An Chomhairle Oidhreachta
The Heritage Council

Heritage Council of Ireland: Multi-disciplinary LCA CPD Training Course Carbon Footprint Audit

By Oonagh Duggan
Céirseach Consulting
February 2011

Document Control				
Document no.:	Index	Date	Originator	Approved By
LCACarbonFootprint	0	06/02/2011	Report Author O.Duggan	O.Duggan
Revisions				
Index	Date	Change	Originator	Approved By
O	13/01/2011	Issued to A. Harvey-Heritage Council, Edmund O'Dwyer-Armada Hotel, Rose DeCourcy-Tulla	Report Author O.Duggan	O.Duggan
rev 1	21/01/2011	Issued to Frank Minogue (Armada Hotel)	Report Author O.Duggan	O.Duggan
rev 2	25/01/2011	Issued to A. Harvey	Report Author O.Duggan	O.Duggan
rev 3	06/02/2011	Edits and corrections made and comments included. Issued to A. Harvey	Report Author O.Duggan	O.Duggan
rev 4	08/02/2011	Final Edits. Issued to A. Harvey	Report Author O.Duggan	O.Duggan

Contents

Summary

Main Findings
The carbon footprint for the multi-disciplinary LCA CPD Course September 2010 is five tonnes of CO_2 from car travel and fossil fuels associated with heating and electricity usage at training venues. The travel emissions of participants and attendees to get to the course account for 70% of total emissions.

Key Recommendations
Key recommendations are listed here, detailed recommendations can be found in Chapter 6.

Reduce Emissions
1. Set up and manage a car pool list to help attendees find other people who might be travelling to the course from their area.
2. All entities involved with hosting the course should seek to reduce, or continue to reduce, the emissions from energy usage.
3. Consider a reduced course fee for those who carpool or take public transport.

Establish Environmental Policies
1. All entities involved (Heritage Council, Tulla Courthouse Association and service providers e.g. trainers, graphic designer) should develop an environmental policy for their organisations which includes a carbon strategy. This should be based on a review of their own environmental impact and contain actions to reduce that impact.

Provide Information
1. Inform all future participants (attendees, trainers, owners of the venues etc.) of the carbon footprint of the course, the goal to reduce that footprint through actions and a request that they too contribute to reducing that impact.
2. Inform course attendees of environmental policies of course service providers.
3. Provide information on alternatives to driving on all course promotional literature - car pool, public transportation.

1.0   Introduction

The Heritage Council of Ireland wishes to understand the carbon footprint relating to the delivery of its award-winning Landscape Character Assessment Continuous Professional Development Training Course (LCA CPD)[1]. The term *carbon footprint* is commonly used to describe the total amount of carbon dioxide (CO_2) and other greenhouse gas emissions (e.g. methane, nitrous oxide) for which an individual or organisation is responsible[2]. As such, an audit of the greenhouse gases must be conducted to ascertain the carbon footprint and once this is understood plans can be put in place to reduce emissions where possible.

This report includes details of the greenhouse gas audit of the LCA CPD course delivered in September 2010. It quantifies the associated emissions and recommends actions for the reduction of emissions for the May 2011 course. It is anticipated that the Heritage Council will also audit the emissions of the May course and measure the success of the emissions reductions plan and make final recommendations for the September 2011 course.

The Heritage Council developed the LCA CPD course from its conception through to its delivery/operational phase. Theoretically, Council may not 'own' all of those emissions (the emissions generated by participants to get to the course are their own emissions), but because the course was established by the Heritage Council and all choices in relation to the course (e.g. location, service providers etc..) was made by it, the Council is keen to influence the reduction of all emissions.

2.0   Methodology

2.1 Audit Methodology

In order to conduct the greenhouse gas audit, an auditing methodology must be selected and followed. The methodology chosen is ISO 14064-1(Greenhouse Gas Inventories) under the ISO 14064 framework, which was developed by the *Canadian Standards Association* and is used world-wide. The principles of this methodology are:

- Transparency;
- Relevance;
- Accuracy;
- Completeness; and
- Consistency.

The auditor of the LCA CPD training course, and author of this report, is qualified in this standard. As of the time of audit there was no known specific methodology to audit the emissions relating to an event or a training course. However the carbon footprint of the United Nations 2009 COP 15 Climate Change meeting[3] in Copenhagen, audited by Deloitte consultants, also used ISO 14064 and the Greenhouse Gas Protocol and the LCA CPD course audit mirrors that process.

