



WORLD
RESOURCES
INSTITUTE

2010 Organizational Greenhouse Gas Inventory

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WRI.ORG

ABOUT WRI

The World Resources Institute (WRI) is a global environmental and development think tank that goes beyond research to create practical ways to protect the Earth and improve people's lives. We work with governments, companies, and civil society to build practical solutions to urgent environmental challenges. WRI's transformative ideas protect the Earth and promote development because sustainability is essential to meeting human needs and fulfilling human aspirations for the future.



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SUMMARY

This report provides a comprehensive description of the World Resources Institute's (WRI) 2010 greenhouse gas (GHG) inventory. The 2010 inventory, for the first time, includes a complete set of scope 3 emissions, following the recently published *GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard*. WRI's 2009 GHG inventory is included as an appendix in this report, and previous inventory reports can be found at <http://www.wri.org/project/wri-sustainability-initiative>.

WRI's 2010 inventory revealed emissions of 4,309 metric tons of carbon dioxide equivalent (mt CO₂e). This is 2.3 times the 2009 inventory of 1,326 mt CO₂e. This increase is mainly attributed to the inclusion of scope 3 accounting. Previous inventories included emissions from select scope 3 categories, namely business travel and employee commuting. However, the 2010 inventory has been expanded to include all relevant scope 3 categories including purchased goods and services, waste generated in operations, fuel- and other energy-related activities, and end-of-life treatment of sold products.¹ Emissions from these four additional categories account for 67 percent of WRI's 2010 inventory.

As this is the first year that WRI is accounting for its full scope 3 inventory, it should be noted that these figures are only estimates and will be continuously improved upon in subsequent inventories. These improvements will follow advancements in data availability, collection, and calculation methodologies.

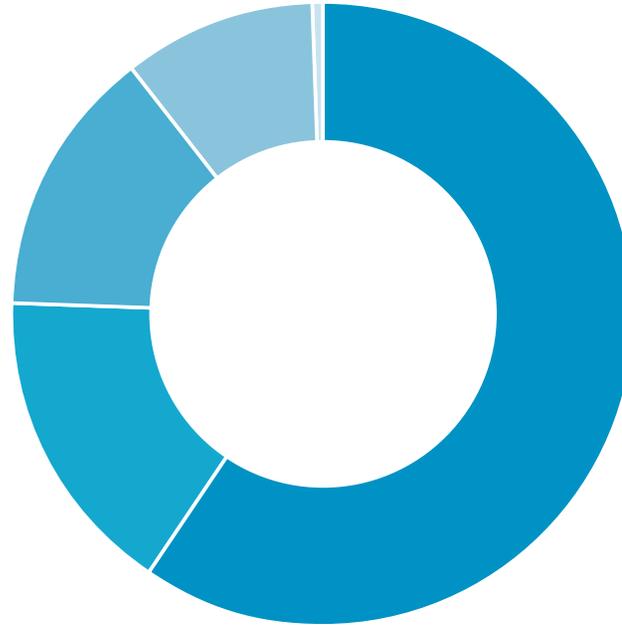
The 2010 inventory,
for the first time,
includes a complete
set of scope 3
emissions.

This report also introduces WRI's new absolute greenhouse gas reduction targets. As the 2010 inventory is WRI's most comprehensive thus far, 2010 will be used as the base year for our new 2020 emissions reduction targets²:

- 50% reduction in scope 2 emissions from purchased electricity;
- 20% reduction in scope 3 emissions from business travel; and
- 20% reduction in all other scope 3 categories (specifically, purchased goods and services, employee commuting, waste generated in operations, fuel- and other energy-related activities, end-of-life treatment of sold products).

Finally this report describes examples of WRI's other sustainability initiative activities, including our first nitrogen footprint assessment. For more information on WRI's GHG inventories, reduction targets, or the sustainability initiative please contact Laura Draucker (ldraucker@wri.org).

WRI's 2010 Baseline GHG Inventory



PURCHASED GOODS
AND SERVICES (60%)
scope 3

BUSINESS TRAVEL (16%)
scope 3

PURCHASED ELECTRICITY (14%)
scope 2

OTHER INDIRECT EMISSIONS (10%)
scope 3

DIRECT EMISSIONS (0%)
scope 1

INTRODUCTION

To mitigate climate change impacts, global emissions must be cut by as much as 85 percent below 2000 levels by 2050.

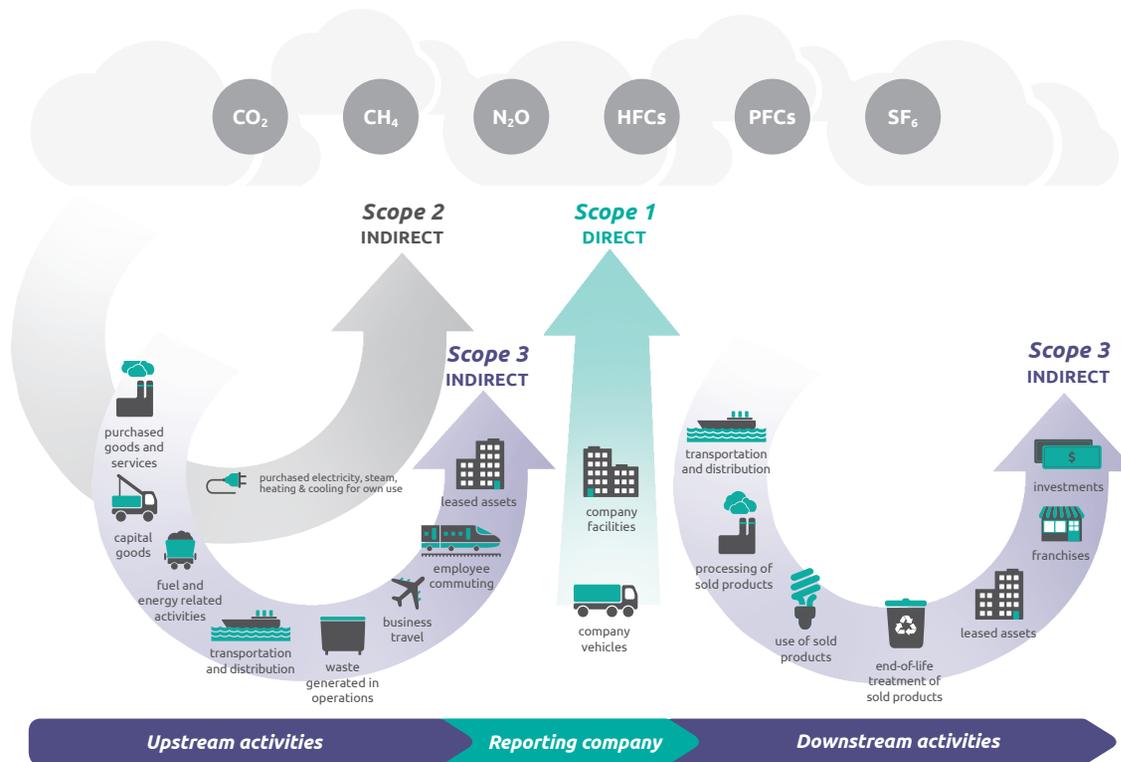
The release of anthropogenic greenhouse gas (GHG) emissions around the world is growing, contributing to a changing climate and catalyzing new and unpredictable risks to our ecosystems.³ To mitigate climate change impacts, global emissions must be cut by as much as 85 percent below 2000 levels by 2050.⁴ As a member of the global community with a mission to move society to live in ways that protect Earth's environment, WRI has a responsibility to set and achieve emissions reductions on our own GHG inventory.

To demonstrate our commitment to combating climate change, WRI has completed a GHG inventory annually since 1999, and achieved net zero emissions through the purchase of offsets from 2000-2009. Offsets are credits (in the form of emissions trading or funding of emissions reductions) that can be purchased in the quantity of inventory emissions.⁵

In 2010, WRI's leadership team unanimously agreed that purchasing offsets without taking action at home to reduce our emissions was not credible, nor was it demonstrating leadership in climate protection efforts. As a result, WRI has stopped purchasing offsets and instead committed ourselves to achieving absolute⁶ reductions in emissions from our own activities. This decision, coupled with the desire of WRI staff to reinvigorate our culture of "learning and leading by doing," led WRI's management to recommit to its internal sustainability initiative in early 2011.⁷

WRI's first goal was to complete a scope 3 inventory utilizing the GHG Protocol's⁸ recently launched Corporate Value Chain (Scope 3) Accounting and Reporting Standard. This standard provides organizations with first-of-their-kind requirements and guidance to calculate emissions over their full value chain. Figure 1 shows the 15 scope 3 categories and the relationship between scopes 1, 2, and 3.

