

A Guide to Greening Your Business

This Guide provides checklists, tools, references, and other suggestions that can help a small to medium sized commercial business improve its environmental practices and image in a manner appropriate for the nature,

size and location of the company. Additional guidance is also provided for those who want to go further to address the so-called Triple Bottom Line of sustainability—environmental, as well as social and economic responsibility.

The Guide is arranged so the company can assess its current situation and opportunities, and then select those steps it wants to take to improve its programs. For example, a company may start down the green path by buying green products and focusing on some aspects of climate change and energy conservation—say, through cutting the use of electricity and improving the efficiency of travel and shipping. Later, it might take up diversity, waste prevention, recycling, and over time address other issues.

By following this Guide, your company should not only be able to enhance its reputation as a responsible corporate citizen, but better meet the needs of customers, improve efficiency and productivity, and make the organization more attractive to talented new recruits.

Table of Contents

1. Addressing Climate Change, Carbon Footprint
2. Greening Your Product Line
3. Other Ideas for Improving the Environmental Practices of Your Operations
4. Driving Toward the Full Triple Bottom Line of Sustainability
5. Ideas for Improving the Economic and Social Aspects of Your Operations

Appendix 1-- Worksheet for Computing an Approximate Greenhouse Gas (GHG) Footprint for a Commercial Business

Appendix 2-- Worksheet for Computing the Environmental Impact of Switching to Recycled Printing/Office Paper

1. Addressing Climate Change, Carbon Footprint

a. Measuring Your Company's Carbon Footprint

(1) Worksheet. See attached *Worksheet for Computing Greenhouse Gas Footprint for Office Products Dealers* (Appendix 1). This worksheet enables an organization to roughly calculate the extent to which it contributes greenhouse gases (in terms of carbon dioxide equivalents) to the climate change problem. You may choose to compute all of your company's emissions of the types listed there or just focus on one or two of the more manageable ones, or those for which data is readily available.

(2) Comparisons. Compare your footprint with the following:

An emission of 1 metric ton of carbon dioxide (CO₂) equivalents in greenhouse gases is equal to:

- Emissions from the average US car for 2 months
- Average emissions from US home energy use for a month
- Emissions from consuming 172 cylinders of propane for barbecues
- Amount of CO₂ consumed by 25 tree seedlings grown for 10 years
- Amount of CO₂ consumed by almost ¼ acre of fir forest per year
- Average amount of CO₂ emissions avoided by recycling 1/3 ton of mixed waste (paper, plastic, metal) rather than landfilling it

For more precise conversion factors, see US EPA, *Clean Energy: Calculations and References*: <http://www.epa.gov/cleanenergy/energy-resources/refs.html>

b. Ideas for Reducing Your Company's Emissions of Greenhouse Gases and Energy Consumption

Review your operations against the following checklist of ideas to identify opportunities to reduce your greenhouse gas footprint. Many of these suggestions will also enable you to reduce operating costs.

Check all that currently apply or interest you

(1) Building/Process Energy Use

Energy Star Equipment. Reduce energy use by purchasing personal computers and other electrical devices bearing the Energy Star certification label from the US Department of Energy, which is granted to energy-efficient items. See <http://www.energystar.gov/>.

Computers on Power Management, Power Strips. Activate the power management feature on computers. (If all computers in the US used this feature, this would product a CO₂ reduction equivalent to removing 1.5 million cars from the road.) Plug multiple computer devices into a power strip and shut off the strip at the end of the day. Electric adapters for computers, printers and other devices use energy even when the device is off. Switching off a power strip is one way to avoid this overnight drain of electricity.

