



How to Reduce GHG Emissions

The primary opportunities to maintain or reduce greenhouse gas emissions include reducing use, switching energy sources, or offsetting emissions. Begin by targeting the “low-hanging fruit” and then move on to initiatives that require capital investments.

Reduce

Free or Low-Cost

Lighting

- Turn off lights when not in use or install occupancy sensors in hallways, bathrooms, meeting rooms, kitchens, storage rooms, and other areas where lights can be shut off for blocks of time.
- Install photocells in outdoor entryway(s) and security lighting to automatically sense outdoor lighting levels.
- Install light emitting diode (LED) exit signs in place of incandescent signs. LED signs last up to 15 times longer and use less energy.
- Reduce overhead lighting near daylight areas, over lit areas, or areas not requiring light.
- Install fluorescent or LED light bulbs.
- If a janitorial service comes in after hours, request that it only use lights in areas it is cleaning. Have service turn all lights off when finished for the night.

Water

- Install low-flow fixtures on showers, sinks, and toilets.
- Insulate hot-water heaters.
- Lower the temperature on water heaters.
- Implement a water conservation program and post water conservation stickers, signs and posters in bathrooms, kitchens, cafeterias, conference rooms, and other places where employees congregate.
- Minimize lawns. Lawns use more water than any other landscape plants.
- Use drip and other low-flow irrigation devices.

Fleet

- Implement a no-idling policy for vehicle fleets and customers.
- Implement a vehicle maintenance policy for vehicle fleets to maximize vehicle efficiency.

Heating and Cooling

- Adjust air conditioning in the summer and heat in the winter.
- Install automatic, programmable, set-back thermostats to control heating and cooling.
- Set thermostats and lights to correspond with shifts.

- Open blinds in the winter and close in the summer.
- Restrict use of space heaters; consider heating pads or blankets instead.
- Clean all filters in heating and cooling systems monthly.
- Limit open doors when picking up or delivering material.
- Schedule HVAC tune-ups once or twice a year. Clean coils, check and correct refrigerant charge, clean and lubricate the fan motor, check for proper airflow, adjust pulley settings and fan belts, replace air handling unit filters, and do routine checks to ensure proper performance.
- When the building is unoccupied, make sure outside air dampers are closed. This includes morning warm-up periods.
- Seal ducts that run through unconditioned spaces. Leaking ductwork can lose 20 percent or more of the conditioned air in a supply duct run.
- When scheduling group activities and meetings after hours, use rooms and areas that can be heated and cooled individually so you don't have to heat or cool a whole floor.

Purchasing

- When buying new equipment, appliances, or fixtures, look for ENERGY STAR or WaterSense certified.
- Purchase products with recycled content or that are recyclable.
- Purchase only what is needed; bulk is not necessarily better if it has an expiration date.
- Purchase Forest Stewardship Council certified paper and wood products.
- Purchase local and/or organic food.

Transportation

- Start an alternative transportation program for employees and consider making a vehicle available to employees with emergencies who use an alternative mode of transportation to get to work.
- Consider allowing employees to telecommute or work an alternative schedule to limit driving to work.
- Educate drivers to be more efficient on the road and drive fewer miles. Speeding and rapid acceleration and deceleration can increase fuel consumption.
- Schedule travel so that multiple tasks can be accomplished with one trip.
- Remove excess weight from your trunk, and if you have a removable roof rack and aren't using it, take it off.
- Replace air filter regularly. A clogged air filter can significantly reduce fuel economy.
- Keep tires properly inflated. Maintaining correct tire pressure and a tuned engine can save more than a ton of greenhouse gases per year.
- Change oil according to the manufacturer's recommendations.
- Join the Clean Air Zone Idaho program and develop an anti-idling policy (www.deq.idaho.gov/air/assist_business/clean_air_zone.cfm).



Waste

- Start a recycling program.
- Start an on-site compost pile.

Equipment and Electronics

- Install motion sensors on vending machines and remove or minimize light bulb use.
- Power down machines when not in use.
- Turn off air compressors when not in use.
- Turn computers and other equipment off at night.

- Use surge protectors for plug-in devices and turn off at the end of the day. Even when electronics or machines are not on, they still consume energy; surge protectors can eliminate the power consumed when devices are turned off.
- Limit printing and print double-sided.
- Engage energy-saving features on equipment and electronics.
- Check and regularly clean filters on exhaust fans.
- Practice routine maintenance.
- Regularly clean and maintain food refrigeration equipment where applicable.
- Stage turn-on of continuous motor loads with ½-hour intervals between loads. This prevents spikes in demand use and associated charges due to higher-than-normal start-up power.

Manufacturing

- Examine manufacturing processes for opportunities to use materials more efficiently; consult lean manufacturing concepts.

Employee Involvement

- Start a green team.
- Seek employee suggestions on how to reduce greenhouse gas emissions.

Capital Required

Building Envelope

- Conduct an energy audit.
- Re-insulate the roof, walls, and foundation.
- Seal cracks and leaks with caulk, spray foam, or weather stripping to prevent air flow loss.
- Install double-pane windows.
- Create a separation between delivery areas and work areas to reduce heat or cool air loss.
- Install sky lights or enhance day lighting.