Fig. 1-1 | Overview of the GHG Protocol Scopes and Emissions Across the Value Chain



More information on scope 3 including definitions of each category is available at <http://www.ghgprotocol.org/standards/scope-3-standard>. Since 2010 was the first year in which WRI assessed the complete emissions across its value chain, 2010 will serve as the base year for WRI's new reduction targets going forward.

This 2010 GHG inventory report is organized into three sections:

- Results: WRI's scope 1, 2, and 3 emissions
- Inventory interpretation: analysis of the results
- Next steps: strategies to achieve the targets set for GHG reductions and other sustainability initiative activities

This report also contains an appendix with more detailed descriptions of the calculations for the 2010 and 2009 inventories.

Notes: From the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard. Upstream activities are purchased by the company, while downstream activities are sold by the company.

WRI'S 2010 GREENHOUSE GAS INVENTORY RESULTS

This presentation of our inventory report follows the scope 3 template provided by the GHG Protocol, which also includes information pertinent to our scope 1 and scope 2 inventory. For more information on the scope 3 standard and to download a copy of the standard and reporting template, please visit <http://www.ghgprotocol.org/standards/scope-3-standard>.

Part 1 | **Descriptive information**

DESCRIPTIVE INFORMATION	COMPANY RESPONSE
Organization name	World Resources Institute
Description of the organization	The World Resources Institute (WRI) is a global environmental and development think tank that goes beyond research to create practical ways to protect the Earth and improve people's lives.
Chosen consolidation approach (equity share, operational control, or financial control)	Operational control
Description of the businesses and operations included in the organizational boundary	WRI's scope 1 and scope 2 inventory accounts for emissions from WRI's Washington, D.C., and Beijing, China, offices. Some WRI projects are run out of other offices (e.g., India, Indonesia, Mexico). These offices are currently considered outside our operational control and their emissions are accounted for in scope 3.
The reporting period covered	2010 (see Section 2.2 for additional information).

Part 1 | **Descriptive information (cont.)**

DESCRIPTIVE INFORMATION	COMPANY RESPONSE
A list of activities included in the report	Scope 1 and scope 2, purchased goods and services, fuel- and energy-related activities, waste generated in operations (D.C. office only), business travel, employee commuting (D.C. office only), end-of-life treatment of sold products.
A list of activities excluded from the report with justification for their exclusion	<p>Scope 1, employee commuting, and waste generated in operations for the Beijing office: These categories were estimated to account for less than 1 percent of the total inventory and were therefore excluded given the challenges and costs associated with data collection.</p> <p>Business travel that was not booked through WRI's travel agency/online system: In 2010, WRI moved to a centralized online system for booking travel. With this shift, we were able to more accurately capture staff business travel. However, any travel that was not booked through the system or directly with the travel agency was not captured in the inventory. While this exclusion was assumed to be small, we are currently working to quantify this. Based on this quantification we may need to adjust the 2010 base year inventory in subsequent inventory reports (see base year recalculation policy below).</p> <p>Emissions associated with purchasing goods and services that totaled less than \$10,000 per fiscal year: The sum of these payments is 4 percent of the total amount of money WRI spent in 2010. It would be resource-intensive to determine which of the 500 individual payments should be included in scope 3 since this sum includes many payments outside the boundary of scope 3 (e.g., staff bonuses) or already captured in another scope 3 category (e.g., air travel reimbursement). Therefore, these emissions were excluded.</p> <p>Emissions associated with purchases made on the corporate credit card account (purchased goods and services): The corporate credit card is used by staff to pay for many things such as business travel, conference registration, office supplies, food, etc. Some of these purchases are included under individual vendors in purchased goods and services or business travel, while others may not be accounted for. However, to avoid double counting we excluded these purchases.</p> <p>Upstream cradle-to-gate emissions associated with diesel fuel (scope 3, category 3): The total combustion emissions from diesel fuel in scope 1 was 0.8 carbon dioxide equivalent (CO₂e). Combustion of diesel fuel accounts for approximately 80% of the total life cycle GHG emissions,⁹ and therefore the upstream life cycle emissions associated with oil (e.g., extraction, refining) were assumed negligible.</p>
Once a base year has been established, the year chosen as base year and rationale for choosing the base year	A 2010 base year was selected. See section 2.1 for rationale.
Once a base year has been established, emissions in the base year	See Part 2
Once a base year has been established, the chosen base year emissions recalculation policy and context for any significant emissions changes that trigger base year emissions recalculations	WRI will recalculate its base year emissions if there are significant changes to our GHG inventory following the guidance given in the Corporate and Scope 3 Standards. Significant changes can be caused by structural changes in the reporting organization, changes in calculations or improvements in data accuracy, or changes in the categories or activities included in the inventory. We define significant as a change or series of changes that impact our base inventory by more than 5%.

Part 2 | Greenhouse Gas Emissions Data

SCOPES AND CATEGORIES	METRIC TONS (mt) CARBON DIOXIDE EQUIVALENTS (CO ₂ e)
Scope 1: Direct emissions from owned/controlled operations	16
Scope 2: Indirect emissions from the use of purchased electricity, steam, heating, and cooling	600
Upstream (purchased) scope 3 emissions	
Category 1: Purchased goods and services	2,559
Category 2: Capital goods	Accounted for in category 1 (purchased goods and services)
Category 3: Fuel- and energy-related activities (not included in scope 1 or scope 2)	296
Category 4: Upstream transportation and distribution	Accounted for in category 1 (purchased goods and services)
Category 5: Waste generated in operations	<1
Category 6: Business travel	700
Category 7: Employee commuting	109
Category 8: Upstream leased assets	Accounted for in scope 2 and category 1 (purchased goods and services) ¹⁰

SCOPES AND CATEGORIES	METRIC TONS (mt) CARBON DIOXIDE EQUIVALENTS (CO ₂ e)
Downstream (sold) scope 3 emissions	
Category 9: Downstream transportation and distribution	N/A
Category 10: Processing of sold products	N/A
Category 11: Use of sold products	N/A
Category 12: End-of-life treatment of sold products (publications)	28
Category 13: Downstream leased assets	N/A
Category 14: Franchises	N/A
Category 15: Investments	N/A (Improving the sustainability of our investments is being addressed independent from our GHG inventory)

Part 2 | **Greenhouse Gas Emissions Data (continued)**

GREENHOUSE GAS EMISSIONS ¹¹	CARBON DIOXIDE (CO ₂)		METHANE (CH ₄)		NITROUS OXIDE (N ₂ O)		HYDROFLUORO-CARBONS (HFCs)		PERFLUORO-CARBONS (PFCs)		SULFUR HEXAFLUORIDE (SF ₆)	
	mt CO ₂	mt CO ₂ e	mt CH ₄	mt CO ₂ e	mt N ₂ O	mt CO ₂ e	mt HFC ¹²	mt CO ₂ e	mt PFC	mt CO ₂ e	mt SF ₆	mt CO ₂ e
Scope 1	0.8	0.8	N/A	N/A	N/A	N/A	0.0000051 (HFC-134a) 0.009 (R-410 A)	15.5	N/A	N/A	N/A	N/A
Scope 2	596.6	596.6	0.016	0.4	0.009	3	N/A	N/A	N/A	N/A	N/A	N/A

WRI's 2010 inventory, including a full scope 3 assessment, is the most comprehensive to date.

