The University of Sydney
Centre for Integrated Sustainability Analysis

Carbon neutral – sense and sensibility

"The Pardoner" – Miniature of one of the thirty pilgrims in the General Prologue of Geoffrey Chancer's 14th-century *Canterbury Tales*.

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This report is freely available at http://www.isa.org.usyd.edu.au/publications/CarbonNeutral.pdf

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Executive Summary

Businesses offering to make you or your company carbon neutral are proliferating on the internet. The term *carbon neutral* is being defined by common usage. There are no standard ways of measuring your carbon emissions and so no standards for becoming carbon *neutral.* This paper examines eleven websites offering carbon neutrality. It compares online calculators, their results and the costs of offsetting calculated on the strength of those results. It traces two offset projects from the online carbon offset retailer to the actual project on the ground in order to compare the online rhetoric with the time consuming and difficult work of developing community based projects in Third World countries. The paper offers a definition of *carbon neutral* based on the ways in which the term is being used. It also uncovers a range of issues for further discussion.

1. Introduction

The notion of cancelling out, or offsetting, one type of behaviour or consequence by invoking another, 'equal but opposite' type of behaviour or consequence is not new. Kevin Smith of Carbon Trade Watch (2007) reminds us of the Pardoners of the Middle Ages who, themselves having a surfeit of good deeds, were able to sell the benefit of those good deeds to us mere mortals in order to offset the consequences of our sins. In this way we could carry on sinning, buy ourselves a bit of someone else's goodness in the form of an indulgence and thus escape time in Purgatory which was the usual fate of the sinner. We could expiate our sins and assuage our guilt while on the other side of the balance the church could make use of its members' surfeit of goodness and benefit financially into the bargain. In a similar vein we now have the *carbon neutral* parody *cheatneutral*[1] which offers to offset your partner-cheating indiscretions by funding another couple to remain loyal and faithful for life thus neutralising the 'heartbreak, pain and jealousy in the atmosphere'. Notice that neither scheme reduces the overall sinning in the world – just matches up the good and the bad and declares them thus cancelled out or neutralised. The means of measuring our sins, and calculating the price we must pay for them to be wiped out, however, are likely to have been in the hands of the Pardoner, not to mention the supply of goodness needed to cancel out our sins. It is unlikely that *goodness units* were issued, recorded and retired once sold! There is also an issue of time here: in the case of *cheatneutral* do Chris and Mim, for example, have to remain faithful for a lifetime in order to neutralise James and Jo's here-and-now indiscretion? Also who is going to keep a check on Chris and Mim to verify their on-going fidelity?

Thus a number of issues emerge.

This paper looks at the modern offsetting phenomenon of the carbon market with its notions of measuring an organisation's or individual's *carbon footprint* and then seeking to cancel out that footprint with some kind of 'equal but opposite' behaviour or consequence and thus becoming *carbon neutral*. Inevitably the modern offsetting phenomenon brings with it issues of measuring, accounting and verifying. It also has its own time problems to do with offsetting today's emissions with the promise of emissions reduction in the future and over time. Apart from these practical problems there are definitional differences to be sorted out. For example: what constitutes a *carbon footprint* and what does *carbon neutral* mean. Wiedmann and Minx (2007) discuss the definition of *carbon footprint* and conclude that it should only include CO_2, rather than all, or a selection of, greenhouse gases; it should include direct, onsite CO_2 emissions as well as all indirect or upstream emissions rather than just onsite; and should refer to a mass (kg, t, etc) measurement rather than an area of land as implied by the term *footprint*. Notwithstanding, our experiences recorded below indicate that, although the term usually does refer to CO_2 and to a measurement of mass, upstream emissions are rarely mentioned in online carbon calculators.

In the case of the term *carbon neutral* a search of Science Direct (06/07/07) drew a blank as did a search of Google Scholar. A regular Google search, however, turned up 1,720,000 hits, of which 30 of the first 50 were commercial sites offering calculators and/or carbon neutral consultancy services and carbon offsets. Of the rest of that first

[1] http://www.cheatneutral.com

50 one was for Wikipedia which sent the reader to an article by L.J. Martin in the eejitsguide.com[2].and many of those remaining were media reports to do with carbon offsetting. Clearly the term is out there in the public arena and is being defined by popular usage. However, as Standard Life Investment noted in 2006[3] "there is no common agreed definition of the term 'carbon neutral' and there is evidence of this being exploited for PR purposes". To this we might add that there is also evidence of exploitation for *financial* purposes.

Having searched many of the commercial sites as well as numerous media reports we offer the following working definition as an attempt to capture the ways in which the term is currently being used. It seems that the term *carbon neutral* is being used to capture the concept of: cancelling out the harm done to the earth's atmosphere by one type of greenhouse gas[4]-generating human activity, through another human activity that: either reduces CO_2 emissions by an equal amount; or prevents an equal amount being generated by an 'essential'[5] CO_2 producing human activity by substituting a non- or low carbon producing alternative.

The 'other' human activity that reduces or prevents emissions can be something that:

- takes an equal amount of existing CO_2 out of the atmosphere, like planting trees that, as they grow take in CO_2, or like conserving trees that otherwise would have been chopped down;
- produces an essential commodity like power, in a way that does not cause, or reduces, the amount of CO_2 usually emitted into the atmosphere by power generation;
- reduces the amount of CO_2 from power generation through an increase in efficiency of energy use; or
- conducts an essential human activity like waste disposal or recycling in a way that provides a commodity (like power or glass or paper) and at the same time prevents greenhouse gases being emitted into the atmosphere from both usual waste disposal methods and from usual power generation or product manufacturing.

This substitution of emissions forgone for emissions produced has become known as *offsetting* – we 'offset' the damage done by our emissions through the good grace of someone else who agrees to change their practice so that they eliminate or prevent a similar amount of damage. This is a concept that has given rise to a thriving industry with those who cannot or don't want to change practices seeking out others who can, and paying for the privilege of having someone else offset emissions for them. It has brought with it the need for a new infrastructure. For example carbon calculators to show how much carbon needs to be offset in order for neutrality to be achieved; mechanisms for determining when practices really have been changed to prevent emissions (maybe the organisation would have done this anyway); mechanisms to determine what counts as emissions sequestration (e.g. for how long does the tree have to remain in the ground); ways of 'trading' in carbon offsets; the 'value' of

[2] Article entitled *Carbon Neutral – What does it Mean?*. This article concluded that *carbon neutral* meant *having no net effect on the amount of carbon in the biosphere.*

[3] http://wwwstandardlifeinvestment.com/content/data/press/press_article/finance_week_06_2006.html accessed 02/07/07

[4] In this case CO_2, although in many cases greenhouse gases are referred to as well as or instead of CO_2

[5] An activity that we deem to be essential to maintaining our living standards, such as power generation or waste disposal.

carbon credits; carbon credits accounting mechanisms (how do you know your carbon credit hasn't previously been sold to someone else); carbon credit traders and trading businesses. Then there is the difference between emissions trading which usually occurs in a formal and legal framework, and carbon offsetting which often seems to refer to voluntary acts, often arranged through a non-profit organisation or commercial carbon offset retailer who sources the offsets (often from non-profit organisations) and arranges the transaction.

To service this growing industry a plethora of carbon calculators has appeared on the internet. The majority are in various ways linked to transactions operating in the carbon marketplace. Most for example calculate your carbon responsibility from say, your car use, flights and household energy consumption and then inform you of what payment needs to be made in order for you to become 'carbon neutral'. Your payment is then used for buying carbon offsets, usually either from a government recognised carbon trading mechanism or through a non-profit organisation voluntarily supporting local or Third World tree planting or alternative energy projects. Some sites support Kyoto-compliant offsetting schemes while others offer voluntary carbon reduction schemes that are not linked to the Kyoto Protocol. Jindal 2006 recognises four kinds of transactions: Kyoto-compliant organisations that trade in emissions; trade in emissions certificates under some other organised and regulated scheme (for example NSW Greenhouse Gas Abatement Scheme); project based transactions that operate under the United Nation's Clean Development Mechanism and Joint Implementation Projects in which buyers invest in carbon emission reduction or sequestration projects and receive credits in return; or some other voluntary project based scheme, where the organisation wishing to offset emissions negotiates directly with a community to fund, for example, tree planting, methane collection, renewable energy projects. These projects are often situated in developing countries (Table. 1). In the case of emissions trading, on-line businesses usually display a guarantee that once sold, carbon credits are *retired* and cannot be resold, that is, these carbon credits have been accounted for. They also often refer to the auditing of their carbon transactions.

