



DFG Going Green: Reducing Our Carbon Footprint

Compiled in this document is a list of ideas that the Department of Fish and Game (Department) could take to create a more climate change friendly way of doing business. Many of the examples mentioned would not only help decrease the Department's contribution to the climate change challenge but also save the Department valuable resources and funds. Specifically, these activities can help minimize the Department's carbon budget and greenhouse gas (GHG) emissions. Examples include going to electronic signatures to cut down on paper, resolving mileage requirements for vehicle use, web-based meetings and conferences, and exploring financial incentives provided by companies such as PG&E to help us "green" Department facilities. Many thanks to all the Department employees who contributed thoughts and suggestions¹ and helped get this document off the ground. Special thanks to Linda Miller for compiling comments and preparing the document for review.

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Table of Contents

Reduce, Reuse, Recycle	3
Reduce Energy Use for Department Business	4
Travel: Teleconference instead of flying or driving	5
Telecommuting	5
Green Meetings	5
Implement paperless office pilot project.....	7
Vehicle Fleet	7
Encourage Bicycle/Pedestrian Commuting	9
Discourage Private Car Commuting	9
Savings in the Field.....	10
Energy Saving in the Office.....	10
Computers and Other Office Equipment: Use the "Off" Switch	11
Lighting - The Right Light for the Right Task	11
Buy Energy-Efficient Products	12
Records Storage	12
Facility Improvements: Save Energy and Money.....	12
Heating, Ventilation, and Air-Conditioning (HVAC) Systems - Improve Efficiency .	13
Investing in Department staff.....	15
Education Sparks New Innovations	15
Provide demonstration or web-link for employees to learn how to:.....	16
Encourage Others to Conserve Energy	16
Ideas for Individual Reduction of Carbon Footprint	16
Maintaining the Department's Commitment: Tracking & Reducing the Department's carbon footprint.....	17
Overview	17
Data Automation Requirements.....	17
Person-power Savings.....	18
Carbon Offsets – Department Lands.....	18
Next Steps	19
Glossary	19
Other Resources	22

Reduce, Reuse, Recycle

Reducing, reusing, and recycling in Department offices helps conserve energy, and reduces pollution and greenhouse gas (GHG) emissions from resource extraction, manufacturing, and disposal.

Reduce

- Reduce paper and toner by using electronic signatures for all documents practicable
- Implement electronic submittal & approval of time-sheets
- Allow employees to opt-out from receiving a paper pay stub when using direct deposit
- Reduce size and frequency of hard copy mailings; replace with electronic communications
- Reduce paper by utilizing scanners, which will increase electronic records-keeping efficiency, effectiveness, and economy
- Convert Department forms, both internal and external, to an electronic format that can be completed, saved, and submitted electronically.
- Require cafeteria contracts to use recyclable or compostable (cornstarch/paper) serving containers and utensils, and to not use Styrofoam, which is non-biodegradable.
- Require cafeteria contracts to offer at least one low carbon meal per day (e.g., use mixed grain/bean proteins and/or locally produced ingredients), or to preferentially purchase from local farmers
- Turn building lights off nights and weekends
- Reduce handouts at meetings by using projectors during presentations/discussions
- Encourage the purchase of RoHS (Restriction of Hazardous Substances Directive) versions of electronic devices to reduce environmentally harmful e-waste.
- Set all printers to the duplex setting (double sided printing) for the default.
- Use reusable Interagency Mail and Messenger Service (IMS) folders for interagency deliveries
- Encourage the use of laptops in meetings, rather than paper agendas, paper notes, paper memos.
- At meetings, use pitchers of water in lieu of bottled water (bring-your-own cup).
- Install hand air dryers in restrooms and coffee rooms to reduce paper consumption
- Reduce water consumption by modifying landscaping at State owned/occupied buildings to use native drought-resistant plants
- Reduce water consumption by implementing water-saving ideas at wildlife areas and fish hatcheries
- Avoid purchasing products that come with excess packaging, especially molded plastic and other packaging that can't be recycled. If you reduce your garbage by 10 percent, you can save 1,200 pounds of carbon dioxide annually.
- Subscribe to on-line versions of professional and scientific journals rather than paper volumes.

- Publish the Department's scientific journal, *California Fish and Game*, on-line only
- Discontinue use of Styrofoam tableware.

Reuse:

- Implement a policy that requires offices to buy supplies made with 100% post-consumer waste recycled and biodegradable local content to the maximum extent practical and economical.
- For general kitchen areas, encourage use of glass dishes, cups, and utensils in lieu of disposable tableware.
- Toner printer cartridges (can be recycled and refilled) Delphin works best because they clean the blades each time.
- For meetings – reuse the name tents or name badges from previous meetings
- Look into re-treading old tires, rather than buying new ones
- Use rechargeable batteries. Over the long haul, rechargeable batteries will not only help the environment but will save you money, too. Americans use approximately 2 billion non-rechargeable batteries every year.

