

Conversely, the study showed that the cities with highest CO2 emissions were those whose most extensive transportation infrastructure was dedicated to cars, including roads and parking systems.¹³

Any meaningful global effort to cut CO2 emissions (and thus stem climate change) must begin with the United States, which, despite having only 5% of the world's population, is second only to China in CO2 emissions. One half of all of the energy consumed in California is used for transportation¹⁴ and 41% of CA emissions comes from transportation.¹⁵ In Santa Monica, transportation accounts for 65% of emissions.¹⁶ Cars cause at least 60% of the air pollution in Southern California.¹⁷ If 190,000 car owners started to regularly get their cars tuned-up it would keep an estimated 90 million pounds of CO2 out of the atmosphere.¹⁸

Transportation-related CO2 and other air pollutants are not only a problem for the climate, they are also linked to negative health impacts in humans. For example, the prevalence of asthma in the U.S. has increased by more than 75% since 1980, with children and certain racial groups, especially African Americans, experiencing relatively greater increases in asthma rates. An estimated 11.9% of Californians - 3.9 million children and adults - report that they have been diagnosed with asthma at some point in their lives, compared to the national average of 10.1%.¹⁹ Reshaping our flawed transportation system is, therefore, also a matter of public health.

ADDICTION TO OIL

Globally, we have become reliant on a resource that is non-renewable and running out. Our current social, economic and political systems are all, in one way or another, dependent on oil - a finite substance that negatively impacts the environment, human health and international relations. The U.S. consumes more gasoline than the next 20 top oil-consuming countries combined, including Japan, China, Russia, Germany, and Brazil. The U.S. not only has the largest automobile fleet in the world but is near the top in miles-driven-per-car and near the bottom in **fuel efficiency**.

To put this in greater perspective, consider that the United States consumes about 18 million barrels of oil each day. Each barrel contains 42 gallons of oil, which will ultimately yield around 20 gallons of gasoline. Therefore, in the United States, approximately 368 million gallons of gasoline are consumed every day.²⁰

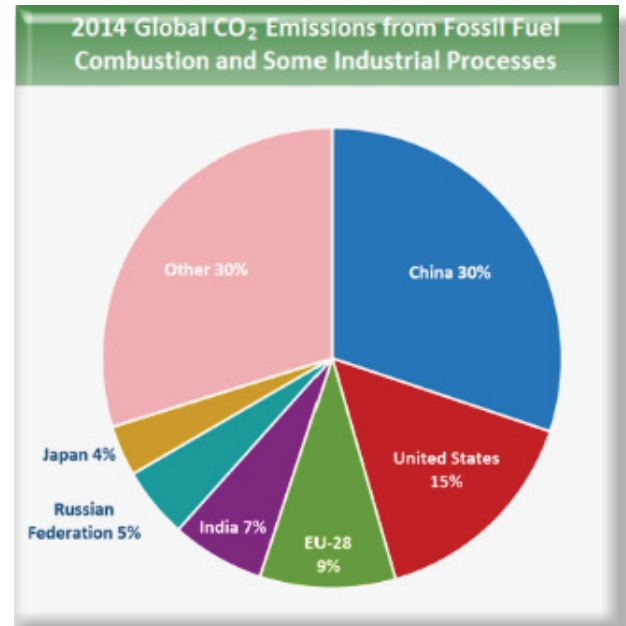
With the world's oil output close to peaking, there will not be enough economically recoverable oil to sustain the growing U.S. fleet, much less support the world's current rate of auto expansion. Oil stocks are now a major security risk. Our dependence on oil to fuel our economy and transportation means that we are dependent on politically vulnerable and sometimes volatile parts of the world. In fact, the world's dependence on oil has lead the International Energy Agency to deliberately overstate both the world's current remaining oil reserves as well as potential future discoveries because they feared that low projections would result in international panic.²¹

WALKABLE AND BIKEABLE CITIES & PUBLIC TRANSPORTATION

One of the reasons that most of us are so auto-oriented is because quite often, our cities are more car-friendly than they are people-friendly. Designing and constructing walkable and bikeable communities ultimately results in the most efficient and affordable surface transportation system an urban area can have. A shift toward these accessible communities, with their emphasis on public spaces, pedestrian ways and bike lanes, will help urban environments become more sustainable by reducing their use of both natural and economic resources. This change will also lead to increased social interaction and physical fitness, while diminishing crime and other social problems. Walkable and bikeable communities are also more livable and tend to contribute to happier and healthier lifestyles for the residents who live in them.²² "In fact, research indicates that the per mile health benefit of cycling is on average \$1.50."²³

Public transportation, when effectively designed and intelligently implemented, also has the potential to improve communities and reduce pollution. A single city bus can take 40 vehicles off the road, saving over 18,000 gallons of fuel and keeping more than 39,000 pounds of pollutants out of the atmosphere each year. Cities around the world such as Paris, Rome, Moscow, Tokyo, New York, Chicago, and San Francisco, which prioritize

Carbon Dioxide Emissions



US Department of Energy, 2014



investment in large-scale public transportation infrastructure, have seen these investments benefit their cities and citizens immeasurably. For example, in 1974, the people of Curitiba, Brazil (population 1 million) began developing an extensive bus rapid transit (BRT) system. Since then, Curitiba's population has tripled but its car traffic has declined by 30%.²⁴ In Bogota, Columbia, a similar BRT system (which designates special express bus lanes to quickly move people around the city), has been so successful that it is being replicated in six other Columbian cities as well as Mexico City, Guadalajara, and Medellin.²⁵

Santa Monica has over 100 miles of improved bikeways, bicycle commute share programs, over 300 public spaces for bikes to park, and a large full service bicycle center.²⁶ Furthermore, Santa Monica is highly rated in the terms of its **walkability** and **bikeability** by Walkscore a company that utilizes a complex algorithm to assign a score depending on the distance of an amenity such as market (walkable score) or a bike lane (bikeable score).²⁷ Researchers at the Brookings Institution found that, for each step up the walkability scale a neighborhood was ranked, stores in that neighborhood were likely to see an 80% percent gain in retail sales.²⁸