- Energy-efficient Lighting.** Replace low output (60 to 100 watt) incandescent bulbs with compact fluorescent bulbs. (CFLs last 10 times longer and use 50 to 80 percent less energy.) Replace high output (100 to 150 watt) incandescent bulbs with halogen bulbs. Replace incandescent bulbs in exit signs with LED bulbs. Replace T-12 fluorescent lamps and magnetic ballasts with T-8 lamps and electronic ballasts.
- Energy-efficient Systems.** Use other energy-efficient lighting and heating, ventilating and air conditioning systems to the extent this can be decided or influenced by the organization.
- Upgrade Equipment.** Replace old inefficient boilers, water heaters, heating and air conditioning equipment with new highly efficient models. Install solar systems or other alternative sources of energy where feasible.
- Fix Leaks.** Seal air leaks around doors, windows, electrical outlets and other wall openings.
- Insulation.** Enhance insulation in ceilings, walls and floors as appropriate. Install windows with better insulating properties.
- Natural Lighting.** Use natural lighting in place of electrically powered light. Paint walls in light colors to enhance the effect of natural light.
- Shading.** To reduce electrical demands for air conditioning, control the heat from natural lighting by shades, awnings, or glass film. Plant trees or vined trellises to provide natural shading during warm weather.
- Lights-out Policy.** Adopt an internal policy that encourages employees to turn off lights, computers, and other equipment at the end of the workday and otherwise when not likely to be in use. Apply “switch-me-off” stickers as reminders. Install timers and motion sensor light switches where practicable. Use task lighting to illuminate only those areas where light is required.
- Thermostat Settings.** Alter the settings on the thermostat to reduce the use of heating and air conditioning equipment.
- Loading Areas.** Install air infiltration barriers in loading areas.
- Energy Audit.** Conduct and implement an energy-saving audit of the office, where cost effective. Some electrical utility companies will do this for free or at a very modest cost for their customers. Do a free self-assessment using the Business Energy Analyzer at <http://www.energyguide.com/> .
- Other Energy-saving Measures.** See the ABA-EPA *Law Office Guide to Energy Efficiency* at <http://www.abanet.org/environ/climatechallenge/lawofficeguide.pdf> for other practical measures that can be taken to cut energy use in an office setting.

(2) Employee Travel

- Energy-efficient Commuting.** Subsidize or otherwise encourage employee use of car pooling, energy-efficient vehicles, car-sharing programs (e.g., FlexCar, I-Go, Zipcar), mass transit, or bikes, or take other measures to reduce the energy consumed by employee commuting or other travel.
- Flexible Work Arrangements.** Provide flexible work arrangements, such as early or late hours, compressed work week, telecommuting or other practices to eliminate or reduce employee commuting time.
- Teleconferencing.** Adopt guidelines on the use of web, telephone and/or video-conferencing and other means to avoid unnecessary travel and associated carbon emissions.

(3) Product Deliveries

- Reduced Deliveries.** Arrange with suppliers to reduce the frequency of deliveries to the extent practicable.
- Efficient Delivery Routing.** Use special routing software or other tools and load consolidation to improve the energy efficiency of product delivery to customers.
- Reduce, Reuse Packaging.** Reduce the amount of packaging used for product deliveries to the minimum needed to protect products from damage. Use durable reusable shipping containers. Shred or form used paper into shipping packing.

(4) Paper Use

- PCW Paper.** Increase the recycled post-consumer-waste (PCW) content of your office paper.
- Paper Recycling.** Recycle discarded mixed office paper and corrugated materials.
- Double-sided Copying; Printer Defaults.** Institute double-sided copying at least for internal documents. Use printers with an automatic duplex option, if possible. Narrow the margins on documents to conserve paper.
- Electronic Communications.** Route faxes electronically; maximize the use of e-communications in lieu of paper documents to the extent practicable.
- Paper Re-Use.** Re-use one-sided non-confidential paper documents for drafts or notepads.

(5) Waste Generation

- Pollution prevention.** Reduce or prevent the generation of waste where practicable. Most waste materials generate greenhouse gas emissions in their production, use and disposal.
- Waste Recycling.** Recycle paper, corrugated, aluminum cans, plastic, metals and other items that can reasonably be recycled in your community. Local recycling often avoids much the generation of greenhouse gases that would occur if virgin materials were used.

(6) Other Actions

- RECs, VECs, Offsets.** Purchase greenhouse gas credits (voluntary emission-reduction credits, renewable energy certificates or greenhouse gas offsets) to make up for some of the greenhouse gases being emitted. See footnote v of Appendix 1 for a listing of reputable offset retailers. Also, some airlines and discount travel services like Expedia allow you to buy an offset for your trip when you purchase your airline ticket. Bear in mind many firms are offering offsets and some are not reputable.
- Employee Ideas.** Create an incentive program which encourages employees to suggest and implement ideas for saving energy and reducing greenhouse gas emissions.

2. Greening Your Product Line

a. Measuring the Environmental Impact of Switching to Green Products

(1) Recycled paper products.

