2012 Greenhouse Gas Inventory

1. Introduction

This report presents the calendar year (CY) 2012 greenhouse gas inventory estimate for the Business Council for Sustainable Energy (BCSE). As a leader in the promotion of a diverse, secure mix of energy resources and market-based approaches to reducing pollution, one of the BCSE's objectives in continuing the measurement and tracking of its inventory is to lead by example and to consider changes that reduce its carbon footprint and offset its emissions.

This report presents the data collection and methods BCSE used to develop its CY2012 estimate. This estimate builds on the Council's CY2011 and CY2010 base year estimates. The Council will use these three years' results as a foundation for further refinements in completeness and accuracy, and as a benchmark against which BCSE will measure annual progress toward managing its corporate GHG emissions.

2. Inventory Process

BCSE began this process in 2011 by familiarizing itself with the ISO 14064-1:2006 normative standard and choosing conformance with the guidelines provided in the WRI/WBCSD – GHG Protocol Corporate Accounting and Reporting Standard (2004, Revised Edition). BCSE conferred with First Environment, Inc. (First Environment), one of its Board members, to develop an inventory plan. The plan included identification of emissions sources, factors, and calculation methodologies appropriate for the BCSE. Staff collected data, ran calculations on a spreadsheet model provided by First Environment, Inc., and completed an internal Quality Assurance/Quality Control (QA/QC) to ensure accuracy. The results in this inventory document represent the BCSE's third attempt at establishing its yearly carbon footprint.

3. Organization Description

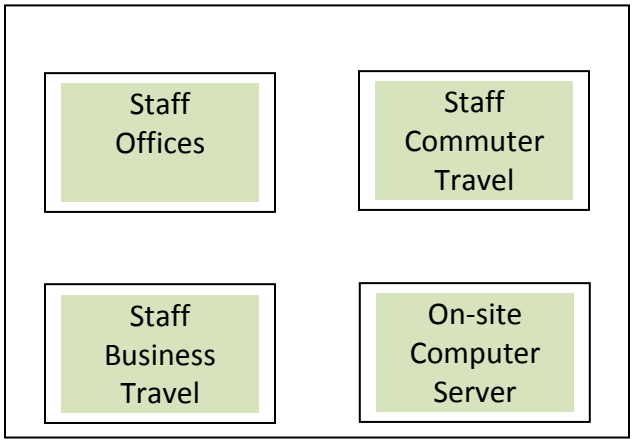
The Business Council for Sustainable Energy is a coalition of companies and trade associations from the energy efficiency, natural gas and renewable energy sectors, and it also includes independent electric power producers, investor-owned utilities, public power, commercial end-users and environmental market service providers. Founded in 1992, the Council advocates for policies at state, national and international levels that increases the use of commercially-available clean energy technologies, products and services. The coalition's diverse business membership is united around the revitalization of our economy and the creation of a secure and sustainable energy future for America.

4. Organizational Boundaries

The BCSE shares office space with First Environment, Inc. at 1620 Eye Street, NW, Suite 501 in Washington, DC. The BCSE has responsibility for its share of emissions associated with building operation, such as lighting, heating, cooling, etc. The basis is the percent of space in the office suite that

BCSE uses. The BCSE defines its organizational boundary to include its full-time employees. The organization reports all emissions associated with its operations as Scope 2 emissions given that the organization does not own or operate any of its own facilities or equipment and thus does not create Scope 1 emissions. The BCSE has its own on-site computer server, and it includes those emissions in the organization's inventory. Employee commuting and non-local business travel result in Scope 3 emissions. The organization includes these emissions in its inventory.

Figure 1 - Organizational Boundary



5. Operational Boundaries

Operational boundaries identify the emissions associated with the organization's operations, and there are two ways to define it: operating control or financial control. The BCSE uses operating control, as opposed to financial control, as the basis for its GHG accounting boundary, as the organization has no subsidiaries or regional offices, thereby rendering operating control the more appropriate option.

6. Emissions Sources

There are two types of emissions. The first type is Direct Emissions. Direct Emissions are classified as Scope 1 emissions and these come from sources that a company owns or controls. The BCSE does not own or have control over any aspect of its emissions. On that basis, it has no Scope 1 emissions to report.

The second type of emissions is Indirect Emissions. Indirect emissions are classified into Scope 2 and Scope 3 emissions. Scope 2 emissions are emissions from the generation of electricity, heat, or steam that a company purchases from an external source, and that the company does not own and control. The BCSE has Scope 2 emissions for its electricity use (including from the computer server). Scope 3 emissions include all other indirect emissions. The WRI/WBCSD GHG Protocol considers Scope 3 emissions as optional for reporting. The BCSE has opted to report Scope 3 emissions for its employee commuting and non-local business travel. [1]

[1] Future inventories may include emissions from its members' travel to BCSE-sponsored events. It may also account for BCSE local staff travel.