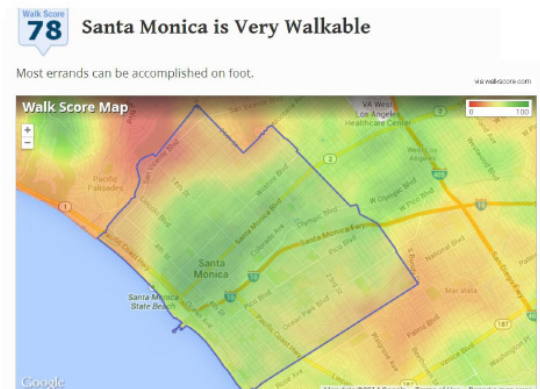
THE PROS AND CONS OF ALTERNATIVE FUELS

Gasoline and diesel fuel have become the crux of our transportation infrastructure, running our cars, planes, trains, ships, buses and trucks. Since the first workable prototypes of the gas engine were developed in the late 19th century, science and technology have continued to experiment with many different types of fuel sources. Some of these, such as hydrogen and vegetable oils, which we may think of as modern, were actually some of the very first fuel sources explored by scientists. But as petroleum companies, throughout the 20th century, began to gain more mainstream and financial power internationally, research on other types of fuels was put on the back burner. Now, as economic, environmental and national security concerns increase, interest is growing in alternatives such as hydrogen and vegetable oils as well as natural gas, ethanol, biodiesel and electricity. Although many of these fuels offer exciting possibilities for supporting a shift away from petroleum, it is important to remember that there are also trade-offs associated with each and that none represents a truly perfect solution.

Hydrogen, a gaseous element that is very abundant in nature, is a fuel source, which can be consumed by vehicles with special fuel cells and has the benefit of creating little to no back-end emissions. A fuel cell converts the chemicals hydrogen and oxygen into water, and in the process it produces electricity. Proponents of hydrogen fuel cite its zero emission potential while opponents point out the difficulty in storing the highly flammable fuel cells, which are also very expensive and require large amounts of fossil fuels to produce.

“Automakers are ready to sell mass-market fuel cell cars but without a matching fueling infrastructure to support them, few customers will want take the fuel cell leap. However, just like there is a push to place electric car chargers in many cities, the hydrogen infrastructure issue is quickly changing as Shell and other fuel companies are hard at work developing ways to create a hydrogen-fueling infrastructure virtually overnight. In California, efforts are under way to construct 100 hydrogen stations in the state in the short term.”²⁹

In 1893, Rudolf Diesel developed the very first engine that could be fueled by vegetable oil. He thought this would appeal to farmers who would already have a ready source of fuel on hand. Ultimately, crude oil became the most popular fuel source, however, modern diesel engines are still well suited to run on vegetable-based fuels such as biodiesel and even straight vegetable oil (SVO). Biodiesel, which can easily be made from refined oils, could be considered a small-scale renewable fuel; however, supply and production limitations reduce its potential for supporting a large-scale shift away from fossil fuels. While used vegetable oil can be collected from restaurants and food trucks, supply is limited, making scalability to any level above personal use nearly impossible. Furthermore, long-term use of biodiesel can cause corrosion and damage engines and other vehicle



SM Walk Heat Map



Action Items

What the City of Santa Monica is Doing:

The City of Santa Monica is committed to creating attractive and convenient choices for people to get where they are going, while improving air quality and helping to reduce vehicle congestion and climate change. For information on the City's mobility campaign "GoSaMo", visit www.GoSaMo.org

CHAPTER 9.53

The City's Transportation Demand Management Ordinance (Chapter 9.53), administered by the Planning & Community Development Department and implemented in 1994, promotes mobility options such as walking, carpooling, vanpooling, biking, using public transit, modified work schedules, telecommuting and other less-polluting forms of transit. Currently, there are over 30,000 employees in the City whose employers offer mobility education and/or mobility incentives to their employees in order to get them to commute to work using fewer polluting modes.

Employers in the City of Santa Monica with 10 or more employees must comply with the Ordinance and help reduce employee commute trips. Reducing the number of employees driving alone to work reduces traffic congestion in peak commute hours and also helps improve air quality while providing a better quality of life to the people who live and work in Santa Monica. Employers with 10 - 29 employees must provide basic information on mode split and educate their employees on the importance of green commuting to help improve air quality. Employers of 30 or more employees further encourage ridesharing by implementing a variety of incentives and strategies. A yearly employee survey tracks each employer's progress in reducing single passenger commutes. Employers strive to meet morning and evening AVR (or average vehicle ridership) of 1.6-2.2 employees in every vehicle that commutes to and from the worksite (the range accounts for a business' proximity to high-quality transportation options). The City of Santa Monica, as an employer itself, is also subject to similar requirements that under Rule 2202, regulated by the South Coast Air Quality Management District, with the goal of reducing employee commute trips at all city sites and meeting the city's average vehicle ridership (AVR) goal of 2.2, which is the highest threshold. Employers that want to do more to encourage green commuting and mobility options may visit the City of Santa Monica's Planning & Community Development Department at santamonica.gov/tdm for information and assistance.

PARKING CASH OUT

Parking Cash Out, part of the health and safety code sec 43845, is a State law requiring employers of fifty or more employees who lease their parking and subsidize any part of their employee parking to offer their employees the opportunity to give up their parking space and utilize other mobility choices for getting to to work instead. In return for giving up their parking space, the employer pays the employee the cost of the parking space. This incentive encourages employees who receive free parking to change their commute habits and rideshare instead.



BICYCLE VALET

The City offers a free Bicycle Valet is offered at various Farmer's Markets and events at the pier as well as other City-sponsored and private events in the city. The Bicycle Valet works much like a traditional automobile valet. Riders can give their bikes and helmets to an attendant who gives them a claim check and parks the bicycle for them in a designated and protected valet parking area. The bike valets provide secure bicycle parking where it might not otherwise exist for thousands of bike riders every year. Bike valets also accept skateboards, scooters, and rollerblades. They encourage residents to bike to events in the City, reducing emissions and congestion while improving the quality of life in Santa Monica. For information on bringing Bike Valet to your business or event, or setting up your own, call Kyle Kozar at 310.458.2201 ext. 5769.