Recycle:

- Increase recycling activities to include all recyclable materials including but not limited to:
 - office paper, newspapers, beverage containers (glass, metal and plastic), electronic equipment and batteries, used printer cartridges
- Consider [leasing programs](#), which create an incentive for suppliers to design products for easy reuse, upgradeability, and recycling
- For end-of-life electronics, donate to schools or other organizations, or ensure it gets recycled or disposed of properly
- Require contractors to report on recycled products, e.g., paper towels used by janitorial services, weight or cubic feet of recycling picked up by garbage services
- Include education on recycling in interpretive materials, e.g., interpretive signing at Wildlife Areas, public buildings, etc.
- Start worm composting bins for food scraps & some paper, [e.g., see CalEPA](#)
- Encourage and promote planting of fruit trees for shade, vegetables for landscaping (artichoke plants make lovely decorative flowering shrubs)
- Utilize compost option in kitchen areas and break rooms (for banana peels and coffee grounds, etc.)

Reduce Energy Use for Department Business

Many of the everyday business activities the Department undertakes can have a huge impact on reducing GHG emissions if we follow a few suggestions.

Travel: Teleconference instead of flying or driving

- Use web conferencing technology (e.g., NetMeeting, or DimDim) rather than in-person meetings to help cut down on travel impacts and allow more staff to participate in relevant meetings
- Choose central meeting locations so a minimum of attendees will need to travel.
- When travel is necessary, encourage staff to reduce their impact:
 - utilize higher-efficiency vehicles when available
 - opt out of hotel room linen and towel changes
 - make sure lights, heater or air conditioning are turned off when not in hotel room
- For times when face-to-face training is a necessity (procurement, records management, etc.) have the trainer travel to the regions rather than having regional staff travel to the training center
- Air travel is the most energy-intensive form of transportation, much more so than traveling alone in any type of fleet vehicle. Therefore, flying should be discouraged as a form of in-state travel.
- If/when purchasing GPS navigation devices for vehicles, consider [Ecoroute functionality](#)

Telecommuting

At a time when climate change mitigation techniques are hotly debated and businesses are anticipating heavy regulation of GHG emissions, many companies, agencies, and institutions are turning to telecommuting as a potential practice to reduce emissions and save energy and costs. Telecommuting can help to reduce emissions associated with worker commutes. In addition, we can leverage telecommuting and adjustment of work schedules to maximize use efficiency for office space (e.g., shared office space for telecommuters)

- develop workplace incentives to encourage telecommuting and mass transit alternatives for employees
- have alternating telecommute days to provide ample staff coverage at the office, while cost savings abound on parking, building overhead, traffic congestion, etc.

Green Meetings

When it is necessary to hold large meeting events, follow these green guidelines:

General

- When available, choose Leadership in Energy and Environmental Design (LEED) certified buildings for meetings
- Choose buildings that use some renewable energy
- Choose locations in developed downtown areas or resorts where there is public transit

- Prefer facilities with landscaping that uses native plants, and requires minimal watering/mowing
- Use compact fluorescent light (CFL) bulbs
- Use energy-efficient appliances
- Use water efficient sinks with motion sensors

Large Event Logistics:

- Choose event meeting rooms that are in walking distance of one another

Food and Beverages

- Provide clearly accessible recycling bins for beverage containers, paper, plastic, etc.
- Avoid individual packaging for sugar, cream, condiments
- Provide reusable or recyclable coffee cups and water cups, in place of disposable cups
- Use paper napkins made with high percentage of post-consumer waste
- Encourage meeting participants to bring their own travel mugs, reusable water bottles, and where food or snacks are served, cloth napkins.
- Use only washable, reusable, or biodegradable dishes/glasses/cutlery at meals and breaks
- Water stations in all of the rooms should have glasses or recyclable cups
- Use local, organic, seasonal and sustainable foods as much as financially possible
- Establish relationship with a local food bank for leftovers

Transportation:

- Provide clean air buses to shuttle participants to off-site events and airports
- Provide detailed/easy-to-use public transportation schedules to discourage staff from driving alone to the event
- Set up an online carpool tool to coordinate rental car or state vehicle sharing

Printing: Printers who abide by the following business guidelines should be considered first:

- Use soy-based inks on paper that contains 100% post consumer waste and is 100% chlorine free
- Use recycled paper, double sided; minimize printed material
- [FSC Certified](#): Promoting the responsible management of the world's forests

Other:

- Advertise meeting electronically instead of on paper
- Minimize printed materials by posting electronic versions of conference documents online
- Purchase long-lasting/reusable name badges and lanyards and collect at end of event to re-use in years to come

- Purchase meeting items with responsible manufacturing in mind first, price second (when possible); purchasing cheaper goods may be counter to our mission in the long-run.
- Collect binders at end of event for re-use next year

Implement paperless office pilot project

With the Department's focus on protecting natural resources, and with Department staff representing approximately 1% of the state's workforce, the Department is the perfect entity to set an example for creating a paperless office environment. Region 1 could serve as a paperless office pilot project. Once the bugs are worked out and the project is optimized, evaluated, and fully beta-tested, it can be expanded to the entire Department, and eventually, all of state government.