2.2 Compiling and Analysing Data

To conduct the audit it was necessary to first investigate the various types of activities that generate emissions during the delivery of the LCA CPD Training Course and then to quantify those emissions. From discussions with the LCA CPD Course Coordinator and Project Manager – Alison Harvey - at the outset, it was evident that the main sources of emissions would be transport by participants travelling to and from the course venues in County Clare, and the emissions associated with the delivery of the course at the two

---

[1] http://www.heritagecouncil.ie/events/heritage-council-corporate-events/view-event/article/multi-disciplinary-cpd-training-programme/?tx_ttnews%5BbackPid%5D=6&cHash=d67ab090c4
[2] Carbon Trust: www.carbontrust.co.uk
[3] http://www.e-pages.dk/visitdenmark/472/

venues –Spanish Point on Day 1 and Tulla on Day 2. However, it was necessary to dig deeper to ensure that all potential emissions were covered.

With this basic information in mind, a questionnaire was designed and distributed to all course participants (after the course in September 2010), including the trainers, relevant services providers along with the course coordinator. The focus of the questionnaire was on the mode of transport used to get to and from the course including: starting points, end points, details of the vehicle if they travelled by car, and reasons for choosing this method over others. Participants were also asked where they stayed overnight, and if they had any suggestions on ways to make the course more environmentally friendly. Trainers and service providers were asked to state whether they supplied paper based materials for the course. A copy of the questionnaire is provided at *Appendix 1*.

In order to understand the potential sources of emissions at the course venues, managers and representatives of these venues were contacted by phone and email to discuss the audit project and to understand the entity's environmental policies and activities, energy systems, and to get specific activity data in relation to the venue (utility bill data etc.).

Information and data compiled from all sources is fully described later in this report. The key data was inputted into a database, evaluated and quantified using the most recent emission factors from reputable sources. Finally, once the amount and source of emissions were established, suggestions on how to reduce these emissions are made.

3.0 The LCA CPD Course: Description and Delivery

3.1. The Business Case or 'Need' for the Course

In March 2002, Ireland signed and ratified the European Landscape Convention (ELC)[4], which came into effect in March 2004, thereby committing the State to meeting its obligations under the requirements of the Convention. The Heritage Council has an explicit remit from Government to make proposals on landscape policy as provided for in Section 6 (1) of the *Heritage Act, 1995*[5] and in pursuit of this aim, Council initiates policies and proposals meeting the different articles of the ELC. The multi-disciplinary LCA CPD training course helps Ireland meet it's commitment to Article 6b[6] of the ELC. Also, in 2006 the Heritage Council commissioned an Evaluation of Landscape Character Assessment in Ireland and a key finding suggested that 68% of Heritage Officers, planners and consultants in Ireland had no formal training in LCA or Historic Landscape Characterisation[7] [8]. The course is the first all-Ireland multi-disciplinary training course and was developed in partnership with 10 all-island and national landscape-related professional entities. The LCA CPD training course was conferred with the Irish Landscape Institute's President's Award in November 2009 and over a hundred professionals and 10 community representatives have undergone the training since its inception in 2009.

3.2 Course Outline and Choice of Location

The course has been held in May 2009 ('Pilot'), September 2009, May 2010 and September 2010 at venues in Spanish Point and Tulla Co. Clare and is open to members of the partner organisations and to

---

[4] http://www.coe.int/t/dg4/cultureheritage/heritage/landscape/default_en.asp

[5] Section 6 (1) of the Heritage Act, 1995 states that: "The functions of the Council shall be to propose policies and priorities for the identification, protection, preservation and. enhancement of the national heritage, including monuments, archaeological objects, heritage objects, architectural heritage, flora, fauna, wildlife habitats, **landscapes, seascapes** [emphasis added], wrecks, geology, heritage gardens and parks and inland waterways".

[6] Source Table 3.12 (page 35), *Landscape Character Assessment (LCA) in Ireland: Baseline Audit and Evaluation, (Sept 2006)*, prepared for the Heritage Council by Julie Martin Associates in association with Alison Farmer Associates.

[7] *Training and Education*: Each Party undertakes to promote: training for specialists in landscape appraisal and operations; b, multidisciplinary training programmes in landscape policy, protection, management and planning, for professionals in the private and public sectors and for associations concerned; c, school and university course which, in the relevant subject areas, address the values attaching to landscapes and the issues raised by their protection, management and planning.

[8] The LCA CPD Course Co-ordinator was also the Project Manager on the 2006 LCA Evaluation study.

representatives from community groups (north and south)[9]. It involves in-class training through presentations, workshops and exercises held in a seminar room at the Armada Hotel in Spanish Point and in Tulla Courthouse, and in addition field work is conducted outside in the coastal and village/drumlin landscapes.

County Clare was chosen as the base for the course as Clare County Council was involved with the Heritage Council in developing a 'pilot' landscape character assessment including historic landscape characterisation of Clare in 2004. As such, Clare County Council is a key partner along with the professional institutes and the Landscape Observatory of Catalonia, Spain.

