



Combating Climate Change in the Capital of Car Culture: Part 1

Varun Sivaram, Ph. D.

Senior Advisor on Energy and Water Policy, former Los Angeles Mayor Antonio Villaraigosa, 2012-2013.

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Next Generation

Part 1

Say the words “Los Angeles,” and you might conjure visions of epic traffic jams, air pollution so thick you can’t see the hills, and a city that seems designed to intimidate and marginalize pedestrians and bicyclists.

But a new reality is emerging in the city of angels. A slew of developments over the past decade is helping the world capital of car culture transform itself into a world leader in sustainable transportation. While traffic is still bad, the air is significantly cleaner, and public transit alternatives are expanding.

If the trends continue, L.A.’s transportation sector could become a model for California—and the nation—as we struggle to end our dependence on oil.

From Traffic Mecca to Clean Transport Leader?

L.A.’s reputation as the mecca of traffic is well-deserved, but its history provides some clues about its potential to be a transportation leader. In the 1950’s, city planners envisioned an extensive freeway system complemented by a futuristic monorail line that could whisk Angelenos to and from work. The freeways were built—today they span 181 miles and carry over 2 million cars—but the monorail remained a dream, overwhelmed by L.A.’s addiction to the passenger vehicle.

Now the landscape is changing. In June 2013, Los Angeles County [awarded two construction companies a \\$2 billion contract for a rail line to the airport](#), gearing up for an aggressive public transit expansion featuring a “Subway to the Sea.”^{1,2} Once a smog-choked metropolis, L.A. has dramatically reduced air pollution through cleaner cars and trucks. And since 2007, L.A. has sat on the 10-city Steering Committee of [C40](#), an international consortium of megacities committed to combating climate change.

L.A.’s recent moves toward sustainability align closely with California’s goal of reducing carbon dioxide emissions by 80 percent by 2050. The success of that goal will depend in large part on tackling transportation emissions, which compose nearly 40 percent of total state emissions. As the biggest and most car-dependent metro area in the state, L.A.’s efforts on emissions reduction will be crucial to meeting California’s ambitious targets and will help set an example for cities around the world. Ultimately, the city’s success will depend on its ability to drastically reduce the transportation sector’s reliance on oil.

Los Angeles has already made considerable progress toward reducing greenhouse gas emissions, thanks in large part to the city’s voters, who have indicated their strong preference for leaders who push the envelope on clean transportation. While Mayor Antonio Villaraigosa drove many of the groundbreaking changes of the past decade, L.A.’s newly-elected Mayor, Eric Garcetti, has pledged to continue support for clean transportation options. In 2007, [Mayor Villaraigosa’s “Green L.A.” report](#) called for reducing carbon dioxide emissions by 35 percent in the year 2030, compared to 1990 levels, paving the way for compliance with California’s overall greenhouse gas reduction targets.^{3,4}

Thanks to city control of the electric system, L.A. has made remarkable advances toward reducing emissions from the generation and distribution of electricity. L.A.’s municipally-owned utility, the Los Angeles Department of Water and Power (DWP), [has reduced its emissions by 28 percent](#), largely through renewable energy, and will achieve around a 40 percent reduction by 2025, which is the year it will cease all consumption of coal power.⁵

But reducing emissions from transportation is just as important as greening the city’s power system—and a far more difficult task. The City can only indirectly affect emissions from the largest slice of transportation emissions—private passenger vehicles—whereas L.A. exerts direct control over

the DWP. Moreover, counting up carbon dioxide molecules from a power plant smokestack is straightforward, but estimating the environmental impact of billions of car trips is daunting.

Nevertheless, L.A. does have power over the large, publicly-funded transportation infrastructure projects that influence individual transit behavior. It is here that the city has set the stage for ongoing emissions reductions; in the process, it may help seed a cultural transformation in the way people think about cars and transit.

