Carbon Inventory Project

Final Report, 2009

carbonneutral
Turn Emissions into Trees®

Carbon Inventory Project - 2009

The project

ECU approached Carbon Neutral in February 2010 to seek its assistance in re-assessing the carbon footprint for its Mount Lawley, Joondalup and Bunbury campuses for the accounting period of 2009. Carbon Neutral subsequently proposed to ECU to complete a Carbon Inventory Project with the following methodology:

1. Carbon Neutral developed and provided ECU with a Data Collection Tool (excel based) for each campus to complete to collect information required for carbon footprint calculation.

2. Carbon Neutral reviews the inventory and calculates the carbon footprint of each site.

3. Carbon Neutral provides ECU with this report (Carbon Inventory Project Report)

Organisational Boundary

The organisational boundary for the ECU Carbon Inventory Project is in accordance with AS ISO 14064.1:2006 having operational control of sites at Bunbury, Mount Lawley and Joondalup.

The classification method used to group GHG emissions, by the level of control an organisation has over them, are categorised into three main types of GHG emissions:

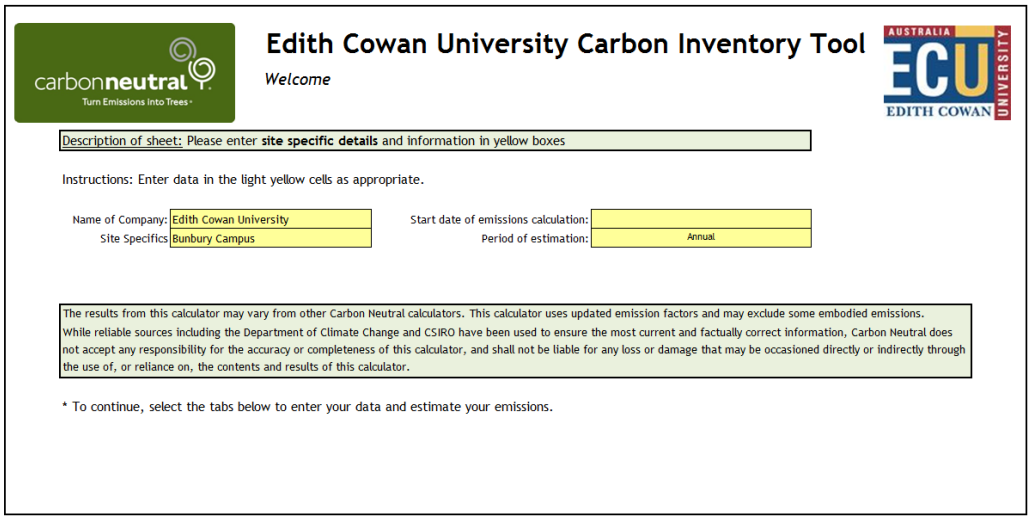
Direct emissions, Scope 1, are emissions related to the burning of fossil fuels, mainly gas, used for building heating, gas boilers for hot water or fuel for company vehicles or fleet. It also includes fugitive emissions such as refrigerant leakages onsite.

Indirect emissions, Scope 2, these are from imported electricity from power stations to run electrical equipment, heating and lighting within the building.

Other indirect emissions, Scope 3, are from products and services such as the emissions from the consumption of water, waste, business travel, paper etc. The boundary of this scope is agreed by the organisation and generally a business is advised to only include what they can quantify and influence.

Data collection

Carbon Neutral provided ECU with a Carbon Inventory Tool in order to collect relevant information for the carbon footprint calculation. This calculator was developed with a balance between the time and resources required to obtain and collate information whilst still providing rigour in the carbon footprint assessment. A screen shot of the calculator is shown below:



The type of data collected and used is shown in Table 1 below:

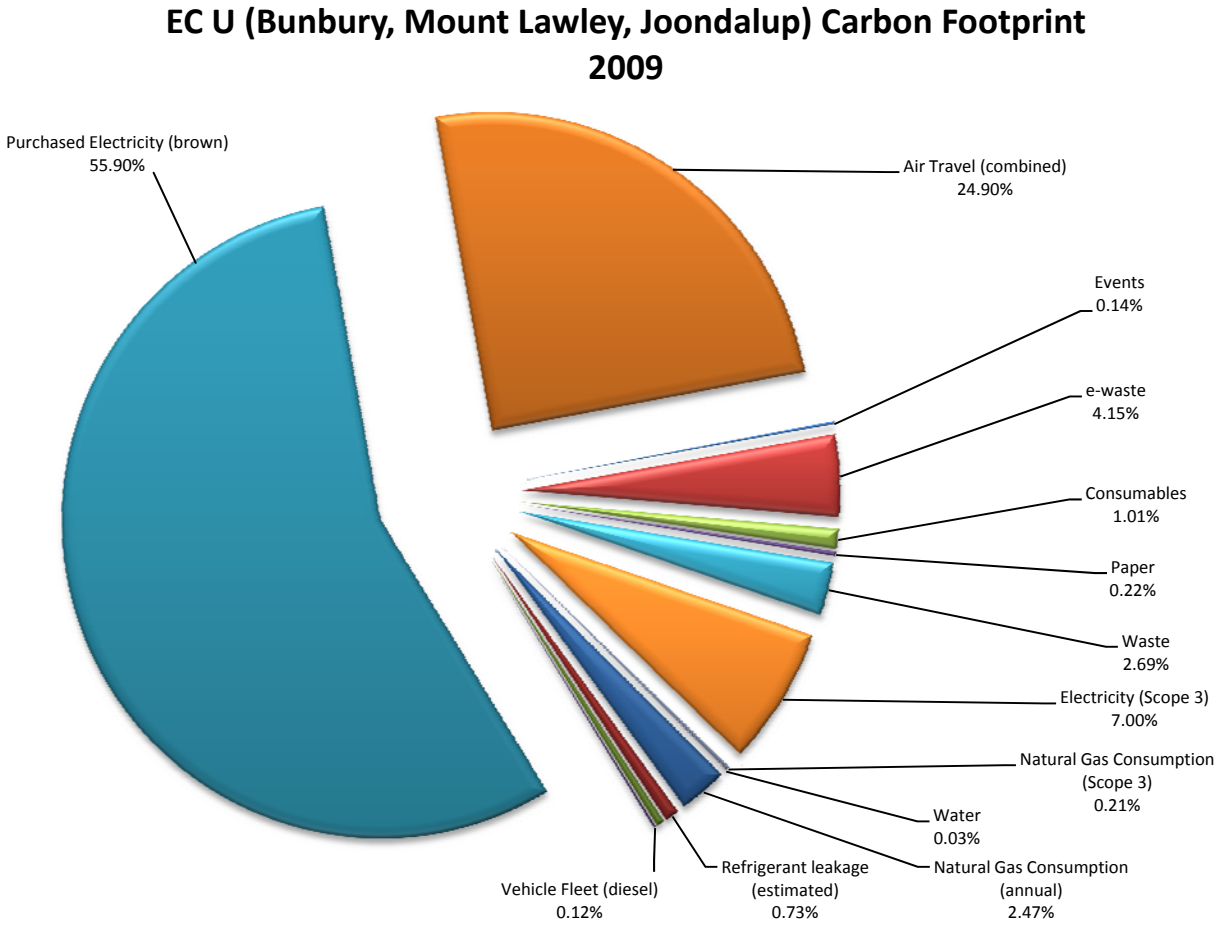
Scope	Source/Activity
Scope 1	Natural gas consumption Vehicle Fleet Refrigerant leakage (estimated)
Scope 2	Purchased electricity
Scope 3	Events e-Waste Waste Consumables Paper Water consumption Natural Gas (Scope 3) Electricity (Scope 3)

Table 1: Scope emissions inlcuded in inventory.

Carbon footprint by activity and site.

The total carbon footprint was calculated as 31,428 tonnes of CO_2e for 2009. The following provides an overview of ECU's carbon footprint for 2009 (fleet vehicles are offset and 5% of electricity is sourced from renewable energy supplies).

Figure 1: Emissions by source (TCO_2e)



Scope 1

Scope 1 emissions at each ECU study site include natural gas consumption; refrigerant leakage estimates and vehicle fleet fuel consumption and total 1,247 tonnes annually (TCO_2e).

Natural gas consumption is used in various ways including catering, heating and laboratory activities amongst other uses. Future benchmark analysis would be useful to determine the energy efficiency of natural gas consumption and identify areas for improvement. Natural gas consumption accounts for less than 1% of ECU's annual greenhouse gas emissions.

Refrigerant leakages are estimated by auditing the number of refrigerant units used cooling, the refrigerant type and charge mass and estimated annual leakage rates as outlined by the Department of Climate Change. ECU predominantly uses R22 refrigerant with some use of HC 134a. The R22 refrigerant is becoming increasingly restricted in its usage due to its high global warming potential (GWP = 1700). Refrigerant leakage represents less than 1% of ECU's annual greenhouse gas emissions.

Vehicle fleet fuel consumption is offset via Carbon Neutral and is not included in the carbon footprint.

Scope 2

Scope 2 emissions at ECU's study sites occurs through the generation of electricity for use in lighting, heating, ventilation and cooling (HVAC) and other activities. Scope 2 emissions total 17,963 tonnes (TCO_2e). ECU's three (3) sites consume over 21,384.6MWh annually and contribute to approximately 56% of ECU's carbon footprint. Future auditing should focus on improving energy efficiency at ECU. ECU is commended for purchasing 5% 'green power' to reduce this aspect of its carbon footprint.