Because much of the Department's paperwork is developed for internal use, or directed to other state agencies, such as the Water Boards, CALFIRE, Coastal Commission, and Caltrans, the Department could initiate the pilot project by focusing only on internal letters, memoranda, and forms, and documents sent to other state agencies.

Because Department offices can easily track expenditures related to producing and disseminating printed documents (printer paper, toner, and postage) the savings to the Department and the state could be easily quantifiable. Rough cost estimates for printer paper and toner cartridges indicate the economic savings for the Department could be substantial.

The goal for this pilot project must be specific, measurable, attainable, relevant, and time-bound. A pilot project goal of reducing paper and toner use by 50% in 2 years, for instance, would set a shining example for the rest of the Department and the state. Many Region 1 staff are looking forward to participating in this project.

Before you print that document ... think about its purpose, its creation, its lifespan and its inevitable end. Will it be preserved for years and years as an intrinsic or historic record at the State Archives? Or, will it sit un-noticed in a file in a basement for 20 years; or end up in the recycle bin next month; or perhaps in your little desk-side garbage can tonight?

Vehicle Fleet

State vehicle acquisition and usage policies of the Department contribute unnecessarily to pollution, highway congestion, and financial waste. Since the combustion of gasoline is one of the major sources of GHG, the Department should make every effort to change these policies.

State employees should be encouraged to minimize use of gasoline and diesel-powered vehicles.

The State vehicle minimum mileage requirement (i.e., 6,000 miles in each 6 month period) should be revised or eliminated. This use-it-or-lose-it policy encourages wasteful use of vehicles and fails to recognize the individual, job-specific needs of field and response personnel at regional offices. It creates waste, pollution, inconvenience, and inefficiency.

The Department should acknowledge and make proper allowances for specific, otherwise low-mileage work requiring certain types of vehicles. The field worker—the biologist, engineer, geologist, or enforcement staff person—may not need a vehicle every day, but they do need dependable access to rugged, well made trucks or sport-utility vehicles (SUV)s. Because they must sometimes haul large amounts of gear into the field on short notice, they benefit from having a dedicated vehicle. Field workers responding to emergency and unexpected problems (e.g., fish kills and pollution spills) do not have time to go searching for an available pool vehicle.

Staff assigned good quality vehicles and given the sole responsibility for their upkeep will tend to use them as needed and maintain them more carefully, improving cost efficiency.

Employees should be encouraged to use more cost-effective and less-polluting public transportation instead of State vehicles when possible and appropriate, especially in major metropolitan areas.

For example, San Francisco Bay area meetings frequently occur in downtown Oakland and San Francisco. Both are easily accessible by Amtrak and Bay Area Rapid Transit (BART). Use of rail reduces auto congestion and air pollution, allows employees to work together or individually while traveling, reduces the likelihood of accidents, reduces GHG emissions, and lowers costs to the State for gasoline, parking, tolls, and vehicle maintenance.

A certain percentage of all new road sedans and SUVs should be good quality (see below) hybrid, electric, or alternative-fuel vehicles. For commuting to meetings in downtown areas and in other regions as appropriate, purchase a small fleet of scooters (\$2,500) or loaner bicycles, rather than automobiles (\$25,000).

Employees should be further encouraged to, whenever possible, carpool to meetings and training sessions.

To lessen waste and improve cost-efficiency, the overall quality of the State vehicle fleet should be significantly improved.

State law should be changed to allow purchase of better quality vehicles from other than the lowest bidder. The old adage – “you get what you pay for” - is true when it comes to

cars. A cheap, poorly-made car ends up costing the State more in the long run in repairs, poor mileage, and decreased longevity. Instead, allow agencies to purchase, with justification, up to the median price per car from within the full range of competitive models in a particular category.

State law should be changed to allow purchase from overseas manufacturers. European and Asian manufacturers often offer better quality vehicles that are less polluting, require less maintenance, and are a better long-term bargain for the tax-payer. Many of these companies manufacture cars in the United States. And the best hybrid cars are currently made by Asian manufacturers.

Overall fleet pollution should be reduced.

Employees should be encouraged to regularly check for proper tire inflation. Vehicles get better gas mileage with proper tire inflation. This can be accomplished by requiring tire inflation be checked at the end of each month when the vehicle logs are submitted and whenever a vehicle is serviced. Automobiles should be checked monthly to ensure that the tires are properly inflated.

All vehicles should be tuned up on a regular maintenance schedule. Regular maintenance helps improve fuel efficiency, reduces pollutant emissions, and increases the life of the vehicle, adding to long-term cost efficiency.

Promote and encourage hypermiling. Hypermiling is a high-fuel efficiency driving technique that minimizes accelerating and braking, and therefore fuel use, by striving for optimal speeds through strategic timing of brake and accelerator usage.