Table. 1 : Four major kinds of transactions under carbon markets (Jindal 2006, italics in the original).

	Trade in emissions allowances	Project-based transactions
Kyoto-compliant	Trade in carbon offsets under European Union Emissions Trading Scheme, UK Emission Trading Scheme	All Clean Development Mechanism and Joint Implementation Projects
Voluntary, not for compliance under the Kyoto Protocol	Trade in emission reductions on Chicago Climate Exchange, NSW Greenhouse Gas Abatement Scheme	*Voluntary Reduction Projects, such as Carbon Sequestration Projects in Africa*

This paper looks at a range of schemes and test drives a selection of online carbon calculators. It tracks down two major schemes to their roots in community-based projects and in so doing it raises a number of issues for further investigation and debate.

2. Offset me now – a review of a selection of carbon-neutral schemes

Before any steps can be taken in the *carbon neutral* dance, the size of the carbon footprint to be neutralised has to be calculated. Below we test-drive a selection of eleven calculators. The calculators were accessed from the internet between 27 April and 3 May 2007. All were detected by the Google search engine, which probably means that they are likely to represent those most widely used.

2.1 Test-driving a selection of calculators

Before beginning this exercise we devised a standard basket of line items[6] and grouped them under the headings: General Information; Household Direct Energy Use; Personal Direct Travel by Car; Public Transport; Personal Direct Travel by Air; Other. We then attempted to enter our standard basket into each of the eleven calculators. Table 2 shows which line items were available for each of the calculators tested. A look at the line items revealed that not all sites requested the same basket of goods and services, which confounds any real comparison. This is therefore not offered as a comparison of like with like, because line items differed widely, but as an indication of the general confusion and lack of standardisation around calculators and the resulting offsets. It illustrates the complex nature of this whole area for individuals and small businesses wishing to become *carbon neutral* where, in the absence of international standards, a plethora of methods and practices has flourished. Notwithstanding, we entered into the calculators whatever we could from our standard basket. Wherever the calculator requested input that corresponded directly with our basket item the cell was marked with an *x*; wherever there were qualifications or additions to our basket item this was indicated in the appropriate cell.

Table 3 provides the results from the eleven calculators together with some comments on the offsets offered and the methodologies used.

2.2 Discussion

No two of the eleven carbon offset websites requested the same basket of inputs, so no real comparisons can be made between the amounts of carbon that were calculated to be offset. For example, *Carbon Neutral Ltd* requested 13 items and *BP Global* requested 11 across all of our input categories. However, *targetneutral* dealt only in car travel; *myclimate* sought some general information, information about direct energy use and car travel; and *Sustainable Travel International* requested general information, car and air travel. From the available information, it also seemed that none of the sites used the same methodology for calculating emissions, although it was difficult to tell because information was sometimes hard to find and on one site at least there was no information readily apparent[7]. Understandably then the results in terms of carbon differed widely, ranging from 6 – 11 tonnes. Although despite the likely differences in methodologies and the obvious differences in input, one or two of the calculations were quite close. *Carbon Footprint Ltd,* for example, calculated 6.356 tonnes of CO_2 to be accounted for and *Sustainable Travel International*

[6] 2 family members; 5000 kWh of electricity; 833 kWh (or 3000 MegaJoules) of gas; no renewables, LPG, oil or coal, 1 x2litre, 4cl, family car travelling 20,000km (12427 miles) per year; 2 short-haul flights per year.
[7] Information may have been there, however our search of the website failed to find it.

calculated 6.61 tonnes. Even so the offsetting fees proposed by these two sites were quite different. *Carbon Footprint Ltd* requested a payment of $A214.80 to support tree planting in Kenya while *Sustainable Travel International* requested $A121.06 to support renewable energy projects in developing countries. Thus different offset projects have different price tags. In this example it would seem that the costs involved in tree planting in Kenya are higher than those of an unspecified 'renewable energy project in a developing country'. This could be because of project costs on the ground, or it could be related to infrastructure costs involved in the retailing of offsets, or more likely a mixture of both.

This raises not only the issue of standardisation and transparency of online calculator methodologies but also the need at least for some explanation of costings. Transparency in fees paid to the retailer/s and funds flowing through to the project would assist in making decisions about which offset retailer to use in pursuit of carbon neutrality.

Only two websites indicated a recognition that upstream/indirect effects should be considered. The UK's *Carbon Footprint Ltd* tells users that their secondary, or upstream, footprint has not been calculated suggesting recognition that omitting the upstream footprint is less than ideal. Another website, *Elementree* based in Western Australia, says that its emissions calculator does not include non-direct emissions in its vehicle-use calculator because *Elementree* does not consider them "to be the responsibility of the vehicle owner". However, they say that they recognise the importance of such emissions and will pursue "accountability for them with the source providers and distributors". Here, as well as a consideration of upstream emissions, there is also a reference to *responsibility.* This raises the issue of who should account for what. If everyone along the supply chain were to account for all upstream emissions there would be considerable overlap and emissions would be counted several times (Gallego & Lenzen (2005); Lenzen et al (2007); Hammerschlag & Barbour (2003)). If we are voluntarily paying into a tax-exempt not-for-profit tree planting project and whatever trees we pay for get planted, then perhaps accurately accounting for carbon is of secondary consideration. If, however, the purpose of a calculator is to underpin a regulated and reliable government program, or if it is part of a responsible commercial enterprise, then accounting surely matters and a methodology such as that developed by Gallego and Lenzen (2005) is needed to avoid double counting and apportion responsibility fairly along the supply chain. Many of the online carbon neutral businesses examined in this table would probably welcome the kind of standardisation of methodology and practice that applies to other accounting practices.

Table 2 Selection of online carbon calculators showing line items

Name & Website	General - Information			Household - Direct Energy Use				Personal - Direct Travel by Car						Public transport	Personal - Direct Travel by Air				Other
	persons in household	State/country	Home Type &/or size	Electricity	Other	Natural gas	Other	Number of Cars	Type, model, year	mileage/ kilom (weekly/ annually)	engine size	mpg or ltr per 100km	Fuel Type	commuting	Domestic/ short haul	med haul	long haul/ International	km travelled	Goods/services
Carbon Footprint Ltd http://www.carbonfootprint.com/index.html	x	UK & US (by state)		kWh or cost	renewables y/n	kWhrs or cost	LPG, oil, coal	x	x	x				underground, bus and train	x	x	x		
Climate Crisis http://www.climatecrisis.net/takeaction/carboncalculator/	x	USA (by state)		cost	% renewables	cost	cost of heating oil & propane		x	x					x	x	x		
BP http://www.bp.com/home.do?categoryId=1&contentId=2006973	x	Country	detached, appartment etc		renewables y/n			x	x	x				underground, taxi, bus and train	x		x		business travel by car, air, train
target neutral http://www.targetneutral.com/TONIC/index.jsp								x	x	x		x	x						
MyClimate http://www.myclimate.org/index.php?lang=en		Switzerland, EU or USA	square feet	kWh			heating fuel type			x		x	x					enter starting point and destination	
Sustainable Travel International (STI) http://www.sustainabletravelinternational.org/offset/index.php?c=1	x	US or Europe	new energy efficient y/n; sm, med, lg							x		x			x		x	enter starting point and destination	gift offsets for car, flight, home, person; hotel stays nights per year

