

World Resources Institute
Carbon Dioxide (CO₂) Inventory Report
For Calendar Years 2006 & 2007

Thomas Damassa

December 2008



WORLD
RESOURCES
INSTITUTE

Table of Contents

Summary.....	3
Introduction	4
Emissions for Calendar Years 2006 and 2007.....	5
Performance Over Time (2000 – 2007)	5
Emissions from Paper	6
WRI GHG Management Activities.....	7
Engaging Businesses and other Organizations on Climate Change.....	13
Appendix I: Overview of Accounting Methodology.....	14
Appendix II: 2006 and 2007 Activity Data, Emission Factors, and Sources.....	17

Summary

This report presents WRI's CO₂ inventory for calendar years 2006 and 2007. It details emission sources included and excluded from the inventory, describes how emissions data were collected and calculated, summarizes how emissions have changed over time, and describes WRI's GHG management activities.

WRI's total emissions were 1,125 metric tons of CO₂ in 2006 and 1,288 metric tons of CO₂ in 2007. This represents an approximately 6% and 21% increase above our 2000 base year emissions, respectively. WRI has committed to offset its emissions to achieve its goal of a "net zero" emissions balance every year. For 2006, WRI procured offset credits through the *Chicago Climate Exchange* (CCX), a voluntary, U.S.-based emissions trading program. For 2007, WRI purchased credits compliant under the Clean Development Mechanism of the Kyoto Protocol, known as certified emission reductions (CERs). These credits were sourced from a landfill gas to energy project in China and a renewable (wind) energy project in India. Details of WRI's offset purchases for 2006 and 2007 can be found on page 10. In 2009, WRI intends to release a review document that describes the Institute's recent decision-making process regarding offsets and its experiences with purchasing CERs.

Finally, this report highlights two important greenhouse gas management activities that took place during 2006-2007:

- *LEED* Gold Certification of WRI's office expansion space which includes a rating for energy efficiency; and
- The design of a new green roof project for WRI's office building that will help increase building insulation.

This report is available online on WRI's website, <http://www.wri.org>. For more information about WRI's CO₂ commitment and our outreach activities, please contact Tom Damassa at 202-729-7783, tdamassa@wri.org.

Introduction

The World Resources Institute (WRI) – a nonprofit environmental policy and research organization dedicated to protecting the Earth and improving people’s lives – recognizes global climate change as one of the most pressing challenges and opportunities of our time. Indeed, one of WRI’s core goals is to “protect the global climate system from further harm due to emissions of greenhouse gases and help humanity and the natural world adapt to unavoidable climate change.” Although our work seeks viable strategies to mitigate and adapt to climate change, we also acknowledge our own contribution to the problem.

As a result, in 1999, WRI committed to “walk the talk” by reducing its carbon dioxide (CO₂) emissions balance to zero (WRI has achieved its “net zero” goal each year since 2000), and publicly reports its progress. The emission sources included in this goal are indirect emissions from the generation of purchased electricity, business air travel, and employee commuting. WRI also tracks its emissions from paper consumption but because of the uncertainties associated with estimating emissions does not include this source in the goal. Through this project WRI gains direct experience in developing a CO₂ inventory and reducing emissions. WRI uses this first-hand knowledge to help others understand climate change and identify actions they can take to effectively measure, manage, and reduce their CO₂ emissions.

To track our emissions and performance, WRI conducts a CO₂ inventory each year. The inventory follows the guidance in *Hot Climate, Cool Commerce: A Service Sector Guide to Greenhouse Gas Management* (see <http://www.wri.org/publication/hot-climate-cool-commerce>), which is based on and consistent with the WRI/WBCSD *Greenhouse Gas Protocol Corporate Accounting and Reporting Standard* (GHG Protocol). A copy of these documents can be downloaded from the GHG Protocol website, <http://www.ghgprotocol.org>.

This report details WRI’s emissions for calendar years 2006 and 2007. WRI issues a full report every two years and a summary report in the intervening years. Previous reports are available online at <http://www.wri.org/project/wri-co2-commitment>.

Emissions for Calendar Years 2006 and 2007

WRI's total emissions for calendar years 2006 and 2007 were as follows. The activity data and emission factors used are detailed in Appendix II.

Table 1: WRI's CO₂ emissions for calendar years 2006 and 2007

CATEGORY OF EMISSIONS	2006 EMISSIONS (IN METRIC TONS OF CO₂)	2007 EMISSIONS (IN METRIC TONS OF CO₂)
SCOPE 1 (DIRECT)	0	0
SCOPE 2 (CONSUMPTION OF PURCHASED ELECTRICITY)	431	479
SCOPE 3 (OTHER INDIRECTS)	577 (from business air travel)	697 (from business air travel)
	117 (from employee commuting)	112 (from employee commuting)
TOTAL CO₂ EMISSIONS:	1,125	1,288