Spanish Point is a village located on the west coast of Clare and was chosen as an important 'case study' due to its unique quality of seascape, significant forces for change (housing, tourism, potential off-shore wind farms) and its historic landscape – e.g. historical links to Spain which reinforce the European Co-operation element of the LCA CPD Course (Articles 7 and 8 of the ELC) and the involvement of the Landscape Observatory of Catalonia, Spain, as a key partner. As an island nation, seascape management is an important element of overall landscape management and the 2006 National LCA Evaluation revealed that the majority of LCA's in Ireland did not include any seascape analysis which demonstrated a significant gap in some of the assessments.

Tulla was chosen as a location for Day 2 of the course because of the unique landscape and townscape features of the village and its environs. It is a large historic village within a rural drumlin landscape with new housing developments (on the fringe and rural housing). It also has a Village Design Statement (VDS) in place and therefore has synergies with other Heritage Council Programmes, i.e. National Village Design Statement Programme II (2010 to date).

3.3 Delivery of the Course

The key entities involved with delivery of the course are the following:

3.3.1 The Heritage Council's LCA CPD Training Team

The Heritage Council initiated and developed the training course and two of its staff members are involved with the delivery of the course. The LCA CPD Course training team is composed of specialists from various landscape-related disciplines from three different countries (Ireland, England and Spain) who have worked together for more than two years on the development of the course and its delivery and have succeeded in presenting a fine-tuned and national award-winning product. The core members of the team are:

Team	Entity
Alison Harvey	Heritage Council, Kilkenny
Anne Barcoe	Heritage Council, Kilkenny
David Mount	Countryside Training Partnership, Derbyshire, England
David Sankey	Museum of London Archaeological Services, England
Xavier Sabate	Landscape Observatory of Catalonia,Spain
Karen Foley	Head of Landscape Architecture, UCD, Dublin
Martin Critchley, Maptec	ERA Maptec Ltd, Dublin
Brian McCarthy,	Senior Executive Planner, Clare County Council
Ruth Minogue	Minogue & Associates, Tuamgraney, Co. Clare
Grainne Shaffrey	Royal Institute of the Architects of Ireland (RIAI) and Heritage Council Board Member, Dublin
Julie Fossitt	Divisional Ecologist, National Parks and Wildlife Service (NPWS), Ireland
Dave Kelly	Stagetek, Co. Laois

---

[9] Three free places are available to community representatives (north and south) at each course.

The team structure reflects well the general aims of the ELC to "to promote landscape protection, management and planning, and to organise European co-operation on landscape issues" and specifically meets Article 8 of the Convention which encourages mutual assistance and exchange of information "to render each other technical and scientific assistance in landscape matters through the pooling and exchange of experience, and the results of research projects; b) to promote the exchange of landscape specialists in particular for training and information purposes; c) to exchange information on all matters covered by the provisions of the Convention"[10].

3.3.2 Armada Hotel, Spanish Point, Clare[11]

The Armada Hotel is located on the west Clare coast at Spanish Point. Participants undergo training at the hotel, participate in field work in the vicinity and most spend two nights at the hotel. The Armada has been involved with the *Green Hospitality Programme* for three years and currently holds the Bronze level *Green Hospitality Award*. The hotel has its own environmental policy (provided at *Appendix 2*) and hotel management is keen to reduce its environmental impact, which also has knock on financial savings for the business.

The *Green Hospitality Programme* is a national programme set up in 2004 as Green Fáilte Cork and in 2008 it expanded to become national programme. It is funded by the Environmental Protection Agency (EPA) under the National Waste Prevention Programme. Participating hotels receive a certificate stating that the hotel is maintaining or exceeding the environmental standard it has set by fulfilling a number of key requirements. The award is granted based on performance in environmental management systems, and waste, water and energy management. *Green Hospitality Programme* hotels are audited by independent auditors who examine the performance of the hotel on an annual basis ensuring that it meets the programme's requirements. The Programme requires continual improvement and if a hotel fails in this regard or fails to meet standards, the award can be withdrawn at any time.

3.3.3 Tulla Courthouse and Services

The second day of the course is held at the Tulla Courthouse, which is a 19th century stone, former courthouse building located in the centre of the village and which is now uses as a community, arts and cultural centre for the parish of Tulla. The Courthouse is managed by the Tulla Courthouse Community Development Association (Tulla Courthouse Association), whose representatives support the delivery of Day 2 of the LCA CPD Course.

3.3.4 Other Course Service providers

Other service providers involved with delivery of the LCA CPD course include a graphic designer and a printer provides copy design and printing services for the course pack that attendees receive.