Elementree http://www.elementree.com.au/calculator.asp		Australian state or territory		kWh	choice to include some upstream	kWh				x	x		x					x	
Mycarbondebt http://www.mycarbondebt.com/?gclid=CJqf7ruEtYsCFSHBYAodJF4Nzw		UK		KWh		KWh	oil			x		x	x		x				nappies & gift vouchers
Noco http://www.noco2.com.au/								x	x	x			x						
Climate Friendly http://www.climatefriendly.com.au/calc.php		x		kWh						x	x				x (choice of cities)				
Neco http://www.neco.com.au/carbon/index.html		Australian state or territory		kWh		Kj			sm. Med, lge etc		x	x	x		x		x		gift offsets

Table 3 showing amount of CO_2 calculated on each site and cost of offsetting

Name & Website	Description	TOTAL CO2 of basket[8]	Cost in Australian $ (at 23/04/07)	Offset	Calculation	Comments
Carbon Footprint Ltd http://www.carbonfootprint.com/index.html	UK business offering business footprinting and consulting services; personal carbon footprint based on **household fuel use and travel**; offers fully traceable certified or voluntary carbon credits; off the shelf flight offsets & gift vouchers;	6356kg	$214.80	plant 9 trees in Kenya @ £10 each based on 1 tree offsets 730kg of CO_2 over 100yrs; option to enter how much you want to offset and see options & prices (e.g. reforestation in Kenya, hydropower in Brazil).	based on Defra's guidelines for GHG emissions;	shows: primary footprint for self and household & compares with average UK household and person; your estimated secondary (indirect) footprint and average for UK household and individual (for food; clothes; car manufacture; building, furniture and appliances; recreation & services; finance & services; share of public services). Advises on footprint minimisation inc switch to green energy;
Climate Crisis http://www.climatecrisis.net/takeaction/carboncalculator/	USA site supports film *An Inconvenient Truth*. Calculates **home energy use and transportation**	5,5 tonnes	$86.47	offset with new Native American and Alaskan Native wind turbines and new family dairy farm methane energy projects to deliver clean, renewable energy to the grid from http://www.nativeenergy.com/Splash/ClimateCrisis/ClimateCrisis.html?ClimateCrisis	power CO_2 per kilowatt hour based on State of residence; fuel efficiency calculated by terrapass (http://www.terrapass.com/); uses fuel emissions factors from US Government's Energy Information Administration (EIA) to convert gallons used to pounds of CO_2; air travel definitions and factors are from DEFRA; energy emissions factors (electricity and other fuels) from EIA;	uses default state average data where no input is provided; results compared against estimated monthly per capita US average of 1,250 pounds from transportation and home energy emissions
BP http://www.bp.com/home.do?categoryId=1&contentId=2006973	BP Global ghg calculator for home **energy use, ground travel, air travel, waste and type of dwelling**	9 tonnes	provides information on alternative energies	UK drivers can neutralise the CO_2 emissions caused by their driving through targetneutral (below)		asks about household heating & air conditioning; building & appliances efficiency; pool; personal energy use habits & recycling; new & renewable technology use
target neutral http://www.targetneutral.com/TONIC/index.jsp	UK based non-profit making partnership from BP; offsets **car only**. Target neutral is entirely funded by BP. BP will contribute to the scheme for every litre of fuel UK targetneutral members buy.	3.49 tonnes	$40.25	support biomass projects in Bihar & Himachal Pradesh through MyClimate	calculated 'according to the number of litres of fuel you consume' average UK driver emits 4 tonnes of CO_2 per year.	car only, can pay monthly or annually, member pack available for £2

[8] 2 family members; 5000 kWh electricity; 833 kWh (or 3000 Mjoules) gas; no renewables, LPG, oil or coal, 1 x2litre, 4cl, family car travelling 20,000km (12427 miles) per year; 2 shorthaul return flights per year. NOTE: not all calculators included all basket items

MyClimate http://www.myclimate.org/index.php?lang=en	Swiss based non-profit foundation offering carbon offsets to business and individuals for carbon neutral **travel**	7.063tonne	$284.51	renewable energy projects in Africa, Asia and South America	No information apparent	offers emissions reduction certificates under the Kyoto Protocol; consultancy services for CDM project developers
Sustainable Travel International (STI) http://www.sustainabletravelinternational.org/offset/index.php?c=1	USA branch of MyClimate-calculators for **flights,driving, household, hotels**	6 tonnes	$121.06	renewable energy projects in developing countries	Downloadable 'Carbon Calculator Architecture' document showing the sources for emissions factors. A note indicates that most of the assumptions used in the calculator are aimed at making it simple to use.	A minimum of 85% of your investment is allocated to MyClimate™ projects, the balance of which covers overheads. Projects are developed according to the standards of the Clean Development Mechanism under the Kyoto Protocol.
Elementree http://www.elementree.com.au/calculator.asp	Autralian owned (WA) not for profit. **car, air travel & electricity and gas**	10.96 tonnes	$110 tax deductible	plant 44 trees. Members are assigned a site number that identifies the precise geographic location of their trees.	car fuel consumption AGO Factors and Methods Workbook; 0.070litres/km/passenger @ 80% occupancy for flights; power AGO workbook	Offset emissions by revegetating the Australian bush with native trees
Mycarbondebt http://www.mycarbondebt.com/?gclid=CJqf7ruEtYsCFSHBYAodJF4Nzw	UK commercial business offering quick offset (e.g. hybrid car; small car etc) or detailed offset (e.g. miles per year, mpg, type of fuel. Offsets for **car, flight, house & baby**	7.435 tonnes	$210.32	Adds contributions to a fund which is used to buy regular batches of tonnes of carbon offset from ethically managed, traceable reforestation and energy projects worldwide.	officially published figures (e.g. Department for Environment, Food and Rural Affairs) to convert quantities of fuel and energy to CO_2 emissions. Use average emissions numbers for cars and homes of various sizes provided by the UK government. Flight calculations are based on data and algorithms provided by Carbon Clear Limited.	suggests first reduce and then offset what can't be reduced
Noco http://www.noco2.com.au/	Australian company: Offset **car and flights**; Certification program to identify carbon neutral businesses and products	5.65tonnes	$80.80	Purchases carbon credits created through demand-side energy efficiency projects under the New South Wales Greenhouse Gas Abatement Scheme (GGAS)		recommend 3 step approach: energy efficiency; reduce travel/transport requirements through improved technology; offset remaining emissions
Climate Friendly http://www.climatefriendly.com.au/calc.php	Australian Retail carbon credit service; supports new renewable energy projects. Offsets for **car, air travel, home or office**	10.5 tonnes	$318.20	Australian and international sustainable energy projects including: wind, solar electric (PV), solar thermal, micro hydro (low-impact), geothermal, ecologically sound biomass, biogas, biofuels, and landfill gas to energy.	The emission factors are based on accepted figures from the Greenhouse Gas Protocol, the International Panel on Climate Change, Defra, UK (Department of Environment Food and Rural Affairs, UK) and the Australian Greenhouse Office.	Current Gold Standard international project is Te Apiti wind farm in New Zealand

3. An in-depth look at two websites with particular attention to offset projects

Below are detailed descriptions of two carbon-offset websites (for summaries of a further 5 websites see Appendix 1). They mention the difficulties inherent in tracking down carbon accounting methodology and the calculation methodology for deciding on how much/many offsets are needed. They look in some detail at the nature and whereabouts of offset schemes; the organisations behind the offsetting businesses; and the organisations actually responsible for the offsetting projects on the ground. Where possible comment from other sources has been included in an effort to gain insight into some of the difficulties inherent in setting up and conducting offset projects.

Carbon Footprint Ltd[9]
Carbon Footprint Ltd in the UK is a commercial enterprise trading in offsets and offering consultancy services. It offers an on-line carbon footprint calculator based on household fuel and travel. The calculator's required inputs are: number of family members; direct electricity and gas use in kilowatt hours or cost, and whether or not renewables are purchased; use of LPG, oil and coal; the number and type of car used by the family and the mileage; and the number of short-, medium- or long-haul flights taken by family members.