Encourage Bicycle/Pedestrian Commuting²

- Encourage and facilitate bicycle commuting, provide showers and bike lockers, participate in Bike-to-Work Month. Bicyclists are entitled to receive up to \$20 per month for riding to work every day of the month. This could be expanded to offer incentives for 1 round-trip per week, for example. Allow for easy bicycle access and storage with lock-ups
- Offer commuter benefits that address limited or expensive parking, reduce traffic congestion, improve employee recruiting and retention and minimize the environmental impacts associated with drive-alone commuting
- Provide parking spaces and hookups for the first hundred small electric vehicles
- Provide incentives for carpools and public transportation (fare subsidies)

Discourage Private Car Commuting

² Anyone using a non-carbon burning (except for human metabolic burning of course) form of transportation such as bicycles, skates, skateboards or their own legs, to get to work and back

Encourage Department regional headquarters and offices to be centrally located near housing and services for Department staff. Relocation of offices to suburban areas such as Natomas or West Sacramento is frequently seen as a cost-saving measure because rents are cheaper. However, the lack of mass transit options and the availability of free parking encourages employees to drive private cars to work every day. Free parking should be reconsidered, as it provides no incentives to employees to use alternative transit.

Savings in the Field

Plug-and-play all-weather mobile camera surveillance systems could be deployed in areas that need to be monitored, e.g., locations where criminal activity is expected (for wardens), or for monitoring wildlife activity. Discretely hidden in a tree or a prop; video is accessible (stores up to 30 days at a time) from a central computer. A warden can receive input from multiple sites and then once an illegal activity is detected or suspected, they can be dispensed to that particular area (plus, recorded information would be available as a record for court, if needed).

Energy Saving in the Office³

The following tips are just a few ways you can start saving energy and money today:

- Keep windows and doors closed to prevent the loss of cooled or heated air (or open to take advantage of outdoor temperatures)
- Close window blinds to shade your rooms from direct sunlight in summer, or open to take advantage of free solar heat in winter.
- Ensure Department staff can dress comfortably for the weather. Then they can adjust layers of clothing before adjusting the thermostat.
- Change landscape irrigation schedule to between 10 p.m. and 10 a.m. when electrical demand is at its lowest.
- Whenever possible, turn OFF the air conditioner/heater and open windows to allow fresh air and sunshine into the workplace (zero emissions, zero energy cost)
- When heating or air conditioning are on, keep windows and exterior and freight doors closed as much as possible
- Ask your office building manager if your office building has earned the ENERGY STAR rating; if so, make sure to display the Energy Star plaque to encourage others. If not, find out how to earn it. <http://www.energystar.gov/>
- Many Department offices have one or many small office refrigerators used to store lunch, snack foods, and beverages. In some cases these are purchased and owned by Department staff, not the State. A needs assessment of these appliances should be undertaken. In some cases, refrigerators are little-used and removing them, and combining their use in larger lunch room/facility refrigerators would be more energy efficient.
- The age and use of all refrigerators and freezers, either for lunch rooms or scientific/research purposes, should be assessed. All Department refrigerators and

³ For buildings not owned by DFG, some suggestions may be limited or require negotiations with building owner.

freezers greater than 12 years old should be replaced with the most energy efficient models available.

Computers and Other Office Equipment: Use the "Off" Switch

Ideas for consideration as appropriate

- Unplug electronics from the wall when you're not using them
- Set energy-saving features on all your office equipment to put them into sleep mode when not in use
- Turn off office equipment at night, over the weekend, and during holidays
- Use large equipment during off-peak hours whenever possible
- [Change power management settings](#) on your computer to automatically enter sleep or hibernate modes and turn off monitors when not in use
- Don't use graphics-intensive screen savers, which use more energy and prevent computers from entering sleep mode
- Install software to automatically (completely) turn off ALL computers every night
- Make duplexing (double-sided printing) the default mode for copiers and printers
- Plug equipment into surge protectors, and then turn these off when not in use
- Consider having employees use laptop computers since they use up to 90 percent less energy than a desktop computer
- Consider ink-jet printers, which also use 90 percent less energy than laser printers
- Purchase the proper sized copier for your needs
- Put power strips on a timer - most electronic devices such as cell phones and pagers do not need more than two to four hours to charge
- Replace cathode ray tube (CRT) monitors with flat-panel liquid crystal display (LCD) monitors – they use considerably less electricity
- Encourage use of centralized printers rather than many individual printers in work spaces

Lighting - The Right Light for the Right Task

Many offices, stores or factories can easily reduce lighting without affecting productivity.

- Maximize natural light and turn off unnecessary office lights
- Turn off lights in hallways where they're not needed
- Install occupancy sensors in offices, conference rooms and storage areas
- Use task lighting instead of overhead lighting, and light only those areas that are needed at the time
- Make sure that equipment and lights are turned off after hours
- Retrofit old T12 lights and magnetic ballasts to newer, more efficient T8 lights and electronic ballasts
- Replace your high-use incandescent light bulbs with CFL or LED bulbs, remove bulbs where staff request. Some areas, e.g., hallways and corridors, could use fewer bulbs with plenty of visibility for the purpose of those areas.
- Use as few bulbs in fixtures as possible – don't over light an area

- Make sure that bulbs, fixtures, lenses, lamps and reflective surfaces are cleaned regularly; by removing grease, dust and other dirt, you can increase the output of lights.
- Install automatic room-lighting controls to turn lights on or off depending on occupancy or time of day
- Replace incandescent or fluorescent exit signs with LED exit signs