The BCSE is including in its 2012 inventory Scope 2 emissions from purchased electricity for its offices and electricity for its server, as well as Scope 3 emissions from employee commuter travel and business travel.

Emissions from these sources (Table 1) include the three major GHG categories: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Emissions of industrial GHGs, such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF_6) are small and do not warrant reporting.

Table 1 – BCSE Emissions and Sources

Description	Source	GHGs
Purchased Electricity	Office electricity use, office heating, office cooling	CO_2, CH_4, N_2O
Purchased Electricity	Power, storage, and cooling associated with Server and Data Center	CO_2, CH_4, N_2O
Mobile Combustion	Employee commuter and business travel associated with BCSE business	CO_2, CH_4, N_2O

7. Emissions Factors

Emissions factors describe the rate of emissions released into the atmosphere from a specified source (e.g., combusting gasoline in a car) relative to the intensity of a specific activity (e.g., number of miles driven at a given miles-per-gallon rate). The source for the electricity emissions factors that BCSE chose is the Emissions & Generation Resource Integrated Database (eGRID), and the source for mobile combustion is the WRI/WBCSD GHG Protocol Mobile Guide (March 21, 2005) . Table 2 provides more detail.

Table 2 – Emission and Conversion Factor Sources[2],[3]

Scope	Source	GHG	*Value	*Unit	Reference
Scope 2	Electricity (general office)	CO_2	429.74	kg CO_2 / MWh	eGRID 2012 Version 1.0 Year 2009 Summary Tables (See note 3)
		CH_4	12.17	kg CH_4 / GWh	
		N_2O	6.79	kg N_2O / GWh	
	Electricity (server)	CO_2	429.74	kg CO_2 / MWh	
		CH_4	12.17	kg CH_4 / GWh	
		N_2O	6.79	kg N_2O / GWh	
Scope 3	Car (gasoline)	CO_2	8.81	kg CO_2 / gal	*GHG Protocol: Mobile Guide* (3/21/05)
		CH_4	.0358	g CH_4 / mi	
		N_2O	.0473	g N_2O / mi	
	Car (diesel)	CO_2	0.233	kg CO_2 / gal	
		CH_4	0.0249	g CH_4 / mi	

[2] http://ghginstitute.org/wp-content/uploads/2011/01/2009%20GHGMI%20Greenhouse%20Gas%20Inventory%20Report%20_FINAL_.pdf
[3] http://www.epa.gov/cleanenergy/documents/egridzips/eGRID2012V1_0_year09_SummaryTables.pdf

		N_2O	0.0393	g N_2O / mi	
	Taxi	CO_2	0.233	kg CO_2 /person/km traveled	
	Bus	CO_2	0.2997	kg CO_2 /person/mi traveled	
	Light Rail	CO_2	0.43	kg CO_2 /person/mi traveled	*Working 9 to 5 on Climate Change: An Office Guide* (WRI, 3/21/05)
	Heavy Rail	CO_2	0.06	kg CO_2 /person/km traveled	*GHG Protocol: Mobile Guide* (3/21/05)
	Pedestrian/Bicycle	CO_2	0.0	kg CO_2 /person/km traveled	
	Air travel (short)	$\leq$ 500	0.18	kg CO_2 /person/km traveled	*GHG Protocol: Mobile Guide* (3/21/05)
	Air travel (medium)	500 to 1000	0.126	kg CO_2 /person/km traveled	*GHG Protocol: Mobile Guide* (3/21/05)
	Air travel (long)	$\geq$ 1000	0.11	kg CO_2 /person/km traveled	*GHG Protocol: Mobile Guide* (3/21/05)

*Location specific per eGRID.

8. Results

For its CY2012 inventory, the total Scope 2 BCSE estimated amount of GHG emissions is 23.88 metric tons of CO_2-equivalent ($MtCO_2$-e). The total Scope 3 BCSE estimated amount of GHG emissions is 16.03 $MtCO_2$-e (this includes both non-local business travel and daily commuting). Emissions resulted primarily from purchased electricity, with a smaller contribution from BCSE staff travel and commuting (Table 3).

The significant decrease in Scope 2 emissions in CY2012 compared to previous years is due in part to updated eGRID emissions factors used in the data calculations for CY2012. Scope 2 emissions also decreased as a result of energy efficiency strategies employed by the building's management, TF Cornerstone. Additionally, we've recalculated CY2010 and CY2011 Scope 2 emissions figures using eGRID2007 Version 1.1 Year 2005 Summary Tables in order to maintain consistency with reporting. The figures had previously been calculated using a different source of data.