The website's terms and conditions state that the calculator "has been produced on a best efforts basis". The metrics, they say, "are based on DEFRA[10]'s guidelines for Green house gas (GHG) emissions, 2005." Carbon Footprint Ltd offers tree offsets calculated using "the estimation that on average one tree will offset 730 kg of Carbon Dioxide during its full-lifetime of approximately 100 years". They will "ensure the correct number of trees is planted" and "use best endeavours to ensure the trees are planted in the chosen areas". They reserve the right to plant the trees in a nearby location.

From our input the site calculates total emissions of 6,356kg CO_2. This is termed the "primary footprint"; the website reminds us that our "secondary Carbon Footprint" from indirect emissions has not been calculated here". The site calculates that we need to plant nine trees at a cost of $A214.80. The trees will be planted by the not-for-profit organisation TIST in Kenya.

We look up TIST on the internet[11] and find that it is The International Small Group and Tree Planting Program (TIST) which operates in India and Tanzania, and according to its website, began in 1999 in Mpwapwa, Tanzania with Anglican Church Small Groups. TIST was founded by Ben Henneke who is president of Clean Air Action Corporation (CAAC) in the US. CAAC is TIST's parent company, owning the local TIST companies. According to CAAC's website[12] CAAC specialises in 'low cost strategies to clean up the air' using control technology and carbon sequestration (through TIST). It says that TIST has been selected for the World Bank BioCarbon Fund.

[9] http://www.carbonfootprint.com/calculator.html accessed 20 April 2007.
[10] UK Department of Environment, Food and Rural Affairs
[11] http://www.tist.org/ accessed 22/04/07
[12] http://www.cleanairaction.com/results.htm accessed 20/04/07

Ben and Vanessa Henneke's paper *Encouraging God Centred Small Groups*, available on the TIST website, provides a good understanding of how these small groups are built and how they operate. The TIST website provides a wealth of detailed information about the activities of the over 7,000 small group members. In order to track the progress of your offsets you can begin with a country profile, say, Kenya, which will tell you that TIST in Kenya is funded in part by USAID and has a total of 1,415,715 trees which have been planted by 2650 small groups; click on one of the two project areas, say Meru, and you will find they have 1,115,985 trees planted by 2051 groups. Click on a group centre say, Chugu, and you will find that they have 358,632 trees planted by 627 groups. The whereabouts of the actual groves managed by these groups is shown by an overlay on a Google satellite map of the area. The 627 groups are listed by group name and TIST number, with their village name, the number of trees planted, the number of seedlings they have in stock and the date of the last monthly report. All groups are periodically audited and the last audit date is recorded. Clicking on the last audit date, say 04 March 2007 for the Muguna A group, reveals the names of the groves, longitude and latitude of each grove, a short description (for example by a house; on a farm) and how many kilometres to the nearest water. Clicking on the grove shows a scatter plot of GPS points around the perimeter of the grove, which can also be viewed superimposed on a Google satellite map. A camera icon indicates that there are photographs of the group members and the groves. Each picture is captioned with Grove Name; Date Picture Taken; and Picture Type (for example trees, nursery). The site says that greenhouse gas offsets created by TIST can be purchased on ebay[13]. The *TIST GHG [ebay] Boutique* is maintained by Clean Air Action (CAAC).

According to Cosman et al (2006) TIST has greatly benefited the local participants, building the capacity of local farmers, for example, to use GPS and palm-pilot technologies to monitor the sequestration projects. However, they say, despite the local benefits TIST has proved to be a costly enterprise for CAAC. TIST in Uganda, for example, has yet to earn carbon credits that CAAC can trade on the carbon market. They see the main barrier to success of local small scale community based projects as high investment costs. TIST apparently makes a small amount of money from carbon credits traded on the voluntary market through organizations like Carbon Footprint Ltd above, however the "stringent certification process of the Clean Development Mechanism" (p.16) although progressing slowly, is currently beyond their reach. This delay in approval from the CDM is having adverse effects on project approval in the host country. In Tanzania, for example, the Designated National Authority (DNA) oversighting the CDM is losing confidence in the local project because of delays, even though the delays are thought to be a consequence of the CDM's approval process rather than quality of the project. The perceived DNAs' lack of confidence in local projects will only be exacerbated by the unreliability of some of the private companies authorized to validate and register projects with the CDM board (Davies, 2007).

[13] http://stores.ebay.com/TIST-GHG-Boutique accessed 22/04/07

BP Global

The BP Global carbon footprint calculator[14] asks for energy use, ground travel, air travel and waste as well as country of residence, number of people in the household and type of dwelling. Input data includes questions about draft proofing and double glazing; light and equipment switch-off habits; recycling practices; solar hot water and/or solar electricity and how much electricity comes from renewables. For transport the user can enter the type and mileage[15] for up to three vehicles and the number of short and long haul flights made by household members, as well as those made for business. It also requires data on how many miles travelled by train, bus, underground and taxi.

From our input basket the site calculates a total of 9 tonnes of CO_2 which it tells us is lower than the Australian average of 14.36. The site suggests that UK drivers can neutralise the CO_2 emissions caused by their driving at *targetneutral*, a non-profit making initiative funded entirely by BP that allows you to fund CO_2 reducing projects to 'neutralise' the CO_2 caused by your driving. BP will also contribute to the scheme for every litre of fuel *targetneutral* members buy.

Targetneutral[16] says that it allows UK drivers a way to make "their own, personal contribution to reducing, replacing and neutralising, the harmful CO_2 emissions their driving produces". The site's calculator asks for the number and type/s of car owned by the household, mileage, miles per gallon and fuel type. It calculates we emit 3.49 tonnes[17]. The site accepts either monthly payments or an annual payment equivalent to $A40 (not including tax) to offset the emissions and support biomass projects in Bihar & Himachal Pradesh. *Targetneutral* says that one tonne of CO_2 can be neutralised for €6 ($A9.5). However, projects do vary in price depending on the type of project and running costs. As illustration of a biomass energy project in Himachal Pradesh in NW India on the border with Kashmir, they provide a photograph of a young woman and small boy holding open a bag or sack and catching something that is falling from a conveyor belt. In response to our email asking about their projects *targetneutral* says that a company called *myclimate* actually conducts BP/*targetneutral*'s biomass projects on the ground[18].

Myclimate[19] is a Swiss not-for-profit organisation offering "high-quality carbon offset certificates for climate neutral business travel, conferences, products or for compliance regimes". For private individuals it offers *myclimate* air tickets to "offset the environmental impact of emissions" from air travel. *Myclimate*'s patronage committee includes the Chairman of the Board of the Swiss Stock Exchange and the co-ordinating main author of the third Assessment Report to the United Nations' Intergovernmental Panel on Climate Change. According to *myclimate*'s website its carbon offset projects are developed "in accordance with procedures, criteria and methodologies from the Clean Development Mechanism (CDM)" controlled by the Kyoto protocol and registered with the United Nations. Once registered under the

[14] http://www.bp.com/extendedsectiongenericarticle.do?categoryId=9008204&contentId=7015209&BPLinkTrace=1604280000 accessed 20/04/07

[15] Although we entered *Australia* as the country the site asked for *miles* travelled.

[16] http://www.targetneutral.com/TONIC/index.jsp.

[17] The Legal Notice found in the small print at the bottom of the page warns that "Despite our efforts, it may not be accurate, up to date or applicable to the circumstances of any particular case".

[18] Email from targetneutral team, received 10 April 2007.

[19] http://www.myclimate.org/index.php?lang=en, accessed 22 April 2007.