Buy Energy-Efficient Products

- Look for ENERGY STAR qualified products for the Office. [An ENERGY STAR qualified computer uses 70 percent less electricity than computers without enabled power management features.](#)
- Wherever practical, replace regular light bulbs with CFL. CFLs are designed to provide more natural-looking light while using far less energy than standard light bulbs. Replacing just one 60-watt incandescent light bulb with a CFL will save you \$30 over the life of the bulb. CFLs also last 10 times longer than incandescent bulbs, use two-thirds less energy, and give off 70 percent less heat. CFLs must be disposed of properly, since they contain mercury.
- Replace existing T12 lighting systems with T8 lights and magnetic ballasts with electronic ballasts. This may reduce lighting energy by 17-48 percent, depending on the specific lights and ballasts.
http://www.oregon.gov/ENERGY/CONS/BUS/light/FAQ.shtml#T12_vs_T8

Records Storage

Invest in digitizing historical, research, and administrative documents to free up space in basements, warehouses, etc. Hard-copy records stored off-site consume our time, resources, space, insurance, energy consumption, etc. Alternative digital storage would reduce space needed to lease/rent, and heat/cool. Efficient digital storage and tracking systems could save energy and resources.

Facility Improvements: Save Energy and Money

Improvements in energy efficiency can often be attained through no- or low-cost projects, many of which have multiple benefits. Reaching California's goal of 80% reductions in emissions by 2050 will be a challenge. However, many local governments are not aware that nearly one-third of the energy used to run a typical government building goes to waste and could easily be conserved through energy-efficiency measures, lowering GHG emissions and moving California towards its ultimate GHG reduction goals.

Furthermore, taking steps to increase energy efficiency can translate into savings of \$0.40 per square foot, allowing local governments to spend tax dollars on more productive things than wasted energy.

Government agencies in the United States spend more than \$10 billion a year on energy to provide public services and meet constituent needs. To the extent possible, Department offices should be consolidated so that efficiencies can be gained through

shared facilities such as conference rooms, break rooms, restrooms, vehicle parking, etc. The more we have to duplicate these facilities, the higher our environmental footprint.

- Install low-flow toilets, motion-sensor sinks, etc. in facilities to save water
- Use high efficiency fluorescent dimmable lighting⁴
- Install skylights or solar tubes to increase natural light
- Estimate potential savings points for Department facilities. For example, a facility with a large flat roof could be coated with reflective coating, so that facility would get a number of potential savings points. Or identify land that has the potential for a number of trees to be planted.
- Install timed movement sensor lights on switches in all common areas (32-40 switches could be done in less than one electrician's day) - buy bulk switches with grant-subsidy from local utility
- Consider a [FreeAire system](#) (or something like it) for refrigeration needs

Heating, Ventilation, and Air-Conditioning (HVAC) Systems - Improve Efficiency⁵

In winter, set the thermostat to 68 degrees during work hours and reduce the setting to 55 degrees when the space is unoccupied. For every degree you lower the heat in the 60-degree to 70-degree range; you can save up to 5% on heating costs.

In summer, adjust the thermostat during work hours, and raise the setting when the space is unoccupied. The energy savings can be significant - as much as 2 percent of your air-conditioning costs for each degree that you raise the thermostat. If all businesses in California set their thermostats to a higher temperature, the State would save 770 megawatts for every 2 degrees.

Use a programmable thermostat and make it easy to adjust the settings as well as regulate the temperature when the office is closed, e.g., on holidays, to avoid unnecessary cooling or heating costs. Consider a locking cover over the thermostat to avoid having employees change temperature settings.

- Have local utilities or energy authorities conduct energy audits of DFG facilities
- Consult with utility companies about changing to power switches that can be manually controlled. With 15% less occupancy because of furlough days, switches would enable cost recovery for less electricity needed.
- Keep cooling and ventilation systems tuned. Use reusable filters, and maintain a regular cleaning schedule. Don't forget to check ducts and pipe insulation.
- Install reusable air filters on all vents; wash regularly
- Install window film, solar screens or removable awning on south and west facing windows; remove awnings in winter for solar gain

⁴ All fluorescent light bulbs must be disposed of properly, since they contain mercury

⁵ For buildings not owned by DFG, some suggestions may be limited or require negotiations with building owner.