SANTA MONICA BIKE CENTER

The Bike Center provides secure bike parking, repair and rentals for community members. The SM Bike Center replaced part of a parking structure, turning 27 car parking spaces into 350 bicycle parking spaces. In 2013 the SM Bike Center parked over 29,000 bicycles from 318 unique members.³⁵ The center also encourages workers to bike to work by providing showers and lockers for commuters to use for a low monthly or annual fee. For more about the Bike Center go to <http://smbikecenter.com/>

ELECTRIC VEHICLE CHARGING

The City has a large network of publicly available charging stations and is working to install more. The City's EV Action Plan will provide a comprehensive approach to expanding charging and providing resources to EV drivers and would-be EV drivers. For information on available funding, public charging stations and the EV Action Plan, please visit www.smgov.net/electricvehicles

BIKE IT! WALK IT! BUS IT! DAY

Santa Monica students started Bike it! Day as a way to spread awareness for global warming and to encourage bicycling to school. This event has since expanded into Bike it! Walk it! Bus it! Day, including walking, carpooling, transit and other mobility options. Over 30% of the district's students participate in Bikelt! week, effectively doubling the average number of students utilizing sustainable mobility choices.³⁶

BREEZE BIKE SHARE

As of 2015, bike share members have access to 500 8-speed Breeze Bikes at 75 stations citywide. Breeze provides a new active transportation alternative for short hops around Santa Monica to local destinations, bus stops and the City's Expo Light Rail stations. You can join the thousands of Breeze riders by registering for "pay-as-you-go" (12¢/minute), monthly, or annual membership rates at: www.breezebikeshare.com

EXPO LIGHT RAIL

The Metro Expo Line is a light rail system that connects Santa Monica to Downtown Los Angeles and dozens of points in between. Santa Monica has 3 Metro stops: Downtown Santa Monica, 17th St/SMC, and 26th St/Bergamot. For more information, visit www.metro.net. There are also bike paths that run along the Expo route.

DO YOU...

- * DRIVE IN YOUR CAR ALONE?
- * STORE ITEMS IN YOUR CAR?
- * LEAVE YOUR CAR IDLING
- * PUT OFF TUNING UP YOUR CAR
- * USE YOUR CAR TO GO A FEW BLOCKS?

NOW YOU CAN...

1. IMPROVE YOUR FUELED COMMUTES: CARPOOL OR TAKE MASS TRANSIT.

Carpool to work, school or play. Many employers offer incentives (sometimes financial!) to share the ride to work. If every commuter car carried one more person it would reduce the use of an estimated 600,000 gallons of gasoline and 12 million pounds of CO₂ would be kept out of the air (UCS). Visit the Support Tools for 10 Tips for Successful Carpooling. The internet has revolutionized carpooling through social networks – try any of these sites/apps to get started:³⁸

- * www.ridematch.info – free, Southern California carpool matching service
- * carpoolworld.com – free, worldwide carpool matching service
- * takescoop.com - carpool matching phone application
- * zimride.com – Carpool matching combined with social networking (for colleges only)
- * waze.com/carpool - Free carpool matching service



Take **Public Transit**-check out www.GoSaMo.org for a list of trip planning options

Visit the GoSaMo Store at 1444 4th Street, Santa Monica just east of the 3rd Street Promenade. There, you can get trip planning assistance, fare media and schedules. Visit www.bigblueblus.com

Visit metro.net - Transit, carpool, and van pool information for Southern California. You can get a TAP CARD, which is good on all Metrocard systems, or an EZ Transit Pass and ride almost any bus or train in LA County all month.

vehicle should last longer and command a higher resale value.

Good driving habits and periodic vehicle maintenance will save you money, protect your vehicle and help your local watershed. A well-maintained car is less likely to leak pollutants onto the street, which travel through open channels and closed storm drains before spilling into your ocean water.

A car that is not tuned properly produces 10 to 15 times more pollution than a well running car.³⁷

* The Consumer Assistance Program (CAP) is designed to help improve California's air quality. A consumer may retire a qualified vehicle and receive \$1000. Consumers meeting low income eligibility requirements may receive \$1500. In addition, CAP provides qualified consumers who own a vehicle that cannot pass its biennial (every other year) Smog Check inspection up to \$500 in financial assistance toward emissions-related repairs.. For more info visit: http://www.smogcheck.ca.gov/80_BARResources/01_CAP&GoldShield/cap_program.html



Keep your tire pressure at optimal pounds per square inch (psi) - Underinflated tires can cause a 5% decrease in fuel economy.³⁸

Proper auto maintenance increases fuel economy by up to 10%

Preventive maintenance should be done according to the schedule in the owner's manual.

Practice proper handling and avoid contaminating the environment when dealing with your used automotive fluids and other tune up materials. Used fluids must be disposed of as hazardous waste, even better recycle your used motor oil.

Find a good technician. Ask friends for recommendations. Check the reputation of the repair shop with your local consumer group. Check out the technicians' credentials. ASE-certified auto technicians have passed one or more national exams in specialties such as engine performance and air conditioning.

The oil filter should be changed with every oil change. Neglecting to replace worn-out oil can result in severe damage to the engine.

Replace your air filter- A dirty air filter can cause an engine to consume over 2% more fuel. Rural vehicles traveling on dusty roads will need air filter changes more often.

Have your vehicle's air conditioner serviced only by a technician certified to handle and recycle refrigerants. Older air conditioners contain ozone-depleting chemicals, which can be released into the atmosphere through improper service.

If you do your own repairs, properly dispose of engine fluids and batteries. Call your local government to find out how. Some repair facilities also accept these items.

Routinely inspect the spot where the vehicle is parked for the following signs of fluid leaks, and check for fumes. Leaking fluids are not only a sure sign that the vehicle needs repair, but the fluids are also harmful to the environment.

- * Black or dark brown drippings - motor oil or grease
- * Yellow or green drippings - coolant or antifreeze
- * Pink or red drippings - transmission fluid
- * Clear drippings - brake fluid, power steering fluid or gasoline

4. CHANGE YOUR BEHAVIOR.

Shut off the engine when waiting- Ten seconds of idling uses more fuel than restarting the engine. An idling gasoline vehicle uses about ½ a gallon of fuel per hour. An idling diesel engine truck uses about ¾ of a gallon of fuel per hour.