CDM projects generate Certified Emissions Reductions (CERs) where one CER unit refers to one reduced tonne of CO_2. These certificates can be traded under the European emissions trading scheme. *Myclimate* also deals in Verified Emissions Reductions (VER) projects. These are projects too small to be registered with the UN, and usually operating in rural and disadvantaged regions (a VER also represents one reduced tonne of CO_2). VERs can be used for voluntary GHG compensations. They are calculated in the same way as CERs.

Both CERs and VERs comply with the Gold Standard, which is, according to the Gold Standard website, "an independently audited, globally applicable best practice methodology for project development that delivers high quality carbon credits of premium value"[20]. The Gold Standard is supported by 29 NGOs among them Greenpeace International and WWF International.

One of *myclimate*'s projects is the generating of electricity from biomass in India. The *myclimate* website, dated 2005, outlines the project and shows the same picture as that displayed on the *targetneutral* website, of a young woman and small boy holding open a canvas bag. The picture is to the right of a picture of factory equipment captioned "Energy from biomass…", under the picture of the woman and boy it says "…is securing the electricity supply"[21]. This, the website says, is part of the 100 village program to provide electricity to Indian villages in Bihar, which is in the North East of the country (i.e. some way from Himachal Pradesh where *targetneutral* had located the picture). Under the heading *Project type*, it says *CDM* (i.e. Clean Development Mechanism, operating as part of the UN's Kyoto strategy). The website says that the project is operated in collaboration with "an experienced Indian company". The *myclimate* website says that, "Simultaneously to the construction of the power plants, local micro-enterprises, such as a rice mill, a cold storage for agro-products or other agro-processing enterprises, will be formed… An established Indian company takes care of the construction and operation of the power plant… A local NGO is responsible for the implementation and administration of the project."[22] Notice that the future tense (*will be formed*) is used indicating that perhaps this is a work in progress.

A search of CDM projects on the UN Framework Convention on Climate Change (UNFCCC) website [23] resulted in one *myclimate* project [24] co-sponsored with Switzerland (which is an Annex 1 country[25] under the Kyoto Agreement). This, however was not the Bihar project. It was a biomass project in the South Western state of Karnataka. In response to our email requesting the title of the Bihar project so that we could search the UNFCCC website more effectively *myclimate* said that, the "project has just been validated and [*myclimate*] will be requesting registration soon"[26]. *Myclimate* included a copy of the project design document (PDD) listing all 100 villages in the Araria District, Bihar. The document indicates that the project was

[20] http://www.cdmgoldstandard.org/ accessed 22/04/07
[21] this same picture pops up on the BP/Targetneutral site as a chemical manufacturing plant in Himachal Pradesh http://www.targetneutral.com/TONIC/projects_2.jsp accessed 23/04/07
[22] http://www.myclimate.org/index.php?lang=en&m=projects&um=overview&uum=india accessed 22/04/07
[23] http://cdm.unfccc.int/Projects/projsearch.html 03/07/07
[24] project description downloaded 03/07/07: WQ2QRYRFUQPQOWPTH9VZKFARG9W86S.pdf
[25] industrialised countries and countries with economies in transition (i.e. Eastern European)
[26] email from Martin Stadelmann, *MyClimate* 06/07/07

first submitted in January 2003 which provides some indication of the time involved in establishing and negotiating projects and then gaining validation.

To find out more about the 'experienced Indian company' and the 'local NGO' we visited *myclimate*'s US representative, *Sustainable Travel International* (STI). STI says that it costs approximately $US9 per 500 miles traveled to offset your journey and at least 80% of the consumer's investment in offsets "flows into the climatic protection projects"[27]. STI say that they provide the opportunity for travelers to "compensate for 100% of the impact" of their travel. One of the offset projects offered is in Bihar, India. To illustrate the project the same photograph of the young girl and boy is used and although it is captioned Bihar, the accompanying text, headed *Biomass Energy in India, Bihar*, talks about the "100 village programme to provide electricity to Indian villages in Tamil Nadu" which is India's Southern-most state, a long way from Bihar in the North. Again the project type is recorded as *CDM* however having learned from *myclimate* that the project is yet to be registered it is unclear whether this has been labeled CDM by mistake or if it means that the project is a CDM *type of* project, or simply that the project provides a mechanism for clean development. STI's website claims that "All MyClimate™ projects: are in operation; are realized by competent partners; are inspected, verified, and certified by independent third parties; are regularly monitored for efficiency; and are developed according to the standards of the Clean Development Mechanism under the Kyoto Protocol."[28] It is unclear how far this statement applies to the Bihar project.

Sustainable Travel International's partners on the ground in India, in a public/private partnership, are The George Foundation[29] and Decentralized Energy Systems India (DESI) Power[30]. DESI Power's role is to look after the construction and operation of the power plant. DESI Power's EmPower Partnership Program (EmPP) "involves building small scale (50KW to 500 KW) biomass gasification based power plants in remote villages with direct association with local partners (NGO/Panchayat[31]/co-operative) who own and operate the plant while technical help is provided by DESI Power which also takes up small equity in the project" (Reserve Bank of India, 2005:43)[32]. Critical success factors are seen as: abundant availability of biomass; involvement of professionals (i.e. in this case DESI Power); collaboration from locals; promotion of micro-enterprises leading to local employment; and price incentive to shift to alternative power.

In response to earlier difficulties in building sufficient capacity in local groups to take on management and operational roles DESI Power now runs a management training centre for women, DESI_MANTRA. DESI_MANTRA trains women to work in DESI Power in the EmPP power plants. According to the DESI website[33] all of the original trainees have now become employees of DESI power and a second intake will commence training in August, 2007. The website observes that new grants are needed to assist in the training.

[27] http://www.sustainabletravelinternational.org/offset/index.php?c=1 accessed 20/04/07
[28] http://www.sustainabletravelinternational.org/documents/carboncalculator_about.html accessed 12/07/07
[29] http://www.tgfworld.org/home.html accessed 20/04/07
[30] http://www.desipower.com/100Village/writeUp100Village.htm accessed 22/04/07
[31] A Panchayat is a local government assembly of five villages (four villages around a central, larger village)
[32] http://www.iimahd.ernet.in/~mssriram/expert-group.pdf accessed 20/04/07
[33] http://www.desipower.com/100VillageStatus/main.htm accessed 12/07/07

In 2005 DESI Power announced its success in being selected by *myclimate* as the provider of CERs generated by "the first of three power plants being built under the 100 Village Program" with "a large upfront payment" *(DESI Power, 2005)*. At the same time it announced its intention of seeking "validation and registration of all the 100 village projects under CDM" (p.1). It expected the process to be completed within a few months and the project to be delivering CERs by the end of 2006. In 2006 the United Nations Development Program (*UNDP, 2006*) Global Environment Facility initiated a project to remove barriers to the increased use of biomass energy sources for generating electricity in India. Phase 1 of the project was to provide technical assistance and investment support in a limited number of states including Haryanan, Maharashtra, Punjab and Rajasthan (in this particular case there was no mention of Bihar and Himachal Pradesh). The report observed that "the commercial viability of the biomass power projects is yet to be demonstrated in India on a visible scale. Viable business models need to be established to improve the confidence levels of investors and regulators. Given the nature of the investors in the cooperative and small entrepreneur sectors, this limited confidence poses high-perceived risk, which leads to larger up-front capital requirements" (p.15). Clearly there were major difficulties to be overcome in development of the 100 village project, not least the issue of investment funding. It says something of the determination of DESI Power that, having first submitted the project to the UN in 2003, they secured funding from *myclimate* in 2005 and in May 2006 the 100 Village project was selected as a winner in the global competition, Development Marketplace, held at the World Bank and co-sponsored by the GEF[34]. A June 2007 article on the DESI power website states that representatives of the World Bank and the State Bank of India have recently visited the project, indicating ongoing interest.