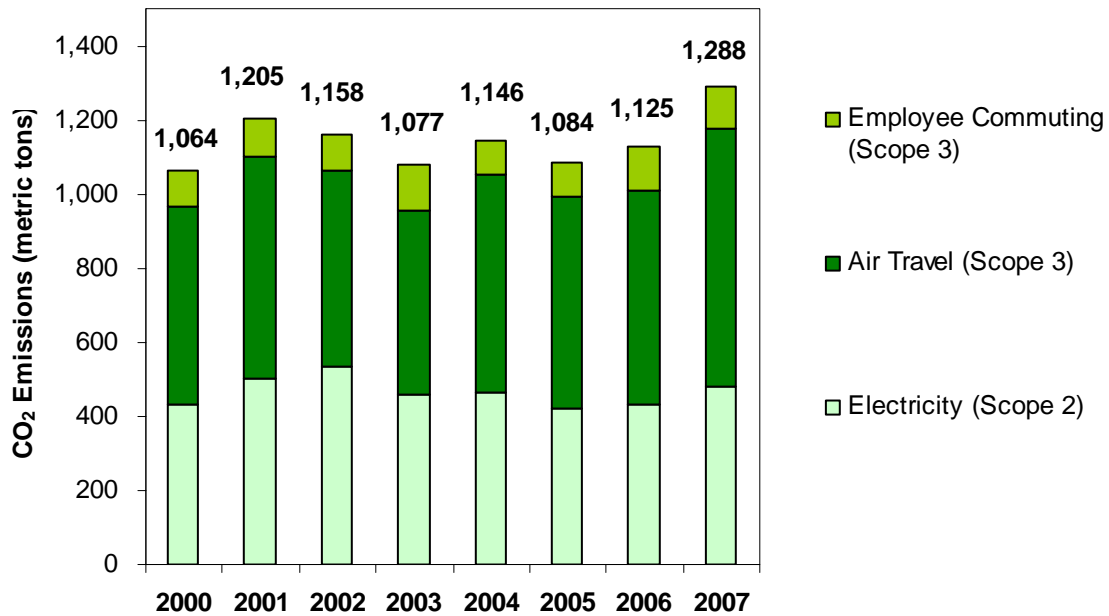
Performance Over Time (2000 – 2007)

In 2006, WRI's total emissions were 6% higher than its base year (2000) emissions. In 2007, WRI's total emissions were approximately 21% higher than its base year emissions. This growth in emissions is largely attributable to an increase (approximately 33%) in the number of WRI staff during 2006-2007 and a subsequent rise in travel-related emissions associated with business travel and employee commuting. Growth in emissions in 2007 is also a result of WRI expanding its office area during this year (see Box 1, p. 8). Table 2 and Figure 1 illustrate WRI's emissions performance from 2000 through 2007, by source.

Table 2: WRI's CO₂ emissions, 2000 – 2007

All emissions shown in metric tons of CO₂								
	2000 (base year)	2001	2002	2003	2004	2005	2006	2007
Scope 2 <i>Electricity</i>	431	503	535	459	461	423	431	479
Scope 3 <i>Air travel</i> <i>Employee commuting</i>	535	598	529	497	589	571	577	697
	98	104	94	121	96	90	117	112
Total Emissions	1,064	1,205	1,158	1,077	1,146	1,084	1,125	1,288

Figure 1: WRI total CO₂ emissions, by source, 2000-2007



Emissions from Paper

From 2000-2003, WRI reported its scope 3 indirect emissions (see Appendix I for an explanation of “scopes”) associated with paper against its goal. While WRI believes that it is important to continue to track and report these emissions and to leverage paper reduction opportunities, we have ceased including paper emissions in our formal inventory and no longer report these against our goal. This is because there are many uncertainties involved in the calculation methodology for paper. The decision to discontinue reporting emissions from paper as part of our goal triggered an adjustment in the reporting of WRI’s historical emissions which have been re-reported to exclude emissions from paper. WRI continues to account for these emissions but reports them separately from the emission sources included in our goal. Table 3 shows WRI’s indirect emissions associated with paper use from 2000 to 2007.

Table 3: Estimated indirect CO₂ emissions from paper use, 2000-2007 (in metric tons of CO₂)

2000	2001	2002	2003	2004	2005	2006	2007
372	148	148	56	58	96	41	78

WRI GHG Management Activities

WRI's GHG management activities for 2006-2007 are in three areas: 1) internal activities in WRI's office space and building, 2) green power purchases, and 3) investment in GHG offsets.

1) Internal activities

WRI office space

WRI's office space was designed to use resources efficiently and to minimize our CO₂ footprint. WRI uses energy efficient compact fluorescent lamps (CFLs) throughout the space, has installed motion sensors in offices and hallways to limit "on-time" of office lighting, and all of our office appliances, including computers, printers, fax machines, copiers, dishwashers, and refrigerators are energy efficient models.

The expansion of our office space in 2007 provided an opportunity to further "walk the talk" by ensuring our remodeled area met the high environmental standards of the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Green Building Rating System – "a third-party certification program and the nationally accepted benchmark for the design, construction and operation of high performance green buildings" (see Box 1).

In addition, WRI's office helps staff minimize emissions from travel. Examples include:

- *Location:* The office is located a few short blocks from Washington DC's main mass transit hub, which connects travelers by rail to other East Coast cities and by subway to the local area.
- *Bicycle-friendly facilities:* On-site shower facilities and a secured area for storing bicycles are important benefits for employees who prefer to commute by emissions-free means.
- *Video-conferencing:* WRI's video-conferencing equipment enables staff to connect with partners around the world without leaving the office.

Paper reduction measures

As noted above, WRI has implemented efforts to decrease paper use, which cause indirect CO₂ emissions. In addition to utilizing double-sided printing, WRI has instituted a switch from a paper-based payroll to an electronic one. WRI's employees submit timesheets electronically and all staff have paper recycling bins in their offices.