---

[10] http://www.coe.int/t/dg4/cultureheritage/heritage/landscape/default_en.asp
[11] http://www.burkesarmadahotel.com/

4.0 Audit Steps and Calculations

4.1 Overview of Audit steps

The ISO 14064-1 methodology to audit GHG emissions is composed of the following steps:

Step 1: Establish organisational boundaries of audit
Step 2: Establish operational boundaries of audit
Step 3: Quantification of Emissions
       3.1 Identification of GHG sources
       3.2 Selection of quantification methodology
       3.3 Selection and collection of GHG activity data
       3.4 Selection of emission factors
       3.5 Calculation of emissions – direct, indirect and emissions from transport – total emissions
Step 4: GHG inventory components
       4.1   Document quantified emissions
       4.2   Identify organisational activities to reduce emissions
       4.3   Establish base year (month) for comparative purposes
       4.4   Assess and reduce uncertainty
Step 5: Inventory quality management
Step 6: Document retention and record keeping
Step 7: Reporting of Inventory

Step 1: Establish the organisational boundaries of audit

The organisational boundaries of the audit are established using the **control approach**. This means that the scope of the audit covers activities whose GHG emissions can be controlled by either the course coordinator or participants of the course. The Heritage Council as organiser of the course wishes to understand all emissions associated with the course and seeks to encourage a reduction of those emissions, where it has influence. The emissions generated by the activities of the graphic designer and the print company were not included as this would take a disproportionate amount of time to calculate. With the exception of the Heritage Council course coordinators, the emissions generated by the training team in the preparation of presentations was not included as this would also take a disproportionate amount of time to calculate.

Organisational boundary
- Training Team (travel emissions only)
- Armada Hotel
- Tulla Courthouse
- Participants

Step 2: Establish Operational Boundaries of Audit

The operational boundary defines which activities which will be included in the audit and which will not be included. Decisions must be made as to whether some activities will be included or excluded for quantification. In some cases emissions are excluded if there is no reliable or recent data, or if the amount of time to calculate such emissions is disproportionate to the estimated amount of emissions. In other cases, the calculation of emissions can be unwieldy and costly and outside the scope of the project goals and budget.

The emissions generated from waste and water of the Heritage Council, the Armada Hotel and Tulla Courthouse were not included in the quantification of the carbon footprint audit. In the case of the Heritage Council the calculation of the waste and water was estimated to be minute for two staff people over 18 days

of coordination and would take a disproportionate amount of time to calculate. The situation with Tulla Courthouse is similar and there was difficulty in getting complete data from the Armada Hotel in order to conduct a calculation. Finally, in relation to the emissions generated by the graphic designer and the printer, these were also not included since it would again take a disproportionate amount of time to calculate emissions from printers, computers, lighting etc for the specific printing or design jobs undertaken for the Heritage Council.

Operational boundary
- Energy use accounted for heating, lighting and cooking at the Hotel accommodation
- Related energy use at the Course Training Venues (x2)
- Related energy use of course coordination at the Heritage Council Headquarters
- Travel emissions of all course participants (including course training team).

Step 3: Quantification of Emissions
Calculation or quantification methodologies shall be selected and used that will reasonably minimise uncertainty and yield accurate, consistent and reproducible results.

Step 3.1: Identification of GHG Sources
Emissions are classified by ISO 14064 and as Direct, Indirect and Other Indirect.
- Direct emissions = those emissions caused by onsite burning of fuel (e.g. burning gas for heating, cooking)
- Indirect emissions = those emissions caused by buying in of energy (electricity), where the emissions are generated offsite.
- Other indirect emissions = emissions which are a consequence of activities but occur from sources not owned or controlled by the organisation (emissions from transport, waste, paper usage)

Table 1 on the next page shows the key activities for all entities and the sources of direct, indirect and other indirect emissions.

Table 1		Sources of GHGS		
Entity/Activity	**Description**	**Direct**	**Indirect**	**Other Indirect**
Heritage Council Head quarters - Course Coordination	Course Coordination	Heating	office based- electricity,	Water, waste, paper
Armada Hotel - Accommodation	Organising and cooking lunches	gas for cooking,	electricity	Waste
	Providing approx 40 bedrooms for overnight stay	Heating,	electricity,	water, waste
	Providing dinner, lunch and breakfasts, tea break refreshments for approx. 40 attendees	Heating, LPG (cooking)	electricity,	
Armada Hotel- Course Training	Providing seminar room for course for Day 1 course training	Heating	electricity	
Tulla Courthouse Course - Training	Providing venue for Day 2 of course training	N/A	electricity	
Transport	Travel by all those who had a physical role to play during course (attendees, trainers, coordinators, AV service)			car travel, public transport
Other	**Not Included in Calculations**			
Trainers	Developing and presenting materials		electricity	Paper
Designer			electricity	Paper
Printer			electricity	Paper

Step 3.2 Selection of quantification methodology
The quantification methodology chosen is activity data (e.g kilowatt hours of electricity) multiplied by emission factors. It is common practice to use this type of methodology. The other options such as direct metering and ascertaining mass balance are outside the scope of the project and would be considerably time consuming and costly for this project.

