

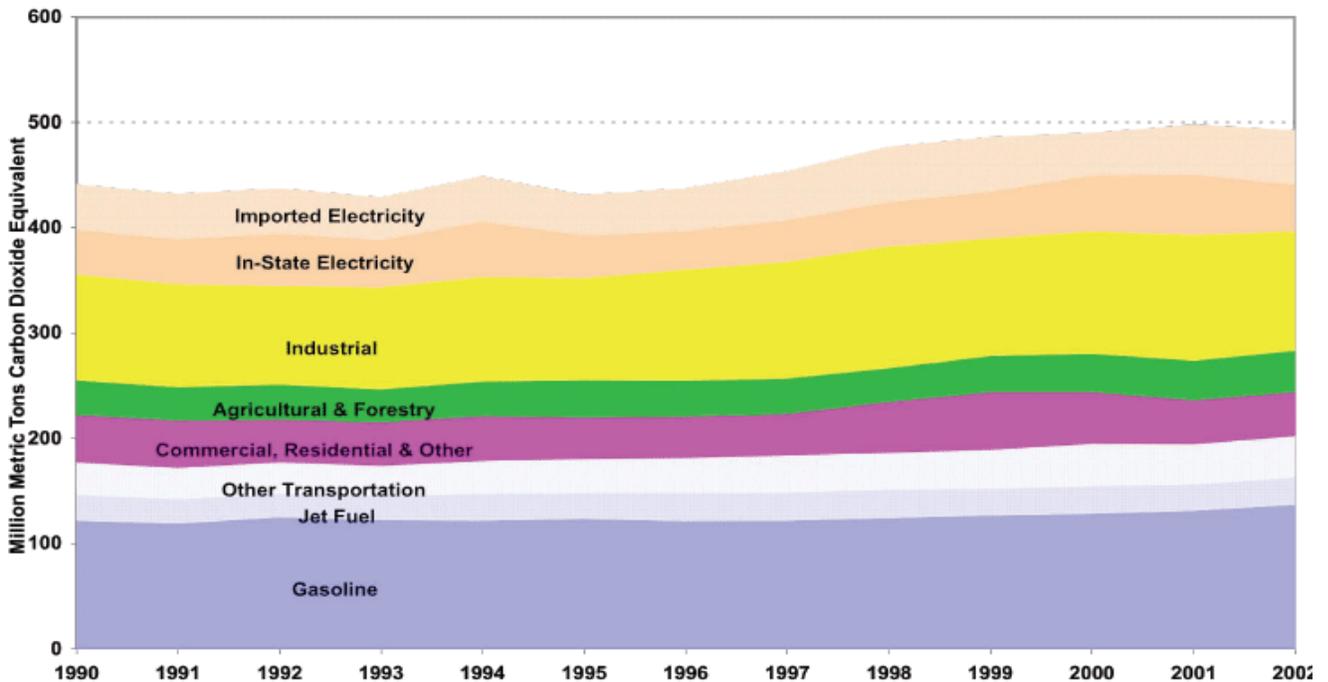


Solving Global Warming One State at a Time

In the absence of a national policy to stop global warming by reducing global warming pollution (GWP), should states act alone? California has already set several precedents. In 2002 assembly bill 1493 was passed, mandating reductions in GWP from cars and light trucks. This model has already been adopted or is being considered in eleven other states. In June 2005, Governor Schwarzenegger established greenhouse gas reduction targets through an executive order. This year, the California legislature will consider a bill - AB 32 (Pavley) - which would set legally binding, mandatory limits on global warming pollution. Lastly, this winter in the Northeast, seven states formally launched the Regional Greenhouse Gas Initiative (RGGI). In this article, we will look at the economic and public health advantages of California (or other states) acting unilaterally to address sources of GWP. (Note: this article will use the term "low-carbon" to refer to energy sources that produce significantly less GWP than current sources).

Sources of California's Pollution

The California Energy Commission produced an inventory of GWP in their 2005 report, Inventory of California Greenhouse Gas Emissions¹:



¹ Bemis, Gerry and Jennifer Allen. Inventory of California Greenhouse Gas Emissions and Sinks: 1990 – 2002 Update. Transportation Technology Office, Fuels and Transportation Division, California Energy Commission. Publication #CEC-600-2005-025. June 2005.

84% of California's GWP comes from five sectors:

- 40.1% Transportation
- 15.7% Industrial
- 10.9% Electric Generation (out of state)
- 9.2% Electric Generation (in state)
- 8.5% Residential and Commercial

The primary source of GWP from "Industrial" and "Residential and Commercial" categories is the burning of natural gas for heating. Another way to view the sources of GWP is about three-quarters of GWP comes from:

- 41% Transportation fuels
- 20% Electricity
- 15% Natural gas

Reducing GWP will mean a combination of increased efficiency and low-carbon alternatives for electricity generation, natural gas heating and transportation fuels.

