



# Reducing California's Global Warming Footprint

**Speech by Russell Long, Ph.D., Executive Director, Bluewater Network  
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I'm going to begin tonight by spending a few minutes discussing the inception of Bluewater Network, an organization I started 7 years ago shortly after having worked on environmental problems with traditional fishers in Kerala, India. My experience there was part of a Tides Foundation project involved with trying to clean up a mess created by a United Nations program designed to help fishers – a huge mess that serves as a metaphor for the problems of global warming. (And just for the record, I'm not opposed to global warming in San Francisco, only elsewhere. Kind of a not-in-your-backyard but mine's okay thing. We're all for new precedents in San Francisco, aren't we?)

While the India story is a key part of our organization's and my own professional history, more importantly, it serves as an illustration of the ways in which our world pursues short-sighted technologies that often bring along with them a cascading set of unintended consequences – consequences that can endanger our communities, our economies, social systems, environment, and planet. The fisheries story doesn't just involve one community – it involves all of us – and it illustrates that even when our intentions are noble, we may still not have a clue what we're doing.

In 1994, the problems in the state of Kerala in South India were tragic. The UN had given traditional fishers outboard motors for the first time in 1981, incorrectly thinking that this would help fishers go faster in their old canoe-like boats, allowing them to catch more fish, and helping them to earn a decent living and better feed their families.

Picture a traditional fleet of beautiful, long boats across south India, many of them 30, 50, and 70 feet long and so narrow -- only up to 7 feet wide. They were all slowly rowed or sailed to where the fish were, every day at around 5 a.m., and this had taken place for generations

Then in 1981, the outboards engines began to arrive by the truckload, allowing fishing boats to go four times faster, carry much bigger nets, scooping whole shoals of fish – mostly sardines and mackerel – and initially making the fishers much more money. At least that's true for the ones the UN gave motors to. But within five years, many of the others borrowed money to buy outboards too, and they went into hock up to their eyeballs to pay for them.

However, the fishers who couldn't get loans were left with fewer fish than before, and really struggled to get by. Suddenly, these fishers who lived on the beach and had never known social inequality, developed a class structure – those with big boats and outboards – and those without. And those without were worse off than before.



Then, because their boats were going much faster than they used to, they started to fall apart in three years, instead of 12. This was because traditional construction methods literally stitched the hull planks together using coconut husk string and they just couldn't handle higher speeds. So now fishers needed four boats every 12 years instead of one. Between the outboards, the boats, and the bigger nets, it now cost five to ten times more to go fishing than it did before the UN arrived. And the fishers were far worse off.

Then the next shoe dropped. The boats were built using a very specific tree, called anjili, that was perfect for boatbuilding but in short supply to begin with. Suddenly, higher demand for boats depleted the anjili forest and wood prices shot through the roof.

Shortly after that, the fishery collapsed altogether due to overfishing, and massive loan defaults occurred when the fishers could no longer pay back their loans for outboards and new boats. This led to strikes, social unrest, and government intervention. But the final nail in the coffin was this – I was facilitating a meeting with fishers from 24 villages, when one of them announced that the fish were beginning to taste like fuel.

Researching this, I learned that the two-stroke outboards which powered their boats, not to mention all recreational boats in the US and Europe, dump a third of all their fuel into the water, unburned. This has to do with design – two-strokes are physically a little lighter and just a little more powerful at low speeds than the cleaner four-stroke engines used in our cars – but it comes at a terrible cost to the environment since the engines are not designed to be clean burning.

The Sanskrit translation for the word Yamaha – which was the most popular outboard engine manufacturer in south India – means the God of Death. And that seemed appropriate for the impacts those engines were having. In the US, those engines turned out to dump the mind-boggling total of 15 Exxon Valdez spills a year of gas and oil into our waterways. Did anyone know that when two-strokes were first designed? Of course they did. But they decided that a few dirty engines weren't a big enough problem to worry about. We hear that line all the time in the environmental movement. Why should we reduce pollution from our snowmobiles or our cruise ships – they're just a tiny part of the problem. Or why should anyone care about California's global warming emissions – they're only 1.5% of the world total? These are ridiculous statements, because everyone will have to do their part if we are ever to control the world's total pollution burden.