Step 3.3 Selection and collection of GHG activity data
The most recent available data was used to quantify the emissions generated.

Heritage Council-Course Coordination: The data relating to the activities of the course coordination at the Heritage Council is taken from the report published in 2009 *Review of the Environmental Processes and Carbon Footprint of the Heritage Council.* In that report in order to calculate the carbon footprint of the Heritage Council's Headquarters over one year, the energy bills (electricity and gas) were analysed and quantified. Since the overall course coordination involved two staff members working a number of days on the course, the total kilowatt hours per employee per days work was extrapolated from the 2009 data. This is the figure used as the activity data for energy use related to the LCA CPD course.

Armada Hotel –Accommodation and Course Training: For the last three years the Armada has logged information on its energy, water and waste usage into spreadsheets for review by the Green Hospitality Award auditors. This information is collated from utility bills. The information collected for 2010 was used as the basis for the calculation of the emissions of providing accommodation for the course attendees. It is not possible to single out the number of kilowatt hours for electricity or diesel used for heating used during the course training itself as there is no direct meter in the training rooms. The Armada's 2010 benchmarking figures show the total number of people who spent a night in the hotel and note these as 'sleepers'. One can calculate the estimated emissions for a single guest from these figures and then multiply by 80 to get the total emissions for the two nights spent at the hotel by the 40 participants. Three people did not spend the night at the hotel (two stayed at a different hotel and one stayed in his van). The estimated emissions for the two individuals who didn't stay at the hotel have been included in the numbers for the Armada since it is expected that emissions would be broadly similar and the guests attended all course related functions (dinner, course work, lunch) at the Armada. Furthermore, spot checks were conducted to verify on the Armada Hotel's 2010 electricity bills and diesel (for heating) bills to verify energy consumed on site.

Tulla Courthouse- Course Training (Day 2): Information on indirect emissions (electricity) from Tulla Courthouse is less accurate because the Courthouse shares a meter with the Credit Union which is in an adjacent building. Because this is a new arrangement, it was not possible to get the exact amount of kilowatt hours the Courthouse would have used in the September time period. However, it is suggested that the potential emissions generated at the Courthouse are very small in comparison to the overall emissions, and would not have a material impact. On the day of the training at Tulla Courthouse, the sources of emissions include electricity powering the in-house projector, one laptop, overhead lights and a burco for hot water for teas and coffees. Other emissions which are very difficult reliably quantify are those generated at the local restaurant which makes soup and sandwiches for lunch and the emissions of the Courthouse Association staff when they bake cakes in their homes for the course. The emissions from gas for cooking and electricity from these sources have not been included as they are too difficult to calculate and moreover more than likely also very small in comparison to the overall emissions. However, they are noted here in order to ensure transparency.

NOTE: Since the emissions from the Heritage Council, the Armada Hotel and Tulla Courthouse are all energy-based emissions from activities within buildings, these emissions will be collated together under the heading of ISO classification of Direct Emissions and Indirect Emissions.

Activity Data from Transport of Participants: The questionnaire which was distributed to all participants yielded the information on the travel choices of participants and information on where people stayed overnight. All participants received the questionnaire during the course and follow-up emails and phone calls were made to encourage return of the forms resulting in a 100% return rate (43 out of 43).

The transport data used in the quantification was derived from the information given by each participant. This included the mode of transport used to get to the course, distances, and make, model and year of cars, kilometres driven, points of origin (for verification), and information on public transport choices from point of origin. Full details of the transport choices of each participant on the September 2010 course is provided at *Appendix 3.*

Step 3.4 Selection of Emission Factors
Emission factors enable a conversion to be made from the input measure of energy to the amount of carbon dioxide emissions that will result. An example is the emission factor for ESB electricity is 547gCo2/kwh, i.e. for every kWh of electricity that is produced by the power plant 547g of CO_2 is emitted.

The emission factors chosen for the calculations are the most recent published data from reputable sources including the EPA, the Department of Food and Rural Affairs (UK), the Sustainable Energy Authority of Ireland, Dublin Bus, Irish Rail. A full list of emissions factors is provided at *Appendix 4.*

Step 3.5 Calculation of Emissions
3.5.1   Direct Emissions Calculation
The direct emissions from heating at the Heritage Council[12] and the Armada Hotel are presented below. The organisers at Tulla Courthouse informed the author that there was no heating used on the day of the course.