Communicating our CO₂ commitment

As part of its CO₂ commitment, WRI makes efforts to communicate the initiative to staff members and other parties. In 2006 and 2007, WRI hosted numerous external groups seeking to learn more about its green building design and office practices, including individuals from:

- D.C. Government;
- Marymount College;
- Coro Fellowship Program;
- American University;
- Earth Watch Institute;
- Thunderbird School of Global Management;
- World Business Council for Sustainable Development;
- Washington Metropolitan Council of Governments (COG);
- International Fund for Animal Welfare;
- United Nations Environment Programme/Regional Office for North America;

- Student Conservation Association; and
- The Environmental Committee of the American Psychological Association.

As a result of office tours and follow up discussions, Earth Watch Institute, APA's Environmental Committee, and COG adopted elements of WRI's green design and green office practices for their own offices. WRI also routinely holds office tours for new staff as part of our broader education effort around our CO₂ commitment.

Box 1. WRI's Office Expansion Space Certified *LEED* Gold

In 2007, WRI expanded its office, which involved a 7,000-square-foot build-out of our offices at 10 G Street, near Union Station in Washington, DC. Besides the satisfaction of creating modern new offices and meeting rooms, this expansion gave us the opportunity to push the envelope in how commercial buildings can be more environmentally friendly.

The extra effort paid off in more than great office space. Recently, WRI was awarded [LEED-CI Gold Certification](#) by the [U.S. Green Building Council](#) (USBGC). The certification involves a rating system involving everything from the materials used to water use and energy efficiency. [LEED-CI](#) applies to Commercial Interiors, but USBGC has standards for many industrial, residential, and even neighborhood building projects. WRI is one of only 7 LEED-CI Gold certified projects in the DC-Maryland-Virginia region, and one of 54 such projects worldwide.

- [Read WRI's Press Release](#) at http://www.wri.org/newsroom/newsrelease_text.cfm?nid=391



Coming soon to WRI – green roof!

WRI is currently collaborating with its landlord, the American Psychological Association (APA), on a green roof project set for completion during the fall/winter of 2008. The green roof will be approximately 3,600 square feet in size and will consist of plants that replace vegetation destroyed when the building was constructed. Ecological benefits to this project include improved storm water management, water and air purification, and a reduction in building energy consumption, resulting from improved insulation. Reductions in building energy consumption decrease indirect Scope 2 GHG emissions from electricity purchased by the building's tenants.

Unique to this project will be the incorporation of a labyrinth in the design of the green roof garden. Funding for this project has been generously provided by the TKF Foundation, with additional funding from APA, the Chesapeake Bay Foundation, and WRI.

2) Green power purchases

Since 2002, WRI has pursued the opportunity to “green” its electricity supply and support renewable energy projects through purchasing renewable energy certificates (RECs). RECs are environmental commodities intended to provide an economic incentive for the generation of electricity from renewable energy sources. A REC is created when 1,000 (net) kilowatt-hours (kWh)¹ of electricity is generated from an eligible renewable energy resource. Typically, RECs are unbundled and sold separately from the underlying electricity generated.

WRI worked with its building owners – APA – to facilitate their procurement of green power. As a result, APA purchased RECs equivalent to 100% and 67% of their two buildings electricity use in 2006 and 2007, respectively.²

WRI supplemented APA’s REC purchase in 2007 by purchasing RECs equivalent to 33% of its own electricity use (including electricity for the expansion space). Coupled with APA’s RECs purchase, this supplemental purchase enabled WRI to “green-up” 100% of its electricity use through RECs. In 2007, WRI purchased RECs equivalent to 324,000 kWh of renewable generation. Since WRI’s office space is not separately metered, WRI used the GHG Protocol guidelines to calculate an amount of RECs for purchase based on estimated electricity use. This REC purchase was supplied by 3 Degrees (<http://www.3degreesinc.com/>) and sourced from 50% biomass energy and 50% wind energy.

Accounting for RECs in WRI’s CO₂ inventory (also see Box 2)

As in previous years, WRI chose to report REC purchases in our 2007 inventory using the following method: kWhs of RECs are multiplied by the average emission factor for the e-GRID³ powerpool sub-region where the RECs were generated; this total is then “netted” from reported scope 2 emissions. This practice is demonstrated in Table 4. Note that carbon dioxide benefits can only be claimed by the owner of the RECs, therefore while WRI met its 100% green energy goal in 2007, its inventory only reports the emissions benefit of the RECs it purchased, not those purchased by its building owner.

Due to current methodological uncertainties regarding the use of RECs in a corporate GHG inventory (see Box 2), WRI has opted to take a conservative approach to REC accounting in 2007: though RECs are included as part of our annual inventory, WRI has also purchased an amount of offset credits (see below) equivalent to our total reported emissions (that is, excluding the calculated carbon value of WRI’s REC purchases). This enables us to definitively meet our annual “net zero” goal even as discussions around “best practice” REC accounting evolve.

¹ One thousand kilowatt hours (kWh) equals 1 megawatt hour (MWh).

² For more information on this purchase and WRI’s involvement, please see WRI’s 2003 CO₂ Inventory Report, available on the WRI website, www.wri.org.

³ E-GRID (Emissions & Generation Resource Integrated Database) provides information on the air quality attributes of electricity generated in the U.S. and is compiled by the U.S. EPA.