The ultimate goal is to significantly reduce worldwide concentrations of GWP in the atmosphere and stabilize the climate. California is the second largest emitter of GWP in the United States (Texas is number one) and the 12th largest in the world. California's long-standing energy efficiency and renewable energy programs have achieved significant results. According to the California Energy Commission, "In 2001, California ranked fourth lowest in carbon emissions per capita and fifth lowest among the states in carbon dioxide emissions from fossil fuel consumption per unit of gross state product." Even so, the atmosphere needs absolute reductions in GWP and California's emissions are increasing.

Although it will set a leadership example, California unilaterally reducing its own GWP will not, by itself, stabilize the California climate. Thus we need to show that early action by California (or any state) will be a net economic benefit to the state through the sum of four factors:

- Energy cost reductions through efficiency
- Competitive alternative power/fuel sources
- Public health benefits from cleaner air
- New competitive industries

Efficiency

Sometimes deemed "no regrets" strategies, efficiency refers to those investments in new or modified vehicles, motors, products, buildings, etc. that provide comparable or improved service and also result in a lower use of electricity, natural gas or fuel. The California Climate Action Team² was established by Governor Schwarzenegger to develop a plan to reduce GWP. The recent economic study³ written by the California Climate Action Team showed that by 2020, a 25 percent reduction in global warming pollution relative to business as usual could be accomplished through

² See website: <http://www.climatechange.ca.gov/climate_action_team/index.html>.

³ California Environmental Protection Agency. Climate Action Team Report to the Governor and Legislature (Draft). Dec 8, 2005.

efficiency strategies at an investment of \$8.1 billion resulting in a savings on energy costs of \$17.3 billion and thus a net benefit of \$9.2 billion. Energy savings can be broken down into:

- \$6.5 billion in electricity
- \$2.1 billion in natural gas
- \$8.7 billion in petroleum

Alternative Power/Fuel

Alternative sources of electricity that produce less carbon include solar, wind and biomass. It is likely that those sources will continue to drop in price due to technology advances and volume production. To cite one example, the Energy Foundation looked at the impacts if the cost of solar installations dropped from the current \$5.50-\$6.50 per installed watt of power to \$2⁴. At the lower price, solar without subsidies would be cost-effective for most homeowners (\$2 per installed watt would be below 10 cents/Kwatt-hour).

As we have documented in a previous report – “Can Biofuels Replace Oil?”⁵ – non-petroleum transportation fuels have the potential to be less expensive than existing fuels. In fact, ethanol (a gasoline additive and replacement) was less expensive than gasoline during 2005. It is not unreasonable to forecast that biofuels will drop further in price as we learn how to make them from a wider variety of plant matter and agricultural waste. New technologies such as "plug-in hybrids" (i.e. a hybrid car that can either run on gasoline or can be recharged at home from the electric grid), will be able to substitute gasoline for less expensive electricity for city driving.

A recent article by *Fortune Magazine*⁶ – “How to Beat the High Cost of Gasoline. Forever! – discusses how ethanol made from a variety of farm and waste products could ultimately replace gasoline.

Public Health Benefits

Reducing energy consumption and shifting to cleaner, renewable energy sources will reduce the air pollution currently coming from transportation fuels and electricity generation. According to a report published by the American Lung Association of California, the South Coast and Central Valley have unhealthy air due to elevated levels of ozone one out of every three days⁷. If the reduced air pollution from addressing GWP brought California into attainment of existing air quality standards, each year it would prevent:

- 6,500 premature deaths
- 390,000 cases of lower respiratory symptoms in children ages 7-14
- 350,000 asthma attacks

⁴ Chaudhure, Maya, et. al. PV Grid Connected Market Potential Under a Cost Breakthrough Scenario. Energy Foundation and Navigant Consulting, Sep 2004.

⁵ Environmental Entrepreneurs. “Can Biofuels Replace Oil?” Environmental Entrepreneurs Update. Nov 30, 2004. Available online at <<http://www.e2.org/ext/jsp/controller?docId=6348>>.

⁶ Lashinsky, Adam and Nelson D. Schwartz. “How to Beat the High Cost of Gasoline. Forever!” Fortune. Vol. 153, No. 2. Feb 6, 2006.

⁷ American Lung Association of California and California Environmental Protection Agency Air Resources Board. “Recent Research Findings: Health Effects of Particulate Matter and Ozone Air Pollution.” Version 1.1. Oct 10, 2003. Available online at <http://www.californialung.org/downloads/hn/Research_HealthEffects_ParticiulateMatter.pdf>.

New Competitive Industries

Three recent California economic studies all demonstrated that a 25 percent reduction in global warming pollution by 2020 can be achieved and still have a positive economic impact:

- California Climate Action Team: *Economic Assessment*⁸ of the Report to the Governor and Legislature (see macro economics⁹ for economic assumptions used in the report).
- UC Berkeley Climate Change Center: "Managing Greenhouse Gas Emissions in California"¹⁰
- Center for Clean Air Policy: "Cost Effective GHG Mitigation Measures for California"¹¹

This is not surprising as many companies have been reducing their GWP through cost-effective efficiency programs. The Climate Group has been tracking these efforts and their 2005 report, "Carbon Down, Profits Up"¹², documents a broad group of companies that have seen economic benefits from reducing their GWP.