Part 3 | **Biogenic CO₂ Emissions Data (If Applicable)**

Biomass, such as trees, plants, or food crops emit biogenic CO₂ when they are combusted, used in biological processes (e.g., fermentation), or allowed to decompose at the end of their life. WRI does not utilize biogenic fuels (e.g., biodiesel) or materials in our operations, so no biogenic emissions are applicable to scope 1. Scope 3, category 5 (waste generated in operations) does include food waste that is subsequently treated, and the treatment of that waste does result in biogenic CO₂ emissions. However, the data used to estimate category 5 does not disaggregate between biogenic and non-biogenic emissions. Therefore, we have included biogenic emissions associated with waste treatment as part of the scope 3 emissions listed in part 2. For more information on the data used for category 5, please refer to Appendix A.

Part 4 | **Description of Methodologies and Data Used**

This information is detailed in Appendix A.

Choice of base year

When WRI began conducting inventories in 1999, it selected 1990 as its base year to mirror the Kyoto Protocol. However, the GHG Protocol Corporate Standard (published in 2001) recommends that the base year should be one in which comprehensive emissions data are available. We then decided to set the base year as 2000, which contained more complete and reliable data. In 2008 the base year was changed again, this time to 2003, because this was the first year activity data relating to short-, medium-, and long-haul flight distances were available.

WRI's 2010 inventory, including a full scope 3 assessment, is the most comprehensive to date. A single, comprehensive base year is preferred, but in situations where scope 1 and scope 2 reduction targets have already been established the GHG Protocol Scope 3 Standard recommends that a separate base year be established for scope 3.¹³ However, because we had already decided as part of the sustainability initiative to establish new targets, a single base year of 2010 was chosen. Moving forward, each year we will assess whether the 2010 base year needs to be recalculated based on the recalculation policy described in Part 1 above.

Inventory limitations

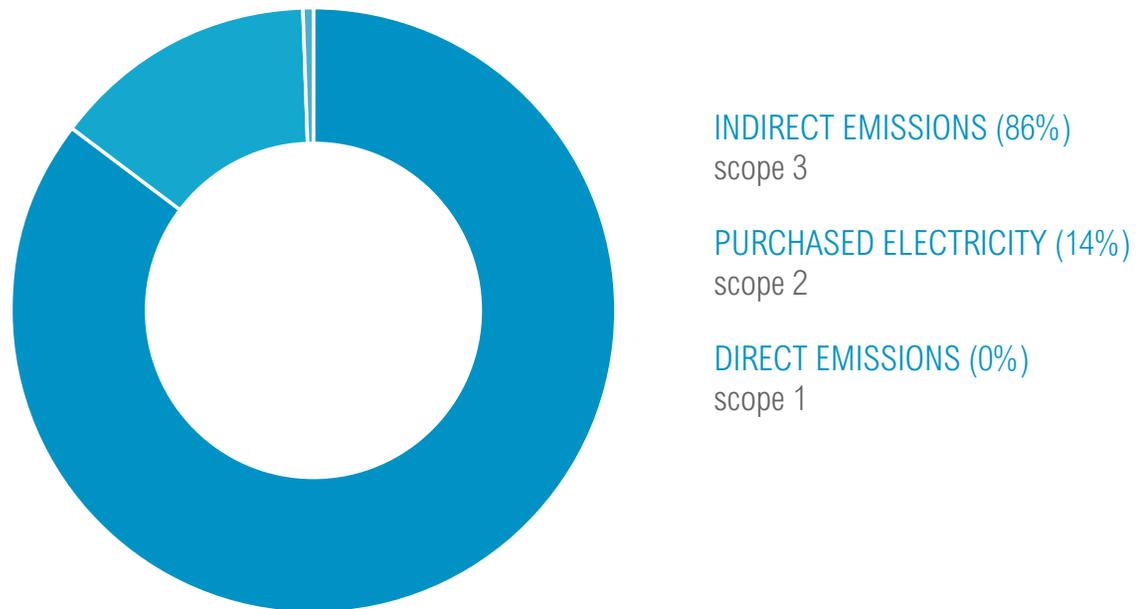
Appendix A includes the description of methodologies and data used to calculate scope 1, scope 2, and scope 3 emissions. Scope 1, scope 2, business travel, and employee commuting are all calculated using activity data specific to WRI's operations; however, other scope 3 categories are more difficult to calculate and rely on secondary and estimated data. For example, purchased goods and services (scope 3: category 1) was estimated using financial activity data from WRI and environmentally extended input-output (EEIO) tables based on average financial data and GHG emissions for each sector. Although this approach is necessary to estimate an initial impact, over time we hope to improve our scope 3 calculations and begin collecting primary data from our suppliers and partners.

All calculations except scope 3: category 1 (purchased goods and services) are on a calendar year basis (January 1, 2010, to December 31, 2010). Because financial data are provided on the fiscal year basis (October 1, 2009, to September 30, 2010), category 1 is not on a consistent time basis with the rest of the inventory. As more specific data are collected for category 1, this inconsistency will diminish, but there will likely always be financial data used to fill data gaps. Calendar year and fiscal year data both cover 12 months and therefore all yearly emissions are accounted for in either approach. Therefore we see this as a justified limitation and should not result in over- or under-counted emissions.

INVENTORY INTERPRETATION

Figure 3-1 shows that 86 percent of WRI's total 2010 inventory is classified as scope 3, with 14 percent scope 2, and less than 1 percent scope 1. While it was not surprising that scope 1 is negligible in a service-oriented organization that does not manufacture products or own buildings or vehicles, we were surprised that scope 3 was so much larger than scope 2. Before completing a full scope 3 inventory, purchased electricity (scope 2) accounted for approximately 50 percent of the total inventory relative to the scope 3 categories of business travel (~40 percent) and employee commuting (~10 percent).

Fig. 3-1 | 2010 GHG Emissions Inventory



While it was not surprising that scope 1 is negligible in a service-oriented organization, we were surprised that scope 3 was so much larger than scope 2.

Figure 3-2 shows a breakdown of WRI's scope 3 inventory, with purchased goods and services contributing the largest portion (69 percent), followed by business travel (19 percent), fuel- and energy-related activities (8 percent), employee commuting (3 percent) and end-of-life treatment of our publications (1 percent). Waste treated in operations is negligible.