Scope 3

Scope 3 emissions at ECU's study sites occur through several activities including waste disposal, air travel, events, e-waste, consumables, natural gas and electricity consumption and paper and water consumption. Scope 3 activities represent approximately 40% of ECU's annual carbon footprint.

Table 2 below shows the total emissions (tonnes eCO_2) by activity for ECU for 2009.

		Greenhouse Gas Emissions Annual (eCO2)			
		Bunbury	Mount Lawley	Joondalup	Total
Scope 1	Natural Gas Consumption (annual)	7.95	361.00	385.52	**754.46**
	Refrigerant leakage (estimated)	52.79	99.68	70.79	**223.25**
	Vehicle Fleet (petrol)	11.57	32.44	84.94	**128.95**
	Vehicle Fleet (diesel)	1.14	2.59	33.32	**37.06**
Scope 2	Purchased Electricity (brown)	965.75	7,053.31	9,944.00	**17,963.06**
Scope 3	Air Travel (combined)			7,600.70	**7,600.70**
	Events			43.27	**43.27**
	e-waste	488.60	-	778.40	**1,267.00**
	Consumables			308.48	**308.48**
	Paper			68.50	**68.50**
	Waste	18.98	288.79	513.64	**821.41**
	Electricity (Scope 3)	114.97	839.68	1,183.81	**2,138.46**
	Natural Gas Consumption (Scope 3)	0.68	30.94	33.05	**64.67**
	Water	0.08	3.92	4.07	**8.07**
	TOTAL	**4,336.15**	**11,386.00**	**15,705.18**	**31,427.33**

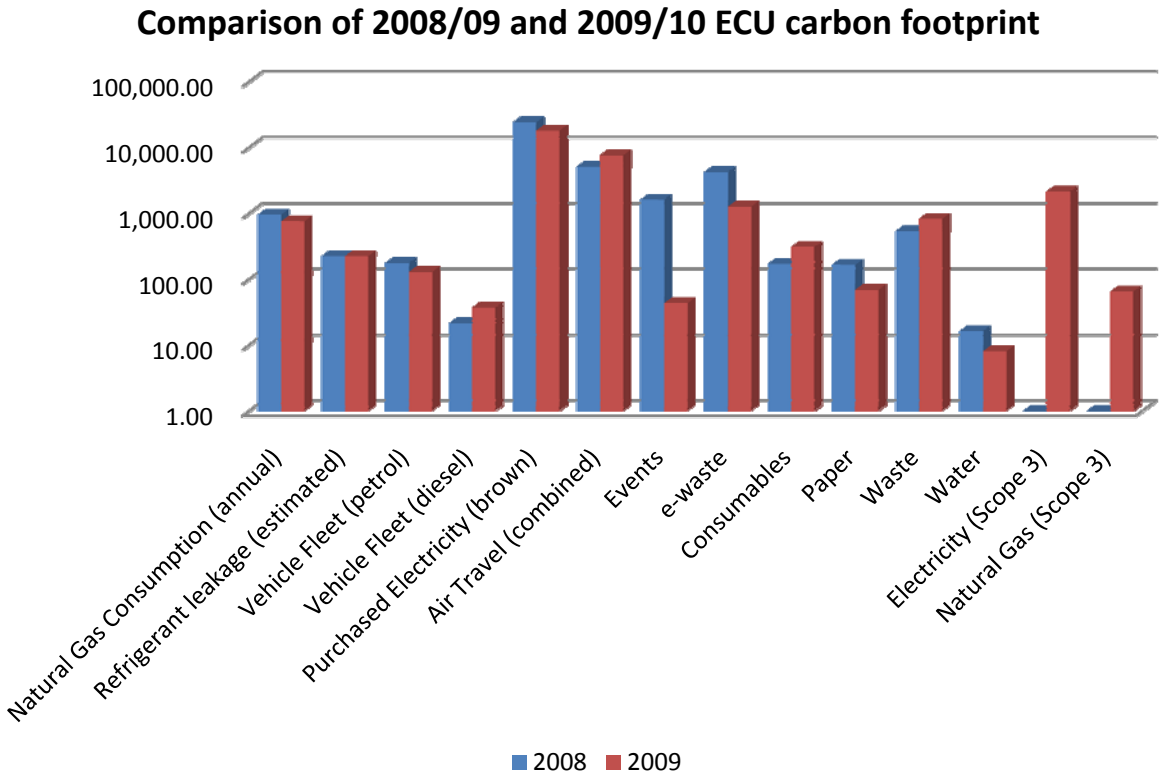
Table 2: Emissions (TCO_2e) at each site by activity

Comparison between 2008/09 and 2009/10

The carbon footprint for ECU has changed between 2008/09 and 2009/10 in various ways. This includes the addition of scope 3 emissions for electricity and natural gas in accordance with the Department of Climate Change and Energy Efficiency updated factors workbook for 2009. The key differences between 2008/09 and 2009/10 include:

- Less petroleum consumption and more diesel consumption used in transport;
- Less emissions resulting from electricity consumption due to an approximately 3% reduction in carbon intensity of the south-west interconnected electricity distribution system;
- A reduction in emissions from most other categories particularly events.

