 2020 reduction target into law and directed the state’s Air Resources Board (ARB) to begin implementation of measures to meet this goal. Among other steps, AB32 required ARB to set a statewide emissions limit equal to 1990 levels, to require mandatory emissions reporting for large GHG emitters, to identify early actions that could begin reducing emissions, and to consider environmental justice implications of climate change policies. The Act also required the ARB to prepare a Scoping Plan

of proposed actions, and set a series of deadlines for this and other activities, culminating in regulations becoming operational by 1 January 2012.

Since 2006 AB32 has thus been the driving force behind California’s climate protection planning, activating powerful regulatory institutions in the state such as the ARB that had previously been developed to combat southern California’s notoriously bad local air pollution. Unlike plans in most other states, which were developed as advisory documents by state agencies or governors’ offices, AB32 is a law passed by the legislature and signed by the governor directing state agencies to take the necessary actions necessary to reach GHG reduction goals. These agencies now have substantial authority to develop a wide range of implementing regulations and programmes themselves.

In September 2007 the ARB proposed 44 early action measures for the 2007–2011 time frame, including the following steps (CAT, 2007):



Source: California Air Resources Board (2007)

**Figure 10.2** Timetable for implementation of AB32 in California

- establish low-carbon fuel standard (reduce carbon intensity of CA fuel 10 per cent by 2020);
- restrictions on high global warming potential (GWP) refrigerants;
- landfill methane capture;
- regulate off-road diesel emissions;
- ban SF<sub>6</sub> in many applications;
- restrict high GWP applications in consumer products;
- 'SmartWay Transport': improvements in truck efficiency;
- reduction of perfluorocarbons from the semiconductor industry;
- 'Green Ports': provide electricity to ships in port;
- refrigerant tracking, reporting, and recovery;
- low carbon-fuel-based production of cement;
- anti-idling enforcement for trucks.

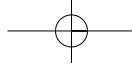
A few of these actions, such as providing electricity to ships in ports, were quickly implemented by the ARB. Others will require more lengthy implementation processes or action by local governments.

In June 2008 the ARB released its draft Scoping Plan (ARB, 2008). This document, based on the work of three advisory groups and 12 CAT sub-groups in different issue areas, outlined a wide range of more substantial longer-term actions in 18 different areas calculated to help the state reach the 2020 target. Main proposed policies included adoption of a market-based cap-and-trade system linked with other states in the western US, an increase in the renewable portfolio standard for utilities to 33 per cent, strengthening of building and appliance efficiency standards, and implementation of the Pavley standards for motor vehicle efficiency and other transportation measures. The Scoping Plan quantified prospective emissions reductions from each strategy. In essence, this plan and other state plans like it represent a real-world version of the 'wedges' approach to GHG reduction popularized by Steven Pacala and Robert Socolow in 2004, which sought to identify a handful of particularly promising strategies to reduce global GHG emissions

globally by the necessary amount (Pacala and Socolow, 2004). In this case, strategies have been screened for political and financial feasibility in the State of California, and no feasible strategy has been omitted no matter how small the potential reductions.

The draft Scoping Plan is notable for what it leaves out as well as what it includes. Land use is barely mentioned, although factors such as the compactness of communities and balance of land uses are widely viewed as affecting levels of driving and emissions (Ewing et al, 2007). Broad-based pricing initiatives, such as carbon taxes, gas taxes, road tolls, congestion pricing and feebates for purchase of efficient/inefficient vehicles, are also absent. Agricultural measures are not mentioned beyond recommended use of manure digester systems. The politically touchy issue of population is not discussed, although the state is projected to grow from 38.1 million residents currently to 59.5 million by 2050 (California Department of Finance, 2008), and it can be argued that such population growth will make efforts to cut overall emissions extremely difficult. Perhaps most surprisingly, the Scoping Plan does not aim to reduce motor vehicle use, even though a previous report from the ARB's Environmental Technical Assistance Advisory Committee (ETAAC) had stated that 'it is time to rethink current methods of mobility for both freight and people ... decreasing Vehicle Miles Traveled (VMT) is critical to meeting AB32 GHG emission reduction goals' (ETAAC, 2008, pp1-9).