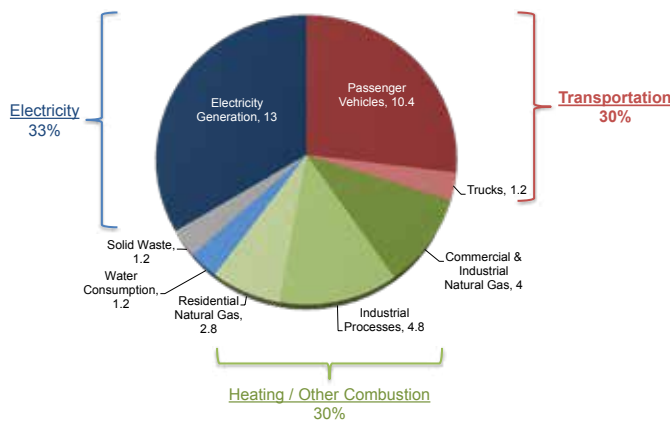


Figure 1: Los Angeles Carbon Dioxide Emissions. Citywide CO₂ emissions broken down by source. Source: 2010 ICF Analysis.

Lifting the Blanket: Smogtown no more

The first thing old-timers notice about Los Angeles' transformation is the skyline: You can actually see it. In 1970, smog blanketed the city; on the worst days, you couldn't see the famed Hollywood sign from downtown, a mere six miles away. Today, the concentration of smog-inducing compounds [has dropped 98 percent](#).⁶

The federal Clean Air Act of 1970 set national air quality standards that gave states and cities a new tool to combat pollution, but California went further to implement strong smog reduction measures, from which L.A. benefited.⁷ As automakers introduced catalytic converters to vehicles, and oil companies complied with state clean diesel requirements, levels of ozone, carbon monoxide, nitrogen oxides, and other toxic pollutants [plummeted in L.A.](#)⁸

The public health benefits of cleaning up air pollution are well-documented. For example, [two recent studies demonstrate](#) a clear link between lower infant birth weight and higher emissions of particulate matter.^{9,10} [By halving particulate matter emissions since 1988](#), L.A. decreased the chance of low birth weight (less than 5 pounds 8 ounces) by 9 percent.¹¹ Still, there is room for improvement—[one study estimates](#) the health and economic cost of L.A.'s emissions remaining above federal standards at over \$20 billion; vigilance is required to continue decreasing levels of ozone and particulate matter that are proven to cause bronchitis, heart attacks, and premature death.¹²

While the economic and public health impacts of clearing the air and enabling a healthy workforce are profound, a hidden co-benefit is the reduction of greenhouse gases and other "climate forcer" pollutants that exacerbate global warming. For example, between 1988 and 2008, the California Air Resources Board passed increasingly stringent regulations on diesel fuel and engines, which had the effect of cutting emissions of black carbon—a product of diesel emissions, a primary ingredient in smog, and also the second-largest contributor to global warming.¹³ So thanks to effective air quality regulations, even as California's diesel emissions quintupled over the past half-century, the levels of black carbon in the atmosphere [decreased by 90 percent](#), with attendant climate change benefits.¹⁴

The Shipping News: Ports Get Clean Trucks

Building on this success, the Ports of Los Angeles and Long Beach, which together handle more container cargo than any other port in the nation, released a Clean Air Action Plan in 2006 to improve air quality around the ports. The impetus for the plan was economic and health considerations—five years earlier, a [court had enjoined the Port of L.A.](#) from constructing a new terminal because pollution from the Ports had increased the risk of cancer in the surrounding area.¹⁵ Confronted by barriers to global competition and an irate surrounding community, the ports signed a pledge to reduce pollution by at least 45 percent within five years.



Figure 2: Air Quality Improvements at the Ports of L.A. and Long Beach. Emissions reductions in percentages and tons from 2005 to 2011, following the Clean Air Action Plan. Expanded pollutant acronyms: DPM - Diesel Particulate Matter, PM_{2.5/10} - 2.5/10 micron particulate matter, NOx - Nitrogen Oxides, SOx - Sulfur Oxides. Truck emissions, regulated by L.A.'s Clean Trucks Program, accounted for the majority of greenhouse gas emission reductions. Source: [Port of Los Angeles Clean Air Action Plan Report Card 2011](#).

