

Carbon Inventory Project



Final Report, 2008



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The project

ECU approached Carbon Neutral in July 2009 to seek its assistance in determining the 2008 carbon footprint for its Mount Lawley, Joondalup and Bunbury campuses. 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)
4. Carbon Neutral will present the findings to ECU representative.

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:

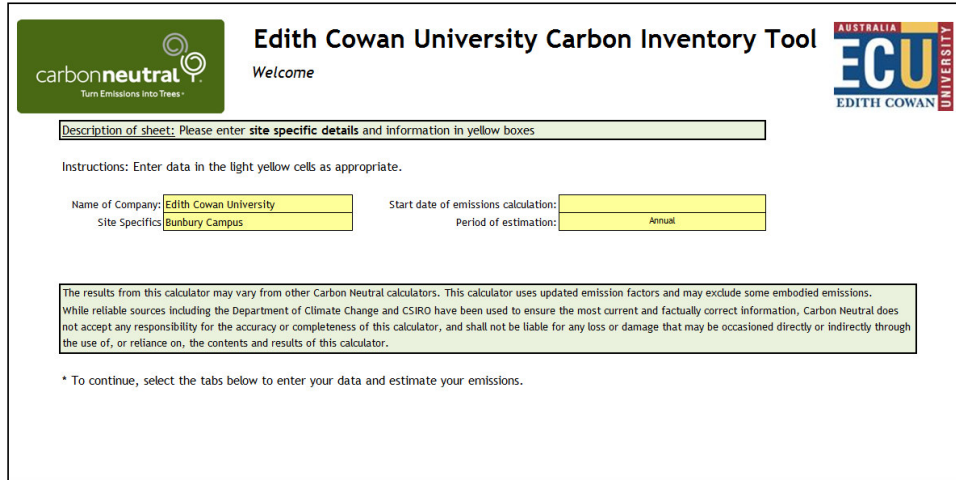
Direct emissions, Scope 1, are those which emissions which are related to fossil fuels burning, mainly gas, used for building heating, gas boilers for hot water or fuel for company vehicles or fleet. It also includes fugitive emissions such as refrigerant leakages onsite.

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:



carbonneutral
Turn Emissions Into Trees™

Edith Cowan University Carbon Inventory Tool
Welcome

Description of sheet: Please enter **site specific details** and information in yellow boxes

Instructions: Enter data in the light yellow cells as appropriate.

Name of Company: Start date of emissions calculation:

Site Specifics: Period of estimation:

The results from this calculator may vary from other Carbon Neutral calculators. This calculator uses updated emission factors and may exclude some embodied emissions. While reliable sources including the Department of Climate Change and CSIRO have been used to ensure the most current and factually correct information, Carbon Neutral does not accept any responsibility for the accuracy or completeness of this calculator, and shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents and results of this calculator.

* To continue, select the tabs below to enter your data and estimate your emissions.