The Scoping Plan does indicate that a number of these missing policy areas are under study for potential future adoption. Still, this document shows the ARB to be taking a highly pragmatic approach in which some of the most controversial potential strategies (changing land use, reducing motor vehicle use, instituting fees, promoting family planning to reduce population growth) are downplayed or omitted. Lack of land use strategies also reflects the ARB's predominant focus on 2020 (a twelve-year time frame in which land use changes will have relatively small effect) rather than 2050 (by which these changes will presumably produce far larger results). Legislation approved by the legislature and

**Table 10.1** Proposed California strategies for meeting 2020 goal of 1990 levels

Recommended strategy	Millions of metric ton CO <sub>2</sub> -eq. reduction by 2020
GHG emissions standards for vehicles	31.7
Increased efficiency for new appliances and buildings	26.4
Require utilities to provide 33% of electricity from renewables	21.6
Reformulated motor vehicle fuels	16.5
Reducing refrigerants and other non-CO <sub>2</sub> greenhouse gases	16.2
Forest management/forest fire prevention	5.0
Efficiency measures for existing vehicles, such as improved tyre maintenance	4.8
Increased water-related energy efficiency	4.8
Requiring more energy-efficient transportation of goods, such as electrification of ships in port	3.7
Increased efficiency standards for medium/heavy duty vehicles	2.5
California solar programme	2.1
Encourage local governments to build more walkable communities/reduce commuting	2.0
Reduction in state government carbon footprint	1.0–2.0
High speed rail	1.0
Landfill methane capture standards	1.0
Voluntary dairy methane capture	1.0
Unspecified cuts through cap-and-trade programme	35.2
Energy audits for large industrial emitters	unknown
TOTAL	At least 176.1
GOAL	169

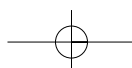
Source: California Air Resources Board/Sacramento Bee (2008).

signed by Schwarzenegger in late 2008 will require development of regional ‘blueprint’ plans, coordinating land use, housing and transportation, and will give ARB the authority to require development of alternative plans if those submitted do not appear likely to reduce GHG emissions. But such plans will be advisory, and there is much political resistance to a stronger state role in regulating land use.

## Policy innovation

Through such efforts to date, the State of California has been able to gear up a remarkably strong planning effort related to climate change. Many state agencies have been involved, coordinating their work with one another, meeting deadlines and producing high quality reports and planning documents. Separate pieces of legislation and executive action have built on one

another, as for example AB32 built on Executive Order S-3-05 and both built on AB1493 and SB1771. Relatively strong targets have been set,<sup>1</sup> and with the release of the early action items and the draft Scoping Plan systematic action to meet them has been initiated. Media reaction to these initiatives has been primarily positive; Schwarzenegger in particular has received favourable press coverage around the world. The most serious crisis in the state’s process arose in 2007, when Schwarzenegger fired ARB chairman Robert Sawyer and the agency’s Executive Director Catherine Witherspoon resigned in protest. Both cited political pressure from the governor’s office against strong climate change action (Wilson, 2007). However, Schwarzenegger avoided a major derailment of climate change planning by appointing Mary Nichols to the Executive Director position. An experienced Sacramento veteran, Nichols is highly regarded by environmentalists and has



helped keep the agency on track towards its 2012 implementation deadline.

Although a number of other states have also been able to develop broad-based climate change strategies, the scope and depth of climate change planning in California as well as the potential for implementation of a broad range of policies goes beyond virtually all of these. The process used by many states, facilitated by the non-profit Center for Climate Strategies, convenes stakeholder groups over many months to produce a plan with around 55 action items. Some elements of these plans can be implemented through executive order, but most require additional legislative action. Once developed, state plans often languish awaiting legislation or executive action. Changes in political leadership have often sidetracked state efforts as well.