- See attached *Worksheet for Computing Environmental Impact of Switching to Recycled Printing/ Office Paper* (Appendix 2).
- To determine the environmental impacts of various types of paper in terms of energy used, greenhouse gases and other air pollutants emitted, wastewater volume and pollutants discharged, and solid waste generated, enter the appropriate data in the *Environmental Defense Paper Calculator*.
<http://www.environmentaldefense.org/papercalculator/> . This website provides charts and graphs showing the impacts of different types of paper (freesheet, groundwood, corrugated, and paperboard, etc.) with different recycled contents.
- Comparisons:
 - A pallet of copier paper (20-lb. sheet weight or 20#) contains 40 cartons at 50 pounds each and weighs one ton (2000 lbs). Each ton of such virgin paper (no post-consumer content) uses 24 trees.
 - One carton (10 reams) of virgin copier paper uses 0.6 trees.
 - One tree makes 16 2/3 reams of copy paper, or 8333 sheets.Source: Conservatree
<http://www.conservatree.com/learn/EnviroIssues/TreeStats.shtml> .

(2) Computer notebooks, desktops and monitors.

- See the Electronic Product Environmental Assessment Tool (EPEAT):
<http://www.epeat.net/FastBenefits.aspx>

b. Increasing Your Use of Green Products

Using green products in your own operations.

Check all that currently apply or interest you

- Paper and plastic products with significant quantities of post-consumer recycled content
- Re-manufactured products (e.g., ink and laser toner cartridges)
- Electrical products that are solar powered (e.g., calculators) or certified as energy efficient by Energy Star
- Compact fluorescent light bulbs and other energy efficient lighting
- Products that are reusable, rewritable, refillable, rechargeable, more durable or repairable
- Products that are recyclable
- Cleaners and solvents that are nontoxic; non-VOC (volatile organic compound); biodegradable; water-based; ammonia-, phosphate-, and chlorine free; and derived from renewable resources rather than petroleum
- Detergents, cleaners and other liquids in concentrate, which minimizes packaging
- Writing instruments with non-toxic inks or other marking fluids
- Furniture, carpets, and paints that do not emit harmful levels of VOCs from adhesives or finishes
- Products made from plant-based materials
- Compostable items, such as garbage and grocery bags
- Multi-purpose electronic equipment (e.g., combination printer-scanner-fax machine)
- Bins for collecting recyclable materials
- Power strips and other devices that enable you to manually or automatically cut power when not needed
- Products certified by reputable third parties as being environmentally superior in specific ways, such as those noted above (See the Green Glossary for a listing of some popular certifications.)

3. Other Ideas for Improving the Environmental Practices of Your Operations

Below are some additional environmental best practices that you may want to consider:

a. Resource Conservation and Pollution Prevention

Check all that currently apply or interest you

- Drinking Water.** Use filtered tap water instead of bottled water. It takes approximately 17 million barrels of oil to make all the plastic bottles used for the bottled water consumed by Americans each year.
- Reusable Utensils.** Use durable plates, cups, glasses, and utensils in the kitchen and conference rooms
- Printer Cartridges.** Recycle printer cartridges and buy recycled cartridges.
- Recyclables.** Recycle the following to the extent practicable:
 - Glass bottles
 - Aluminum cans
 - Batteries
 - Plastic bags
 - Tyvek envelopes
 - Cardboard
- Reuse Center.** Establish a re-use center for binders, file folders, and other items.
- External Reuse.** Sell or donate old office equipment, furniture, and supplies that can't be reused internally.
- Doormats.** Use good doormats or entryway track-off systems to prevent people from tracking dirt into the building. Less dirt means fewer resources used for cleaning.
- Grounds Management.** Conserve the use of water for grounds watering, where applicable and to the extent that can be decided or influenced by the organization. Use natural landscaping and minimize the use of chemical fertilizers, herbicides and pesticides, to the extent lawn maintenance is within the control of the organization.
- LEED Building Features.** Adopt "green building" features and practices, such as those encouraged under the Leadership in Energy and Environmental Design (LEED) program of the US Green Building Council, to the extent that can be decided or influenced by the organization. See <http://www.usgbc.org/> . Every day, over \$464 million worth of construction projects are registered with LEED.

Check all that currently apply or interest you

b. Reducing Supply Chain Impacts

- Orders and Deliveries.** Use supplier e-systems to order and pay for products and services. Consolidate multiple sources and deliveries of products and services to reduce environmental impacts.

- Product Recycling/ Take-back Programs.** Arrange with product manufacturers, the Link 360 Program (<http://www.link360recycling.com/>) , E-Cycle Environmental (<http://www.ecycleenvironmental.com/>) or other reputable firms to take back customer products after use.