Remove excess items from the vehicle. Less weight means better mileage.

Roll up your windows when traveling over 35mph to improve aerodynamics.

- Park in the shade when possible to avoid evaporative emissions that occur during daytime heating of fuel delivery systems of parked vehicles.
- Don't top off. Fumes escape and react with air pollutants to cause smog. Don't add gas after the pump automatically shuts off; this will avoid spills of gas and unnecessary VOC emissions.
- Hypermiling. Using safe legal techniques to maximize fuel efficiency, such as coasting, and slow acceleration. Driving 65 miles per hour instead of 75 increases fuel efficiency by up to 15 percent.³⁹
- Use re-refined motor oil and recycle your used motor oil. Using re-refined oil saves energy, because it takes less energy to produce a gallon of re-refined oil vs. a gallon from fresh crude oil.

According to the California Integrated Waste Management Board

- * Re-refined oil is just as good, if not better than virgin oil
- * Re-refined lubricants that are American Petroleum Institute (API) certified comply fully with vehicle manufacturer' warranty requirements
- * The price of re-refined oil is comparable to virgin oil. In some cases it costs less.

Check out ciwmb.ca.gov/UsedOil/Rerefined for more information



- Trip Link** – Consolidate daily errands to eliminate unnecessary driving.
 - * Combine trips to work, school or play
 - * Keep a running list of the things you need
 - * Organize the errands by location
 - * Give yourself plenty of time to head out and do them all in one trip
- Improve your driving habits. Avoid speeding and sudden acceleration; both waste gas.

5. BUY LOCALLY MADE OR LOCALLY GROWN PRODUCTS.

Buying items that are made or manufactured locally means that transportation costs are significantly reduced, fewer pollutants are spewed into the air and there are fewer vehicles on the road. Locally grown products usually use less plastic packaging, which also reduces oil consumption (plastic is a petroleum product).

- Support Local Manufacturers. This helps to keep jobs in your community and to reduce the amount of congestion and emissions related to product transportation.
- Support Local Farmers. Buying local cuts down on the shipping distance. Most goods in the U.S. are hauled by truck. Trucks going long distances use more fuel so they pollute more, cause more traffic, and do more damage to roads. The average good travels some 1,200 miles from source to buyer! Supporting local workers, farmers, artisans, etc., brings job security and promotes environmental protection.
- Support Local Small Stores. Goods produced overseas are made in nations that may not have environmental regulations, and local small stores support jobs in your community and put revenue back into the local economy.



6. SWITCH TO A BETTER WORLD CLUB MEMBERSHIP (AN ENVIRONMENTALLY FRIENDLY ALTERNATIVE)

Join the Better World Club. They are the only roadside assistance and travel club that strives to balance your transportation needs with your desire to protect the environment. Bike roadside assistance is also



offered. They advocate on behalf of the consumer and the environment by donating an amount equal to 1% of annual revenues toward environmental clean-up efforts and by providing unique eco-friendly travel alternatives. Visit the Support Tools for a specific comparison of Better World Travel and AAA services.

Use the promotion code **SWRK0125** for a **25%** Sustainable Works discount to Better World Club.

7. EARN TRANSIT CHEKS OR UTILIZE A PARKING CASH OUT OPPORTUNITY.

- Ask your employer if they offer **pre-tax commuter benefits** as part of their Employee Trip Reduction Program. You can get transit cheks from your workplace for using mass transportation or vanpooling to work. You can receive up to \$225.00 worth of transit cheks each month tax-free.
- When you don't drive, you don't park. Look into your work or school Parking Cash Out option so you can accept a cash payment in exchange for your parking space. Commuter Benefits Program allows employees to set aside \$225 a month tax free for vanpool and/or transit costs. **Parking Cash Out** programs are mandated by the State of California to promote alternative commuting among employees whose employers subsidize leased employee parking.

8. PARTICIPATE IN A CAR-SHARING PROGRAM.

With car costs soaring (gas, insurance, maintenance etc.), many people are opting to own fewer vehicles and take advantage of growing mobility options like car-sharing programs.

- Car Sharing** Programs help our environment and community. Using a shared car decreases traffic on the road, helps relieve parking congestion, and reduces vehicle miles traveled. It is estimated that each shared car replaces six cars on the road (up to eleven cars in high density areas). Most shared cars are environmentally friendly vehicles, with increased **Miles Per Gallon (MPG)** and low vehicle emissions.
- Hop Skip Drive - a mobile application that connects parents to safe and experienced drivers to transport their children
- Zipcar- Mobility clubs that gives members the key to new cars, trucks, and minivans located across a metropolitan region. You pay an hourly rate, and they pays for the car, insurance and gas!
- Envoy - Car sharing company with on-demand electric vehicles for office buildings, hotels, and housing complexes. Rates are offered per-minute or daily (rates available in the app).
- Maven - Car sharing app which allows you to select the type of vehicle you would like and reserve cars by the hour or day.



NOTES

9. PURCHASE A HIGH FUEL EFFICIENCY OR ALTERNATIVE FUEL VEHICLE.

- Drive a fuel-efficient vehicle. A car that gets 20 mpg emits 50 tons of carbon dioxide over the course of its lifetime. A 40 mpg vehicle emits half that.
 - * The California Air Resources Board provides an online buying guide to the cleanest, most efficient cars on the market.
<http://www.driveclean.ca.gov/>
- Diversify society's fuel source and reduce US dependence on foreign oil and all of the sustainable challenges associated with non-domestic fuel production.

Alternative fuels include:

- * Ethanol
- * Biodiesel
- * Straight Vegetable Oil (SVO)
- * Electric

The Sierra Club's new EV Guide brings together, for the first time in one place, an EV buyer's guide, the Sierra Club's Go Electric campaign, information on EV incentives and emissions, and current specs for available EVs -- all based on where you live.