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

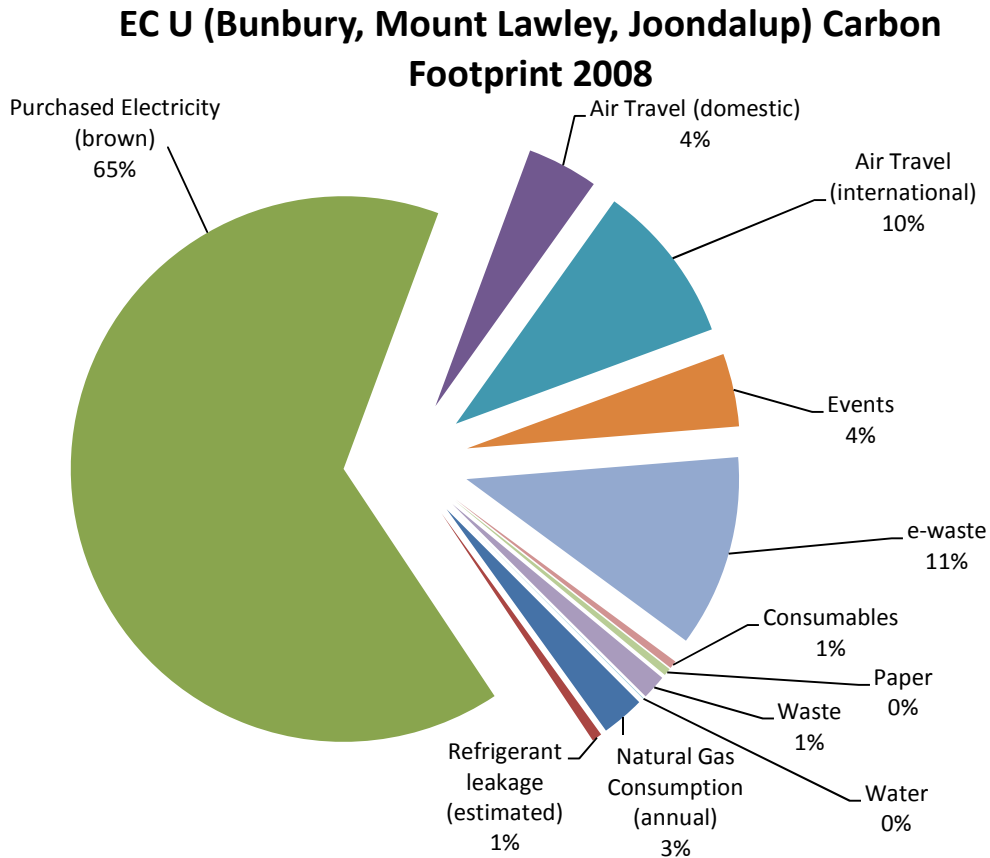
Scope	Source/Activity
Scope 1	Natural gas consumption
	Vehicle Fleet
	Refrigerant leakage (estimated)
Scope 2	Purchased electricity
Scope 3	Events
	e-Waste
	Waste
	Consumables
	Water consumption

Table 1: Scope emissions included in inventory.

Carbon footprint by activity and site.

The total carbon footprint was calculated as 35,857 tonnes of CO₂e for 2008. The following provides an overview of ECU's carbon footprint for 2008 (fleet vehicles are offset and 5% of electricity is sourced from renewable energy supplies).

Figure 1: Emissions by source (TCO₂e)



Scope 1

Scope 1 emissions at each ECU study site include natural gas consumption; refrigerant leakage estimates and vehicle fleet fuel consumption and total 1,171 tonnes annually (TCO₂e).

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 3% 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 22,879 tonnes (TCO_{2e}). ECU's three (3) sites consume over 24.5 MWh annually and contribute to approximately 65% 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, and paper and water consumption. Scope 3 activities represent approximately 30% of ECU's annual carbon footprint.

Table 2 below shows the total emissions (tonnes eCO₂) by activity for ECU for 2008.

		Greenhouse Gas Emissions Annual (eCO ₂)			Total	
		Bunbury	Mount Lawley	Joondalup		
Scope 1	Natural Gas Consumption (annual)	9.09	423.37	516.01	948.48	1,171.73
	Refrigerant leakage (estimated)	52.79	99.68	70.79	223.25	
	Vehicle Fleet (petrol)	25.70	56.27	93.72	175.69	offset
	Vehicle Fleet (diesel)	-	-	21.40	21.40	offset
Scope 2	Purchased Electricity (brown)	959.04	9,816.88	13,307.31	24,083.23	22,879.07
Scope 3	Air Travel (domestic)	1,562.34			1,562.34	11,806.32
	Air Travel (international)	3,422.84			3,422.84	
	Air Travel (trans Tasman)	109.68			109.68	
	Events	1,606.11			1,606.11	
	e-waste	253.40	1,859.20	2,107.00	4,219.60	
	Consumables	170.61			170.61	
	Paper	164.52			164.52	
	Waste	11.99	183.39	339.11	534.49	
	Water	16.14			16.14	

Table 2: Emissions (TCO_{2e}) at each site by activity

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 2008 (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. Air travel was excluded as it has been offset.

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. Should ECU wish to discuss offsetting options in more detail for either all or portions of its carbon footprint Carbon Neutral is very happy to assist.. To offset ECU's total carbon footprint would cost \$681,285.

Carbon Neutral Logo use

Once offsetting has been completed, ECU is encouraged to promote its good work using Carbon Neutral's certificate and logo. 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.