Upon returning to the States, I decided to spend six months taking on the engine manufacturers and seeing if an individual with absolutely zero knowledge of US environmental laws or the environmental movement could have any impact on this problem.

I lucked out. Within the year, we had our first big grant from the Goldman Foundation, our second employee, and soon after that, we settled a lawsuit against the marine industry, had banned two-strokes in areas like Lake Tahoe and San Pablo Reservoir, Oakland's main water source, and we'd convinced the California Air Resources Board to ban the sale of all dirty, two-stroke engines in the state by 2004. Also, if you look at new outboards and jetskis, they all have our new eco-label on them now, listing them as low, very low, or ultra low emissions engines.



That campaign continues, but then we took on MTBE, the toxic gas additive, convincing other environmental groups and eventually the Governor that it had to go, and helping break the story on 60 Minutes. Then we went after air and water pollution from big ships like oil tankers, cargo carriers, and cruise ships, forcing the Clinton administration to regulate them. We fought for and got a ban on jetskis in our national park system; got a ban on snowmobiles too which Mr. Bush reversed – we’re still fighting that one – and cleaned up San Francisco’s future fleet of ferries with boats that will be 90% cleaner than the ones on the Bay now. We forced the Coast Guard to require leak detection devices on oil tankers, and petitioned Mr. Bush and federal agencies to plan for the destruction and loss of national parks and marine sanctuaries across the nation due to his idiotic failure to confront global warming in any meaningful way.

But success comes with a cost. Bluewater Network is up to a staff of eleven now with a big budget that isn’t easy to raise, we’ve had threats of violence against us, and this weekend, someone with a crowbar tried very hard to break in to our downtown office.

I guess it all means we’re having an impact.

Anyway, for many years, I’d wanted Bluewater to grow sufficiently large that we could jump into the most important environmental battle of all – global warming. Global warming threatens to undermine a century of progress on many of the most important social and environmental problems of our time, including the issues of pollution, environmental justice, peace, human rights, social justice, and wildlife protection. The issue is just so vast, and the potential implications so far-reaching, that it seems to me that within 20 years, the world will certainly be at war politically and legally over the fallout.

Think about it. Where do you put 15 million displaced Bangladeshis and people from island nations around the world who will be swamped from rising sea levels? Who pays for Holland? As droughts deepen in Africa, or beetle populations migrate north into Canada to decimate forests and crops, will the World Court find that the fossil fuel industries or the US government are liable for damages to animals, crops and even loss of life due to famines? Will Congress put billions into saving the Everglades, which are only a few feet above sea level, or just write it off? Will coastal homeowners sue the government for neglecting to put up sea walls, or file a class action against Exxon/Mobil? Issues like these could dominate the world political agenda in the future. The moral is: send your kids to law school – with any luck, they’ll make a fortune on Uncle Sam.

Until 2000, Bluewater hadn’t gotten involved in the global warming battle, in part because we had hoped that Al Gore, as President, would have an impact on a federal level. But after the election, it was apparent to many of us that the next four years would be really, really grim ones for the environment – I don’t think we appreciated just HOW grim. Realizing that Congress was simply not going to do anything about greenhouse gas pollution, it occurred to me that our only opportunity to move the ball was to work on a statewide level. And what better state to do it in than one with a Democratic Governor and legislature in a region renowned for demonstrating environmental leadership?