Visit: <http://content.sierraclub.org/evguide/>

Looking for EV charging stations in Santa Monica? Visit www.smgov.net/electricvehicles

- * Gas Electric Hybrid
- * Hydrogen

For a map of Alternative Fuel stations in Santa Monica or in your area visit the U.S. Dept. of Energy's website Alternative Fuels Data Center at <http://www.afdc.energy.gov/locator/stations/>

Alternative Fuel conversions

- * Gas to Ethanol whitelightning.net/
- * Diesel to SVO
- * Anything to Electric leftcoastelectric.com



10. GET ACTIVE.

Become informed on transportation issues

- * Expo Light Rail metro.net/projects/

Advocate for better transportation options

- * The Transit Coalition thetransitcoalition.us/nationaltc
- * Mobility21 Coalition mobility21.com/

If you are an employer, offer benefits to employees for "green commuting".

If you are an employee, ask your employer to offer ridesharing incentives and benefits.

If you plan events, have a bike valet and encourage attendees to use transit, walk, bike or carpool. Make sure you provide information on how to get to the event by transit as well as where to park.

Volunteer

- * Santa Monica Bike Center
- * Los Angeles County Bike Coalition
- * Santa Monica Spoke
- * Plug In America
- * Clean Air Coalition
- * The National Transit Coalition
- * Educate yourself on the latest sustainable legislative issues by visiting: sustainableworks.org

Write a letter or attend a community meeting

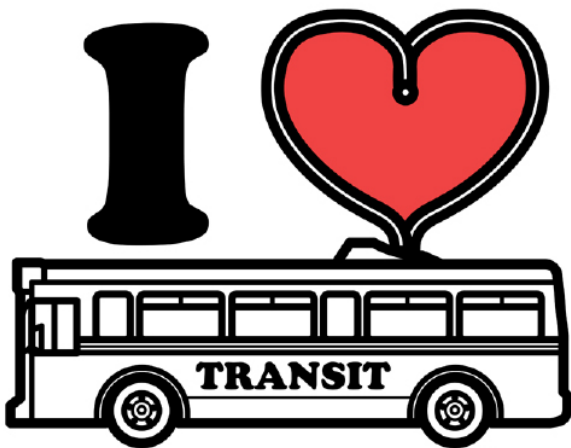
- * Ask your local and state representatives to vote for funding of pedestrian, bicycle and public transportation
- * Write your congressperson about local transportation issues and needs

- * Tell your congressperson to stay tough on CAFE standards
- * Join the Los Angeles County Bike Coalition to help advocate for local bike projects in your area.

Participate in the following thematic events:

- * National Arbor Day in April
- * Bike to Work Day in May
- * Try Transit Week in September
- * Global Car Free Day in September
- * Park(ing) Day in September
- * Walk our Children to School Day in October
- * Rideshare Week in October
- * Bike It! Walk it! Bus it! Day in October
- * Car Free Fridays

Consider a Green Job, or making your current job more sustainable.



GREEN JOBS – TRANSPORTATION

VEHICLES

- * **Automotive Engineer** – This job calls for coming up with original designs, concepts for eco-friendly cars and trucks, and modern testing methods, as well as evaluating emissions information (and sustainability), and consulting the costs of such designs. It also requires familiarity with automobile design and function, knowledge of current trends in transportation, green technologies and DOT and EPA regulations.



- Visit www.gm.com or www.toyota.com for job openings in this field.

- * **Smog Check Technician** – Smog check technicians are professionals who work simultaneously with the government and the public to reduce emissions and provide clean air. In California, technicians are licensed by the Bureau of Automotive Repair (BAR). Particularly, there are three degrees of licensing: intern, basic and advanced. Unless previously involved in automotive mechanics and repair, novices are encouraged to complete some secondary education, obtain an internship license, and begin work under a higher level technician. Associate's degrees in the automotive and mechanical fields are entry ways to beginning with a basic or advanced license. Upward mobility in the field is possible and likely after gaining experience.



- Explore the Bureau of Automotive Repair's website at www.bar.ca.gov and look under the Industry tab to find more information on licensing and careers as a smog check technician.

ALTERNATIVE FUELS

- * **Alternative Fuels Policy Analysts & Business Sales** – Stay on top of alternative fuel legislation and the renewable energy credits market, coordinate with partners in sales and project implementation and help market alternative fuels to consumers. Areas of recommended college course work include Marketing & Sales, Economics, Environmental Studies, and Alternative Fuels and a Bachelor's Degree is a minimum requirement. Both analyst and sales jobs will increase as alternative fuel technologies expand. Estimated salary is \$60,000/year.

ELECTRIC

- * **Electric Vehicle Electrician** – Support project planning and design implementation for electrical vehicle projects and install dedicated circuits needed to support high current charging systems. A Bachelor's of Science is the minimum education requirement as well as 5-10 years experience including old and new aspects of electrical installations. The salary range is from \$22-\$26/hour.



- Visit for more information on electric vehicles

HYBRID

- * **Hybrid Powertrain Development Engineer** – Develop powertrain designs including components and sub-systems, perform complex design analysis, create specifications and conduct calibration for alternative fuel and hybrid powertrains. The minimum education requirement is a Bachelor's Degree in Electrical or Mechanical Engineering or related field. Job applicants must have knowledge of powertrain technology, vehicle engineering, development, certification, OEM calibration, alternative fuels calibration and hybrid powertrain development. Salaries are comparable to other engineering classes but vary with experience.