Particular innovations in California's climate change planning fall into several categories. The first has to do with goals. California was among the first jurisdictions to move well beyond Kyoto by adopting a very deep long-term target for GHG emissions reductions (80 per cent below 1990 levels by 2050). Three years later, this 2050 goal is still stronger than the vast majority of state climate change plans, most of which do not aim beyond 2020 at all (Wheeler, 2008). Seen in a global context, setting such a long-range target supported by science can be seen as a major step towards a successful post-Kyoto framework of climate change policy.

Secondly, California's climate change planning represents perhaps the fullest expression to date of a 'backcasting' approach to planning in which necessary targets are set and policy makers work backwards from that point to determine the necessary steps required. Such an approach is radically different from many other planning processes in which general goals or visions are set forth as well as policies aiming in their direction, but without rigorous quantification of likely success or consistent follow-up and revision to ensure success. These usual 'muddling through' processes have been seen as a pragmatic response to political realities in a pluralistic society (Lindblom, 1959). However, they often never reach their desired goals, and are inadequate to the task of addressing environmental crises in

which the end state is determined by scientific reality rather than the more flexible needs of social systems and political acceptability. Backcasting approaches to planning have been employed before, for example in air quality regulation and efforts to preserve habitat for endangered species. But never has this style of planning been attempted on a scale that will require change in virtually every aspect of economy and society. California's climate change planning may thus be seen as a significant step towards a new style of planning appropriate to sustainable development generally.

For such a backcasting approach to gain political traction, it must be thoroughly supported by science so as to be credible. Scientific research into climate change effects and technology options is a third main area in which California has been an innovator. Using funds from a surcharge on utility bills in the state, the California Energy Commission's Public Interest Energy Research (PIER) programme annually awards up to \$62 million for energy research and has sponsored 146 technical studies related to climate change since 1998. The CEC has also sponsored summary documents such as the 2006 'Our Changing Climate' report that have helped galvanize public concern about climate change (California Climate Change Center, 2006a). It is currently sponsoring a Scenarios project looking at implications for the state of different IPCC scenarios for future emissions (Cayan et al, 2006). California universities, corporations and labs have undertaken much additional research related to climate change, with or without state support; the role of national labs such as Lawrence Berkeley Laboratories is particularly worth mentioning. Although more research into social marketing and other political, social or institutional aspects of implementing climate change policy is needed, this massive effort at directed research is an important element of the state's climate planning process.

A fourth main area of innovation, as mentioned previously, lies in inter-agency coordination and stakeholder involvement. Rabe (2002) concluded that bipartisan support and coalition-building are important elements of

successful state climate change planning efforts, and California seems to be incorporating these elements. Groups such as the CAT, the ARB and the CEC represent high-level, public involvement by state officials responding to climate change. Whereas officials in many other states were brought together in one-time processes to create climate change plans, California's efforts represent ongoing coordination that will presumably continue until at least 2020 or even 2050. At a staff level, the CAT's 12 sub-groups have provided extensive opportunities for networking and information-sharing between agencies. Other forums such as the annual Climate Change Research Conferences in Sacramento sponsored by the CEC and Cal EPA develop processes of education, diffusion and coordination further.

State Attorney General Jerry Brown's creative application of the California Environmental Quality Act (CEQA) to local planning represents yet another policy innovation. A colourful character, who is a former governor, former mayor of Oakland, and former candidate for President of the United States, Brown has used his current office to force local governments in the state to consider the climate change impacts of their policies. CEQA requires environmental impact review of all public and private projects in California, and has been a centrepiece of environmental protection in the state since its inception in 1970. However, climate change impacts of projects have never been considered until recently. In 2007 Brown sued San Bernadino County for not addressing GHG emissions within the Environmental Impact Report (EIR) for its General Plan, and reached a settlement under which the county agreed to include such analysis. His office has since sent letters to dozens of other California jurisdictions requesting specific changes within EIRs to add climate change analysis, striking fear into the hearts of many local officials, many of whom are pre-emptively adding climate change analysis and policy alternatives in order to avoid litigation. Through his interpretation of CEQA Brown is in effect establishing policy for the entire state regarding environmental review of climate change impacts, a course of action with

very large implications for day-to-day local planning. Somewhat belatedly, the Governor's Office of Planning and Research is drafting new CEQA guidelines that will formalize such requirements.