Fig. 3-2 | 2010 Scope 3 GHG Emissions Inventory

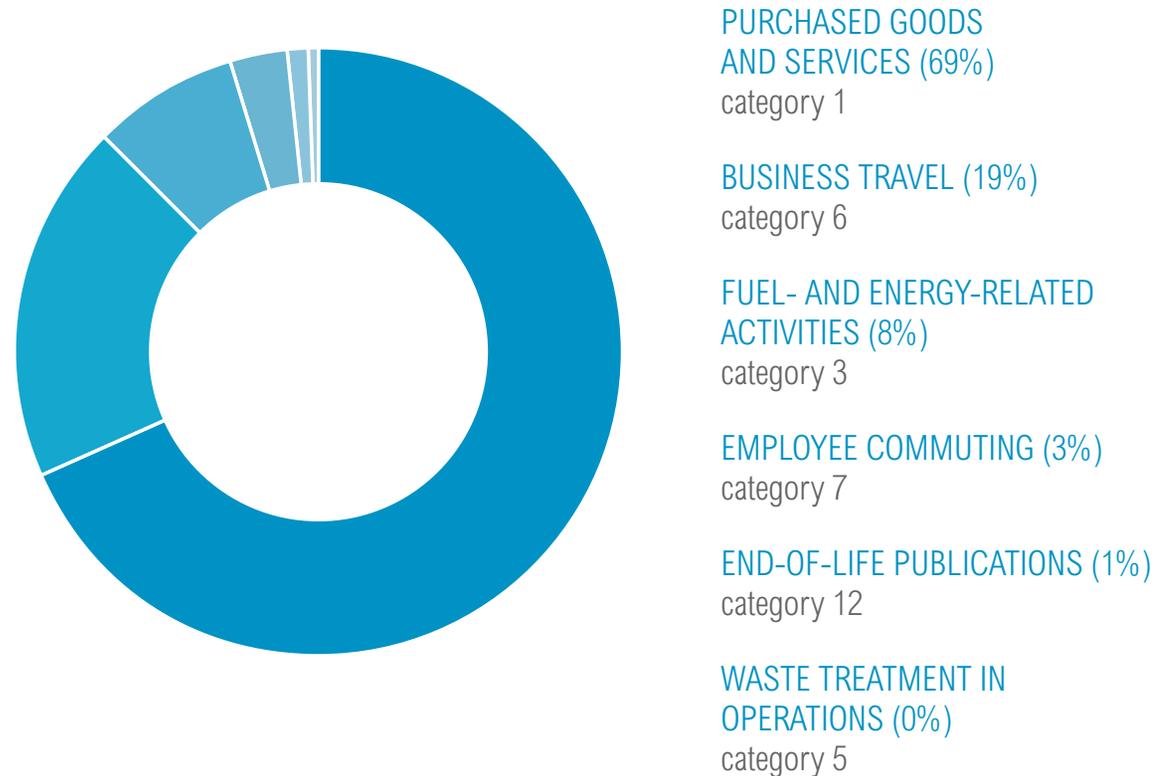
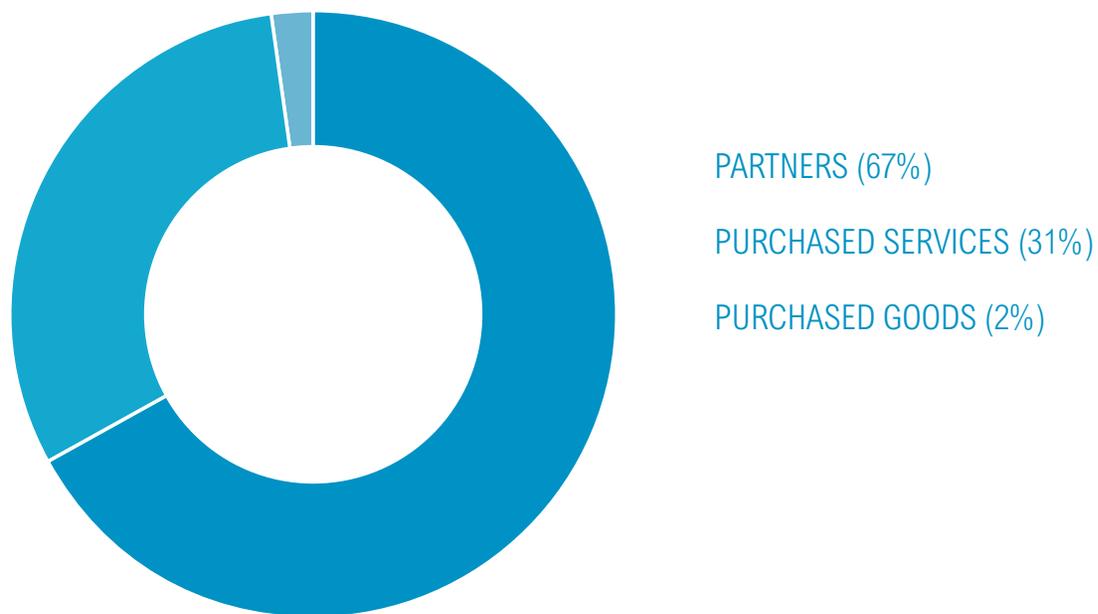


Fig. 3-3 | 2010 Purchased Goods and Services

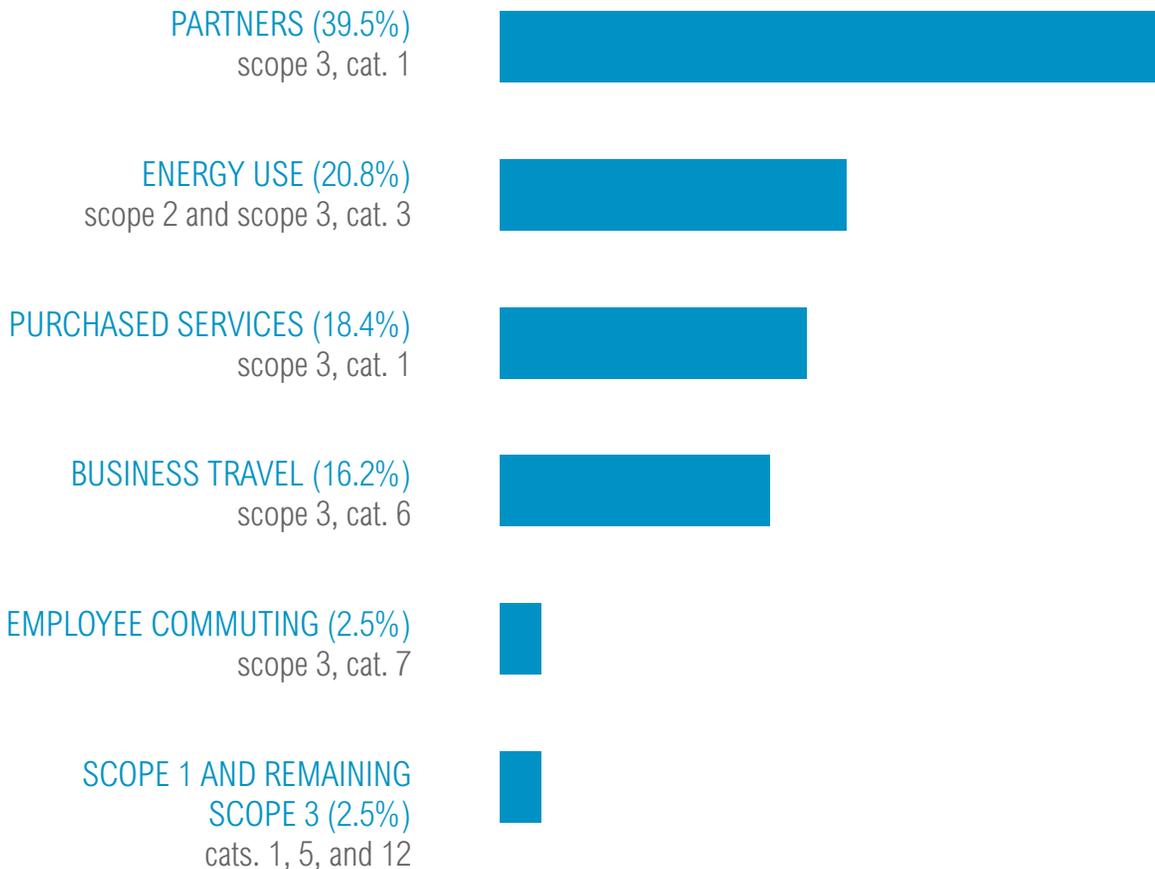


Purchased goods and services (scope 3, category 1), can be further classified into three sub-categories as shown in Figure 3-3: purchased goods (food, office supplies), purchased services (consulting, design, printing), and services purchased from partners. Partners include other NGOs and organizations that we do joint project work with or provide funding to (sometimes referred to as sub-grantees). Partners also include other WRI-affiliated offices that we don't consider under our operational control, such as our EMBARQ network centers in Mexico, Turkey, Brazil, India, and Peru. In total, partners contribute 67 percent to category 1, followed by purchased services at 31 percent. Purchased goods only contribute 2 percent; however, this sub-category is under reported because some office supplies are purchased on the corporate credit card and those charges are currently not included in the inventory results (see section 2.2). We estimate that even with the inclusion of these purchases this sub-category would still be smaller than partners and suppliers.¹⁴

It is important to note that the calculation methodology used for purchased goods and services, as outlined in more detail in Appendix A, does not use emissions factors specific to any one partner or supplier but sector averages. Although there is variation in emissions factors for each given sector, partners or suppliers falling under the same sector are applied the same emissions factor, making amount spent or given to the partner the variable factor. Using secondary data based on financial information and average emissions factors do not allow us to distinguish partners and suppliers based on their own emissions profile and reduction practices. This is why collecting specific, primary data from our partners and suppliers is a key next step to improving our understanding of our supply chain.

Figure 3-4 shows all the scopes and activities included in WRI's 2010 GHG inventory, ranked in order of highest to lowest contribution to our total metric tons CO₂e. These results help us determine where to focus our reduction efforts. Purchased electricity (scope 2) and fuel- and energy-related activities (scope 3, category 3) are grouped together in Figure 3-4 as both will be affected by energy use reduction strategies. Direct emissions (scope 1), waste treatment in operations (scope 3: category 5), end-of-life treatment of publications (scope 3: category 12), and purchased goods (scope 3: category 1) are also grouped together based on their low overall contribution (2.5% of the total GHG inventory).