TRANSPORTATION SYSTEMS

- * **Urban Regional Planner/Transportation Engineer/Transportation Planner** – Perform technical and analytical urban/regional planning work relating to the transportation infrastructure. Evaluate land-use requests, implement long-range land use plans, conduct various planning and environmental studies, and explain the planning program and related issues to the public. Requirements for entry-level jobs include a bachelor's degree, preferably with a major in urban/regional planning, transportation planning, public administration, architecture, environmental sciences, geography, landscape architecture, or a related field. Higher-level positions require that you be



SUPPORT TOOLS



Fuels of the Future

FUEL TYPE	WHAT IT IS	PROMISE	PROBLEMS	USED IN	MAINSTREAM POTENTIAL
Natural Gas	A fossil fuel captured from wells or manufactured from organic matter such as coal.	Produces 20 to 25 percent fewer greenhouse gases and virtually no particulates compared with petroleum. Available, accessible, and transportable via existing infrastructure. Home fueling stations area viable option.	As a fossil fuel, it is a limited resource. Though cleaner than gas and diesel, it still creates greenhouse gas and other emissions.	130,000 vehicles, including the Honda GX, transit and school buses, refuse haulers.	Moderate to high
Propane	Liquefied petroleum gas, a by-product of processing natural gas and refining crude oil.	Infrastructure for processing and transporting is existing. Much lower ozone-forming toxic and emissions.	Flammable, made from nonrenewable resources.	Some buses: some light duty and passenger vehicles produced before 2004.	Moderate
Ethanol	An alcohol-based alternative fuel produced by fermenting and distilling cellulose or starch crops(corn, barley, wheat, etc.) that have been converted into simple sugars.	Made from renewable: produces lower emissions: can be blended with gasoline or diesel.	Shifting land use from food crops of forest to fuel crops could present problems.	Flex-fuel vehicles. Twelve percent of automotive fuel sold in the Unites States contains some ethanol.	High
Methanol	An alcohol that can be manufactured from carbon-based feedstocks including natural gas, coal, and wood.	Used to make enhanced octane M85 (85 percent methanol, 15 percent gasoline), which touts lower emissions, higher performance, and lower risk of flammability than gas.	Emits large amounts of formaldehyde.	FFVs that run on M85.	Moderate
Electric	Battery powered engines, sourced from a variety of metals.	Average savings of emissions of 70% under current energy mix even when comparing a “Well to Wheels” analysis.	Batteries contain toxic heavy metals and recycling required. Currently few highway ready vehicles available.	Globally, but through a small number of models.	High

FUEL TYPE	WHAT IT IS	PROMISE	PROBLEMS	USED IN	MAINSTREAM POTENTIAL
Biodiesel	A fuel produced from agricultural resources, typically refined soybean oil, but also canola, sunflower, and recycled cooking oils, and sometimes animal fats. B100 is pure but can be blended with conventional diesel to make B5 (5 percent biodiesel, 95 percent diesel) and B20 (20 percent biodiesel, 80 percent diesel).	Can be domestically produced and is renewable and biodegradable. B100 can reduce CO2 emissions by up to 75 percent; reduces other pollutants too. Requires no special equipment for fueling and most conventional diesel engines can use it without modifications.	Supplies are plentiful, but not great enough to support a large scale shift. Changes in land use-shifting from food or forests to produce fuel crops-could be problematic. Blends still rely on petroleum.	Approximately six hundred fleets nationwide.	High
Straight vegetable oil	Food-grade waste oils, usually harvested from restaurants, but further unrefined.	Presently free; less polluting than diesel; reuses a material that would otherwise be thrown away.	Reduced engine life; not currently street legal.	Primarily Do It Yourself (DIY) modified vehicles.	Low
Hydrogen	A gaseous element that's readily abundant in nature	Little to no back-end emissions. Advanced solar and other technology could reduce or eliminate front-end CO2 emissions. Home fueling stations possible.	Fuel cells and storage technology and inadequate; production is expensive and requires fossil fuels; no existing infrastructure. Highly flammable.	Honda FCX, Mercedes-Benz B-Class F-Cell; some public buses.	Uncertain



betterworldclub

Roadside Assistance | Insurance | Travel Service

Membership Program Comparison				
	BWC Premium	AAA Plus*	BWC Basic	AAA Classic*
Simple Nationwide Pricing	YES	NO	YES	NO
Cost for Primary Member*	\$92.95* (We will match AAA prices on new membership)	\$72.99* (check with your local office for current prices, exceptions and variations)	\$57.95* (We will match AAA prices on new membership)	\$44.63* (check with your local office for current prices, exceptions and variations)
Additional Family Members*	\$37.00* (We will match AAA prices on new membership)	\$20-\$40* (check with your local office for current prices, exceptions, and variations)	\$27.00* (We will match AAA prices on new membership)	\$20-40* (check with your local office for current prices, exceptions, and variations)
One Time, Non-Refundable Signup Fee*	\$12.00 (\$0.00 if you are switching from AAA)	\$10-\$20	\$12.00 (\$0.00 if you are switching from AAA)	\$10-\$20
1% of Revenue Donated to Environmental Cleanup and Advocacy?	YES	NO	YES	NO
Anti-Environmental Lobbying?	NEVER	YES	NEVER	YES
Hybrid Vehicle Owner Discount*	YES	NO	YES	NO
Gas Guzzler Surcharge?*	YES	NO	YES	NO
Auto Roadside Assistance Comparison				
Towing Miles	100 Miles	100 Miles	5 Miles	3-7 Miles
Flat Tire Assistance	YES	YES	YES	YES
Jumpstart	YES	YES	YES	YES
Fuel Delivery	YES	YES	YES* (Basic member pays for fuel)	YES
Extrication/Winch Service	YES	YES	YES	YES
Usage Limit (per covered member)	4 service calls per year	3-5 service calls per year	4 service calls per year	3-5 service calls per year
Lockout Service	\$100	\$100	\$50	\$100

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Member Discounts and Other Benefits				
	BWC Premium	AAA Plus*	BWC Basic	AAA Classic
Car Rental Discounts	YES	YES	YES	YES
Hotel Discounts	YES	YES	YES	YES
Free Maps and Custom Trip Routing	YES	YES	YES	YES
International Drivers Permit	No. Click Here	Yes	No Click Here	Yes
Travelers Insurance (Available for purchase at the time of booking)	YES	YES	YES	YES
Bail Bonds*	YES	YES	YES	YES
Car Theft Reward†	\$5000	\$2000	\$5000	\$1000
Legal Fee Reimbursements*	\$1000	\$1500	\$1000	\$1000
Trip Interruption	\$1500	\$1000	\$1000	\$200
Bicycle Roadside Assistance Comparison				
	BWC Bicycle Program	AAA Bicycle Program		
Cost for Primary Member*	\$39.95 for Bike Only* (\$17 if added to an auto membership.)	No Fee & No Bike Only		
Additional Family Members*	\$17* *\$0.00 if Bike is added to an auto membership*	*R restrictions and Limitations Apply *C coverage only in certain cities and states		
Anti-Bike Lane Lobbying	Never	Yes		
Miles Covered	30 Miles. Nationwide.	5-100 Miles* *R restrictions and Limitations Apply. *C coverage only in certain cities and states.		
Usage Limit (per covered member)	2 service calls per year for bicycle (Doesn't count toward auto limit)	Included in auto service calls (Counts towards total limit)		
Bicycle Only Membership Benefits				
	BWC Bicycle Only	AAA		
Car Rental Savings	YES	Does not have Bike Only		
Hotel Savings	YES	Does not have Bike Only		
Free Maps and Custom Trip Routing	YES	Does not have Bike Only		

Household (PLUS) membership cover up to three additional members of your household.