Box 2. A Note on REC Accounting

The methodology described above reflects previous “best practice” reporting guidelines for REC accounting derived from the EPA Climate Leaders Program and others. However, recent thinking on REC accounting has changed substantially. For example, in December 2007, the EPA Climate Leaders Program released their latest guidance for REC accounting which recommends using the non-baseload e-GRID powerpool emissions factor (as opposed to the average powerpool emissions factor used in WRI’s inventory calculations) when calculating emission reductions from the purchase of RECs⁴. In addition, there are also arguments that RECs should not be considered at all in a GHG inventory or used as a mechanism for meeting a company’s GHG reduction goals.

In response to this increasing uncertainty regarding REC accounting “best practices,” WRI (including the GHG Protocol team) is currently undertaking a set of conversations that will review existing methods (including our own current practice of REC accounting). However, since this assessment (and any forthcoming recommendations) has yet to be finalized, WRI has chosen to report RECs in our 2007 inventory as in previous years but to be conservative by purchasing an amount of offset credits equivalent to our total reported emissions (that is, excluding the calculated carbon value of WRI’s REC purchases). We will make revisions in the future, if necessary.

Finally, readers should note that while WRI’s REC accounting methodology may change for future inventories, any guidance on REC accounting (such as that currently offered by EPA Climate Leaders) is independent of GHG accounting under the GHG Protocol *Corporate Accounting and Reporting Standard* (which WRI follows to produce its annual CO₂ inventory). The GHG Protocol *Corporate Accounting and Reporting Standard* does not make any recommendations regarding how companies or organizations might apply any reductions to their inventory by purchasing renewable energy certificates.

3) Investing in GHG offsets

WRI has sought to maximize efficiency opportunities in its use of electricity, and to reduce travel emissions (see above), However, WRI’s annual goal is to achieve a “net zero” emissions balance, and to reach this target we must offset all emissions we have not been able to reduce through internal activities.

An offset is an activity or project that reduces or sequesters greenhouse gas (GHG) emissions and takes place outside the inventory boundary of an organization. Companies and organizations can invest in these projects to counteract or “offset” the GHG emissions from their own operations. GHG offsets can be used to meet emission reduction targets (see Table 4), especially when the cost of internal reductions is high or opportunities for internal reductions are limited.

Offset purchases

Since 2000, WRI has invested in several types of GHG offsets to achieve its “net zero” emissions balance target. Descriptions of these purchases are recorded in previous year’s

⁴ Climate Leaders also includes important eligibility criteria for RECs (which WRI follows). For example, only RECs from facilities that were brought online after January 1997 can be accounted for in GHG inventories. This and other eligibility criteria are consistent with the standards promoted by Green-e, the independent RECs certification program. For more information on the EPA’s methodology, refer to Climate Leaders (www.epa.gov/climateleaders).

inventory reports (see <http://www.wri.org/project/wri-co2-commitment>). After joining the Chicago Climate Exchange (CCX) in 2003 as an “associate member,” WRI met its “net zero” commitment for 2003-2006 through purchases of CCX allowances or offsets (known as carbon financial instruments – CFIs).⁵

With the recent rapid growth of the global offset market, WRI re-evaluated our investment in offsets at the end of 2007. Through a series of internal discussions, WRI assessed both compliance and voluntary market options with respect to meeting the goals of the Institute (i.e., we did not evaluate particular offset vendors) and elected to pursue offsets from a compliance market.

To offset our 2007 CO₂ emissions, WRI purchased Certified Emission Reductions (CERs). CERs are a fungible commodity with 1 CER equivalent to 1 metric ton of CO₂. They are produced under the Clean Development Mechanism (CDM), an arrangement within the United Nations Framework Convention on Climate Change (UNFCCC) that allows industrialized countries with a greenhouse gas reduction commitment under the Kyoto Protocol (called Annex I countries) to invest in projects that reduce emissions in developing countries as an alternative to more expensive emission reductions in their own countries (a viable strategy since the effect of greenhouse gases is global, rendering the point of reduction irrelevant). The CDM is a compliance market and CERs are therefore compliance credits.

WRI procured CERs from two projects, the Nanjing Tianjingwa (China) landfill gas to electricity project and the 6.75MW small scale grid connected wind electricity generation project in Tamil Nadu, India. CERs for both projects were procured through EcoSecurities, Ltd. (<http://www.ecosecurities.com>), an independent broker that specializes in sourcing, developing, and trading emission reduction credits. Details of these projects are available at the UNFCCC website:

Nanjing landfill gas to energy: <http://cdm.unfccc.int/Projects/DB/DNV-CUK1129289693.13/view>

Tamil Nadu wind power: <http://cdm.unfccc.int/Projects/DB/DNV-CUK1175246467.05/view>

In brief, WRI pursued this portfolio of CER credits for the following reasons:

- The CDM is a fully-functioning, international, compliance carbon market.
- The CDM offers a relatively rigorous protocol for assessing the environmental integrity (“additionality”) of projects.
- China and India have been identified as “priority” countries for WRI’s continuing work in its 2008 draft strategic plan.

This approach also enabled WRI to gain a deeper understanding of how to navigate different offset markets – essential to our “learning by doing” goals.

WRI intends to document our “lessons learned” and provide a more detailed explanation of the process the organization went through to arrive at this offset purchase decision in a forthcoming brief. We hope our own experience and insights may provide guidance to companies, peer non-profits, and other organizations as they consider various offset options.

⁵ For more information on these purchases and WRI’s involvement with CCX, please see WRI’s 2003 and 2004&2005 CO₂ Inventory Reports, available on the WRI website, www.wri.org.

Table 4: Emissions balance summary (metric tons of CO₂), including the purchases of RECs and offsets.