After all, when the auto industry played games with Congress for over a decade protesting that they couldn’t design an affordable catalytic converter, and that mass production would bankrupt them, two “crazy” engineers working at a California state agency figured out how to do it in about a week. They put one on a car for about \$50. So California forced the auto industry to



capitulate, eventually leading to catalytic converters on cars across the US and the world. The nation and the world can also thank California for proving that we don't need lead in fuel, a development that saved millions of children from possible brain damage, and for forcing the auto industry to mass-produce hybrid-powered vehicles, like the Toyota Prius, ending the argument once and for all about whether the auto industry can create 60 mpg four-seaters that are affordable, attractive, and have good performance. Remember when the industry told us that it wasn't possible?

Soon, the nation will be thanking California for reducing greenhouse gas emissions from cars, too.

I'd like to start by asking you to consider these facts:

- 96 percent of America's transportation energy comes from petroleum.
- 40 percent of US petroleum use is from SUVs, pickups, minivans, and cars – the largest single source of oil demand.
- Each gallon of gasoline burned releases 20 pounds of carbon dioxide into the atmosphere.
- The EPA confirms that 2002 vehicle fuel mileage averages are the lowest since 1980, now just over 22 mpg.
- Almost a century ago, the Model T got better fuel mileage than today's average vehicle.

That's progress for ya!

Since my discussion today primarily focuses on AB 1493, what's known as The Pavley Bill, I thought I'd start by providing a little background on how this bill originated and came to be signed by Governor Davis, what it will do, where the regulation is now, and the hurdles it still faces. I'll also tell you why I believe this regulation -- if it is handled correctly, and it's not at all clear that it IS being handled correctly -- is the perfect instrument for ending all greenhouse gas and smog emissions from passenger vehicles in California by 2020. And if the correct approach is taken, it could have dramatic effect across the nation, making cars and SUVs that emit virtually zero emissions of any kind. If that sounds hopeful and optimistic, it is. The fact is that if we can bring vehicle emissions to zero – and I believe we can – we will have accomplished something miraculous that could pave the way for multilateral global action that will reduce greenhouse gas emissions everywhere.

Okay, a few years ago, right after the 2000 elections, I drafted a bill modeled loosely on the Federal Clean Air Act, one which would define a whole new approach to regulating vehicles.

First, rather than just going after fuel mileage, or raising the CAFE standards as they are known, the bill would give the state broad, ongoing authority to reduce all greenhouse gas emissions from passenger vehicles. And that's an important distinction from just dealing with fuel mileage. Here's why:

Even though raising fuel mileage reduces the most important greenhouse gas – carbon dioxide – it doesn't reduce others such as nitrous oxides that come from poorly-designed catalytic converters, or hydrofluorocarbons that come from air conditioners. These are unregulated by the CAFE standards.



Nor does CAFE address the fact that some fuels, like diesel, ethanol, biodiesel, and natural gas all have lower net carbon dioxide emissions per mile driven than gasoline. So here we are as a nation, driving around in vehicles that virtually all use gasoline – the fuel with the highest amount of greenhouse gases, and ignoring the global warming benefits of all these other fuels. Raising fuel mileage standards in Congress won't fix the problem of using the wrong fuel in the first place, but the Pavley Bill can and, if handled correctly, should start to address that.

Second, the CAFE approach is a very blunt policy instrument because it can't deal with increasing numbers of cars on the road every year. When I was born, there were less than 200 million Americans. Today, there are almost 300 million, (which is funny considering that I keep running into the same people everywhere!) And almost everyone drives. Or wants to.

CAFE also ignores the increasing mileage driven by individuals. People drive about 13,000 miles a year now, a much higher number than even ten years ago. CAFE fundamentally ignores the extra driving, so that even if fuel mileage standard were raised say, by 10% in the next five years, since people may actually be driving 10% more by then, the gains would completely evaporate. Add to that the increasing numbers of people on the road and you can see how the CAFE approach fails entirely. So in Pavley, I included language that gave manufacturers "maximum flexibility" in how they chose to meet their targets. That means that auto companies could potentially get credit for reducing emissions by setting up ride-share or telecommuting programs, or adopting other creative approaches that could get people out of their cars in the first place.