The Council's Scope 3 emissions (16.03 $MtCO_2$-e) fell by 32 percent compared to CY2011 (23.47 $MtCO_2$-e) but was still approximately 17 percent higher than baseline CY2010 (13.66 $MtCO_2$-e) emissions due to an increase in the amount and average distance of staff travel since that year. These changes occurred due to the BCSE's expanded engagement in national utility commissioner meetings and the U.N. climate negotiations occurring in Asia, Europe, and Africa.

Table 3 – CY2012 Emissions Total[4]

Scope	Description	Total CO_2-e metric tons	CO_2	CH_4 (CO_2-e)	N_2O (CO_2-e)
Scope 2	Purchased Electricity, Heat, and Steam	22.93	22.80	0.01	0.11
	Server Electricity	0.95	0.94	0	0
Scope 3	Mobile Combustion	16.03	16.03	0	0
	Total CO_2 metric tons equivalents	**39.91**	**39.77**	**0.01**	**0.11**

*Figures calculated using updated eGRID 2012 Version 1.0 Year 2009 Summary Tables (Different from previous years' figures)

Table 4 – CY2011 Emissions Total[5]

Scope	Description	Total CO_2-e	CO_2	CH_4 (CO_2-e)	N_2O (CO_2-e)
Scope 2	Purchased Electricity, Heat, and Steam	30.96	30.78	0.02	0.16
	Server Electricity	1.14	1.14	0	0
Scope 3	Mobile Combustion	23.47	23.47	0	0
	Total CO_2 metric tons equivalents	**55.57**	**55.39**	**0.02**	**0.16**

Table 5 – CY2010 Baseline Emissions Total

Scope	Description	Total CO_2-e	CO_2	CH_4 (CO_2-e)	N_2O (CO_2-e)
Scope 2	Purchased Electricity, Heat, and Steam	38.26	38.05	0.02	0.19
	Server Electricity	1.14	1.14	0	0
Scope 3	Mobile Combustion	13.66	13.66	0	0
	Total CO_2 metric tons equivalents	**53.06**	**52.85**	**0.02**	**0.19**

9. Methodology and Data Sources

The normative process standard for the BCSE base year and first year's inventory is ISO 14064-1: 2006; the normative methodological basis is the WRI/WBCSD *GHG Protocol: Corporate Accounting and Reporting Standard* (2004, Revised Edition).

9.1 Purchased Electricity

[4] http://www.epa.gov/cleanenergy/documents/egridzips/eGRID2012V1_0_year09_SummaryTables.pdf
[5] Both CY2011 and CY2012 calculated using eGRID2007 Version 1.1 Year 2005 Summary Tables http://epa.gov/cleanenergy/documents/egridzips/eGRID2007V1_1_year05_SummaryTables.pdf

BCSE reports purchased electricity for its offices by following a method similar to the "Building-specific data estimation method" outlined by the GHG Protocol.

Equation:

*Office Electricity Emissions = Total Annual Office Electricity * The % Area of the Building Occupied by BCSE Staff*

Assumption:

- % working factor: 1.0 for full time, 0.5 for 50% time, 0.25 for 25%, etc.

The BCSE referenced the eGRID database to select the appropriate, location-specific electricity emissions factor to calculate emissions from its office electricity use, in this case the emissions factor relevant to Washington, DC in the RFC East eGrid subregion.[6] BCSE assumes that no employees conduct organizational work from a home office.

9.2 BCSE Server Emissions

The BCSE accounts for electricity and heating/cooling emissions of its on-site server, housed in its office in Washington, DC. The server electricity use is constant as it runs 24-hours per day at 365 days per year, i.e., 8760 hours annually. By parsing this electricity use from overall electricity, the BCSE has a clearer understanding of its staff's day-to-day behaviors related to electricity use. As a result, the organization is better positioned to identify ways its staff can change current behaviors in order to reduce energy usage and thus reduce emissions.