3.1 Discussion

The above attempt to locate offset projects illustrates the potential for forming quite different perceptions of the project on offer when first reading descriptions on a carbon neutral/carbon offset retail website (in this case *targetneutral, myclimate* and *Sustainable Travel International*) and then learning of what is actually happening with the project on the ground. For example having entered your data and been told that *targetneutral* accepts either monthly payments or an annual payment equivalent to $A40 to offset your emissions and support biomass projects in Bihar & Himachal Pradesh, you might expect that you are paying towards a project that is already in operation and is reducing local carbon emissions. However this may not match up with the on-the-ground story. It is possible that your payment is going towards the process of engaging local support and setting up the project rather than running it, and that savings in carbon emissions will occur some time later once local energy generation is transferred from the current method to biomass. While the development of such a project is something that many offset buyers would consider to be a good thing to support, the problem lies in the misconceptions that are possible where information provided by offset retailers is scant. It is unhelpful for example, that three related sites provide different geographic locations, for the same project and use the same photograph, in two cases with different captions. It is potentially confusing to refer to the 100 Village project type as *CDM,* which would appear to indicate an established venture available as an approved and validated offset provider.

[34] Global Environment Facility, an independent financial organisation

A search of websites associated with the actual project on the ground tells a complex story of the time and resources needed to secure funding and investment partners; to consult with communities; and provide community training to support local implementation of projects. In this particular case it reveals a four-year journey from original request for recognition under the CDM in 2003, to financial support from *myclimate* in 2005 and the GEF in 2006, and eventual validation through the CDM process and subsequent request for registration as a CDM project able to generate offset certificates in 2007.

In our quest for information about the project on the ground beginning with the *BP Global* carbon neutral website, we were first sent to *targetneutral* and then on to *myclimate*. From there we went to *Sustainable Travel International* who identified their partners on the ground in India. A search for DESI Power revealed a small part of the project side of the story, and a glimpse into the local and global negotiations that must take place to support the development of such a project. A search for the UNDP Global Environment Facility revealed some of the on-the-ground difficulties involved in initiating and supporting local projects such as that proposed by DESI Power. It also referred to the difficulty of finding organisations willing to invest in such projects.

The above investigation, following links when they were provided, searching for and scouring websites when they were not, and email exchanges to fill in some of the gaps, took about fourteen hours over a number of days. It revealed some of the realities of initiating projects in small and sometimes, isolated communities. Few people seeking carbon offsets would commit the time to do this, or even see the need to track down the whereabouts and status of the projects for which their payments were being collected. It is likely that those of us seeking to voluntarily offset some part of our lifestyle may willingly pay our money on the strength of the good name and/or not-for-profit status of the offset provider. However carbon offset retailers could perhaps play a greater part in ensuring that we get accurate and accessible information so that we can have confidence in the projects described. Confidence needs to be restored following such incidents as the high profile UK case of the rock band offsetting its tour by planting mango trees in Africa – trees that actually damaged the local ecology, were not wanted by the community and subsequently died ((Smith 2007)). Ready access to information about DESI Power's training program for women, for example, could illustrate the spin-off benefits of CDM type projects and help engender confidence in such projects. TIST, with its detailed audit trail, including photographs bearing the names of locations and team members, can provide a model for offset accountability.

For organisations needing to purchase offsets for compliance purposes the status and reliability of CDM projects is probably much more important than it is for voluntary purchasers. Yet information is difficult to track down and the status of projects is hard to uncover. And even when a project can be traced and its verified status confirmed on the UNFCCC website this does not always mean that the project is in fact contributing to emissions offsetting or reduction. The UN's Methodology Panel[35] convened to recommend new baseline and monitoring methodologies for CDM

[35] http://cdm.unfccc.int/Panels/meth/members/index.html 09/07/07

projects, recently prepared a report on Designated Operational Entities (DOEs). DOEs are private companies authorised to validate and register projects with the CDM board. In its unpublished report[36] the panel found that close to 50% of the projects checked could not be said to be additional to the baseline, that is, they would have happened anyway, and thus should not have qualified as CDM projects and were not entitled to sell CERs. According to a report in the Guardian Weekly "one of the CDM's experts calculates that as many as one third of the projects registered in India are commercial ventures which do not produce any additional cut in greenhouse gases and were wrongly approved" (Davies, 2007). The Methodology Panel concluded that it must in future make spot checks on the performance of DOEs and if necessary disqualify them.

Thus not only is it sometimes hard to tell from carbon offset business websites just which projects are actually officially recognised CDM projects, once found it is still hard to know the real value of the project in reducing emissions. Information gathering is also hampered by the difficulty in searching the UNFCCC website, the search engine of which, rather than keywords, requires the project title or reference number, things that few people would be privy to.

[36]Personal correspondence from Schaeffer, R. member of the Meth Panel, 12/06/07 following a story in The Guardian Weekly (http://business.guardian.co.uk/story/0,,2093836,00.html) which outlined the report's findings.

4. Conclusions

On-line calculators cannot be divorced from the purpose for which emissions are being calculated. The purpose of the website, its emissions accounting status, or non-profit project based status, has implications for how we view the methodology used to calculate how much carbon the individual or organisation should account for. One might expect for example that a site involved in emissions trading schemes would have access to a standard calculator that would apportion the user responsibility for the appropriate amount of carbon. This is particularly important in light of the current doubts about emissions trading schemes such as the European Union Emissions Trading Scheme where carbon reached $47.6 per tonne in 2006 only to crash to $0.21 by June 2007.

There is probably not the same urgency for standardisation of carbon calculators used on non-profit websites offering voluntary, project based offsets. Voluntary offset payments made to non-profit organisations are usually tax deductible and therefore are seen as a donation[37]. However since most on-line calculators (that is, in this instant those detected by Google searches on 26 April and 1 May 2007) provide results for the purpose of some kind of payment, rather than donation, to be made, the individual or organisation needs to be confident that what they are paying for is, within reasonable bounds, a reflection of the carbon emissions for which they are responsible, and that their money is well spent.

The carbon-offset industry has grown dramatically over the last few years, as businesses, households and individuals seek to understand what it means to become carbon neutral. And while the UN is still struggling with protocols and strategies the carbon entrepreneur has set up shop. While the UN looks at issues of standardising, measuring and reporting, the carbon neutral online business provides a home-grown calculator for reporting to family and clients or customers. While global reporting regimes talk about benchmarks and targets the small-scale online carbon business helps its customers move from their current position, identified by its online calculator, to what it calls a *carbon neutral* position. As a business, the online offsetter's strategies to reduce and prevent carbon emissions are simple, they: measure; advise; provide and distribute energy efficient products; and provide offsets certificates to fill the gap of whatever outstanding carbon remains, according to their measurements. Meanwhile the tools and infrastructure to measure, verify, audit and trade are slowly developing.

It is inevitable that gaps will appear in the global mechanisms being formed to regulate and account for the carbon economy, and that it will take time to fix them. It is also inevitable that projects on the ground will be messy and that, for example, gaps in local expertise will be found and will have to be dealt with before projects can go ahead, meaning that things will always take longer than expected. Meanwhile around the globe individuals and organisations are supporting offset projects by buying carbon credits in an effort to become carbon neutral. In these early days of what sometimes seems like a carbon neutral free-for-all it is doubtful if our purchase of offset certificates for a particular amount of carbon to be neutralised by reduction or

[37] Tax deductibility for a donation is contingent on the donor receiving no benefit or profit from the donation. It is therefore unclear if a company could donate and then claim to be Carbon Neutral – a claim that may have significant business benefit for a company..

prevention elsewhere is any guarantee that his has been achieved. It is as well to ask yourself if the project in which you are investing is, in and of itself, a good thing and if, as seems to be the case with TIST and with DESI Power, local expertise is being developed to manage it. If so it's probably worth supporting for its own sake. Any contribution to the reduction of carbon in the atmosphere is a welcome bonus.

If on the other hand you are buying carbon credits in order to claim carbon neutrality for a business, you need to ask questions about just what carbon you are responsible for, how it is being measured and then exactly where the carbon credits have come from, how reductions have been verified and how you will know that once you have paid for those reductions they are retired so that nobody else can buy them.