The key clause in the bill is that greenhouse gas emissions must be reduced, "to the maximum extent feasible, and cost-effective." It provides an open-door approach that mandates the maximum reductions while also recognizing that we can't do this in a vacuum -- cost has got to be a factor or this bill would be politically dead-on-arrival.

Seasoned legislators turned down our bill, but Assemblywoman Fran Pavley, a new member, agreed to take it on. Initially, the inside-the-beltway environmental groups wouldn't fully support it because they saw it as too aggressive, but after pushing it through the tough Assembly Transportation Committee virtually on our own, they finally signed on, which paved the way for a very contentious and historic campaign of which many people and organizations played a significant role.

Involvement by national political leaders such as Senators John McCain and Joe Lieberman, Representatives Nancy Pelosi and George Miller, celebrities Robert Redford, Barbra Streisand, and Cameron Diaz made for a really colorful campaign, too, and millions of dollars were spent by the auto industry in running the most disingenuous scare campaign in recent memory, one in which the Auto Alliance claimed that this bill would raise fuel taxes, lower the speed limit, and ban SUVs altogether! None of those claims are true. The auto industry generated tens of thousands of calls to the legislature and the Governor, boosted AM-talk show ratings, and scared the daylights out of the public and auto dealers who bought into this nonsense. It also led to a death threat at my organization's offices, a harsh reminder of what can happen when the auto industry plays dirty by intentionally misleading people.



In the end, there was a lot of political jockeying that led to passage of the bill by a single vote, thanks in particular to Assemblywoman Pavley, Senator Burton, and Assemblyman Wesson and several big environmental groups that helped us, including the Sierra Club and the California League of Conservation Voters. And the happy result? Last summer, with one stroke of the pen, Governor Davis did more to control greenhouse gas emissions than all the other 49 Governors combined.

So okay, where are we today?

The California Air Resources Board is comprised of 11 members appointed by the Governor, and it will adopt regulations to implement AB 1493 by January 1, 2005, just a year-and-a-half away. Fortunately, the clause "maximum feasible reductions" limits how much the regulation can be watered down by the board. This is important since it will have to survive both Democratic and Republican administrations.

The state legislature will have one year starting on January 1, 2006 to review the approved regulations for possible changes, and we don't anticipate any problems. Early credit will be given to companies like Toyota, whose average vehicles are already cleaner than any other company.

The auto industry will then have three years to gear-up to meet the regulations, so by January 1, 2009, the Pavley bill will reduce emissions from all new cars, pickups, minivans, SUVs and any other vehicle whose primary purpose is personal transportation, including HumVees or Ford Excursions that are personally owned.

Okay, what does the bill allow?

It permits technology changes to vehicles that will result in lower greenhouse gas emissions, including smoother-running transmissions, lower resistance tires, increased use of hybrids, better air conditioners, and improved catalytic converters. We believe it also requires the development of vehicles that use alternative fuels with lower greenhouse gas emissions, such as hydrogen, natural gas, ethanol, and biodiesel. Why? Because Pavley requires the Air Board to reduce greenhouse gases to the maximum extent feasible and cost-effective. Ignoring the potential of alternative fuel vehicles would violate the law.

There's been a lot of talk about hydrogen lately, especially since Mr. Bush is allocating over a billion dollars to develop a fuel cell car. And the Pavley bill is an ideal instrument to get us into hydrogen fuels, so let's talk about that.

First, I want to straighten out a few misconceptions.

Please don't think of hydrogen as a fuel. Think of it simply as a new form of battery – basically, a liquid or gaseous energy storage system. And no, there are no vast hydrogen reserves buried deep under the Arabian Peninsula or the Amazon or the North Sea for extraction. But hydrogen is all around us, in the water that comes through our tap, and in all the planet's oceans and rivers. It's just not usable unless we use electricity to get the hydrogen out of water.