	2000	2001	2002	2003	2004	2005	2006	2007
Scope 1 (Direct)	0	0	0	0	0	0	0	0
Scope 2 (Purchased Electricity)	431	503	535	459	461	423	431	479
<i>WRI REC Purchases</i>	0	0	-535*	-120	-115	-106	0	-186
Scope 3 (Air travel and commuting)	633	702	623	618	685	661	694	809
GHG offsets purchased	2,011	1,947	0	0	0	0	0	1,288
CCX offsets/allowances purchased	0	0	0	1,100	1,200	1,100	1,200	0
<i>GHG Offsets Applied</i>	<i>-1,064</i>	<i>-1,205</i>	<i>-623**</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>-1,288***</i>
<i>CCX offsets/allowances applied****</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>-1,100</i>	<i>-1,200</i>	<i>-1,100</i>	<i>-1,200</i>	<i>0</i>
WRI GHG Emissions Balance	0	0	0	0	0	0	0	0

* In accordance with best practices at the time, although the avoided emissions value of WRI's 2002 RECs purchase was 860 metric tons, WRI only "netted out" 535 metric tons – an amount equal to its 2002 Scope 2 emissions. If WRI netted out the entire carbon value of its 2002 RECs purchase, the effect would be that the RECs would "offset" non-Scope 2 emissions.

** The 623 metric tons of offsets applied in 2002 were "banked" or left over offsets from WRI's 2000 and 2001 offset purchases. WRI keeps an internal account of GHG offsets banked from year to year.

*** Due to current methodological uncertainties in REC accounting (see Box 2), WRI opted to take a conservative approach to our GHG accounting in 2007 and purchase an amount of offsets equivalent to its total reported Scope 2 and 3 emissions.

**** CCX requires members to purchase an amount of allowances or offsets – called carbon financial instruments or CFIs – equivalent to a company's total emissions, rounded up to the nearest one hundred tons. Also, while WRI applied RECs to its Scope 2 emissions from 2003-2006, these deductions are not reflected in the total amount of offsets purchased for these years because CCX does not recognize RECs. WRI followed the program's guidelines to develop its inventory in those years (offset totals therefore reflect the sum of Scope 2 and 3 emissions).

Engaging Businesses and other Organizations on Climate Change

In addition to WRI's own CO₂ commitment, WRI also engages businesses and other organizations on GHG management, GHG reduction strategies, green power purchasing, and other activities related to climate change. WRI initiatives and efforts related to this include:

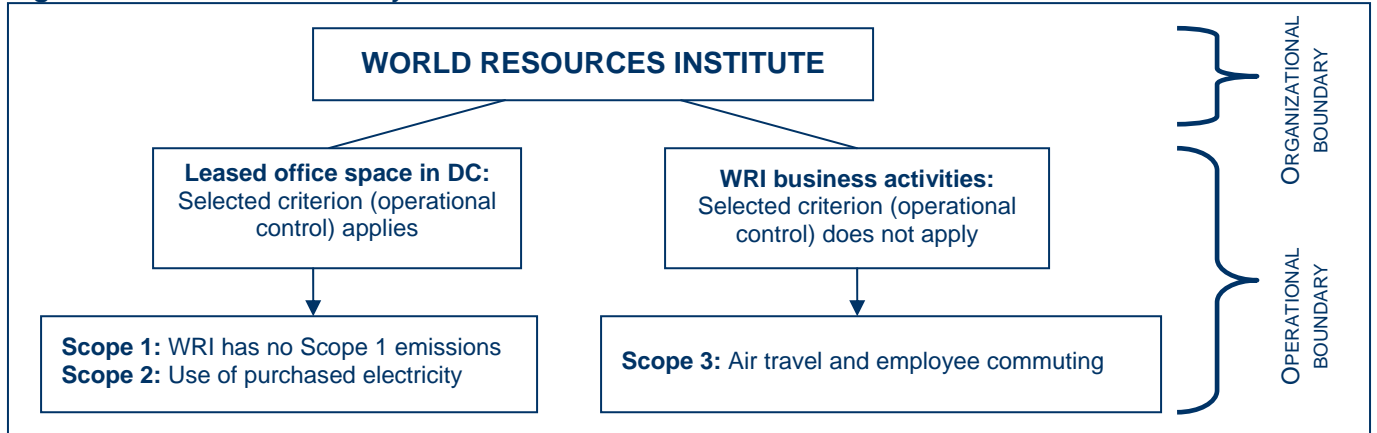
- *GHG Protocol Initiative:* The GHG Protocol Initiative (GHG Protocol) is a multi-stakeholder partnership of businesses, NGOs, governments, and others convened by WRI and the World Business Council for Sustainable Development (WBCSD). The Initiative's mission is to develop internationally accepted accounting and reporting protocols for corporate GHG emissions inventories and GHG mitigation projects, and to promote their use by businesses, policy makers, NGO's and other organizations. The GHG Protocol Corporate Accounting and Reporting Standard, which has emerged as the pre-eminent international standard for corporate GHG inventory development, is being used by several hundred companies worldwide and serves as a GHG accounting and reporting foundation for several voluntary and mandatory GHG programs. www.ghgprotocol.org
- *U.S. Climate Business Group:* The U.S. Climate Business Group – Climate Northeast, Climate Midwest, and Climate Southeast - builds strategies for companies to thrive in a carbon-constrained economy. Partners develop greenhouse gas (GHG) management systems, share energy management practices and invest in clean energy. These corporate actions shape multi-sectoral policy approaches for a safe climate, sound business future. The U.S. Climate Business Group is one example of WRI's collaboration with the private sector to address the challenge of climate change. By working together, WRI and its corporate partners have an opportunity to learn, share best practices and solutions with a diverse set of peers, create a leadership forum on corporate responses to GHG issues, and become more informed and effective participants in policy dialogues taking place at the state, federal and international levels. www.climatenortheast.org, www.climatemidwest.org, www.climate-southeast.org (forthcoming)
- *Green Power Market Development Group:* Convened by WRI in 2000, the Green Power Market Development Group is a unique commercial and industrial partnership dedicated to building corporate markets for renewable energy. The Group seeks to develop 1,000 megawatts (MW) of new, cost-competitive green power by 2010 in the United States. The Green Power Market Development Group also includes European and California affiliates. www.thegreenpowergroup.org
- *Envest:* Envest - Environmental Intelligence for Tomorrow's Markets - ensures that financial implications of environmental opportunities and risks are properly understood by financial institutions, investors and issuers and are appropriately reflected in the world's capital markets. WRI's premise is that environmental considerations are not incorporated into the overall financial analytical framework used by most actors in the capital markets. As such, investors possess insufficient information to adequately assess how environmental considerations impact a company or project's risk/return tradeoff. WRI believes that markets that have fully discounted the environmental implications on risk and return will ultimately facilitate capital allocation to companies with sound environmental strategies. www.wri.org/project/envest