Energy Assessment Technical Assistance

U.S. Department of Energy Industrial Technologies Program
www1.eere.energy.gov/industry/saveenergynow/

Idaho Office of Energy Resources Industrial Efficiency Program
<http://energy.idaho.gov/energyefficiency/industrial.html>

Idaho Office of Energy Resources Building Efficiency Program
<http://energy.idaho.gov/energyefficiency/building.html>

Avista Utility Tools
www.avistautilities.com/business/services/pages/default.aspx

Idaho Power Energy Efficiency for Your Business
www.idahopower.com/EnergyEfficiency/Business/default.cfm?tab=Business

Building Design

- If conducting renovation, designing a new building, or looking for a new space to lease consider LEED criteria (www.usgbc.org/DisplayPage.aspx?CategoryID=19).

- Install highly reflective roofs (www.epa.gov/heatisland/mitigation/coolroofs.htm) to help make cities cooler, reduce formation of smog, reduce air-conditioning loads, and save money. Highly reflective roofs and surfaces can reduce air-conditioning bills by 10 to 50 percent.

Water

- Install a tankless hot water system.
- Plant a xeriscape garden or a garden that requires no or limited irrigation.
- Reuse wastewater or reclaimed water for other industrial uses, landscape irrigation, agricultural irrigation, aesthetic uses such as fountains, and fire protection, and other non-potable uses.
- Recycle water for the same application for which it was originally used.
- Collect rainwater or irrigation runoff for reuse, called water harvesting.
- Use the same water to perform several cooling procedures.
- Conduct a waste assessment to look for opportunities to reduce waste.

Product Design

- Reduce packaging by shipping products in correctly sized boxes, reducing the material used for product packaging, or redesigning products or product packaging to use recyclable or recycled product, weigh less (reduces fuel use in transport), or use less material.

Transportation

- Invest in video conference technology to reduce traveling.
- Purchase fuel-efficient vehicles for company fleets.
- If you have delivery or pick-up services, plan routes to maximize efficiency and prevent duplication.



Heating and Cooling

- During occupied hours, make sure the amount of outside air matches load. Adding CO2 monitors, coupled with outside air controls, will only allow as much outside air as necessary to enter the building in the heating season.
- Consider ways to use waste heat from manufacturing to augment the heating and air conditioning system.

Switch

An opportunity for reducing or maintaining greenhouse gas emissions is to switch the type of energy used. Consider switching to renewable energy or electricity supplied from alternative energy sources such as wind, solar, geothermal, hydro, and biomass by:

- Purchasing green power from your utility.
- Increasing on-site renewable energy generation by installing solar panels or wind turbines.
- Considering biofuels. Biomass can be converted directly into liquid fuels, called biofuels, to help meet transportation fuel needs. Ethanol and biodiesel are the two most common types of biofuels.
- Investing in alternative fuel and flex-fuel vehicles for your business transportation needs.
- Purchasing electric or hybrid vehicles.

Renewable Energy Resources

- ENERGY STAR's Guide for Small Businesses and Using Renewable Energy
www.energystar.gov/index.cfm?c=sb_guidebook.sb_guidebook_renewable
Provides business-oriented links related to renewable energy and green power.

- National Renewable Energy Laboratory - Renewable Energy for Small Business Owners
www.nrel.gov/learning/small_business.html
Provides information on biofuels, geothermal heat pumps, passive solar heating, photovoltaic (solar cell) systems, solar hot water heaters, and wind energy.
- U.S. Department of Energy Consumer's Guide: Renewable Energy
http://apps1.eere.energy.gov/consumer/renewable_energy/
Features comprehensive basic information and resources suitable for small businesses as well as consumers.
- Green Power Network
<http://apps3.eere.energy.gov/greenpower/about/index.shtml>
Provides news and information on green power markets and related activities and summarizes green power products available in Idaho and nationally available renewable energy certificate products.

Renewable Energy Examples

Possible sources of renewable energy include the following:

Bioenergy

Bioenergy technologies use renewable biomass resources to produce an array of energy-related products including electricity, liquid, solid, and gaseous fuels, heat, chemicals, and other materials. The term "biomass" means any plant-derived organic matter available on a renewable basis, including dedicated energy crops and trees, agricultural food and feed crops, agricultural crop wastes and residues, wood wastes and residues, aquatic plants, animal wastes, municipal wastes, and other waste materials.

Bioenergy Resources

- U.S. Department of Energy Alternative Fuels and Advanced Vehicles Data Center
www.afdc.energy.gov/afdc/
Provides a wide range of information and resources to enable use of alternative fuels, in addition to other petroleum reduction options such as advanced vehicles, fuel blends, idle reduction, and fuel economy.
- U.S. Environmental Protection Agency: Alternative Fuels
www.epa.gov/oms/consumer/fuels/altfuels/altfuels.htm
Supplies information on alternative fuels, including fact sheets and information on vehicle emissions.