So the real question isn't – where are the proven hydrogen reserves? It's – where is the electricity coming from to get the hydrogen out of the water? How do we get the H out of the H<sub>2</sub>O?

Okay, hydrogen is ordinarily produced in one of two ways – it is either made using electricity from the grid to electrolyze water, in effect, yanking the hydrogen molecules apart from the oxygen molecule. Or, it is directly converted from natural gas, a process called steam reformation. Now in California, most grid electricity comes from burning natural gas at power plants, meaning that hydrogen powered vehicles are basically still running on fossil fuels – in this case, they are running on the natural gas used to make electricity, which in turn, is used to create the hydrogen fuel.

Now do you see why the oil industry loves hydrogen cars? The hydrogen is expected to come from natural gas. And guess who owns the world's reserves of natural gas? If you've been sensing yet another oil industry bait and switch, you have excellent instincts.

But there's a third way to get our hydrogen – it's to use renewable power like wind or solar to create the electricity to electrolyze water in the first place. In other words, if the grid ran on renewable power, we could use that grid electricity to get our hydrogen from water. That's where we can reduce greenhouse gas emissions by huge amounts. The oil industry doesn't want us to go there – they worked hard to find all those natural gas reserves – they want to cash in. And they'll fight like the devil to prevent us from making our hydrogen from wind turbines or solar panels.

Okay, let's put that aside for a second and look more carefully at hydrogen-powered cars.

Studies by MIT and by Argonne National labs on hydrogen-powered vehicles are NOT particularly optimistic about hydrogen's ability to reduce greenhouse gases, because they assume that the hydrogen will be coming from fossil fuels like natural gas. After all the propaganda we've heard for years about how hydrogen fuel cells are going to save the world, these studies should have been a wake-up call to policymakers, but somehow, the message got buried.

Okay, a few more basics. There are two ways to run a vehicle on hydrogen – the fuel cell car that we've all heard about is one. And there's another way – with just a few small modifications you can run a normal car engine on hydrogen. We're talking about a conventional, internal combustion engine just like the ones in our cars today.

Both of these hydrogen-powered designs dramatically reduce smog and fine particle emissions, and will substantially improve air quality and public health. But, neither one is assured of reducing greenhouse gases in the least, only smog. Reducing greenhouse gases depends entirely and completely on how the hydrogen is made.

Let's start with fuel cell vehicles. The fact is, nobody knows if or when they will ever be affordable or practical. If they are not cost-effective, they won't meet the requirements for Pavley anyway. The mandate is that the technology must be cost-effective. And comments by Ford several weeks ago in the Chronicle weren't promising. Their spokesman denied that they would be ready to build and sell affordable fuel cell cars in California by 2017, a decade and a half away!



Actually, many of us find ourselves wondering if affordable, reliable fuel cells could turn into a far bigger pipe dream than battery powered cars. Or maybe not. But we shouldn't bet the bank. As the adage goes, hope for the best, but plan for the worst.

On the other hand, making internal combustion engines that burn hydrogen is both practical and affordable. Ford and BMW have already developed prototypes, and BMW says that they may sell cars that burn hydrogen starting in 2007. So obviously BMW believes the technology is cost-effective.

One fact is clear – if we can create internal combustion vehicles that run on hydrogen, and if the hydrogen comes from renewable energy sources, we will have an easy-to-build, affordable, proven vehicle that will clearly meet the requirements of Pavley – a vehicle with virtually no smog or global warming emissions. The concept is a hands-down winner, and that's the direction we'd like to see the Air Board go in the regulations and standards that they are now developing.

Internal-combustion engine cars that run on hydrogen will also help solve a chicken and egg problem. The problem is this – automakers always have an excuse. And one excuse being warmed up right now is that until the fuel is widely available at the pumps, they don't have sufficient incentive to get fuel cell vehicles on the showroom floor, even if they become affordable. That's known as "the infrastructure problem." The flip side is – until there are hydrogen vehicles available, the oil industry won't spend the money to put hydrogen pumps at their service stations.