- Solar control window films applied to existing glass on windows and doors is an effective method to reduce peak demand during hot months and conserve energy anytime air conditioning might be required. In addition to the energy management benefits, the use of these films can also reduce exposure to ultraviolet radiation and reduce glare.
- Install ceiling fans - they make it feel at least four degrees cooler during the summer
- When buying new cooling and ventilation units - choose [ENERGY STAR](#). They are 20 to 30 percent more efficient than older models.
- Rewire restroom fans to operate when the lights are turned on
- Install an air conditioning economizer to bring in outside air when it's cool
- Insulate water heaters and supply pipes
- Install ENERGY STAR labeled reflective "[Cool Roof](#)" roofing materials
- If possible, install ceiling and wall insulation. This will save money on monthly utility bills and employees will be more comfortable.
- Install solar voltaic panels on extensive roof surfaces
- If renting, consider LEED Certified Green Buildings if available.
- Plant native tree and shrub species near windows to provide insulation and shade (they may also provide food and shelter for birds)

Create a Carbon-neutral Landscape

[Plant a Native Tree](#)

If you have the means to plant a tree, start digging. During photosynthesis, trees and other plants absorb carbon dioxide and give off oxygen. They are an integral part of the natural atmospheric exchange cycle on Earth, but there are too few of them to fully counter the increases in carbon dioxide caused by automobile traffic, manufacturing and other human activities. A single tree will absorb approximately one ton of carbon dioxide during its lifetime. Trees absorb carbon dioxide from the air and use it as their energy source, producing oxygen for us to breathe. A tree in the temperate zone - found between the tropics and the polar circles - can remove and store 700 to 7,000 pounds of carbon over its lifetime. A tree that shades a house can reduce the energy required to run the air conditioner and save an additional 200 to 2,000 pounds of carbon over its lifetime. [Native trees](#)⁶ are better adapted to local climate, are more likely to thrive naturally over time, and support the insects and birds that attract other native wildlife. Native trees and plants require less water, fertilizers, and maintenance, thereby saving on energy.

- Replace the dust-collecting plastic plants in the office with live oxygen-generating plants (just add water!!!).

Reduce or remove lawns

[Reduce the size of lawns](#), and plant native plants instead. A lawn can be a significant source of GHG emissions. Gardeners often use fertilizers, gas-powered equipment, and

⁶ In locations outside of urban or backyard environments, professional restorationists should be consulted prior to planting trees.

large quantities of water to maintain a lawn. If a lawn is replaced by native plants, especially trees and shrubs, it can be more carbon-neutral, or even become a carbon sink.

Investing in Department staff

Conserving energy and reducing our carbon footprint can have multiple benefits, including increased staff morale and satisfaction. Most Department employees have a naturally strong conservation ethic, and knowing that their employer is doing what it can to reduce climate change can have a positive impact on employees and their workspace in the following ways:

- Using sustainable energy, e.g., solar or wind, gives employees a sense of pride and ownership.
- Allowing flexibility in work schedules (to allow carpooling and alternative work environments) builds morale and results in a more productive workforce.
- Enhancing the indoor environment of a building increases worker morale and productivity
- Improving visual acuity helps workers complete tasks and reduce eyestrain
- Improving indoor air quality reduces risk of and liability for health problems like “sick-building syndrome” and building-related illnesses
- [Studies suggest](#) that many energy efficiency measures can reduce absenteeism due to health issues and help prevent onsite accidents
- Improved indoor quality can help attract the best and the brightest workers; up to 90% of our time is spent indoors
- Throughout the Department, these benefits to worker performance could mean huge amounts of resources each year going to better use.
- Supervisors are ultimately responsible for the energy conservation and efficiency of the staff and facilities that they supervise.
- Attention to energy conservation and efficiency can be included in annual staff evaluations.

Some additional ideas for investing in Department staff include:

- Provide incentives for getting outside, such as picnic tables for lunchtime
- Budget for a Sustainability Specialist or Energy Specialist for the entire department.

Education Sparks New Innovations

Education programs create a means for managers to learn from staff. Be sure to include a feedback mechanism so that after learning about the value of energy efficiency, employees can offer suggestions. Not only does this generate new and innovative ideas for the energy saving initiatives, it also actively engages people in thinking about energy and its use.

Some ideas for collecting feedback include:

- Prominently place a comment box near where employees congregate, like a cafeteria or locker room
- Offer rewards and other incentives for ideas that are adopted
- Brainstorm ideas as a group during trainings and meetings
- Establish a “Going Green Blog” where employees can post ideas for reducing carbon footprint
- Add energy efficiency criteria to employee reviews; make energy efficiency a factor in career advancement
- Post a bulletin board where staff can share their ideas

The Department can encourage employee participation by aiding facilities to perform energy audits, establish carbon footprint reduction goals, and allow employees to track progress toward those goals. Employees should be provided with recommendations on how they might integrate carbon-conscious thinking into their personal lives away from the office.

Provide demonstration or web-link for employees to learn how to:

- Perform their own energy audit at home
- Establish personal carbon footprint reduction goals
- Methods for meeting the footprint goals
- Methods for tracking progress toward goals

Encourage Others to Conserve Energy

Share information about recycling and energy conservation with your friends, neighbors, co-workers, and establishments doing business with the Department (restaurants, contractors, vendors, etc.) and take opportunities to encourage establishment of programs and policies that are good for the environment.