A centerpiece of those efforts was L.A.'s Clean Trucks Program, aimed at modernizing the 17,000 mostly inefficient diesel trucks that haul goods to and from the Port. The law imposed stringent emission regulations, immediately took 2,000 pre-1989 trucks off the road, and has culminated in a clean fleet of 5,500 trucks powered by electricity or alternative fuels like natural gas.¹⁶ As a result, harmful emissions (diesel particulate matter, nitrogen and sulfur oxides) from trucks [have plunged 80 percent](#); across the two ports, the Clean Air Action Plan is on target to reduce the risk of cancer in adjoining communities by 85 percent.¹⁷

While addressing climate change was not the primary motivation for action at the ports, emissions reduction was a strong collateral benefit. Combined greenhouse gas emissions at the two ports fell 18 percent from 2005-2011, and over half of that

reduction came from cleaner heavy-duty trucks. To put this in context, the Port of L.A., accounting for about a million metric tons annually of regional CO₂ emissions, [composes almost 3 percent of L.A.'s citywide emissions](#).¹⁸

Again, the City's sovereignty played a big role in this success story; like the L.A. Department of Water and Power, the city has direct control over the Port of L.A.

The Big Kahuna: Private Passenger Vehicles

While the greenhouse gas reduction from the port campaign was dramatic, emissions from the Port's trucking fleet are dwarfed by those of the other vehicles on the road. To address those emissions, the City must figure out how to slash pollution from its 2 million passenger vehicles.

Vehicle Innovation: LA's Approach

- 4,000 synchronized stoplights and congestion pricing reduce idling, increase vehicle speeds – and improve vehicle efficiency
- 140 free charging stations for electric vehicle users ease “range anxiety”
- 80,000 electric vehicles expected on the streets by 2015

The challenge: car culture is part of L.A.'s DNA, reflected in its sprawling infrastructure. So City policies over the past eight years have aimed to rein in emissions even as [Los Angeles remains the most congested city in the US](#).¹⁹ Vehicle Miles Travelled (VMT) is a popular metric to evaluate the prevalence of car transportation, but two other important factors affect emissions per VMT: traffic dynamics and car technology. Through three promising policies, L.A. has sought to streamline traffic flows and support electric vehicles, reducing both emissions and commute times.

Last February, as the Mayor flipped the switch on the last of 4,000 synchronized stoplights, L.A. became the first major city in the nation to synchronize its entire network of traffic signals. Using magnetic sensors in the road and geolocation of its transit system, traffic controllers will now hold a green light for buses to efficiently traverse their routes; the system can even reroute flows citywide to minimize waiting times and streamline traffic. As a result, average speeds on surface streets have climbed from 15 to 17.3 miles per hour, and travel times are down 12 percent. The city's Department of Transportation (LADOT) [estimates the emissions benefit at a million metric tons of avoided carbon dioxide](#), around 10 percent of all vehicle related emissions.²⁰

To further manage traffic flows, L.A. is in the midst of a congestion pricing trial along its Harbor Freeway. In 2012 LADOT turned a high-occupancy vehicle (HOV) lane into a high-occupancy toll (HOT) lane that allows single passenger cars to use the lane by paying a variable amount (\$0.25 - \$1.40 per mile) depending on prevailing traffic conditions.²¹ Cars burn gasoline most efficiently when travelling at a steady clip, between 50-60 m.p.h., and congestion pricing both increases average speeds and decreases speed variability. Therefore, [one study contends](#) that congestion pricing can reduce emissions from 7 to 12 percent in L.A.—though at this limited trial stage, it is too early to assess that claim.²²

Charging Electric Cars: the Utility of the Future

Finally, the L.A. Department of Water and Power (DWP) has extended the scope of its environmental efforts beyond stationary electricity sources, like power stations and rooftop solar systems, to electric vehicle (EV) infrastructure. Through "Charge Up L.A.!" DWP subsidizes charging equipment at home and at the workplace; DWP also has 140 standard chargers set up around the city, along with 16 "Level III" chargers that will [recharge an EV in just 20 minutes](#) (Figure 3).²³ This network of "DC Fast-Chargers" alleviates range anxiety among EV owners, ensuring that a charger is within five miles of any major freeway.

By supporting EV chargers, DWP is reducing the barrier to entry for EV ownership. Over the long term, DWP also hopes to take advantage of an extensive EV network and to use cars as mobile batteries to store and discharge energy from renewable sources.