Fig. 3-4 | Scopes and Activities That Contribute to WRI's 2010 Inventory



WRI'S GHG REDUCTION TARGETS AND OTHER GOALS

To do our part to reduce global GHG emissions, WRI has set three new absolute reduction targets focused around our largest GHG generating activities:

- 50% reduction in scope 2 emissions from purchased electricity;
- 20% reduction in scope 3 emissions from business travel; and
- 20% reduction in scope 3 emissions from all other categories, focusing on purchased goods and services.

Purchased electricity, business travel, and purchased goods and services make up 95 percent of our 2010 GHG inventory. We aim to achieve these targets by 2020 relative to a 2010 base year. As each target focus is different, our approach to achieve each target will also vary.

To achieve a 50 percent reduction in emissions from purchased electricity, we will make changes in our office space and work more efficiently. This includes modeling potential energy saving projects that can be implemented in our building and piloting more flexible work arrangements that allow for less office space per person.¹⁵ Our landlord purchases renewable energy credits (RECs) that cover the full energy use of the

building; however, we do not currently subtract these from our scope 2 emissions. The GHG Protocol is drafting a guidance document that specifically outlines how to account for renewable energy. Once published, we will reevaluate whether our RECs can be subtracted from our GHG inventory and if so, we will update the reduction target to focus on energy consumption.

To achieve a 20 percent reduction in business travel, we plan to increase the use of telepresence when it's available and travel more efficiently when it's not. Telepresence includes video conferencing and other virtual platforms that allow participation without travel. WRI currently does not have a video

conference system sophisticated enough to support wide adoption of telepresence in lieu of business travel. Therefore we are working to update our systems so this can become a viable business travel alternative.

However, we recognize that not all meetings and conferences can be attended virtually. For unavoidable travel, we plan to implement policies and best practices that help us be as efficient as possible. For example, we plan to integrate features into our travel booking system that show users the least GHG intensive way to get from point A to point B.

Achieving a 20 percent reduction in scope 3, meanwhile, will require engagement and cooperation from our partners and suppliers. We first need to identify the ones with whom we will pilot an engagement strategy. This group will likely be composed of those partners and providers that we have good relationships with and that contribute significantly to our inventory. During engagement, the first step will be to collect primary data related to each participant's corporate inventory.¹⁶ This will help us update our inventory results with more specific data. Then we will work with them to set and achieve reduction targets.

Although this will take time and effort, reductions achieved by our partners and

suppliers will have a positive impact on our scope 3 inventory and help us achieve our reduction target. Additionally, we hope that our partners and suppliers see the benefit of measuring their GHG inventory, setting their own scope 3 reduction targets, and engaging with their own partners and suppliers. This trickledown effect can have a large positive impact on global GHG emissions.

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Once we achieve these reductions, we will set new, aggressive targets and work toward the ultimate goal of an 85 percent reduction below 2000 levels by 2050.

.....

Each year, we will update our inventory report and highlight any progress we have made in reaching our goals. Additionally, we will document our shortcomings and discuss how we plan to improve our efforts. Beyond the yearly update, we intend to launch a new project website for the sustainability initiative that can provide regular updates on our progress and allow space for others

embarking on similar reduction strategies to share successes and learning experiences. Once we achieve these reductions, we will set new, aggressive targets and work toward the ultimate goal of an 85 percent reduction below 2000 levels by 2050.

In addition to reporting on our GHG inventory and reduction target process, during the coming years we plan to expand our inventory report into a corporate sustainability report covering all projects under the sustainability initiative. For example, in 2010 we also completed our first nitrogen footprint using a nitrogen footprint calculator tool developed by WRI for small businesses. This tool calculated the nitrogen loadings to the Chesapeake Bay watershed by our Washington, D.C. office from business travel, energy use, commuting, sewage, and stormwater runoff. For 2010, our nitrogen footprint was 4,605 lbs., which is equivalent to approximately 400 tons of manure. Although we do not currently have plans to set nitrogen-specific reduction targets, achieving our GHG reduction targets around business travel and energy use will have nitrogen reduction co-benefits. We plan to continue monitoring our nitrogen footprint each year, and to include this as well as other sustainability activities into future reports.

CONCLUSIONS

WRI takes its sustainability commitments seriously. From 2000-2009, we calculated our GHG emissions inventory and achieved our target of net zero emissions by purchasing offsets. However, the growing release of anthropogenic GHG emissions and the resulting changes to our climate and ecosystems will not be solved without absolute reductions. With the publication of our full value chain 2010 GHG emissions inventory and the setting of absolute reduction targets, we are reaffirming our commitment to “walking the talk”.

However, this report is just the beginning. Now that we know our largest emissions sources, we can begin making the tough choices required to meet our targets. Moving forward, each annual inventory report will highlight what strategies we have implemented to achieve reductions. We will continue to share our experiences with NGOs and other like-minded institutions as part of the Sustainable Manager’s Roundtable, a knowledge sharing group started by WRI in 2011. Additionally, we will publish blogs and other periodic updates to let everyone know how we are “learning by leading and doing”.

WRI is convinced that we can continue to reduce our environmental impact while advancing our mission to catalyze broader positive changes in the world. Our overarching goal is that the success of WRI’s sustainability initiative will motivate others to do the same.

We are reaffirming our commitment to “walking the talk” with the publication of our full value chain 2010 GHG emissions inventory and the setting of absolute reduction targets.

ACRONYMS

CMU EIO	Carnegie-Mellon University Economic Input-Output
CH ₄	Methane
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DEFRA	Department for Environment, Food and Rural Affairs
EEIO	Environmentally Extended Input-Output
eGRID	Emissions and Generation Resource Integrated Database
EPA	Environmental Protection Agency
ft	Feet
GHG	Greenhouse Gas
GRP	General Reporting Protocol
GWP	Global Warming Potential
HFC	Hydrofluorocarbons
HVAC	Heating, Ventilation, Air Conditioning
IPCC	Intergovernmental Panel on Climate Change
kg	Kilogram
KWh	Kilowatt hour
lbs	Pounds
LCA	Life Cycle Assessment
mt	Metric Ton
MWh	Megawatt hour
N ₂ O	Nitrous Oxide
NGO	Non-Governmental Organization
oz	Ounce
PFC	Perfluorocarbons
RAC	Refrigeration and Air Conditioning
RECs	Renewable Energy Credit
SF ₆	Sulfur Hexafluoride
WBCSD	World Business Council for Sustainable Development
WRI	World Resources Institute