Associate members on Bicycle Only memberships are \$17 per person, \$27 on Basic Auto memberships, and \$37 on Premium memberships.

AAA is a registered trademark of the American Automobile Association.

There are over 80 regional AAA clubs. Each regional AAA club sets its own rates, policies and services. If you switch to Better World Club, we will match your current AAA price.

AAA rates on this page do not include promotions or other price discounts.

Price ranges and services listed are representative and not necessarily complete.

Check with your local AAA club for specific rates, policies and services.

AAA Plus is not available in certain regions to new members

Price matching applies to new membership only.

Signup fee is nonrefundable.

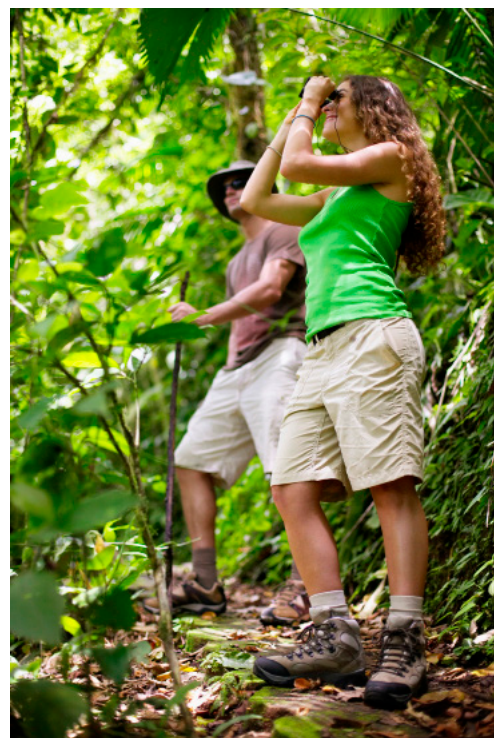
Hybrid Vehicle Owners Discount: 10% discount for owners of hybrid vehicles; offer for new members only

Gas Guzzler Surcharge: 20% surcharge for owners of the TEN worst gas-guzzling cars.

Sustainable Travel Tips

PLAN YOUR TRIP WITH THE ENVIRONMENT IN MIND.

- * Consider vacationing close to home. You will reduce your emissions from driving or flying and you'll get to know your local environment.
- * When planning your trip, book with an eco-friendly travel agent. Visit travelgreen.org or gogreentravelgreen.com
- * Go on an **eco-tour**. Eco-tours are specifically designed programs that provide access to remote areas while protecting the local environment, culture and economy.
- * Choose to participate in **Sustainable Tourism**.
- * Maximize the positive aspects of tourism on host communities, including employment of local staff, using local suppliers and developing sustainable local businesses.
- * Minimize the negative effects that tourism can have. Do not divert resources away from local communities or drive up prices on local resources.
- * Provide opportunities for cultural exchange, where locals and visitors can share and learn from each other.
- * Contribute to host community welfare. Where possible look for companies who



- * engage in partnerships with local agencies developing programs that assist the host communities.
- * This may be in health, or education on environmental protection.

PREPARE BEFORE YOU LEAVE HOME.

- * Turn off AC/heat or adjust the thermostat to lowest setting.
- * Turn water heater to “Vacation” or lowest setting and turn water off at outside connection to prevent flooding should a pipe break while you’re gone. When you return, turn on the water slowly and check for problems.
- * Unplug appliances to prevent Phantom Power loss
- * Stop your newspaper delivery.

USE GREEN HOTELS.

Green Hotels are hotels, motels, and bed and breakfasts using sound environmental management practices to reduce their impacts on the environment, improve their bottom line and satisfy customer demand for environmentally conscious lodging establishments.

- * Support members of the Green Hotel Association. The Green Hotels Association® is a membership organization that promotes community among Green Hotels. Member hotels are encouraged to implement water-saving measures, execute energy-saving techniques and reduce solid waste. Rather than putting all these measures into effect “behind the doors”, GHA encourages all lodging accommodations to get guests and clients involved. Hotels can offer towel and sheet-changing options, soap and shampoo dispensers, guestroom recycling baskets and reduced food-related waste.
- * Support lodging facilities with Green Seal Certification. Green Seal is an independent, non-profit organization that strives to achieve a healthier and cleaner environment by identifying and promoting products and services that cause less toxic pollution and waste, conserve resources and habitats, and minimize global warming and ozone depletion.



WALK LIGHTLY ON EARTH AND LEAVE NO TRACE

- * Take only photographs and leave only footprints-Do not take “souvenirs” from natural or historic areas.
- * Avoid the use of All Terrain Vehicles (ATVs), dirt bikes and motorcycles in sensitive natural environments

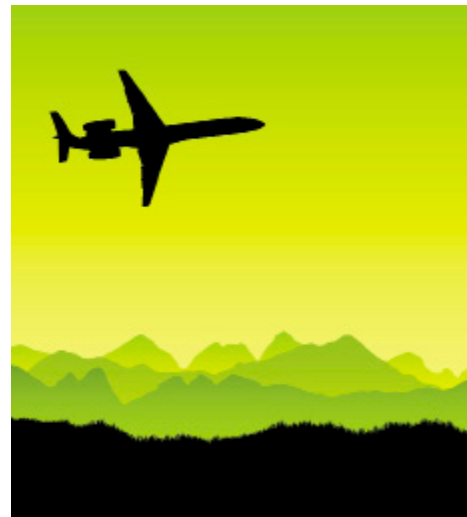
PRACTICE CONSERVATION BEHAVIORS WHEN TRAVELING.