- Caterers.** Use caterers that minimize disposables.

- Inks.** Specify the use of soy inks and paper with recycled content for all print jobs

- Landlord.** If the office is leased, work with the landlord and office building manager to help minimize the adverse environmental impacts and risks of the operations and maximize the beneficial ones.

- Facility Improvements.** Incorporate environmental criteria in the design and construction of office and other facility improvements.

- Green Hotels.** Select hotels with “green” practices for conference sites or regular use. See the CERES Green Hotel Initiative for best practice checklists and other tools: <http://www.ceres.org/> then search for hotel.

4. Driving Toward the Full Triple Bottom Line of Sustainability

a. Background; What is Sustainability?

“Green” is a common expression that originally referred to those products, actions or organizations that were thought to be environmentally superior. In recent years, more people have begun to associate the term with sustainable development or sustainability. *Sustainable development* carries many definitions, the most common of which was articulated by the UN’s Brundtland Commission in 1987: “development that meets the needs of the present without compromising the ability of future generations to meet their own needs. “

From the perspective of organizations, the goal of sustainable development –often referred to in the shorthand as *sustainability* –entails meeting the “Triple Bottom Line” of economic, social and environmental responsibility. It is about fostering respect for people and other living things while at the same time wisely using and managing environmental and economic resources. It calls for a careful balancing that takes into account the interests of key stakeholders—employees, customers, suppliers, investors, governments, and others—the very parties whose support is critical to the success of any organization.

Over the last few years, many businesses, cities, non-governmental organizations, and academic institutions have realized they have a role to play in the march toward sustainability. Certainly commercial businesses have an important role, too.

b. General Guidance on Implementing a Sustainability Program

(1) Use Guidance; Prioritize.

If your organization desires to pursue sustainability, it should do so in a practical way-- in a way that is most suitable to its resources, location, structure, culture, and nature of operations, and service. The approach should be one that adds the most value to the organization. The checklists and other guidance above and below can provide ideas on how that might be done. It is not expected that the organization adopt all of these practices; indeed, there may be other practices that are as effective for the organization, if not more so, than those listed. Also, given the breadth of sustainability, it is advised that you prioritize and pace your efforts toward implementation over the course of years. Take a few short steps, gain some success, and then move on to others.

(2) Systematic Approach.

A simple management system approach, though not essential, may prove helpful in pursuing sustainability. This entails a sequential process of planning, implementing the plan, reporting and evaluating performance, adjusting the approach, and periodically repeating these steps for continual improvement. Here are some more specific steps that may be worth considering, too:

- (a) **Secure Buy-in:** Discuss with employees what you are trying to accomplish by adopting this sustainability initiative and why you think the organization should do it; secure employee buy-in.

- (b) Adopt and Post Policy:** Adopt, sign and post a sustainability policy in one or more prominent places in your office area. This will inform everyone about your purpose and objectives. For ideas about the content of such a document, see the two model policies in Appendices 3 and 4.
- (d) Appoint Coordinator:** Identify a person from the organization as a sustainability coordinator to oversee your implementation of the policy, and track and report progress.
- (e) Assess Status:** Use the checklists and other recommendations of this Guide to assess the current status of sustainability of your organization.
- (f) Create Plan with Goals:** Establish a plan for implementing the sustainability policy in a way that makes sense for the organization. One way to do this is to have teams propose a few objectives, metrics, and goals, and then the organization's leaders can select the priorities and spread them across a number of years so that progress is steady but not overwhelming.
- (g) Identify Implementation Leaders:** Assign people within the organization to lead the implementation of each key objective or goal. A supporting sustainability team may also be useful for implementing some items.
- (h) Evaluate Performance:** After a period of implementation—say, one year-- commence an annual evaluation of progress and challenges.
- (i) Report Progress:** Periodically communicate the organization's progress in implementing the policy. Do this internally first, then publicly. This is most credibly done when noteworthy achievements and best practices are conveyed along with a description of challenges and plans for further improvement. A public report may take the form of a brochure or other publication for customers. It may also entail posting a simple progress report on the website of your organization. Guidance on public sustainability reporting and ideas for performance measurements may be found at the Global Reporting Initiative website:
<http://www.globalreporting.org/>
- (j) Recognize Achievements:** Celebrate success; recognize exceptional performance; have some fun.
- (k) Adjust and Repeat Process:** Adjust the objectives as appropriate, and repeat the process for continual improvement. Eventually meld the process into the organization's regular business planning. Make this part of the organization's culture.
- (l) Tell Others:** Share your experience with others outside the organization (customers, new recruits, other organizations, communities, media, etc.); inspire others to undertake a similar commitment.