ENDNOTES

1. While WRI does not sell any products, we do publish reports and other publications that we print and distribute. The end-of-life treatment of these is included in the “sold products” category for completeness.
2. WRI’s scope 1 inventory was 16 mt CO₂e in 2010 which is less than 1 percent of the total inventory. Therefore, we have not set a reduction target around our scope 1 emissions. We do not expect any significant increases in scope 1, but we will continue to calculate these emissions annually. If increases do occur, we will reassess whether a scope 1 reduction target is needed.
3. IPCC, Climate Change 2007, Fourth Assessment Report; IPCC, 2012: Summary for Policymakers in Managing the Risks of Climate Change Adaptation.
4. IPCC, Summary for Policymakers in Climate Change 2007: Mitigation, Fourth Assessment Report.
5. See the GHG Protocol’s “A Corporate Accounting and Reporting Standard” and “The GHG Protocol for Project Accounting” for more information on offsets.
6. Absolute reductions are total GHG emissions reduced and are not normalized to institute growth.
7. The objective of the Sustainability Initiative is to enhance WRI’s ability to achieve results by putting our mission and goals into practice. This effort is led by a sustainability manager, and the resources to support the work are collected through a carbon tax on business travel and energy use. This report highlights one activity under this initiative: achieving absolute GHG reductions from our own activities.
8. The GHG Protocol is a joint partnership between WRI and the World Business Council for Sustainable Development (WBCSD). More information on the GHG Protocol as well as free downloads of the standards and tools are available at www.ghgprotocol.org.
9. National Energy Technology Laboratory (2008), Development of Baseline Data and Analysis of Life Cycle Greenhouse Gas Emissions of Petroleum-Based Fuels, <http://www.netl.doe.gov/energy-analyses/pubs/NETL%20LCA%20Petroleum-based%20Fuels%20Nov%202008.pdf>.
10. WRI leases its office space, copiers, and printers. Electricity use is included in scope 2, and any maintenance of the copiers and printers is included in category 1.
11. WRI’s 2010 inventory uses GWP factors from the 4th assessment report, published by the Intergovernmental Panel on Climate Change (IPCC) in 2007. WRI’s previous inventories used GWP factors from the IPCC second assessment report (SAR).
12. HFC – 134a and R-410 A are types of refrigerants.
13. See chapter 9 in the GHG Protocol Scope 3 Standard for more details on choosing a base year.
14. We did a sensitivity analysis by using the maximum assumption that all purchases on the corporate credit card were purchased goods. In this situation, purchased goods total 18% of category 1 instead of 2%. Although this is a substantial increase, it is still less than partners or suppliers and therefore we can safely assume that purchased goods have the smallest impact on category 1.
15. Rebound effects will be considered when determining emissions savings from flexible work arrangements. Rebound effects occur when staff working at home run appliances or HVAC systems that otherwise would be off during the day.
16. Over time, we may want to collect product-level data from partners and suppliers; however, corporate inventory data are often easier to calculate and more readily available and therefore are sufficient to help build the engagement program.
17. Calculating HFC and PFC emissions from the manufacturing, installation, operation, and disposal of refrigeration and air conditioning equipment. Guide to calculation worksheets (Version 1.0, January 2005), GHGP online tools.
18. Economic Input-Output Models-Carnegie Mellon (<http://www.eiolca.net/Method/LCAApproaches.html>)
19. This includes any travel booked and paid for by WRI for a partner or outside individual to attend a meeting or conference.

APPENDIX A: CALCULATION METHODOLOGY FOR WRI'S 2010 INVENTORY

The following general formula was utilized to calculate emissions in WRI's inventory:

Activity Data × *Emissions Factor* × *Global Warming Potential (GWP)* = *CO₂ equivalent (CO₂e) Emissions*

Activity data | A quantitative measure of a level of activity that results in GHG emissions.

Emissions factors | A factor that converts activity data into GHG emissions data (e.g., kg CO₂ emitted per liter of fuel consumed, kg CH₄ emitted per kilometer traveled, etc.).

Global Warming Potential (GWP) | A factor describing the radiative forcing impact (degree of harm to the atmosphere) of one unit of a given GHG relative to one unit of CO₂. The GWP values utilized in this inventory were from the Intergovernmental Panel on Climate Change's (IPCC) fourth assessment report (2007).

Scope 1 – Emissions from Staff Refrigerators

Overview and Activity Data |

Calculating the emissions from WRI's refrigerators required an inventory of our systems and estimation equations from The Climate Registry's General Reporting Protocol (GRP) v1.1 (2008).

Activity data = Total full charge (capacity) of the equipment = 1.02 kg

Calculation

Formula (The Climate Registry's GRP v 1.1):
Total Annual Emissions (metric ton [mt]) = $[(C_N * k) + (C * x * T) + (C_D * y * (1 - z))] \div 1,000$

C_N = Quantity of refrigerant charged into new equipment = 0 kg

C = Total full charge (capacity) of the equipment = 1.02 kg

T = Fraction of the year the equipment was in use = 1 year

C_D = Total full charge (capacity) of equipment being disposed of = 0 kg

k = installation emissions factor = 0 kg

x = operating emissions factor = 0.5%

y = refrigerant remaining at disposal = 0%

z = recovery efficiency = 0%

Inventory of Refrigeration Equipment at WRI's Washington, D.C. Office

TYPE OF EQUIPMENT	# OF UNITS	CAPACITY (oz)	CAPACITY (kg)	REFRIGERANT USED	GWP
GE Profile™ ENERGY STAR® 22.2 Cu. Ft. Bottom-Freezer Drawer Refrigerator	2	4.06	0.12	R-134a	1300
GE Spacemaker® 4.4 Cu. Ft. Compact Refrigerator	1	2.12	0.06	R-134a	1300
GE ENERGY STAR® 22.1 Cu. Ft. Side-By-Side Refrigerator with Dispenser	1	4.75	0.13	R-134a	1300
Danby ENERGY STAR® 4.4 Cu. Ft. Compact All Fridge	1	—	0.5	R-134a	1300
U-Line Icemaker	1	3.25	0.09	R-134a	1300

Results

Refrigerant utilized = R-134A (also known as HFC-134A)

GWP of HFC-134A = 1300

Total annual refrigerant emissions = 5.1E-06 mt of HFC-134A

Total from refrigerators = 6.6E-03 mt CO₂e

*Emissions factor of 0.5% obtained from The Climate Registry's General Reporting Protocol Version 1.1

0.5% = operating emissions factor X % of capacity/year

Limitations | These calculations are only for the Washington, D.C., office and do not include any refrigerant utilized in the Beijing office. The D.C. office has approximately 12 times the number of staff in the Beijing office, so any Beijing emissions are likely to be negligible.

Scope 1 – Emissions from Air Conditioning Systems

Overview and Activity Data |

Calculating the emissions from WRI's air conditioning systems required taking inventory of the air conditioning systems.

Because these systems service the entire building, of which WRI leases only a portion, the following ratio and formula is used to allocate the emissions. This ratio is based on square footage and is used for all data received that are not specific to WRI's own operations.

$$\text{Activity data} \times \frac{\text{Total WRI sq.ft. (50,199)}}{\text{Total building sq.ft.(252,782)}} = \text{WRI's estimated portion of activity}$$

This ratio is calculated as 0.198.

Activity data | 100 pounds R-410 A (refrigerant purchased in 2010 for whole building, data received from building manager)

Activity data for WRI= 100 pounds x 0.198 = 19.9 pounds = 9 kg R-410 A

Calculation

The GHG Protocol tool for calculating emissions from refrigeration and air conditioning (RAC) systems was used (worksheet available online at <http://www.ghgprotocol.org>). The tool offers three different approaches for calculating emissions, namely the sales-based, life-cycle, and screening approaches. Generally, equipment manufacturers and users who maintain their own equipment are likely to find the sales-based approach more accurate and easier to use while equipment users who have contractors maintain their equipment (as is the case with WRI) tend to find the life-cycle approach easier to use. The screening approach is utilized by organizations looking to establish if emissions from their RAC systems are significant in comparison to their other sources of emissions. The life-cycle stage approach was utilized in this inventory.

This approach tracks the emissions at each stage of the life cycle of the equipment: equipment manufacturing, operation, servicing, and disposal.¹⁷

Results

Total from air conditioning systems = 15.5 mt CO₂e

Limitations | These calculations are only for the Washington, D.C., office and do not include any air conditioning utilized in the Beijing office. The D.C. office has approximately 12 times the number of staff in the Beijing office, so any Beijing emissions are likely to be negligible. Also, the use of an allocation factor based on square footage is not as accurate as sub-metering the use of RAC systems for WRI's own operations.

Inventory of A / C Equipment at WRI's Washington, D.C. Office

TYPE OF EQUIPMENT	# OF UNITS	REFRIGERANT USED	CONVERSION FACTOR	GWP
TRANE WPVD 035	2	R-410 A	1.00E-03	1725
TRANE WPVD 080	1	R-410 A	1.00E-03	1725
CARRIER 350 ton chillers	2	R-410 A	1.00E-03	1725

Scope 1 – Emissions from Diesel Generators

Overview and Activity Data | The building in which WRI's Washington, D.C. office is located has a diesel generator on the roof that is used in case of electricity outage. The building manager provided activity data, and the square foot ratio is used to allocate WRI's portion.

Activity Data | 400 gallons of diesel utilized in entire building in 2010 (data received from building manager)

Diesel utilized in WRI building in 2010 = $400 \times 0.198 = 79$ gallons

Calculation

The WRI (2008) GHG Protocol tool for stationary combustion, version 4.0 (worksheet available online at <http://www.ghgprotocol.org>) was utilized to calculate the emissions released in 2010 from the diesel generator operated in the building housing WRI's

Washington, D.C. office. Emissions factors utilized in the tool are from the 2006 IPCC guideline for National GHG Inventories.