A comparison between accounting periods can be shown below:



Greenhouse Emissions Factors and Calculation Methodology

Carbon Neutral has conducted its assessment of ECU's carbon footprint in accordance with the following principles, which are based upon those outlined in the GHG Protocol and adopted under the NGER System. These principles are consistent with those outlined under the Australian and international standards including AS ISO 14064 and ISO 14040 series.

Relevance: Carbon Neutral have ensured that the greenhouse gas inventory for ECU appropriately reflects the greenhouse emissions attributed to ECU.

Completeness: Carbon Neutral have endeavoured to account and report all greenhouse gas emissions sources and activities within the scope of the project.

Consistency: Carbon Neutral have used consistent methodologies to allow for meaningful comparisons of greenhouse gas emissions over time.

Transparency: Carbon Neutral's report has endeavoured to be transparent and accurate.

Accuracy: Carbon Neutral have ensured that quantification of the greenhouse gas emissions is systematically conducted and wherever possible uncertainties are reduced. Carbon Neutral has used conservative estimates for quantification of activities with higher uncertainty levels.

Except where otherwise stated in this report, Carbon Neutral calculated ECU's carbon footprint using *Department of Climate Change – National Greenhouse Factors* for 2009 (the study period). Scope 3 emissions are generally much harder to quantify as the emissions usually come from various sources with no direct way to easily measure the contribution to climate change. Where there is no specific information available to quantify the carbon footprint of these activities (e.g. events, e-waste), Carbon Neutral has relied on information contained within the CSIRO 2005 report, "*Balancing Act – A triple bottom line analysis of the Australian economy*".

This report uses the well developed analytical approach of 'generalised input-output analysis' to develop a numerate triple bottom line account of the Australian economy for three financial, three social and four environmental indicators. For each of 135 economic sectors, every indicator is developed as intensity, that is, per one dollar of final demand or per one dollar spent for consumption in everyday life. The indicators are generated with a supply chain approach where all activities are included or 'embodied' in the final indicator number. This approach therefore represents the best available information to calculate some aspects of ECU's scope 3 emissions. Air travel emissions are based on several calculations including IPCC figures which better account for effects in the upper atmosphere (radiative forcing). Further information is contained within Carbon Neutral's calculation paper.

Exclusions and Justifications

Chemical processing emissions were excluded from Scope 1 assessments as they were deemed to be insignificant and exceedingly difficult to obtain required information. All Scope 2 emissions were included and emissions profiles for Scope 3 were included where reliable data was available and conservative estimates were used to quantify emissions.

National Greenhouse and Energy Reporting (NGERS)

According to the National Greenhouse and Energy Reporting Guidelines, from 1 July 2008, all businesses must apply for registration with the Greenhouse and Energy Data Officer if they:

- are a constitutional corporation, and
- meet a reporting threshold for greenhouse gases or energy use or production for a reporting (financial) year.

Edith Cowan University currently doesn't meet the thresholds for each facility (campus) of 25kt/100TJ of carbon dioxide equivalence (eCO_2)/energy for the 2009/10 financial year. In addition, the group doesn't appear to exceed any combined corporate threshold of 87.5kt/350TJ for 2009/10. It should be noted however that the scope of work conducted by Carbon Neutral doesn't include ECU Resources for Learning Ltd which is likely to be considered part of the corporate group for NGERs reporting. In addition, the 2010/11 reporting threshold for a corporate group will be reduced to 50kt per financial year and ECU should investigate the contribution of ECU Resources for Learning Ltd and seek legal advice to determine if this subsidiary should be included and therefore impact on ECU's reporting requirements.

Offsetting

Carbon Neutral is providing the following information for guidance only and recognises that ECU already supports Carbon Neutral with offsetting aspects of their vehicle fleet. To offset ECU's total carbon footprint would cost $612,600.

Carbon Neutral Logo use

Carbon Neutral has provided ECU with its logo in JPEG and EPS format and requests that ECU adheres to Carbon Neutrals Style Guide provided. In addition, Carbon Neutral encourage any messages or communications to be accurate in nature and refer to the Trade Practices Act for advice on claims of carbon neutrality.