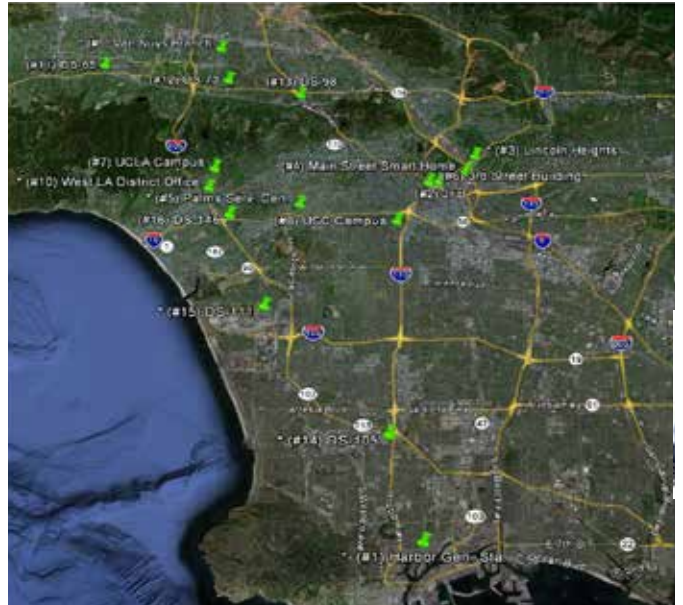


Figure 3: DC Fast Charger Locations in L.A. *The green pushpins denote the locations of existing and proposed Level III EV Chargers, installed by DWP. For a limited time, L.A. residents can use the chargers for free, and the network has been organized to ensure easy access from any major L.A. highway. Source: DWP.*

Thanks in part to these programs, [L.A. is projected to top the nation in cumulative EV and PHEV adoption](#), with 80,000 EVs on the streets by 2015.²⁴ City policies have made it easier to transition from a gasoline vehicle—but substantial emissions reduction will only happen if EV penetration increases by an order of magnitude. In the meantime, while L.A. has embarked on a promising path to reduce the emissions intensity of cars on the road, its parallel effort to boost public transit ridership is essential for a transition away from oil.

This Train is Bound for Glory

Over a hundred years ago, the Los Angeles Railway maintained a network of streetcars and narrow-gauge trains that helped connect the city in the decades before the advent of cars. With the passage in 2008 of a new sales tax dedicated to transportation improvements, L.A. may be on a road back to the future—Measure R is expected to generate more than \$4 billion over 30 years to fund a vast expansion of L.A.'s Metro rail service.²⁵



Figure 4: Planned Metro Rail Expansion. The map displays Metro's plans to extend its rail service using funds from Measure R and America Fast Forward federal legislation. Source: [Los Angeles County Metropolitan Transportation Authority](#).

Over the coming decades, L.A. will extend its subway to the Pacific Ocean and add rail lines to districts like Westwood and South L.A. The County's Metropolitan Transport Agency predicts that the projects will [create 160,000 jobs and reduce VMT by 208 million miles annually](#).²⁶ Accelerating transit-oriented development, where the City encourages dense commercial and residential development near public transit nodes to reduce travel distances, will further boost economic and environmental metrics. The success of existing developments, like the [Hollywood & Highland Development](#), bodes well for new and ambitious projects like the planned [Sixth Street Viaduct](#). Rounded out by a bus fleet that runs on 100 percent alternative fuels, L.A.'s transit system will provide a compelling and sustainable alternative to the passenger vehicle.^a

About the Author: Varun Sivaram was the Senior Advisor on Energy and Water Policy to former Los Angeles Mayor Antonio Villaraigosa from 2012-2013. A Rhodes Scholar, he received his doctorate in Physics from Oxford University and currently serves on the World Economic Forum Global Agenda Council on Urbanization.

Next In the Series: Staying Focused: Make Carbon Reductions the Goal

^a An important distinction here is between the City of Los Angeles and Los Angeles County. The prior policies introduced have all been City policies, and this report mostly concerns City-level policies under the Mayor's purview. However, L.A. County's Metropolitan Transportation Authority (MTA) manages rail service within the City and therefore will implement the Measure R projects to expand rail transport. While Mayor Villaraigosa did not directly oversee the MTA, he did serve as chairman of the Board and appointed three others to the 13 member Board.

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