California's nascent cap-and-trade emissions trading system represents a final area of innovation for the state. Such a market-based system was previously applied to sulphur dioxide emissions in southern California, but has not been otherwise used in the US. Indeed, the European Union represents the only large-scale GHG emissions trading system in the world at this point. Because of its size, California can unilaterally initiate such a system without waiting for multi-state regional systems to develop. California intends its system to be a main part of the Western States Initiative in the long term, but will initiate activities of its own if need be. Within the state, intensive thought is now going into the potential design of such a system, for example, how to apportion or auction the emissions permits to begin with (e.g. California Air Resources Board Market Advisory Committee (MAC), 2007).

These policy innovations have been made possible by a number of factors. Political support from Governors Davis and Schwarzenegger as well as a Democratic-controlled legislature has certainly been important. The large size and economic clout of the state are also factors. But a major element has been the state's history of air quality and energy initiatives, which have left it with strong agencies such as the ARB, CEC and Cal EPA that are used to taking aggressive regulatory action. AB32 specifically empowers the ARB to use its regulatory authority to reduce emissions, and to levy fees in order to fund these steps. Such authority gives California agencies unusual power in implementing climate change policy and raising funds to support oversight, compared with other states.

## Structural obstacles

Although California's process bears considerable promise, the state faces large structural obstacles in reaching its 2020 goal let alone the 2050



target. These obstacles are typical of other US states, but in some cases are amplified by California's size, history and diversity. The state clearly has the technical ability and resources to mitigate emissions – there is evidence not only that it can do this but that many climate change mitigations may yield a net economic benefit (California Climate Change Center, 2006b). But whether California or any other state can take action institutionally and politically to reach such climate change goals is open to question.

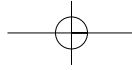
One basic problem is that control over land use is almost entirely local: as in most other parts of the US California has no history of statewide land use planning, as do Oregon, Washington, Maryland, Vermont, Florida and a few other states. Furthermore, California regional agencies have little authority to mandate 'smart growth' or other land use planning strategies. The regional 'Blueprint' plans that are currently being touted as the state's approach to smart growth are entirely voluntary in nature, meaning that they can simply be ignored by local governments intent on growth. While they do have some impact through education of policy makers and peer pressure upon local governments, these plans are only likely to have teeth if state infrastructure funding is conditioned upon local compliance, a step that has not yet happened and that would be resisted politically. Since transportation is such a large share of California's GHG emissions, and since land use changes are likely to be necessary to bring about deep reductions in transportation emissions, the state has a problem.

A related challenge is the state's tax structure which, following the adoption of Proposition 13 in 1978 and subsequent tax-cutting measures, actively encourages motor vehicle-dependent sprawl and leaves state and local governments strapped for resources. 'Fiscalization of land use' is a major problem in the state (Fulton and Shigley, 2006): local governments zone far-flung parcels of land for malls, big box stores and motor vehicle dealerships in an attempt to gain sales tax revenue, while avoiding much-needed land uses such as multifamily housing that would require services without providing compensating funds. The result is to encourage growth in

motor vehicle use and related GHG emissions. Without sufficient resources and faced with requirements for two-thirds votes of the electorate to raise taxes, local governments are having difficulty in implementing programmes that could reduce emissions, ranging from energy and water conservation to transportation and recycling. Such local programmes are likely to depend on assistance from higher-level government (Bailey, 2007), but the state itself is perpetually broke, unable to adequately fund important services such as schools. Proposition 13 is deeply entrenched politically, and is unlikely to be revoked anytime soon.