Table 2: Heritage Council Direct Emissions	
Number of HC Staff Days (2 staff members)	18
HC Kilowatt hours of heat energy used per employee	35kwh
Natural Gas Emission Factor (most recent Source CER 2010)	0.205kg CO_2/kwh
CO_2 emissions for gas per workday	35kwh x 0.205Kg CO_2/kwh= 7 kg CO_2/kwh
Emissions for Course Coordinating Time (7kg x18 days)	**126Kg** CO_2**/kwh**

Table 3: Armada Hotel 2010 Total Direct Emissions			
	Diesel (heating)	*LPG (cooking)*	*Total*
Total kwh	900505	238157	1138662
Emission Factor (SEAI via GHA)	0.264kg CO_2/kwh	0.229kg CO_2/kwh	n/a
Total kg CO_2	237733	54538	292271
kwh/sleeper (based on 33683 sleepers in 2010)	26.7	7	33.7
kwh x 80 LCA participants	2136	560	2696
Kg CO_2/ participant	7	1.6	8.6
Kg CO_2 **x 80 LCA participants (Kg** CO_2**)**	560	128	**688**

The total direct emissions from onsite burning of fuel are presented below in Table 4:

Table 4: Total Direct Emissions <u>in tonnes</u> of CO_2			
	Activity	**Type**	**t** CO_2
Heritage Council	Heating	Natural Gas	0.126
Armada	Heating	Oil	0.560
	Cooking	LPG	0.128
Tulla Courthouse	None		0
		Total	**0.814**

---

[12] Emissions for the HC are calculated based on average energy usage per employee per day based on data in the 2009 report *Review of Environmental Processes and Carbon Footprint of the Heritage Council,* page 8. Calculation: 61,500kwh per annum, 168 kwh/day, divided by 17 employees =10kwh per day per employee

3.5.2 Indirect Emissions Calculations
The indirect emissions are those generated electricity usage. In Tables 5 and 6 the indirect emissions from electricity for the Heritage Council and the Armada are presented.

Table 5: Heritage Council Indirect Emissions (electricity)	
HC Course Coordination Time	18 (days)
average kwh of electricity per employee	10kwh
Airtricity Emission Factor (Source CER 2010)	0.203kg CO_2/kwh
CO_2 emissions for electricity per workday	10kwh x 0.203g CO_2/kwh= 2kg CO_2/kwh
Total Kg/CO_2 for course coord. (2kg x18 days)	**36.5Kg**CO_2

Table 6: Armada Hotel 2010 Indirect Emissions (electricity)	
Total kwh	531952
Energia Emission Factor	0.526Kg CO_2/kwh
Total kgCO_2	279807
Kwh per sleeper (488036/30096).	15.7
KgCO_2/ sleeper	8.3
Total KgCO_2 x LCA Attendees (84)	**664.0**

The emissions from electricity from Tulla Courthouse are difficult to gauge as the local Credit Union uses an adjacent building managed by the courthouse and both use the same electricity meter. The only electricity used on the one day of the course held there is that to power the burco for teas, the coffee pots, and one laptop and one projector for presentations. The average electricity usage in an Irish household is 5000kwh per annum[13], which is 13kwh per day. The interior of Tulla Courthouse is about the size of an average house though it is an historic building and the insulating properties of the building materials would need to be taken into account in an energy analysis. Considering the number of appliances used at the training and the amount of time they are running, the kilowatt hours of electricity used are likely to be very small. However, to exercise conservatism in estimations, a suggested nominal amount of two days annual electricity usage will be used. Suggestions are made to increase the certainty in relation to an accurate figure in the Recommendations section of this report.

The total indirect emissions derived from electricity usage is 0.7165 tonnes CO_2 as presented below in Table 7 :

Table 7: Total Indirect Emissions			
	Activity	Type	**t**CO_2
Heritage Council	Electricity	Airtricity	0.0365
Armada	Electricity	Energia	0.664
Tulla Courthouse	Electricity	ESB	0.016
		Total	**0.7165**

---

[13] http://www.seai.ie/Renewables/Renewable_Energy_FAQ/

3.5.3 Emissions from Transport to the Course (Other Indirect Emissions)

The complete detail for the transport of all participants to the training course is listed in *Appendix 3*.

The information gleaned from the questionnaires shows that 41 out of the 43 people attending or involved with training on the course travelled by car to get to the course and the total number of kilometres driven was **16,426km**. The three people who used public transport were trainers travelling from abroad. No course attendee used public transport to get to the course venues though two people got lifts from others. Two individuals took flights, one was an attendee coming from England and the other was a trainer travelling from Barcelona in Spain.

The total transport emissions for all participants to get to the venues as presented in the Table 8 below is 3.5tCO_2e (rounded)

Total tonnes of CO_2e from Attendee travel by car and one flight: 2.4t CO_2

Total tonnes of CO_2e from trainer/service provider: 1.05t CO_2e

A breakdown of the transport emissions according to mode of transport is presented in Table 9. A discussion of these results will follow in the next chapter.