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Appendix 1 – Summary description of five carbon neutral/carbon offset websites

Elementree

Elementree[38] is an Australian owned (WA) not for profit organisation. It offsets emissions by revegetating the Australian bush with native trees. Its website says that "Elementree is a family of diverse and unique individuals with a wide spectrum of values, opinions and lifestyles".

The Elementree online calculator requests: State of residence; Electricity units or kWh; Gas units or kWh; and asks if I want to "include emissions from the manufacture of generation fuels and delivery of electricity (True Cost)" and the "emissions from production, processing, transmission and distribution of gas (True Cost)". I am invited to enter the annual amount of my fuel bills or else I can use the Australian average of 2500kWh of electricity and 2000 units of gas per year. Living in NSW my energy footprint, including 'upstream' effects is calculated at 5.48 tonnes of CO2 to the atmosphere, had I lived in Tasmania, and used power from hydroelectricity generation this would have been 0.03 tonnes. Without upstream effects my footprint is 4.62 tonnes, a difference probably too low to account for the full upstream effects.

For my car I can enter the type of fuel, weekly litres, kilometres or cost, or else annual kilometres. If I choose annual kilometres I am asked for the engine size. The page tells me that the average car in Australia produces around 4.0 tonnes of CO2 per year. For air travel I am asked to enter kilometres flown, To help calculate this I am directed to a website[39] called *Web Flyer* which calculates miles between requested destinations.

I enter my data, do not request upstream additions for energy and find that I emit 10.1 tonnes of CO2 to the atmosphere. This can be neutralised by planting 40 trees at a cost of $A100 which is tax deductible. If I include upstream energy use I emit 10.96 tonnes at an offsetting cost of $110. Again this represents a very small difference between onsite and upstream calculations.

A downloadable file tells me that litres of fuel are converted to CO2 using the 'point-source emissions factor' figures from the Australian Greenhouse Office's 2004 Factors and Methods Workbook. The emissions calculator does not include non-direct emissions because Elementree does not consider them "to be the responsibility of the vehicle owner". However, they say that they recognise the importance of such emissions and will pursue "accountability for them with the source providers and distributors".

Flights are calculated on 0.070litres/km/passenger at 80% occupancy for flights. This figure was reached through a study of the rate of fuel consumption to seating capacity for Qantas, British Airways and Virgin Blue. Power is calculated using the AGO Factors and Methods Workbook. Again Elementree does not consider emissions produced in the production of energy "to be the responsibility of the home owner", however in recognition of their importance Elementree provides the option of offsetting them while pursuing accountability with the providers. The site suggests

[38] http://www.elementree.com.au/calculator.asp accessed 20/04/07
[39] http://www.elementree.com.au/help_flightkms.asp accessed 23/04/07

that if you subscribe to green power you can accommodate this by reducing your reported power consumption by a suitable percentage. Number of trees required for sequestration is calculated using the AGO booklet *Growing Trees as Greenhouse Sinks*, which estimates for dry areas a rate of sequestration of between 193 and 291 tonnes of CO2-e per hectare over 30 years. And that this, "at a stocking rate of 1000 trees per hectare … equals a sequestration rate of approximately 0.25 tonnes of CO2-e per tree, over the first 30 years of its life".

The website terms of use say that the service "is a commitment to supply, plant and nurture the trees such that, if maintained over their expected natural life (or a minimum period of 30 years) there will be sufficient uptake and storage of carbon to counter … the cumulative global warming effect due to be caused by the emission of the number of tonnes of carbon stated on the Form." The trees will not be harvested for commercial gain. To date Elementree projects only occur in WA. They are 100% tax-deductible. Members are assigned a site number that identifies the precise geographic location of their trees.

Mycarbondebt

Mycarbondebt[40] is a commercial organisation advertising purchase of offsets to personally become carbon neutral or in the form of gift vouchers. It also offers advice to companies on emissions reduction as well as selling offsets for carbon emissions, and the commercial use of a logo to advertise your green credentials. It also offers help in measuring the 'carbon footprint' of your business. The site signals the future addition of an online eco-store.

Mycarbondebt offers a choice of 'quick offset' or 'detailed offset' for your car, your flight, your house or your baby. The quick offset page for cars lists five different types of car with an estimate of emissions and a carbon cost for each type, for example: "Medium Car (36mpg) £41.13 Offset 3.5 tonnes of greenhouse gases generated by the average medium sized car driven for 12,000 miles". If you choose to add this to your shopping cart you can proceed to your account and pay for it online. If you choose the detailed offset the calculator will ask for annual miles or kilometres travelled; how many miles per gallon or kilometres per litre; and what sort of fuel is used. A petrol driven car, travelling 12427 miles per year at 30 miles per gallon is

calculated to emit 4.557 tonnes of CO2 and will cost me £53.58 to abate. A similar process is employed for assessing emissions from flights: Quick offsets include European Flight: £5.88; Transatlantic Flight: £17.62. Detailed offsets require you to enter your starting point and destination and your number of passengers. The quick offset for my house allows me to buy offsets for gas, gas and electricity, or annual household emissions at the national average of 3.9. tonnes of C02 generated by gas use (cost £45.83); 5.3 tonnes generated by gas and electricity (£62.27) or 11 tonnes for average one-car UK household (£129.25). The detailed offset asks for electricity use kWh per month or cost; gas kWh per month or cost; Litres of heating oil per month or cost. To offset my baby I can choose either disposable nappies at £7.88 for 2.5 years of the baby's life or cloth nappies at £6.90.

[40] http://www.mycarbondebt.com/?gclid=CJqf7ruEtYsCFSHBYAodJF4Nzw accessed 08/04/07

Using our standard input the calculator says that we generate 7.435 tonnes of CO2. This will cost $A210.19 to offset. We are told that our contribution will be added to a fund "which we use to buy regular batches of tonnes of carbon offset from ethically managed, traceable projects worldwide" (currently from TIST in India and Tanzania). The website says that the calculator uses officially published figures (e.g. from the Department for Environment, Food and Rural Affairs) to convert quantities of fuel and energy to CO2 emissions. It uses average emissions numbers for cars and homes of various sizes provided by the UK government. The flight calculations are based on data and algorithms provided by Carbon Clear Limited.

The website says that you can "offset your CO2 emissions by funding ethical and sustainable reforestation and energy projects around the world". Its project criteria state that projects must be efficient; must have additional long-term benefits for communities that undertake them; and must follow the spirit of the Kyoto agreement.

The Carbon Reduction Institute

The Carbon Reduction Institute[41] is a commercial organisation based in NSW. Its website offers to calculate and offset your car and flights to enable you to become 'carbon neutral', it also offers a link to the Redefining Progress[42] website's Ecological Footprint Quiz which calculates your ecological footprint for you.

The car calculator asks for: car type (e.g. Medium car or small 4wd (4cyl); fuel type; distance per year or per week; and the number of cars. It calculates that we emit 4.68 tonnes per year and costs our offset at $72.07. We add this to our shopping cart and move to the flight offsetting screen. Here we can choose: starting point and destination, country and airport; return or one way; number of trips/passengers. It calculates that we emit 0.97 tonnes of CO2 and costs this at $14.94. We add this to the shopping cart and proceed to the checkout where we can pay by VISA the total of $87.01 to have our emissions offset for us.

The Institute offsets CO2 emissions through: energy conservation, applying "the results of its Energy Saving Assessments which help businesses and households conserve energy"; renewable energy and installation of renewable energy systems like solar power; and "purchase of carbon credits under the NSW government's Greenhouse Gas Abatement Scheme (GGAS)".

The Institute also offers a certification program for *No CO2* or *Low CO2* businesses and products. The Carbon Reduction Institute offers to assess your emissions and provide your business with an emissions reduction plan, and, depending on your plan and reduction time frame, it will certify you as *No CO2* or *Low CO2*. According to the website the Institute will invest money generated by the certification program in "energy efficiency and renewable energy projects that reduce greenhouse gas emissions."