Total from diesel generation = 0.8 mt CO₂e

Limitations | These calculations are only for the Washington, D.C. office and do not include any diesel generators utilized in the Beijing office. The D.C. office has approximately 12 times the number of staff in the Beijing office, so any Beijing emissions are likely to be negligible. Also, the use of an allocation factor based on square footage is not as accurate as sub-metering the use of diesel generator systems for WRI's own operations.

Total scope 1 = 16.3 mt CO₂e

Results – Emissions from Diesel Generators

CO ₂ (mt)	CH ₄	N ₂ O	TOTAL (mt CO ₂ e)
0.8	N/A	N/A	0.8

Scope 2 – Purchased Electricity (D.C. Office)

Overview and Activity Data | WRI's office spaces are not metered separately and therefore the electricity purchase data for the entire building was used and allocated using the square foot ratio. Electricity utilized by the entire building in 2010 was 5,715,307 kWh. Using the 0.198 ratio, WRI's electricity usage for 2010 was estimated to be 1,134,981 kWh (1,135 MWh).

Calculation

Emissions factors for sub-region RFC East (the region where WRI's Washington, D.C. office is located) were used from the U.S Environmental Protection Agency (EPA) Emissions & Generation Resource Integrated Database (eGRID).

Emissions Factors (mt GHG / MWh):

CO₂ – 0.516

CH₄ – 1.373E-05

N₂O – 8.488E-06

Total D.C. office purchased electricity = 590 mt CO₂e

Limitation | The use of an allocation factor based on square footage is not as accurate as sub-metering the electricity use for WRI's own operations.

Results – Purchased Electricity (D.C. Office)

ACTIVITY DATA MWh	mt CO ₂	mt CO ₂ e (CH ₄)	mt CO ₂ e (N ₂ O)	TOTAL mt CO ₂ e
1,135	586.4	0.4	2.9	589.7

Note: Multiplied the emissions factors by total MWh and GWP.

Scope 2 – Purchased Electricity (Beijing Office)

Overview and Activity Data | To calculate the scope 2 emissions from the Beijing office, activity data were calculated based on a pre-paid electricity rate. Electricity usage in 2010 = 12.2 MWh

Calculation

Emissions factors for China were provided by the U.S Department of Energy, Energy Information Administration.

Emissions Factors, China
(mt GHG / MWh):
CO₂ – 0.839
CH₄ – 0.01458
N₂O – 0.01841

Total Beijing office purchased electricity = 10.3 mt CO₂e

Limitations | The China emissions factor is not localized and may not be accurate to the electricity mix in Beijing.

Total scope 2 = 600 mt CO₂e

Results – Purchased Electricity (Beijing Office)

ACTIVITY DATA MWh	mt CO ₂	mt CO ₂ e (CH ₄)	mt CO ₂ e (N ₂ O)	TOTAL mt CO ₂ e
12.2	10.2	4.4E-03	6.7E-02	10.3

Note: Multiplied the emissions factors by total MWh and GWP.

Scope 3

The following Scope 3 categories were accounted for in WRI's 2010 Inventory.

- **Purchased Goods and Services** | Extraction, production, and transportation of goods and services purchased or acquired by WRI, not otherwise included in categories 2 through 9. In WRI's inventory, this category included any applicable emissions from capital goods, transportation and distribution, and leased assets (e.g., printers and copiers).
- **Fuel- and Energy-related Activities** | Extraction, production, and transportation of fuels and energy purchased or acquired by WRI, not already accounted for in scope 1 or 2.
- **Waste Generated in Operations** | Disposal of waste generated in WRI's operations.
- **Business Travel** | Transportation of WRI employees for business-related activities.
- **Employee Commuting** | Transportation of WRI employees between their homes and WRI's office.
- **End-of-life Treatment of Sold Products** | Waste disposal/treatment of publications distributed by WRI.

CATEGORY 1: PURCHASED GOODS AND SERVICES

Overview and Activity Data | Category 1 was calculated using financial activity data. WRI's accounting department provided FY 2010 data summed by vendor for all goods and services purchased.

Calculation

The Carnegie-Mellon University Economic Input-Output (CMU EIO) Life Cycle Assessment (LCA) tool was utilized to calculate emissions from WRI's purchased goods and services in 2010. This tool is available for free at <http://www.eiolca.net/>.

Input-Output tables traditionally represent the monetary transactions between industry sectors in mathematical form. Environmentally Extended Input-Output (EEIO) models indicate what goods or services (or output of an industry) are consumed by other industries (or used as input).¹⁸ EIO tables utilized in life cycle assessment (LCA) additionally calculate the average emissions of pollutants associated with spending a certain amount of funds on a particular industry. This is the methodology utilized by the CMU EIO tool.

To align the activity data with the EEIO tool, we had to identify the service or good provided by each vendor, and then group this service or good into predefined sectors based on NAICS sector codes. Some data, such as payments to staff for time worked and bonuses were excluded from the scope 3 calculations. Additionally, all vendors for which spending totaled less than \$10,000

were excluded due to estimated insignificance, and charges on the corporate credit card were excluded due to data collection limitations. Because it is not possible to know how much of the credit card charges are already counted in scope 3 (e.g., business travel), we estimate that 6 to 16 percent of purchased goods and services are not captured in this inventory.

The following information was entered into the CMU EIO tool for each good or service that was purchased by WRI in 2010:

- The detailed sector that each good or service is a part of;
- The model to be used for the analysis (the US 2002 Benchmark producer price model was used);
- The amount of economic activity in the sector, i.e., the amount of money spent on purchasing that good or service.

Results – Category 1

SUB-CATEGORY	mt CO ₂ e
Partners and sub-grantees	1,704
Purchased goods	61
Purchased services	794
Total Category 1 (purchased goods and services)	2,559

Results

The results can be grouped into three main categories: purchased goods (food, office supplies), purchased services (consulting, design, printing), and services purchased from partners and sub-grantees (money provided as part of project work).

Limitations | Financial activity data are secondary data. It is difficult to account for emissions reductions without primary activity data. The credit card charges are excluded.

CATEGORY 3: FUEL- AND ENERGY- RELATED ACTIVITIES

Overview and Activity Data | The data from scope 2 are used to calculate this category.

Calculation

Washington, D.C. Office Electricity

- Total pro-rated usage for D.C. office = 1,134,981 kWh (please refer to scope 2 calculations)
- Cradle-to-gate emissions factors for RFC East (eGrid sub-region) = 0.78 kg CO₂e/kWh (obtained from Carbon Trust Footprinter)
- Combustion emissions factors for RFC East = 0.52 kg CO₂e/kWh
- Upstream emissions factors for RFC East = Cradle-to-gate emissions factors for RFC East (eGrid sub-region) – combustion emissions factors for RFC East = 0.78-0.52 = 0.26 kg CO₂e/kWh

Beijing Office Electricity

- Total usage for Beijing office = 12,150 kWh (please refer to scope 2 calculations)
- Cradle-to-gate emissions factors for China = 0.92 kg CO₂e/kWh (obtained from Carbon Trust Footprinter)
- Combustion emissions factors for China = 0.84 kg CO₂e/kWh
- Upstream emissions factors for China = Cradle-to-gate emissions factors for China – combustion emissions factors for RFC East = 0.92 – 0.84 = 0.08 kg CO₂e/kWh

Results

Washington, D.C. Office Electricity

- Total kWh pro-rated usage for 2010 x upstream emissions Factors for RFC East / 1000 = 295 mt CO₂e
- Total from D.C. office = 296 mt CO₂e

Beijing Office Electricity

- Total kWh pro-rated usage for 2010 x upstream emissions factors for China / 1000 = 0.95 mt CO₂e
- Total from China office = 0.97 mt CO₂e

Total category 3 = 297 mt CO₂e

Limitations | Upstream cradle-to-gate emissions associated with diesel fuel were not included in this category. The total combustion emissions for diesel fuel in scope 1 were 8.05E-01 CO₂e, and therefore the upstream emissions were assumed negligible. The combustion and cradle-to-gate emissions factors are from different sources so some uncertainty was introduced when those values were subtracted from each other. Additionally, the China emissions factors are not localized and therefore not as accurate.