- * Let housekeeping know that it is not necessary to change your towels and sheets or clean your room every day.
- * When you leave the room, turn off the AC/heat, lights and TV.
- * Leave the little bottles of shampoo, conditioner, body lotion, etc.
- * Use public transportation or walk in your destination city.
- * Rent Fuel efficient vehicles

OFFSET YOUR TRAVEL EMISSIONS.

A **carbon offset** is a reduction in emissions of carbon dioxide or greenhouse gases made in order to compensate for or to offset an emission made elsewhere. Many people choose to purchase carbon credits to offset the impacts of miles traveled by plane or car. The money paid for offsets goes towards re-forestation or clean energy programs.

- * Check out Carbonfund.org to calculate the carbon footprint of your trip and purchase offsets.



Adapted from a table in Ready, Set, Green by Graham Hill and Meaghan O’Neill, Villard, 2008, p106-109.
<http://sherryboschert.com>, Sherry Boschert (author of Plug in Hybrids), Presentation on Well to Wheels Emissions.

GLOSSARY OF KEY TERMS

Bikeability: The factors associated with bicycling and the environment of the route, the distance, and the interaction between the bicyclist and the bicycle. These factors interact with three different purposes: transport, recreation and exercise.

Carpooling/Ridesharing: getting to and/or from work or school with more than one person per vehicle. Carpooling is an economical, environmentally friendly alternative to commuting alone to work everyday.

Car Sharing: a community based vehicle that can be reserved, used and restored by multiple persons.

Carbon Offset Program: an anti-global warming program. Fees are added to airfare and then used to fund programs that reduce carbon dioxide and greenhouse gas emissions.

Commuter: a person who travels regularly between home and work or school. (APTA)

Eco Tour: a form of tourism that promotes environmental protection, cultural sensitivity, and local economic development.

Ecotourism (aka sustainable travel, green travel, or environmental tourism): responsible travel to natural areas that conserves the environment and sustains the well-being of local people. (International Ecotourism Society) A special form of tourism that meets three criteria:

- * provides for conservation measures.
- * includes meaningful community participation
- * is profitable and can sustain itself.

Electric Vehicles (EV): vehicles which rely on chemical energy stored within rechargeable battery packs alongside electric motors instead of traditional combustion engines. The vehicles themselves produce no exhaust fumes or CO2 emissions.

Emissions: gaseous waste materials discharged into the atmosphere. They include pollutants coming from vehicle tailpipes (HC, CO, NOx, CO2 and O2).

Fuel Efficient: the use of fuel with minimal waste or emissions.

Green Hotels: hotels, motels, and bed and breakfasts using sound environmental management practices to reduce their impacts on the environment, improve their bottom line and satisfy customer demand for environmentally conscious lodging establishments.

Fuel Cell Vehicles (FCVs): FCVs are hydrogen gas-powered vehicles meant to solve the problems of environmental pollution, dependency on foreign oil and rising gas prices because hydrogen is the most abundant element in the universe and produces zero emissions. At present, the cost to build the vehicles and the infrastructure needed for hydrogen fueling stations makes it more of a concept than a viable solution.

Hybrids Vehicles: vehicles that combine an electric motor with a traditional engine so a car produces zero emissions when running at low speeds. The electric motor is driven by batteries which receive their charge during regenerative braking and from the petrol engine. It is estimated that hybrids improve fuel consumption by around 30 per cent.

Hydrogen Fuel Cells: a fuel cell converts energy directly, without

combustion, by combining hydrogen and oxygen electrochemically to produce water, electricity, and heat. Need to consider the source of energy producing the Hydrogen before confirming sustainability of Hydrogen Fuel Cells.

Multimodal: issues or activities which involve or affect more than one mode of transportation, including transportation connections, choices, cooperation and coordination of various modes. (APTA)

Low Emission Vehicle (LEV): a vehicle designation indicating reduced emissions. The LEV program requires that new vehicles - any vehicle with 7,500 miles or less on the odometer - must be equipped with factory-installed California-certified advanced emission control systems. LEVs mean less air pollution. The LEV program protects your health by reducing harmful pollutants emitted into the air from vehicle exhaust - pollutants such as carbon monoxide, volatile organic compounds, nitrogen oxides, and toxics such as benzene.

Mass Transit: another name for “Mass Transportation” or “Public Transportation.” (APTA)

Mass Transportation (aka mass transit, public transportation or transit): transportation by bus, or rail, or other conveyance, either publicly or privately owned, providing to the public general or special service (but not including school buses or charter or sightseeing service) on a regular or continuing basis. (APTA)

MPG: Miles Per Gallon

Parking Cashout: a commuter benefit in which an employer offers employees the option to accept taxable cash income instead of a free or subsidized parking space at work.

Public Transportation: another name for “Mass Transportation” or “Public Transportation.” (APTA)

Ridesharing (aka carpooling or vanpooling): a form of transportation, other than a transit agency, in which more than one person shares the use of the vehicle, such as a van or car, to make a trip. (American Public Transportation Association)

Service Oriented Travel: promotes community service work in the destination location.

Sustainable Transportation: moving people and goods in cleaner, greener, healthier, safer, more equitable ways, and, where appropriate, NOT moving people and goods.

Sustainable Transportation System: one that allows the basic access needs of individuals and societies to be met safely and in a manner consistent with human and ecosystem health, with equity within and between generations is affordable, operates efficiently, offers more choice of transport mode, supports a vibrant economy, limits emissions and waste within the planet's ability to absorb them, minimizes consumption of non-renewable resources, reuses and recycles its components, and minimizes the use of land and the production of noise. (The Centre for Sustainable Transportation)

Telecommute: to work from home.

Transit Check: Voucher purchased by an employer for the employee to use to pay for transit or vanpool costs.

Trip Link: consolidating daily driving to eliminate unnecessary

vehicle trips.

Walkability: A measure of how friendly an area is to walking. Factors influencing walkability include the presence or absence and quality of footpaths, sidewalks, or other pedestrian right-of-ways, traffic and road conditions, land use patterns, accessibility to stores and businesses, and overall safety.

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