The Low CO2 logo includes the percentage reduction in emissions pledged by the company and calculated by the Institute based on the previous year's baseline. Low CO2 organisations are certified to use the *Green Choice* logo. The emissions

[41] http://www.noco2.com.au/ accessed 20/04/07
[42] http://www.earthday.net/footprint/index.asp accessed 24/04/07

embodied in *Green Choice* products can be offset at point of sale if the customer chooses to pay extra in order to make the product 'carbon neutral'.

The No CO2 certification indicates that the organisation is carbon neutral and has accounted for its "total operational emissions as well as the emissions embodied in the products" that it sells and uses. No CO2 organisations are entitled to use the *Pre Green* logo which means that the product has "had its lifecycle emissions offset prior to purchase".

The Agincourt Hotel[43] in Sydney is an example of a Carbon Reduction Institute No CO2 organisation, offering carbon neutral beer. According to Agincourt's website it "invests 2.5 cents from each beer sold into energy efficiency initiatives… Recent energy efficiency measures involving the installation of LED downlights has resulted in a direct saving of 5.43 Tonnes of CO2e every year."

The Carbon Reduction Institute says that its emission assessments and reports are conducted in compliance with the ISO 14000 series and the GHG Protocol Corporate Accounting and Reporting Standard. It uses "referenced emissions coefficients from the Australian Greenhouse Office's Factors and Methods workbook, as well as published life cycle analysis figures to calculate the impacts of electricity usage, transport and the embodied emissions in products that businesses buy and sell".

According to its FAQs the Institute's offsets "are sourced through projects that comply with the Gold Standard" and "100% of the money from certification and green products is put towards carbon offsets, renewable energy installations and energy assessment projects".

The Institute's *energy efficiency for business* initiative provides CFL light bulbs free of charge to organisations that participate and will "subsidise other energy efficiency undertakings like LED down-light replacements or switching from electrical to gas or solar hot water". The Institute is able to provide this service free of charge because it is funded by the certification program (i.e. those of us who buy our certificates on the website and) "in order to make our certified partners carbon neutral". It is these energy efficiency projects that provide the Carbon Reduction Institute with their NSW GGA Certificates. According to the website the easiest way to qualify for an energy efficiency project is for an organisation to become a *No CO2* or *Low CO2* certified organisation.

Climate Friendly Pty Ltd

Climate Friendly and Climate Neutral are trademarks of the Australian company Climate Friendly Pty Ltd[44]. The company provides a retail carbon credit service. It counts among its clients, Go Get, Australian Conservation Foundation, Ethical Investment Services and WWF, and shows the WWF logo on its website's banner. The Climate Friendly website offers visitors the chance to neutralise their carbon emissions by purchasing green energy credits. It offers to calculate emissions from car, air travel, home or office and enables you to pay online. It also offers what it calls 'packages', which are standard items such as a *small car* (3.2 tonnes "enough to fill 143 wheelie bins each week" @ $70 per year) or *citizen* (28 tonnes @ $616 per year).

[43] www.agincourthotel.com.au accessed 20/04/07
[44] https://www.climatefriendly.com/ accessed 08/04/07

Or you can simply pay for one tonne of carbon at $22 or two tonnes for $44. These are advertised as 'gift ideas'. The website also suggests that if businesses wish to neutralise other items they may contact Climate Friendly for a 'carbon footprint and quote'.

To calculate my car emissions we are asked for: either weekly petrol cost or car engine size plus weekly distance travelled. To calculate flight offsets we need to enter: return or one-way; from which city in the world, to which city in the world; and the number of trips and/or people. We can choose to neutralise the full amount or half the amount. For home or office we are asked to enter: state of residence if we live in Australia or otherwise country of residence; electricity usage in kWh per day with a choice ranging from 10kWh per day to 40 kWh per day or average power bill in kWh per day, quarter or year. we can choose to neutralise 50% Australian GreenPower/50% International Gold Standard[45] or 100% Australian GreenPower.

The Climate Friendly calculator, the website says, was developed by drawing on extensive experience with the CSIRO in scientific modelling. The emission factors are based on figures from "the Greenhouse Gas Protocol, the International Panel on Climate Change, Defra, UK (Department of Environment Food and Rural Affairs, UK) and the Australian Greenhouse Office."

Our standard input yields 10.5 tons at a neutralising cost of $318.20. Climate Friendly uses about two thirds of our payment to buy carbon credits on our behalf to reduce fossil fuel emissions by supporting "new [built since 1997] and accredited renewable energy projects, such as wind farms, which creates further demand for their product". These credits include ones from the Australian Government's GreenPower as well as Gold Standard accredited credits. They are raised from projects that, according to Climate Friendly's stated commitment: address the cause of climate change; prevent greenhouse emissions; are additional to business as usual; are independently verified for quality; and neutralise emissions close to the time they are being emitted.

The balance of the money we pay goes towards Climate Friendly's running costs. Climate Friendly's website says that it keeps a carbon register of all sales and purchases of energy and carbon credits, and is audited annually. Once its credits have been sold to us they are 'retired' and cannot be resold. According to the website Climate Friendly is an accredited GreenPower[46] supplier and has its own retirement account with the Australian Office of Renewable Energy Regulator for Green Power and the NSW Greenhouse Gas Abatement Scheme.

The website's FAQs explain that renewable energy projects earn carbon credits for "creating energy without burning fossil fuel. One carbon credit represents 1 tonne of CO_2 that is prevented from entering the atmosphere and contributing to global warming". Climate Friendly buys these carbon credits and sells them on to their customers who wish to become carbon neutral.

[45] Climate Friendly's current Gold Standard project is the Te Apiti wind farm in New Zealand which will be producing credits into 2008 (email correspondence 13/04/07) after which time Climate Friendly 'will be looking for a new overseas project'. http://www.meridianenergy.co.nz/aboutus/powerstations/teapiti/default.htm accessed 24/04/07

[46] Australian Government accredited green power

Neco the Eco Superstore

Neco[47] is an online store trading in eco friendly services – house and business eco assessments – and products – they advertise over 500 different products including eco efficient light bulbs, water saving devices and low carbon household products. Neco also offer carbon offsets. These services and products represent what they call their three phase strategy to emissions reduction: asses, reduce, offset.

The website offers to offset your CO_2 emissions "by allowing you to contribute to projects that reduce CO_2 in the atmosphere by the same amount that your activities add". You are asked to "Simply choose the CO_2 reduction packages from our website that best suit you".

The carbon calculator follows the: calculate, reduce, offset, sequence. First we choose which state or territory we live in. For energy use we can enter my annual or daily kWh; for gas we can enter annual or weekly Kj use. The calculator asks what size car, motor bike or scooter we drive (light, small, medium etc) and from this estimates our fuel consumption; we have the choice of entering the engine size instead. We can enter the type of fuel used and kilometers per year (we have the choice of entering a number or selecting low, average etc). The following screen offers ways in which we can reduce our carbon emissions (a home assessment; buying better products; or contacting Origin Energy for purchase of green power). Finally the calculator tells us our annual emissions and the cost of offsetting them. Having entered our standard amounts we find we emit 10 tonnes of carbon that will cost $200 to neutralise through energy efficiency credits or $400 if we purchase renewable energy credits.

Instead of working our way through the calculator the website also offers the opportunity to purchase 'off the shelf' carbon offsets. This includes offsets for domestic or international flights, car or house or the purchase of a gift card. A domestic short haul flight would cost $12, for this we receive a luggage tag and certificate. A medium sized car would cost $105 to offset for a year, for this we would receive a bumper sticker and certificate.

For the house offset we are asked to choose our state of residence. We find that residents in NSW, ACT and SA are asked to pay $203 for their fridge magnet and certificate; NT and Queensland $185; VIC $240; WA $165 and Tasmania a mere $40. A gift card costs $24.95 to offset one tonne of carbon.

[47] http://ww2.neco.com.au/product.asp?pID=464&cID=152 accessed 24/04/07