Geothermal

Geothermal energy is heat from the Earth. It's clean and sustainable. Resources of geothermal energy range from the shallow ground to hot water and hot rock found a few miles beneath the Earth's surface and down even deeper to the extremely high temperatures of molten rock called magma.

Geothermal Resources

- Geothermal Heat Pump Consortium
<http://geoexchange.org/>
Provides information on geothermal heat pumps, including case studies, brochures, heating system comparisons, and a list of manufacturers.
- International Ground Source Heat Pump Association

www.igshpa.ok.state.edu/

Provides basic information about ground-source heat pumps and a business directory of accredited installers and designers by state.

- U.S. Department of Energy
www.energy.gov/energysources/geothermal.htm
Provides basic information on energy sources.

Solar

Examples of solar technologies being developed by the Department of Energy and industry are photovoltaic cells, concentrating solar power technologies and low temperature solar collectors. Photovoltaic cells convert sunlight directly into electricity and are made of semiconductors such as crystalline silicon or various thin-film materials. Photovoltaics can provide tiny amounts of power for watches, large amounts for the electric grid, and everything in between. Concentrating solar power technologies use reflective materials to concentrate the sun's heat energy, which ultimately drives a generator to produce electricity. These technologies include dish/engine systems, parabolic troughs, and central power towers. Low-temperature solar collectors also absorb the sun's heat energy, but the heat is used directly for hot water or space heating for residential, commercial, and industrial facilities.

Solar Resources

- Tips for Daylighting with Windows
<http://btech.lbl.gov/pub/designguide/>
Guidelines from Lawrence Berkeley National Laboratory for new commercial buildings.
- U.S. Department of Energy Consumer's Guide: Outdoor Solar Lighting
http://apps1.eere.energy.gov/consumer/your_home/lighting_daylighting/index.cfm/mytopic=12170
- U.S. Department of Energy Consumer's Guide: Small Solar Electric Systems
http://apps1.eere.energy.gov/consumer/your_home/electricity/index.cfm/mytopic=10720
- U.S. Department of Energy Consumer's Guide: Solar Water Heaters
http://apps1.eere.energy.gov/consumer/your_home/electricity/index.cfm/mytopic=12850
- U.S. Department of Energy: National Renewable Energy Laboratory (NREL)
www.nrel.gov/learning/small_business.html

Wind

The terms wind energy or wind power describe the process by which wind is used to generate mechanical power or electricity. Wind turbines convert kinetic energy in wind into mechanical power. This mechanical power can be used for specific tasks (such as grinding grain or pumping water), or a generator can convert this mechanical power into electricity. Instead of using electricity to make wind, like a fan, wind turbines use wind to make electricity. The wind turns the blades, which spin a shaft, which connects to a generator and makes electricity.

Wind Resources

- U.S. Department of Energy Consumer's Guide: Small Wind Electric Systems
http://apps1.eere.energy.gov/consumer/your_home/electricity/index.cfm/mytopic=10880
Provides basic information and resources applicable for small businesses.



- U.S. Department of Energy: Energy Efficiency and Renewable Energy Published Small Wind Electric Systems: A U.S. Consumer's Guide;
www.windpoweringamerica.gov/pdfs/small_wind/small_wind_guide.pdf
Although written for a consumer audience, the information is relevant to small businesses.
- Green Power Network
<http://apps3.eere.energy.gov/greenpower/about/index.shtml>
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Offset

What is an Offset?

An offset is a reduction of greenhouse gases from the atmosphere due to a project intended to compensate for emissions occurring elsewhere. Carbon offset project types generally fall into four categories: 1) renewable energy, 2) energy-efficiency projects, 3) land use/land change projects like reforestation and avoided deforestation, and 4) landfill gas destruction and agricultural methane destruction.

Five main types of offset sellers are: 1) project developers 2) retailers/wholesalers, 3) brokers, 4) aggregators, and 5) utility companies. Each type offers different value-added services, from providing messaging plans and outreach services to facilitating faster, larger scale transactions.

Why Purchase Offsets?

Carbon offsets can:

- Help reduce greenhouse gas emissions to zero in addition to reducing use and switching energy sources.
- Immediately and cost-effectively reduce greenhouse gas emissions.

Criteria for Quality Offsets

- The offset is additional, meaning the project associated with the offset would not have been completed otherwise or under a business-as-usual scenario.
- The project associated with the offset is completed in a reasonable time frame and has not yet been completed.
- Projects should produce permanent reductions.
- A local project is preferable to a long-distance project.
- Offset projects are monitored and verified.
- Offsets are not resold and are retired after purchased.
- Projects have benefits to the environment as well as public health and the community.
- Specific projects with a beginning and ending are better than long-term programs.
- Offsets should be registered with a public registry, which prevents double-counting.

Offset Resources

- Carbon Concierge
www.carbonconciierge.com

Carbon Concierge engages businesses at prominent environmental and sustainability-related conferences around the country to engage in climate reduction strategies. Additionally, Carbon Concierge assesses offset providers in the voluntary carbon market.

- Offset Consumer
www.offsetconsumer.org/providers/
Ranks carbon offset providers.