E2 believes the real upside is the creation of a new low-carbon energy industry. Most transportation fuel dollars end up leaving the state to pay for crude oil. By increasing in-state fuel production and using agriculture products and waste, more economic value will stay within the state. For example, 40 percent of fuels in Brazil come from Brazilian produced biofuels. *Fortune* states that "not only does Brazil no longer have to import oil but an estimated \$69 billion that would have gone to the Middle East or elsewhere has stayed in the country and is revitalizing once-depressed rural areas."¹³

A recent letter signed by E2 members in the investment community to the governor stated:

We believe that to continue to encourage and stimulate the entrepreneurial spirit that makes California a world economic leader, the state must set enforceable limits on global warming pollution.

Entrepreneurship in California is closely reflected in venture capital activity. According to the Cleantech Venture Network¹⁴, \$425 million, or 8.3 percent, of all North American venture capital was invested in Cleantech companies in the third quarter of 2005. More than half of that was invested into energy-related companies. For the state of California, in the 12 months ending in October 2005, venture capital investment in new Cleantech companies was \$523 million. A cap on carbon would guarantee a growing low-carbon market and further spur innovation which would in turn increase the economic output for the state and further lower the costs of meeting the GWP reduction targets.

⁸ California Environmental Protection Agency. [Climate Action Team Report to the Governor and Legislature \(Draft\)](#). Dec 8, 2005.

⁹ Available online at <http://www.climatechange.ca.gov/climate_action_team/reports/>.

¹⁰ The California Climate Center at UC Berkeley. [Managing Greenhouse Gas Emissions in California](#). Jan. 2006. Available online at <http://calclimate.berkeley.edu/managing_GHG_in_CA.html>.

¹¹ Center for Clean Air Policy. [Cost Effective GHG Mitigation Measures for California](#). Jan. 19, 2006. Available online at <http://www.ccap.org/domestic/Summary%20Report-Final%201-19-06_.pdf>.

¹² The Climate Group. [Carbon Down, Profits Up](#). 2nd ed. 2005. Available online at <http://www.theclimategroup.org/assets/CDPU_2005_v2.pdf>.

¹³ Lashinsky, Adam and Nelson D. Schwartz. "How to Beat the High Cost of Gasoline. Forever!" [Fortune](#). Vol. 153, No. 2. Feb 6, 2006.

¹⁴ Available online at <<http://cleantech.com/index.cfm?pageSRC=OurPublications>>.

Can One Assume Innovation?

One of the models used to calculate the cost/benefit of GWP reductions, [EDRAM](#), examines changes in purchasing behavior and models their effects. This model took the 2004 California economy with \$1,317 billion in income and 16,460,000 jobs and projected its size in 2020 including the changes needed to achieve the Governor's 25 percent GWP reductions. It projected \$2,132 billion in income and 20,787,000 jobs for a slight increase over what would have happened without the climate change policy. The good news is this model predicts that you can reduce GWP and have a slight positive effect on the economy. The problem with such models is they can't forecast innovations.

Imagine a model run in 1985 predicting the economy in 2000. It would not include the economic benefits of technologies such as the rapid advance in computers, the digital camera, wireless computing, the internet, or applications such as email, the web, iPod, eBay, Google, or Amazon.com. A cap on carbon would stimulate private investments in alternative fuels and a low-carbon economy. Given the pace of innovation and investment in Cleantech, there's good reason to believe that the innovation in products and technologies would be as staggering as those of the last 15 years.

First Mover Advantage

To address global warming, there will eventually be a U.S. and worldwide cap on GWP. There are several potential advantages of a state putting its own low-carbon strategies into effect before the rest of the U.S.:

- **Opportunity for more flexibility:** In 1969, California enacted clean air regulations prior to the U.S. As a result, when the U.S. finally created standards for air pollution, California was granted an exemption allowing the state the flexibility to create policies stronger than the federal policy. As a result, California is the only state with the ability to act independently. All other states either conform to the federal policy or can adopt California's.
- **Attract Business:** Businesses tend to locate close to their markets. By establishing a state market for low-carbon solutions, a state will attract new companies and be in a position to benefit economically as those companies generate jobs and revenue, and eventually sell products to other states and countries.
- **More favorable international position:** Countries committed to the Kyoto Protocol are moving to create their own low-carbon markets. Companies in those countries are making the investment in energy efficiency and low-carbon energy sources. U.S. companies run the risk of being less efficient and therefore falling behind. If a state enacts its own market by placing a cap on carbon, it will position itself to better compete internationally.

Summary

The California Climate Action Team has demonstrated it is possible to reduce global warming pollution by 25 percent by 2020 relative to business as usual and have a small, but positive, effect on the state's economy and job creation. In parallel, the California legislature is considering a bill, AB 32, which would make those reductions mandatory and enforceable. We believe that such a cap implemented in California or other states with high-tech industries and strong energy policies will not only pay for itself but also provide a stimulus for innovation and keep more energy dollars within the state.