CATEGORY 5: WASTE GENERATED IN OPERATIONS

Overview and Activity Data | WRI's Washington, D.C. office utilizes single-stream recycling and the building's management company provides monthly recycling data reports. Applying the conversion factor of 0.198 (WRI sq. ft./Total building sq. ft.) to the recycling data from 2010, we were able to estimate the amount of waste recycled and generated by WRI.

Calculation

Following the guidance given in the Scope 3 Standard on accounting for emissions from recycling, the emissions associated with recycling are not reported in category 5. Therefore, we used the following emissions factors to estimate the emissions associated with the total waste residue. These data are for average treatment of waste in Great Britain from the Carbon Trust's Carbon Footprinter tool.

- Waste treatment: Dense plastics= 0.004 kg CO₂e/ kg waste
- Waste treatment: Commercial Corrugate Card= 0.010 kg CO₂e/ kg waste
- Waste treatment: Plastic films= 0.004 kg CO₂e/ kg waste
- Waste treatment: Packaging paper= 0.032 kg CO₂e/ kg waste
- Waste treatment: Food waste= 0.168 kg CO₂e/ kg waste
- Average (Waste treatment)= 0.044 kg CO₂e/ kg waste
- Waste generated in operations= Total Residue x Average (Waste treatment) x (1 kg/2.2046 lb)*(1 kg/1000 mt) = 0.08 mt CO₂e
- Total category 5 = 0.08 mt CO₂e

Limitations | The emissions factors data could be improved in a future inventory with similar data from the United States (at the time of this inventory report, those data could not be located).

CATEGORY 6: BUSINESS TRAVEL

Overview and Activity Data | Flight and rail travel booked by WRI staff through the Concur travel site in 2010 were utilized as the activity data for calculation of emissions from business travel.¹⁹ WRI traveled a total of 5,100,000 miles by plane in 2010, and 25,000 miles by train.

Calculation

All flights were grouped into short-, medium-, or long-haul flights based on leg miles based on the GHG Protocol business travel calculation tool. The UK government's Department for Environment, Food and Rural Affairs (DEFRA) emissions factors were used to calculate the CO₂, CH₄, and N₂O emissions. Rail travel was calculated using emissions factors from DEFRA, the Environmental Protection Agency (EPA), and the Intergovernmental Panel on Climate Change (IPCC) 2006 guidelines for National GHGs. Calculations were done each quarter.

Results

Total mt CO₂e from air travel= 695
 Total mt CO₂e from rail travel = 5
 Total mt CO₂e from business travel (air and rail) = 700

Results – Overview of Waste Generated

DEBRIS CATEGORIZATION	TOTAL (lbs)	RECYCLED (lbs)						WASTE (lbs)
	INBOUND WEIGHT	OFFICE PAPER	CARD-BOARD	MIXED PAPER	PLASTIC CONTAINERS	ALUMINUM CANS	GLASS	RESIDUE
Total debris generated in 2010	183,840	98,900	32,880	22,430	7,720	1,320	450	20,180
WRI's estimated contribution	36,508	19,640	6,530	4,454	1,533	262	89	4,007

CATEGORY 7: EMPLOYEE COMMUTING

Overview and Activity Data |

WRI surveys its Washington, D.C. staff annually to obtain data on commuting patterns. The number of staff who answered the survey in 2010 was 146 and the total number of staff present at that time was 190. A scaling factor of 1.3 (190/146) was applied to the activity data collected to estimate commuting for all staff. Staff traveled approximately 45,600 miles by bus, 191,500 by metro, 152,100 miles by commuter rail, and 47,900 miles walking or biking. Staff also used approximately 4,900 gallons of fuel by car.

Calculations

The GHG Protocol tool for transport or mobile sources was utilized to calculate the emissions from employee commuting. The tool utilizes emissions factors from DEFRA, EPA, and IPCC 2006 guidelines.

A distance-traveled approach was used to calculate emissions from employees commuting by bus, metro, and commuter rail while a fuel-based approach was utilized for calculating emissions from commuting by car.

Results

Total for category 7 = 109 mt CO₂e

CATEGORY 12: END-OF-LIFE TREATMENT OF SOLD PRODUCTS

Overview and Activity Data |

As a global environmental and development think tank, WRI does not release any conventional “products.” However, WRI does produce publications as part of its work, and the end-of-life treatment of these publications was estimated and included in the 2010 inventory. The following conservative assumptions were made about the number and weight of publications:

- In 2010 WRI produced 19 publications, and it was assumed 2,000 copies of each were produced for a total of 38,000 copies printed in 2010.
- It was assumed that each weighed 1.3 lbs. Hence 38,000 publications weighed approximately 22,407.7 kg.

Conservative assumptions were made to get the worse-case scenario estimate for this category.

Calculation

EPA statistics for municipal solid waste generation, recycling, and disposal in the United States for 2009 indicate a 34 percent average recycling rate for all materials and a 74 percent recycling rate for office-type paper. Because it was not clear whether publications would qualify as office-type paper, we assumed the conservative value of 34 percent recycled and the rest disposed of in a landfill. The total mass of publications in 2010 assumed to eventually be disposed of in a landfill is $(1-0.34) \times 22,407.7 = 14,789$ kg.

Based on EPA GHG Inventory statistics, 58 percent of U.S. landfills have some methane recovery. Emissions factors for landfill of paper and textiles, with recovery (1.45 kg CO₂e/kg waste) and without (2.5 kg CO₂e/kg waste) were obtained from the New Zealand Ministry for the Environment, 2008.

Results

Total for category 12 = 28 mt CO₂e

Limitations | The United States-only estimates for recycling rates that are used in this report are likely not accurate since our publications are distributed worldwide. The data from New Zealand landfills may not be an accurate representation of the average global disposal of our publications. We made no assumptions about waste being incinerated with or without energy recovery because no emissions factors data were located, although it is likely that some portion of publications are disposed of in this way.

APPENDIX B: WRI'S 2009 INVENTORY

Results – WRI's 2009 Inventory

CATEGORY	SOURCES OF EMISSIONS	EMISSIONS (mt CO ₂ e)
Scope 1	Direct emissions from sources under WRI's operational control- Refrigerators	0.007
Scope 2	Purchased Electricity	501
Scope 3	Category 6: Business Travel	675
	Category 7: Employee Commuting	150
Total		1,326

Operational Boundary

The following emissions were accounted for in WRI's 2009 inventory:

- Scope 1 emissions from WRI's D.C. office
- Hydrofluorocarbon emissions released by leakage of refrigerant from refrigerators during servicing

Scope 2 emissions from WRI's D.C. and Beijing offices

- Emissions from purchased electricity

Scope 3 emissions from WRI's D.C. and Beijing offices

- Business Travel
- Employee Commuting

Note: Emissions from employee commuting from the Beijing office were not included in this inventory.

Organizational Boundary

WRI's 2009 inventory also utilized the operational control approach, accounting for emissions from both its head office in Washington, D.C., and its Beijing, China office.

Scope 1

WRI's scope 1 emissions from its refrigerants in 2009 were calculated to be 5.1E-06 mt CO₂e. This calculation was done using the same data and assumptions as in WRI's 2010 inventory. Scope 1 emissions from the air conditioning systems and the diesel generator were not included in the 2009 inventory.

Scope 2

The same approach and data sources from the 2010 inventory were used to calculate the 2009 scope 2 emissions. 2009 was the first full year the Beijing office was in operation.

SOURCE	EMISSIONS (mt CO ₂ e)
Washington, D.C. Office	494
Beijing Office	7

Scope 3

The same approach and data sources used to calculate business travel and employee commuting for the 2010 inventory was used in the 2009 inventory. Business travel increased slightly while employee commuting dropped slightly in 2010 compared to the 2009 inventory results.

SOURCE	EMISSIONS (mt CO ₂ e)
Business Travel	675
Employee Commuting	117

ACKNOWLEDGMENTS

This paper has benefited from the peer review and helpful feedback of numerous WRI colleagues: Mark Cheater, Janet Ranganathan, David Rich, Neelam Singh, Mary Sotos, and Lauren Withey. Hyacinth Billings and Nick Price supported the editing and production process.

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Gomati Madaiah supported this project in her former role as an intern working for WRI's Sustainability Initiative.



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