Equation:

*Total Energy Consumption = Power Usage Effectiveness * Power Consumption of Server * 8760 hours/year*

Assumptions:

- Power Usage Effectiveness (PUE) = Total Facility power/IT equipment power
- Average PUE = 2.0[7],[8]
- Average Server Energy Use is 251 watts[9]

9.3 Mobile Combustion

[6] http://www.epa.gov/cleanenergy/documents/egridzips/eGRID2012V1_0_year09_SummaryTables.pdf
[7] EPA Report to Congress on Server and Data Center Energy Efficiency http://www.energystar.gov/ia/partners/prod_development/downloads/EPA_Datacenter_Report_Congress_Final1.pdf?98e3-d738
[8] http://ghginstitute.org/wp-content/uploads/2011/01/2009%20GHGMI%20Greenhouse%20Gas%20Inventory%20Report%20_FINAL_.pdf
[9] EPA Report to Congress on Server and Data Center Energy Efficiency http://www.energystar.gov/ia/partners/prod_development/downloads/EPA_Datacenter_Report_Congress_Final1.pdf?98e3-d738

The BCSE reports mobile transport emissions associated with staff business travel outside of the DC metropolitan area and commuting. The organization followed the following approach to quantify its mobile source emissions as outlined in the GHG Protocol Corporate GHG Accounting and Reporting Protocol and the Mobile Guide for Emissions (March 21, 2005), and "Working 9 to 5 on Climate Change: An Office Guide."

Equations:

*Air emissions = distanced traveled * emissions factor*
*Car emissions = distance traveled/fuel consumption (mpg) * emissions factor*
*Taxi emissions = distance traveled * emissions factor*
*Bus emissions = distance traveled * emissions factors*
*Light Rail Train emissions =distance traveled * emissions factors*
*Heavy Rail Train emissions = distance traveled * emissions factor*

Assumptions:

- Vehicle-miles-traveled, not person-miles-traveled, fuel economy based on EPA mileage ratings of actual staff cars driven in combined highway and city measurements
- Bus distance estimated per Google Maps from stop to stop
- Light rail distance estimated per Google Maps and Map Pedometer tool[10]
- Heavy rail distance estimated per Amtrak statistics from CyberSpace World Railroad[11]
- Air travel distances based on WebFlyer mileage calculator[12]

10. Quality Assurance and Quality Control (QA/QC) and Uncertainty

BCSE will continue to use an internal checking and review of its inventory spreadsheet calculations and report as its initial QA/QC process. Future inventories by BCSE staff may implement further QA/QC procedures, such as a quality management plan and uncertainty analysis.

11. Offsets and RECS

As was done for CY2010 and 2011 emissions, carbon offset credits and renewable energy certificates (RECs) have been purchased for CY2012 emissions. The BCSE's main focus in acquiring these credits is high quality domestic projects. In addition to bolstering its sustainability objectives, the Council will also seek to support its industries' technologies and its members and to spur local economic development in choosing which RECs and offsets to purchase. Following general protocols, the BCSE has acquired RECs to account for its Scope 2 emissions and offsets to cover its Scope 3 emissions.[13]

Following consultations with BCSE members Winrock International's American Carbon Registry and Native Energy and close looks at a variety of offset and REC projects, the BCSE acquired 17 emission

[10] http://www.mappedometer.com/
[11] http://www.cwrr.com/Amtrak/ne_bo_nss.html
[12] http://www.webflyer.com/travel/mileage_calculator/

reduction tons (ERTs) or carbon offsets from the GreenTrees Carbon Forest Project for its 16.03CO_2-e metric tons of Scope 3 emissions. At $9 per ERT the total came to $153. BCSE also acquired 56 MWh worth of RECs from the Indiana School Wind Project to account for its 55.26 MWh of electricity usage or Scope 2 emissions and at $6.50 per MWh the total came to $364.

The GreenTrees Carbon Forest project is a privately managed forest restoration and carbon sequestration program created to reforest at least one million acres in the Lower Mississippi Alluvial Valley. More information is available at http://americancarbonregistry.org/carbon-registry/projects/greentrees-forest-carbon-project.

The Indiana School Wind Project includes three 900kW PowerWind turbines, on the campuses of Northwestern School Corporation, West Central School Corporation, and North Newton School Corporation. Each district owns its turbine and every kilowatt hour generated by the turbine offsets a kilowatt hour of electricity used by the school at the retail rate. The turbines are expected to save the school corporations millions of dollars over their 20-plus year lives. More information is available at http://www.nativeenergy.com/indiana-school-wind-project-2.html#jumb. These projects were chosen for their contributions to the guidelines stated above.

Due to the recalculations of CY2010 and CY2011 Scope 2 emissions, BCSE had previously purchased slightly more RECs than were needed. The impact of this was not significant as the organization's emissions are quite small to begin with. The slight over purchasing was in BCSE's favor as it helped further contribute to the overall reduction and mitigation of greenhouse gas emissions.

12. Considerations and Goals for CY2013 Inventory

- Review organizational boundary
- Improve the data collection and management process
- Develop better data management
- Include local taxi travel and related GHG emissions
- Include emissions associated with major events and membership meetings