A related challenge is political: there is a deep divide between the two main political parties in the state, one of which is largely responsible for creating the current structural problems. With the Republican Party and its business allies sceptical of climate change in general, against policy measures perceived as regulatory burdens, and fiercely opposed to any actions resembling tax increases, the challenge of developing climate change policy, funding initiatives and changing pricing structures to promote energy conservation and reduce emissions is very large. For example, lobbyists from the oil industry, auto dealers, the California Chamber of Commerce and the Howard Jarvis Taxpayers Association have successfully mobilized against bills such as AB 2558 in 2008, a measure which would have allowed California regions the ability to impose climate mitigation fees on gasoline or vehicle registrations, and to use the proceeds to fund programmes such as public transit.

The political problem is amplified at the state level by a constitutional requirement that budgets be passed with a two-thirds majority. Although the Legislature is strongly Democratic, this provision essentially gives the minority Republicans veto power over new spending. The ARB can finance some initiatives through fees that it adopts itself, but major new financing for efforts such as retrofitting state buildings or providing financial incentives for alternative energy would need financing through the Legislature. Other initiatives, such as for a proposed high speed rail line between Los Angeles and the Bay Area, would be referred to



the voters through referenda subject to the same two-thirds requirement, and are likely to be vigorously opposed by conservative political forces.

A final, more general structural problem has to do with the extent to which resource consumptive lifestyles are entrenched within California society, like US society generally. The ARB's approach to the 2020 target has been to identify relatively feasible regulatory changes that can produce the needed emission reductions, such as improving motor vehicle efficiency, reformulating fuels and raising renewable requirements for electric utilities. This strategy may work for 2020. But the much deeper cuts in emissions that will be needed for 2050 essentially require an end to the fossil fuel-based economy so central to California lifestyles. People will almost certainly need to drive and fly far less, challenging the ethic of mobility central to the culture. Vacation homes, recreational vehicles, powerboats and large houses may become problematic due to their resource demands. Living in hot, desert areas such as much of southern California may also become problematic due to needs for air conditioning and imported water. Californians do not seem ready to question such basic elements of their lifestyles, and a fundamental reorientation of social and individual values would be required to do so. Many experts view changes in lifestyle and related pricing of resources as among the most difficult measures to implement (Shaheen, 2008).

## Conclusion

California, then, illustrates some of the more creative planning efforts to address global warming, and some of the most deeply entrenched structural obstacles to doing so. Whether the state can maintain the rate of progress on this topic made during the 2000s and achieve its long-term goals remains to be seen. Prospects for the short term are good; longer-term change will be more difficult. Much may depend on exogenous factors such as whether the price of petroleum continues to rise, whether the US adopts tough climate

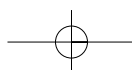
change policy at a national level, and whether American social norms and lifestyles change across the board. The stakes are high: if California can help lead the US as a whole towards a more sustainable way of life, chances are greater that developing nations such as China and India will be motivated to reduce their own emissions, and that the world overall can respond to the global warming challenge. If California and the US cannot change in this way, future prospects are not nearly as bright.

## Note

- 1 It is still debatable whether these targets are strong enough. The goal of 80 per cent reduction from 1990 levels by 2050 is the strongest target actually being adopted by jurisdictions internationally as of 2008, but offers only a 50 per cent likelihood of holding climate change to two degrees Celsius (Luers et al, 2007). Monbiot (2007) argues that 90 per cent reductions by 2030 are needed to do this. Also, the target of reaching 1990 levels in 2020 represented only a 16 per cent reduction from 2005 levels, or about 1 per cent a year. This trajectory is not nearly strong enough to reach the 2050 target, which would require annual reductions of between 3 and 4 per cent.

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