Now, as I've mentioned before, we don't know if fuel cell vehicles will be a boon or a bust. But we need to get rid of this pretext before the whining begins.

That's yet another reason for the Air Board to require hydrogen-powered internal combustion vehicles – it will preempt the standoff by filling the demand side of the equation. And by doing that, we will embrace the right mechanism to bring us a hydrogen economy – one that theoretically, at least, could use hydrogen from renewable sources. And that easily trumps a guaranteed fossil future. Of course, if the hydrogen comes from fossil fuels, we'll have gotten rid of smog from vehicles, but we'll be no better off when it comes to greenhouse gas emissions. So that's the high-stakes game we're playing.

Last month, scientists at Lawrence Berkeley Laboratories made a shocking pronouncement. They stated that to avoid the downsides of global warming, industrial nations must begin producing at least three-quarters of their energy from renewable sources. That means petroleum, natural gas, and coal are out. Wind and sun are in.

This has a direct bearing on another bill sponsored by Assemblywoman Pavley bill, AB 740 which is being debated in Sacramento right now. AB 740 would give voters the opportunity to pass a bond measure next March for \$500 million to create hydrogen fueling stations at up to 30% of the gas stations in California. There's a great opportunity here to solve half of the chicken and egg problem – the fueling stations. And if that happens, the Air Board will be perfectly poised to solve the other half – the vehicles.



So here's the big enchilada – if the new bill by Pavley is amended – and we're talking to her office about that – to require that a certain percentage, and ultimately all, of the hydrogen sold in California be made from renewable sources, it will do exactly what the Lawrence Livermore scientists have said we should do. As a result, by 2020, new vehicles in California would have no tailpipe emissions, and no greenhouse gases either. And since other states have the legal authority to adopt California's auto standards, it may not make any difference at all if Congress is still gridlocked on CAFE, because the nation will already be hooked on hydrogen!

I want to finish by talking about the future – where should our energy come from?

A new study by the National Renewable Energy Labs is underway. They estimate that the United States has ample wind resources to develop electricity to make hydrogen for all the passenger vehicles in the US, and perhaps enough for all commercial vehicles, too. Alternatively, by installing enough solar panels to cover about 4% of the state of New Mexico, we could power 200 million hydrogen powered vehicles. They also say that by installing solar across Nevada's southern desert areas, we could meet all US electrical demands. The cost of wind? It will soon be only 2 cents a kilowatt hour – very affordable. Solar? Still too high at 20 cents, but that will fall soon to less than ten cents, also becoming affordable.

This study demonstrates that if the will is there, we have the potential to meet all US energy and fuels needs without fossil fuels. The real question is, how do we convince the policymakers to take us there? And now that renewable costs are at least in the ballpark of fossil fuels, how can we afford NOT to use them?

I'm thankful that we live in California, a state that is at least willing to intelligently explore these options. Can California save the world? I don't know, but that hasn't stopped us from trying in the past.

And I'll end with this: When the fisheries collapsed in south India, I asked the fisher representatives why they didn't reduce their fishing catches to preserve what was left. And one of them – an old fisherman – looked me in the eye and said, "We know that soon, the fish will be gone from the sea. But what choice do we have? The future is far off. We need to survive today."

Neither outboard engines, nor hydrogen fuels will solve any of the world's environmental or social problems. Only a long-term strategy that uses infinitely renewable energy from the wind, the sun, and the tides to power our vehicles gives us a chance. Renewables don't require extraction, they're bountiful, and they're free. We only need the technology to capture them. If we wait too long, we'll be like the fishers – just trying to survive now. But if we plan for long-term development of renewable sources, I'm hopeful that we have a bright future ahead. Even if it is raining in San Francisco tonight.