Ideas for Individual Reduction of Carbon Footprint

- Adjust the temperature of domestic water heaters down to 120 degrees F.
- Use a clean, low-phosphate or phosphate-free detergent when doing laundry. Phosphates can damage streams and rivers.
- Instead of plastic bags, use reusable containers to store leftovers or when packing lunches. If just 25 percent of American homes used 10 fewer plastic bags a month, we'd save more than 2.5 billion bags a year.
- Take a reusable cloth or mesh bag to the grocery store, and never again answer the question "paper or plastic?"
- Drive less. This is a challenge in a society that loves its cars, but consider taking mass transit or riding a bicycle whenever possible - even if it's just once or twice a week.
- Carpool to work. If every commuter car carried one more passenger, we'd save more than half a million gallons of gasoline.

- Call your electric utility company and ask about the availability of an "energy audit." The company may be able to show you how to save energy and money on your monthly bills.
- Insulate attics, walls, doors, windows and water heaters to cut heating and cooling use and save money.
- Don't start your dishwasher or clothes washer and dryer until you have a full load.
- A household can save up to 20,000 gallons of water a year by not leaving the faucet running when doing things like brushing teeth, shaving, washing dishes in the sink, or washing the car at home instead of a self-service car wash.
- Put a plastic bottle in your toilet tank to act as a displacement device. You will use less water -- from 15-40 percent for most households.
- Americans receive almost 4 million tons of "junk mail" every year; if only 100,000 families stopped their junk mail, we could save up to 150,000 trees every year. Write to Mail Preference Service, Direct Marketing Association, 6 East 43rd St., New York, NY 10017. (212) 768-7277. Let them know you want your name removed from mailing lists.

Maintaining the Department's Commitment: Tracking & Reducing the Department's carbon footprint

Data Requirements for Climate Change Emissions Report: Automation is needed!

Overview

GHG produced by the Department are tracked using the Climate Action Registry Reporting Online Tool (CARROT). Items tracked include electricity, natural gas, gasoline and diesel use which is further identified as mobile or non-mobile. There are no other controllable sources of GHG produced by the Department such as a dairy farms or refinery operations. The main purpose of CARROT is to convert the energy used by the Department into tons of carbon dioxide released into the atmosphere, for the purposes of tracking.

Data Automation Requirements

Currently the Business Management Branch (BMB) must manually collect the energy used by the Department because the Business Information System (BIS), Payment and Procurement module does not include all the necessary data fields. In order to capture the data using BIS, additional fields must be added:

- The consumption amount must be entered for invoices with the following object codes:
 - 362 - Electricity
 - 378 - Natural Gas
 - 525 - Fuel (Vehicles, Planes or Boats)
- On the input screen, the following fields need to be added:
 - Unit of Measure (KWHs, therms, gallons, etc.)

Type (electricity, gasoline, diesel, CNG, LPG, etc.)
Amount
Mobile or Non-Mobile (check box)

Note: Some invoices may include multiple types of fuel. For example, one invoice might be for the purchase of both 100 gallons of gasoline and 100 gallons of diesel fuel.

The desired result is a report from the Data Warehouse that summarizes the energy consumption by location.

Person-power Savings

For the 2007 emissions report, BMB spent approximately 3000 person-hours between January 1, 2008 and June 30, 2008 gathering consumption amounts. The majority of the time was spent in the Accounting Services Branch manually reviewing monthly invoices to collect the data. A comprehensive report would eliminate the manual process and cut the required number of person-hours in half.

Carbon Offsets – Department Lands

The Department owns or manages over one million acres of land in California. Some of this land could provide carbon sequestration credits to help offset the Department's GHG emissions. An estimate of how much carbon sequestration Department Wildlife Areas, lands, and easements would contribute should be calculated.

Glossary

Air conditioning economizer

Mechanical device intended to reduce energy consumption, by using cool outside air as a means of cooling the indoor space.

Biodegradable

Capable of being broken down, especially into innocuous products by the action of living things, e.g., microorganisms.

Blog

A contraction of the term “weblog.” A type of website providing commentary or news on a particular subject, often open and interactive.

Carbon footprint

The total set of GHG emissions caused directly and indirectly by an individual, organization, event or product.

Carbon-neutral

Refers to achieving net zero carbon emissions by balancing a measured amount of carbon released with an equivalent amount sequestered or offset.

Carbon offset

Individuals, companies, or governments can purchase carbon offsets to mitigate or compensate for GHG emissions. These offsets typically support projects that reduce GHG, such as development of renewable energy, i.e., wind farms or solar farms, destruction of industrial pollutants, destruction of landfill methane, or projects such as tree planting. Care must be taken to invest in appropriate projects, as there is much controversy on this topic, and some offsets have dubious effects.

Compact Fluorescent Light bulb (Lamp) (CFL)

A type of fluorescent lamp designed to replace common incandescent light bulb, and able to fit into most existing incandescent light fixtures.

Compost

A combination of food waste and other organic materials that decomposes through aerobic decomposition into a rich black soil that can be used to enhance garden soil.

Cool Roof roofing materials

A roofing system that reflects visible, infrared and ultraviolet wavelengths of the sun, reducing heat transfer to the building, and also releases a large percentage of absorbed, or non-reflected solar energy. Most cool roofs are white or other light colors.

Data Warehouse

A DFG intranet application that allows Department personnel the ability to access and analyze financial and other data and create reports, without having to understand complex database concepts.