Appendix I: Overview of Accounting Methodology

Accounting and reporting boundaries

Figure 2 depicts WRI’s organizational and operational boundaries⁶.

Figure 2: WRI’s CO₂ inventory boundaries



- 1) *Organizational boundary*: This defines the businesses and operations that constitute an organization and the criteria for how the emissions will be reported. WRI’s organizational structure is simple, consisting of one legally incorporated organization with no units or branches beyond the Washington DC headquarters’ office which WRI leases.⁷ It is considered part of WRI’s organizational boundary based on the GHG Protocol’s control criteria. For the purposes of reporting our inventory, WRI applies the GHG Protocol’s control approach based on the operational control criterion.

- 2) *Operational boundary*: This identifies and categorizes emissions sources associated with an organization as defined in the organizational boundary. WRI’s inventory includes emissions from electricity consumption, business air travel, and employee commuting. These emissions are further categorized into the following “scopes” as defined by the GHG Protocol:
 - Scope 1 (direct emissions from sources that are controlled by WRI)
 - WRI has no Scope 1 emissions

 - Scope 2 (indirect emissions from WRI’s use of purchased electricity)
 - Use of electricity (purchased electricity is the only source of energy in the building WRI occupies)

 - Scope 3 (all other indirect emissions)
 - Business air travel by staff if booked through WRI (via travel agency or other sources)
 - Business air travel by partners/consultants (booked through WRI’s travel agency)
 - Employee commuting

⁶ For more information on setting inventory boundaries, refer to *Hot Climate, Cool Commerce: A Service Sector Guide to Greenhouse Gas Management*, available on the WRI website, www.wri.org.

⁷ For more information on accounting for emissions from leased assets, refer to *Hot Climate, Cool Commerce*.

Inventory omissions

The following emissions sources are not currently included in WRI's inventory:

- Transmission and distribution losses associated with the consumption of purchased electricity
- Business car or train travel
- Business air travel when the travel is not booked by WRI (for example if the travel is arranged by a partner)
- Business travel organized by WRI for its partners and consultants but WRI's travel agency is not used
- Shipping/courier services
- Disposal and transportation of waste generated in operations
- Embedded carbon in purchased assets

WRI also does not currently account for other GHGs besides CO₂ (e.g., CH₄ and N₂O), breaking with GHG Protocol's *Corporate Standard* guidelines. However, for the sources included in WRI's inventory, these gases would likely constitute a very small portion of total emissions. [Note: As a founding member of The Climate Registry (<http://www.theclimateregistry.org/>), beginning with WRI's CO₂ inventory for 2008 (to be completed in 2009), our emissions inventory will include non-CO₂ GHGs following guidelines established by The Climate Registry and consistent with the GHG Protocol *Corporate Standard*].

Base year

A base year is a reference year against which emissions performance can be measured over time. Initially WRI selected 1990 for its base year to mirror what the U.S. requirements would have been had it ratified the Kyoto Protocol. The major challenge with this has been that data from 1990 are largely incomplete making comparisons against this base year less meaningful.

Following the guiding principles of the GHG Protocol to use a base year for which accurate and complete data are available, WRI changed its base year from 1990 to 2000, the first year for which WRI had reliable and complete data.

As a result of WRI's decision to not track indirect emissions from paper against our reduction target (see p.7), WRI adjusted its base year and subsequent year emissions (by removing paper emissions from its scope 3 reporting) so that changes in emission levels are accurately reflected over time. These emissions are instead reported separately (see tables 12 and 13).

Emissions adjustments

As our knowledge and experience in inventory development grows, we may develop improved calculation methodologies and tools. When this happens, previous years reported emissions are adjusted according to the new methodology. Adjustments are also made when new emission factors are published that more closely reflect actual emissions than those available at the time the original calculations were made. These adjustments allow our emissions accounting to be as accurate and consistent from year to year as possible. However, in the case where adjustments are relatively insignificant or do not reflect a change in calculation methodology, recalculations are not performed for previous years' emissions.