Table 8: Total Transport Emissions of Participants

	Mode	kgs/CO_2
Course Attendees	car	2479
Course Trainers	car and public transport	1051
Total Transport Emission		**3530**
		3.5 tCO_2

Table 9: Transport Emissions by Mode

	Mode	kgs/CO_2
Total Public Transport	Trains, trams buses, ferries	168
Car Transport	16426kms	2921
Flights (2)	2 short haul	441
	Total	**3530**
Total Kms Driven by 38 people : 16,426km		

3.5.4 Total Emissions for Course

Table 10 below shows all emissions generated through the coordination and delivery of the course and the subsequent chart 1 shows the visual breakdown in percentages.

THE TOTAL CARBON FOOTPRINT OF THE COURSE IS 5 TONNES OF CO_2.

| Table 10: TOTAL EMISSIONS			
Total HC emissions for Course Coordination			
Direct	Heating	Natural gas	0.126
Indirect	Electricity	Airtricity	0.0356
		subtotal	**0.1616**
Total Armada Hotel emissions			
Direct	Heating	Oil	0.56
Direct	Cooking	LPG	0.128
Indirect	Electricity	ESB	0.664
		subtotal	**1.352**
Tulla Courthouse Emissions			
Direct	Heating		0
Indirect	Electricity		0.016
		subtotal	**0.016**
Transport Emissions			**3.53**
TOTALS			
Total Direct			**0.814**
Total Indirect			**0.7156**
Total Other Indirect (transport)			**3.53**
		Total:	**5.0596**
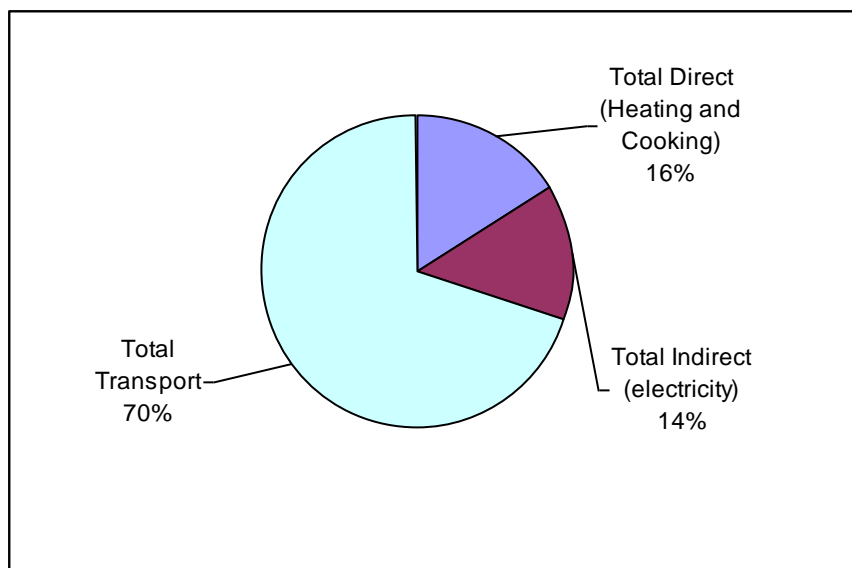
Chart 1: Visual depiction of emissions total in percentages

Step 4: GHG Inventory Components

4.1 Document Quantified Emissions
The emissions have been documented in Step 3.5 above.

4.2 Identify organisational activities to reduce emissions
See Section 5 below.

4.3 Establish base year for comparative purposes
A base Course Date will be established as September 2010. The courses held in May 2011 and September 2011 will be compared against this.

4.4 Assess and reduce uncertainty
Table 11 below provides an assessment of any uncertainty of parameters measured. This is a normal and required component of the carbon audit.

Table 11: Assessment of Uncertainty	
Data Source	*Uncertainty Level*
Emission Factors	Low (they are the most recent and up to date factors produced by mostly government sources or companies e.g. Dublin Bus, RENFE)
Electricity and Gas consumption Heritage Council	Low (the data was taken from a 2009 report where the report writer directly analysed bills for energy usage)
Electricity, Gas and Oil consumption Armada	Low (the energy data was inputted by Armada hotel staff from energy bills) and corroborated through spot checks by the auditor.
Electricity consumption Tulla	High due to stated issues in relation to shared electricity bill. Mitigation measure has been suggested to counteract this for next inventory of emissions.
Transport Data	Low (each participant was requested to give information on their vehicle including kilometres driven and all public transport choices and distances).

Step 5 Inventory Quality Management
The management of information is the key task in relation to inventory quality management. All raw data will be supplied to the client in an electronic file conforming with the principles of ISO 14064-1. It is unclear whether a subsequent inventory will occur of subsequent courses (May 2011 and September 2011). Actions to help reduce the carbon footprint are expected to be implemented before May 2011 and it is anticipated that these will mainly affect the area of transport. Any changes to the inventory design which are different to the baseline calculation of September 2010 must be documented and explained.