Energy audit

An assessment of the amount of energy a home uses for the purpose of discovering and implementing measures to improve energy-efficiency.

ENERGY STAR rating

A rating system developed in 1992 by the US Environmental Protection Agency as a method to identify and promote products that are energy efficient. Appliances carrying the Energy Star rating typically are 10 to 20% more energy efficient than non-rated models. Buildings can be rated also; an ENERGY STAR qualified facility meets strict energy performance standards set by EPA and uses less energy, is less expensive to operate, and causes fewer GHG emissions than its peers.

FSC Certified

A certification by the Forest Stewardship Council (FSC) that a landowner or company practices forestry consistent with FSC standards. These standards are to ensure that forestry is practiced in an environmentally responsible, socially beneficial, and economically viable way.

Greenhouse Gas

Common gases in the Earth's atmosphere that absorb and emit infrared radiation, heating the surface of the Earth. Common greenhouse gases include water vapor, carbon dioxide, methane, nitrous oxide, and ozone.

Hybrid vehicle

A vehicle that uses two or more distinct power sources to move the vehicle. The term most commonly refers to hybrid electric vehicles, which combine an internal combustion engine and one or more electric motors.

Hypermiling

The attempt to maximize gas mileage by making fuel-conserving adjustments to one's vehicle and one's driving techniques, such as minimizing accelerating and braking, and striving for optimal speeds through strategic timing of brake and accelerator usage.

KWH

Term used for measuring energy output. A kilowatt hour (KWH) is the amount of energy expended if work is done at a constant rate of one thousand watts for one hour.

Leadership in Energy and Environmental Design (LEED) Green Building Rating System

Developed in 1998 by the [U.S. Green Building Council, LEED](#) is an internationally recognized green building certification system, providing third-party verification that a building or community was designed and built using strategies aimed at improving performance across the following metrics: energy savings, water efficiency, CO2 emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts.

LED lights

Abbreviation for Light Emitting Diode, an electronic device that lights up when electricity is passed through it. LEDs have a lower energy consumption, longer lifetime, and smaller size than traditional light sources. However, they are relatively expensive.

Post-consumer waste

A type of waste that is produced by the end consumer of a material stream, which would usually be discarded in a waste receptacle. Using recycled products that

contain a higher percentage of post-consumer waste helps keep waste out of landfills, avoids using virgin resources like forests, and helps strengthen the market for recycled materials.

Restriction of Hazardous Substances Directive (RoHS)

The Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment regulations (the “[RoHS Regulations](#)”), was adopted in 2003 by the European Union (EU), and took effect in 2006. The Directive restricts the use of six hazardous materials in the manufacture of various types of electronic and electrical equipment.

Sustainable food

Sustainable food and agriculture involves food production methods that are healthy, do not harm the environment, respect workers, are humane to animals, provide fair wages to farmers, and support farming communities. These practices use less energy and thereby cause less GHG emissions.

T12 and T8 fluorescent lights

Tubular fluorescent lamps. A T8 lamp is a 1” diameter lamp, and a T12 is a 1.5” diameter lamp. T8 lamps offer higher efficiency and improved lighting performance compared with T12 lamps. T8 lamps function with reduced mercury, a potentially harmful substance used in many lighting fixtures, however, it is still important to recycle or dispose of lamps properly.

Telecommuting

E-commuting, e-work, telework, working from home. A work arrangement where employees utilize mobile telecommunications technology to work from home or other locations.

Teleconference

A meeting or conference involving several persons and machines remote from one another but linked by a telecommunications system, such as a conference phone, or via the internet.

Therm

A unit of heat energy equal to 100,000 British thermal units (BTU). It is approximately the energy equivalent of burning 100 cubic feet of natural gas.

Web Conference

Used to conduct live meetings or presentations over the Internet. Each participant sits at his or her own computer and is connected to other participants via the internet. This can be either a downloaded application on each of the attendee’s computers or a web-based application where the attendees will simply enter a URL (website address) to enter the conference.

Other Resources

[Tools for Local Governments; Save Energy and Money](#)

[Institutional Best Practices Guide](#)

[California inaugurates digital signatures October 19, 1999](#)

[Government Paperwork Elimination Act \(GPEA\)](#)

[New York State Electronic Signatures and Records Act \(ESRA\)](#)

[State of Arkansas Policy Statement on the Use of Electronic Signatures by State Agencies June 2008](#)

[OMB Guidance on Implementing the Electronic Signatures in Global and National Commerce Act](#)

[CA Regulations Approved By Office of Administrative Law on June 12, 1998](#)

[Interlink Electronics at the forefront of government esignature initiatives](#)

[Carbon Offset Programs](#)

[Turn computers off, or on sleep mode](#)

[Flex Your Power – Residential](#)

[Steps for personal reduction in energy/GHG gas production](#)

[PG&E - click on screen to get energy savings tips for every room in the house](#)

[Carbon Footprint Calculator](#)

[Low Carbon Diet Personal CO2 Calculator](#)

[The Nature Conservancy Carbon Footprint Calculator](#)

[National Geographic article on one couple's Carbon diet](#)