In 2006, the emission factor for employee commuting by commuter (intercity) rail was adjusted to reflect updates in the published emission factor for this source. Below is a visual summary of the changes from 2005 to 2006. Travel by commuter rail is one component of the calculations for employee commuting (see Appendix II) and the change in the emission factor does not affect

any other travel modes. While travel by commuter rail constitutes the largest source of WRI emissions from employee commuting in both 2006 and 2007 inventories (see Appendix II), changes to the total inventory are on the order of 2-3%. Therefore, since this update is minor and does not reflect a change in calculation methodology, previous years' emissions were not recalculated.

Table 5: 2006 Emission Factor Adjustments

	2000 - 2005 EMISSION FACTORS	2006 & 2007 EMISSION FACTORS*
	KG CO₂ PER PASSENGER MILE	KG CO₂ PER PASSENGER MILE
US COMMUTER RAIL (E.G., AMTRAK)	0.16	0.31

*See Appendix II for emission factor sources.

Calculation methodology

The formula used to calculate all CO₂ emissions in WRI's inventory is:



Activity data = quantification of an activity of emissions source (e.g., air miles traveled, kWh of electricity used, etc.).

Emissions factor = A factor relating activity data and absolute emissions. The source-specific or published emissions factor is used to convert activity data to an emissions value.

Inventory quality

To ensure inventory quality, one or more WRI staff external to the inventory team, reviews all calculation spreadsheets for accuracy. [Note: As a founding member of The Climate Registry (<http://www.theclimateregistry.org/>), beginning with WRI's CO₂ inventory for 2008 (to be completed in 2009), our emissions data will be verified by a third party following guidelines established by The Climate Registry].

Appendix II: 2006 and 2007 Activity Data, Emission Factors, and Sources

Scope 2 Information

- *Electricity.* WRI occupies one complete floor and, as of 2007, most of another floor in an eight story building (see Box 1, p. 8). This space is not separately metered therefore annual electricity use by WRI must be estimated. The formula used is:

(area of WRI's space ÷ total building area)	X	Total building usage of electricity	=	WRI's estimated electricity use
---	---	-------------------------------------	---	---------------------------------

Table 6: WRI's 2006 Scope 2 emissions (Appropriate unit conversions are applied to achieve data in metric tons of CO₂). In 2006, WRI occupied 38,018 square feet of a building with a total area of 252,782 square feet.

Scope 2 <i>(electricity)</i>		Source of emissions	Activity data	Emission factor	Metric tons of CO ₂
		<i>Purchased electricity</i>	<i>865,322 kWh¹</i>	<i>1.1 lbs of CO₂/kWh</i>	<i>431</i>
Total					431 tCO₂

1. Emission factor source: U.S. EPA E-Grid database, MAAC (owner), 2004 data

Table 7: WRI's 2007 Scope 2 emissions (Appropriate unit conversions are applied to achieve data in metric tons of CO₂). In 2007, WRI occupied 45,400 square feet of a building with a total area of 252,782 square feet.

Scope 2 <i>(electricity)</i>		Source of emissions	Activity data	Emission factor	Metric tons of CO ₂
		<i>Purchased electricity</i>	<i>962,740 kWh</i>	<i>1.1 lbs of CO₂/kWh</i>	<i>479</i>
Total					479 tCO₂

Emission factor source: U.S. EPA E-Grid database, MAAC (owner), 2004 data

Scope 3 Information

Business Air Travel




Two methods are used to obtain activity data for air miles traveled:

- Air miles for travel booked through WRI's travel agency are automatically compiled and are available for download through the travel agency's website.

- Staff are required to complete a travel authorization form for each trip taken. A section has been added to this form for staff to complete with information about miles traveled if the trip is not booked through WRI’s travel agency.




Since emissions per mile are higher for short flights than for long flights, data on air miles traveled is further broken down in to short, medium and long flights as defined in the GHG Protocol mobile combustion tool and a unique emission factor is applied to each.

Table 8: WRI’s 2006 Scope 3 emissions from air travel (Appropriate unit conversions are applied to achieve data in metric tons of CO₂ and totals may not sum exactly due to independent rounding).

Scope 3 (air travel)		Source of emissions	Activity data	Emission factor	Metric tons of CO₂
		Air travel, short flights	62,424 km	0.15 kg of CO ₂ /km	9
		Air travel, medium flights	434,985 km	0.12 kg of CO ₂ /km	52
		Air travel, long flights	4,684,030 km	0.11 kg of CO ₂ /km	515
Total					577 tCO₂

Emission factor source: Short and long flights, UK DEFRA. Medium flights, derived from UK DEFRA.

Table 9: WRI’s 2007 Scope 3 emissions from air travel (Appropriate unit conversions are applied to achieve data in metric tons of CO₂ and totals may not sum exactly due to independent rounding).

Scope 3 (air travel)		Source of emissions	Activity data	Emission factor	Metric tons of CO₂
		Air travel, short flights	67,947 km	0.15 kg of CO ₂ /km	10
		Air travel, medium flights	586,313 km	0.12 kg of CO ₂ /km	70
		Air travel, long flights	5,608,093 km	0.11 kg of CO ₂ /km	617
Total					697 tCO₂






Emission factor source: Short and long flights, UK DEFRA. Medium flights, derived from UK DEFRA.

Employee commuting

WRI surveys its staff once each year to obtain information about average commuting habits. The information gathered is used to extrapolate average annual commuter miles traveled by all

staff via various modes of transport. For a sample copy of WRI's commuter survey, please contact Tom Damassa at tdamassa@wri.org.