5. Ideas for Improving the Economic and Social Aspects of Your Operations

Guidance for improving the environmental aspects of your organization is provided above. Below are other ideas for addressing the other two aspects of sustainability's Triple Bottom Line. As mentioned above, it is not expected that the organization undertake all these practices but rather to prioritize among them, select those that will have the greatest impact and add the most value, and then over time, perhaps address others.

(1) Economic success: the wise use of financial resources

Check all that currently apply or interest you

(a) Organization's Economic Prosperity

Business Improvement. Develop and implement strategies and tactics to strengthen the business over the short and long terms.

(b) Community's Economic Prosperity

Donations. Donate money and/or time to charitable or economic development activities that strengthen the community.

Voluntary Deductions. Create the opportunity for, but do not coerce, voluntary automatic deductions from employee compensation for donations to social and environmental causes of the employee's choice

Local Contractors. Use local contractors, if available, for needed services.

Fairtrade Items. Buy fairtrade coffee and/or other "fairtrade" products for use by the organization.

(2) Social responsibility: respect for people

(a) Respect for Employees

• **Communication with Management:**

Employee Feedback. Conduct regular employee meetings and/or use other techniques (surveys, focus groups, etc.) by which employees can provide constructive feedback to management; communicate management's response.

• **Employee Development:**

Training & Development. Encourage and support ongoing skills development and training for employees.

Performance Reviews. Provide all employees regular performance reviews and personal development plans.

- Mentoring.** Establish a program under which experienced employees mentor new employees and interns.
- Manager Training.** Provide training for new managers on how to supervise and coach other employees
 - *Fair Compensation:*
- Compensation.** Provide employees with competitive compensation and benefits
 - *Safety:*
- Ergonomics, Safety Training.** Assure employees have ergonomically appropriate equipment, furniture, and workstations (including lighting), and the training to do their jobs safely.
- Electrical Safety.** Periodically assess the office for compliance with good electrical safety practices, and correct any problems noted.
- Travel Safety.** Provide training on safety related to travel, as relevant (e.g., responding to hotel fires, avoiding street crime, safety in airplanes, food safety, obtaining medical care).
- Back Safety.** Provide back-safety training for employees who often lift boxes of records or other heavy items.
- Exits.** Periodically check exits to assure they are not blocked or locked so as to prevent emergency egress, and are properly marked if visitors may be confused about their location.
- Emergencies.** Establish emergency response procedures that cover fires, explosions, workplace violence and other hazards, and that include evacuation procedures and contacting emergency response authorities. Have the entire staff conduct a drill annually and evaluate the results.
- Harmful Substances.** Have the offices evaluated for the presence of the following, and, if present in potentially harmful quantities, manage them appropriately to prevent harmful exposures:
 - Friable asbestos
 - Harmful mold
 - Radon
 - Lead paint (for older properties)
- Indoor Air Pollution.** Assure that office air is otherwise safe and comfortable.

- **Employee Privacy:**

- Employee Records.** Establish procedures for maintaining the privacy of employee records.

• **Work-life Balance:**

Work-Life. Adopt measures to help assure the proper work-life balance of employees, including as appropriate, the following:

- Child care benefits
- Early or late work hours to avoid traffic congestion
- Telecommuting, where practicable
- Sabbatical program
- Retention of temporary help during times of heavy workloads
- Maternity and paternity leave policy
- Opportunities for part-time work and job-sharing
- Clear communication of work priorities and deadlines to subordinates
- Competitive (and mandatory) vacation policy
- Policy on overtime for hourly workers

(b) **Diversity, Fair Hiring Practices**

Diversity. Include diversity as important criteria in the hiring of employees, as well as suppliers, consultants, and other retained firms.

(c) **Responsible Governance**

Ethics Training. Provide initial and regular refresher training to employees on the relevant ethics and disciplinary rules, and establish a policy making adherence to legal and ethical standards a condition of employment.

(d) **Dealing With Customers**

Customer Privacy. Assure employees are aware of the rules on customer privacy and confidentiality of information.

Customer Satisfaction. Institute periodic surveys or other regular measures to collect feedback on customer satisfaction with products and services; respond as appropriate.

Business Promotion; Green Claims. Assure that the advertising and promotional practices of the organization conform to the Better Business Bureau's *Code of Advertising* and *Code of Online Business Practices*. See <http://us.bbb.org/>. Assure that any green promotional communications are clear, transparent and balanced, and that green claims about products or services are specific, accurate, and verifiable.

(e) **Awareness and Advice**

Sustainability Awareness. Use training sessions or other techniques to raise awareness of employees about the sustainability policy and the sustainability issues in your business.

Worksheet for Computing an Approximate Greenhouse Gas (GHG) Footprint for a Commercial Business

Data to be Collected (annual measured, calculated or estimated values)	How to Calculate Greenhouse Gas Emissions from That Data	Enter Greenhouse Gas Quantity in Metric Tons (2205 lbs.) of CO ₂ Equivalents
<p>(1) Direct Emissions from Own Organization</p> <p>a. Fossil Fuels Combusted for Building Heat, Processes (e.g., furnace, boiler) <i>(If a shared facility, allocate total consumption based on % of site used.)</i> <i>(i)(ii)(iii)</i></p> <ul style="list-style-type: none"> - Natural gas burned - -- in therms → - -- in 1000 cu.ft. (MCF) → - No. 1, 2, 4 fuel oil burned --in gallons → - Propane/LPG burned -- in lbs. → - -- in gallons → 	<ul style="list-style-type: none"> therms x 0.00591 thousands of cu. ft. x 0.0609 gallons x 0.01020 pounds x 0.00133 gallons x 0.00575 	
<p>b. Employee Transportation for Commuting and Other Business Travel</p> <p>If vehicle and plane miles are known, enter the miles in the WRI <i>Safe Climate Calculator</i>. http://www.safeclimate.net/calculator/ .</p> <p>As an alternative for plane travel, you may enter the starting and ending destinations in the Expedia <i>Flight Emissions Calculator</i>. http://www.terrapass.com/ect/us/en/flightcalc.php</p> <p><u>Or</u> you may calculate the GHG impact from the following <i>(i) (ii) (iii) (iv)</i>:</p> <ul style="list-style-type: none"> - Total commuting miles - -- car (19.7 mpg ave) → - -- bus → - -- Amtrak → - -- commuter rail/subway/tram → - Total other business travel - -- car (19.7 mpg ave) → - -- plane (short flights under 300 mi.) → - -- plane (medium flights) → - -- plane (long flights over 2000 mi.) → 	<p>The web calculators will automatically compute the CO₂ equivalents in pounds. Divide this sum by 2205 to get metric tons and enter it at the right.</p> <ul style="list-style-type: none"> miles x 0.000450 passenger miles x 0.000300 passenger miles x 0.000320 passenger miles x 0.000160 miles x 0.000450 passenger miles x 0.000250 passenger miles x 0.000200 passenger miles x 0.000175 	

<p>(Note: Some travel agencies will track miles flown per month.)</p> <p><u>Or</u> you may calculate the GHG impact from the gallons of fuel purchased (i) (iii):</p> <ul style="list-style-type: none"> - If gasoline → gallons x 0.00887 - If diesel fuel → gallons x 0.01015 		
<p>c. Product Deliveries (iii)</p> <ul style="list-style-type: none"> - Total miles by van/light truck → miles x 0.00066 - Total miles by tractor-trailer (heavy truck) → miles x 0.00148 		
<p>d. Paper Use</p> <p>Identify percent recycled content and weight in pounds, tons (2000 lbs) or metric tons (2205 lbs) of various types of paper, corrugated and paperboard purchased for use, and enter data in <i>Environmental Defense Paper Calculator</i>. http://www.environmentaldefense.org/papercalculator/</p>	<p>Web calculator will automatically compute the CO₂ equivalents in pounds. Divide this sum by 2205 to get metric tons and enter it at the right.</p>	
<p>TOTAL <u>DIRECT</u> GHG EMISSIONS</p>	<p>Sum of all lines under category (1) above.</p>	