Table 10: WRI's 2006 Scope 3 emissions from employee commuting (Appropriate unit conversions are applied to achieve data in metric tons of CO₂).

Scope 3 (employee commuting)		Source of emissions	Activity data	Emission factor	Metric tons of CO₂
		<i>Bus</i>	<i>23,027 miles</i>	<i>0.30 kg of CO₂/mile</i>	<i>7</i>
		<i>Metro</i>	<i>230,598 miles</i>	<i>0.17 kg of CO₂/mile</i>	<i>39</i>
		<i>Commuter rail</i>	<i>16,684 miles</i>	<i>0.31 kg of CO₂/mile</i>	<i>50</i>
		<i>Car</i>	<i>2,414 gallons of gas</i>	<i>8.87kg of CO₂/gallon</i>	<i>21</i>
		<i>Walk/bike</i>	<i>34,393 miles</i>	<i>0</i>	<i>0</i>
Total				117 tCO₂	

Emission factor sources:

- **Car travel:** U.S. Energy Information Administration (EIA): Voluntary Reporting of Greenhouse Gases Program, Emission Coefficients.
- **Metro travel:** Transportation Energy Data Book, Edition 24, 2004, Tables 2.11, A15; U.S. Energy Information Administration (EIA): Updated State-level Greenhouse Gas Emission Coefficients for Electricity Generation 1998-2000, April 2002.
- **Commuter rail:** Transportation Energy Data Book, Edition 22, 2002, Tables 2.11, A16; U.S. Energy Information Administration (EIA): Voluntary Reporting of Greenhouse Gases Program, Emission Coefficients; U.S. Energy Information Administration (EIA): Updated State-level Greenhouse Gas Emission Coefficients for Electricity Generation 1998-2000, April 2002
- **Bus travel:** Bureau of Transportation, National Transportation Statistics, 2000.

Table 11: WRI's 2007 Scope 3 emissions from employee commuting (Appropriate unit conversions are applied to achieve data in metric tons of CO₂).

		Source of emissions	Activity data	Emission factor	Metric tons of CO ₂
Scope 3 (employee commuting)		Bus	23,011 miles	0.30 kg of CO ₂ /mile	7
		Metro	225,201 miles	0.17 kg of CO ₂ /mile	38
		Commuter rail	150,423 miles	0.31 kg of CO ₂ /mile	47
		Car	2,254 gallons of gas	8.87 kg of CO ₂ /gallon	20
		Walk/bike	39,192 miles	0	0
	Total				

Emission factor sources:

- **Car travel:** U.S. Energy Information Administration (EIA): Voluntary Reporting of Greenhouse Gases Program, Emission Coefficients.
- **Metro travel:** Transportation Energy Data Book, Edition 24, 2004, Tables 2.11, A15; U.S. Energy Information Administration (EIA): Updated State-level Greenhouse Gas Emission Coefficients for Electricity Generation 1998-2000, April 2002.
- **Commuter rail:** Transportation Energy Data Book, Edition 22, 2002, Tables 2.11, A16; U.S. Energy Information Administration (EIA): Voluntary Reporting of Greenhouse Gases Program, Emission Coefficients; U.S. Energy Information Administration (EIA): Updated State-level Greenhouse Gas Emission Coefficients for Electricity Generation 1998-2000, April 2002
- **Bus travel:** Bureau of Transportation, National Transportation Statistics, 2000.




Paper Use

Emissions from paper result from the manufacturing and disposal processes, not the use of the paper itself. WRI reports these emissions separately. Activity data are collected in the following way:

- **Office paper:** WRI's facilities director supplies information, obtained from vendor invoices, about annual use of office paper.
- **Checks:** WRI's staff accountant provides information about the number of checks written each year.




- Publications paper: WRI staff responsible for tracking CO₂ emissions collect information on each publication (includes reports, brochures, invitations, postcards, etc.) produced by WRI each year along with the quantity included in the print run and the number of partners associated with the publication. This information is used to calculate the amount of paper used.

Table 12: WRI's 2006 emissions from paper (Appropriate unit conversions are applied to achieve data in metric tons of CO₂).

Scope 3 (paper use)		Source of emissions	Activity data	Emission factor	Metric tons of CO₂
		<i>Office paper</i>	<i>9,593 lbs</i>	<i>9,863 lbs of CO₂/ton</i>	<i>20</i>
		<i>Checks</i>	<i>73 lbs</i>	<i>10,500 lbs of CO₂/ton</i>	<i>0</i>
		<i>Publications</i>	<i>10,009 lbs</i>	<i>10,249 lbs of CO₂/ton</i>	<i>21</i>
Total				41 tCO₂	

Emission factor source: Environmental Defense's Paper Task Force, 1995, 2002.

Table 13: WRI's 2007 emissions from paper use (Appropriate unit conversions are applied to achieve data in metric tons of CO₂).

Scope 3 (paper use)		Source of emissions	Activity data	Emission factor	Metric tons of CO₂
		<i>Office paper</i>	<i>10,095 lbs</i>	<i>9,863 lbs of CO₂/ton</i>	<i>21</i>
		<i>Checks</i>	<i>70 lbs</i>	<i>10,500 lbs of CO₂/ton</i>	<i>0</i>
		<i>Publications</i>	<i>27,178 lbs</i>	<i>10,249 lbs of CO₂/ton</i>	<i>57</i>
Total*				78 tCO₂	

Emission factor source: Environmental Defense's Paper Task Force, 1995, 2002.