<p>(2) Indirect Emissions from Others</p> <p>a. Consumption of Purchased Electricity <i>(i) (ii)</i></p> <p>Obtain GHG emission rate in lbs of CO2 per megawatt hour (lbs. CO2/MWh) for your state or region from the US EPA's eGrid website: http://www.epa.gov/cleanenergy/energy-resources/egrid/</p> <p>Obtain the amount of electricity purchased for the year in kilowatt hours (kWh) (1000 kWh= 1 MWh)</p>	<p>Calculate:</p> $\frac{\text{Your total kWh}}{1000} \times \frac{\text{eGrid rate}}{2205}$ <p>Or as a default, multiply your total kWh by the national average of 0.000778 metric tons CO2/kWh</p>	
<p>b. Deliveries from Major Suppliers</p> <p>Determine number of deliveries per year, the estimated % of vehicle capacity used for your supplies, and the miles per delivery.</p> <ul style="list-style-type: none"> - If deliveries are by van/ light truck → - If deliveries are by tractor-trailer (heavy truck) → - → 	<p>Calculate:</p> <p>If Z= (No. deliveries) x (% capacity/100%) x (miles/delivery)</p> <p>Z x 0.00066</p> <p>Z x 0.00148</p>	
<p><i>TOTAL INDIRECT GHG EMISSIONS</i></p>	<p>Sum of all items under category (2), above.</p>	
<p>(3) Total Greenhouse Gas Reduction Credits (Offsets) Purchased (v)</p>	<p>If credits were purchased in tons of CO2 equivalents, convert to metric tons by multiplying the number of tons by 2000/2205= 0.907</p>	
<p><u>TOTAL GHG FOOTPRINT</u></p>	<p>Total (1) Direct Emissions + (2) Indirect GHG Emissions – (3) GHG Reduction Credits.</p>	

References:

- (i) US EPA, *Clean Energy: Calculations and References:*
<http://www.epa.gov/cleanenergy/energy-resources/refs.html>
- (ii) *Working 9 to 5 on Climate Change: An Office Guide*, by S. del Pino and P. Bhatia (WRI):
http://www.safeclimate.net/business/measuring/WRI_CO2Guide.pdf
- (iii) *The Greenhouse Gas Protocol—A Corporate Accounting and Reporting Standard*, by WRI and WBCSD : <http://www.wbcsd.org/DocRoot/IX9QDY3RmB83EDgaeKUW/ghg-protocol-revised.pdf> ; also <http://www.ghgprotocol.org/calculation-tools>
- (iv) *The Carbon Trust Carbon Footprint Calculator for Small and Medium-sized Businesses:*
<http://www.carbontrust.co.uk/solutions/CarbonFootprinting/FootprintCalculators.htm>
- (v) *Four of the more respected US retail providers of greenhouse gas (carbon) offsets or credits are Climate Trust (www.climatetrust.org); Native Energy (www.nativeenergy.com); Sustainable Travel International (www.sustainabletravelinternational.org); and Green-e (<http://www.green-e.org/>). For more details, see *A Consumer's Guide to Retail Carbon Offset Providers*, by Clear Air, Cool Planet: <http://www.cleanair-coolplanet.org/ConsumersGuidetoCarbonOffsets.pdf>.*

Worksheet for Computing the Environmental Impact of Switching to Recycled Printing/Office Paper

Obtain the cases (10 reams) of paper purchased and the percent of post consumer waste (PCW) recycled content, then calculate:

$$\frac{\text{cases of paper purchased}}{40 \text{ cases / ton}} \times \frac{\text{percent of post consumer recycled content}}{100\%} = X \quad \boxed{\text{tons of Post consumer recycled content}}$$

To compute the environmental impact of switching to PCW recycled paper, use X from the above calculation and calculate the following:

$X \times 24 =$ number of 40-ft. trees saved
(Note: One 10-ream carton of 100% virgin copier paper uses 0.6 trees.)

$X \times 3 =$ tons of wood saved

$X \times 0.187 =$ number of homes that could be powered in a year with the energy saved

$X \times 1.05 =$ tons of greenhouse gas avoided because of no decomposition of disposed paper

$X \times 0.192 =$ number of cars that would have to be taken out of operation to equal the savings in greenhouse gas emissions from paper manufacture and avoidance of decomposition of paper in a landfill

$X \times 15 =$ pounds of air pollutants avoided in paper manufacturing

$X \times 8,750 =$ gallons of wastewater avoided in paper manufacturing

$X \times 0.562 =$ tons of solid waste (waste paper, sludge and other production waste) not sent to a landfill or incinerator

Sources:

- a. Environmental Defense Paper Calculator
<http://www.environmentaldefense.org/papercalculator/>
- b. Conservatree <http://www.conservatree.com/learn/EnviroIssues/TreeStats.shtml>