Step 6 Document Retention and Record Keeping
All documents pertaining to the carbon footprint will be held by the course coordinator. A series of actions will be implemented to reduce uncertainty in data collection.

Step 7 - Reporting of Inventory
The Heritage Council will decide whether it will publicly report the inventory (carbon footprint audit) of the LCA CPD course. Verification by an independent third party is recommended if the Heritage Council chooses to report the inventory.

5 Analysis of the Results

5.1 Overview

It is clear from the information presented above that greatest source of emissions are those from travel by participants to the course and this topic will be addressed first and feedback from the questionnaire will be presented. The emissions from the Heritage Council, the Armada Hotel, and Tulla Courthouse will then be discussed.

Emissions from Travel

Travel emissions total 3.5 tonnes and 83% of these emissions is from the 16,426 kilometres driven from points of origin to Spanish Point and to Tulla. The adjacent pie chart shows the breakdown of the emissions from travel.
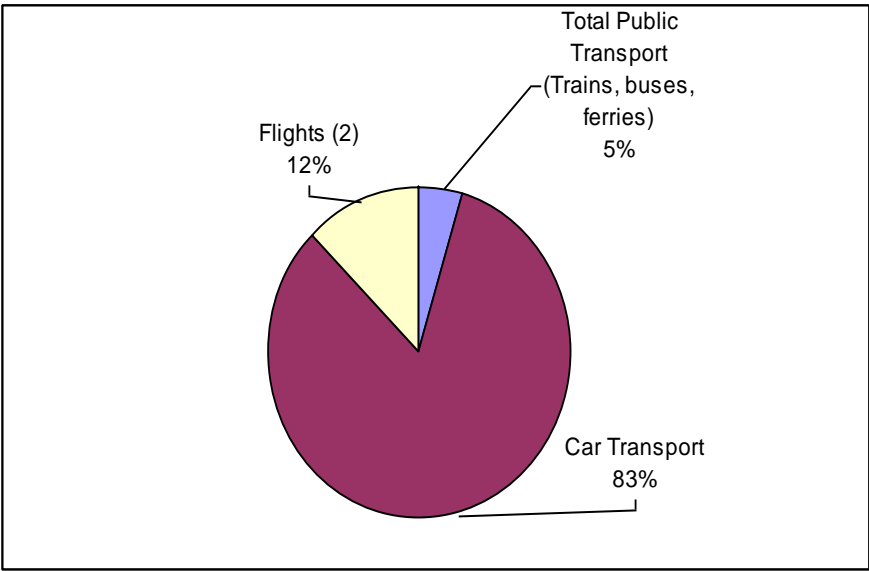
Chart 2: Transport Choices

5.2 Emissions from Travel

The three individuals who make up the 5% who took public transport were trainers who came from England and Spain. The two trainers who came from England came by train, bus, ferry, DART, LUAS, London underground and lifts. One stated that it was only possible for him take public transport as he was taking annual leave. In future if he is under time pressure, he may have to fly. However, it is very commendable to see the efforts made to get to Clare from such long distances.

5.2.1 Where did course participants travel from?

People travelled to the course from every corner of Ireland with a high percentage of people coming from the Dublin area. Table 12 below shows the points of origin of all the course attendees.

Table 12: Point of Origin of Irish-based Participants	
Dublin x 11	Galway County x1
Tallaght x 1	Roscommon x 1
Dun Laoghaire x 1	Kildare x 1
Limerick City x1	Wicklow x 1
Limerick County x1	Kilkenny x 3 (carpool x2)
South Clare x 1	Cavan x 2
Wexford x 2	Cork x 2
Galway City x1	Derry x1
Belfast x 2	Meath x 2 (carpool)

5.2.2 Why did people drive?

The information gleaned from the questionnaire give answers to this question and all responses are attached at *Appendix 5*. All participants were asked if they drove why they chose to do so; 36 people out of 43 responded to the question. The reasons for driving can be summarised as follows:

➤ The most common reason for driving, given by 12 out of the 36 respondents (28%) was that 'there was no suitable public transport that would get them to Clare'.
➤ The second most common answer, 10 out of 36 (27%), was that 'driving was faster and more efficient time wise'.
➤ Thirdly, 7 out of the 36 respondents (19%) said that they had other stops to make along the way/were combining trips for work.
➤ Two respondents stated that they 'didn't know other doing the course people with whom they could car pool'.
➤ Those involved with training (4 respondents) didn't choose one of the prompted questions and stated that they needed to bring materials or equipment to the course.
➤ One person stated that they had other commitments before and after the event which limited them and did not work with public transportation times.
➤ One person stated that the mileage allowance given by their employer was another reason for driving.

Most people travelling to the course did so because they felt that there was no suitable public transportation to get them to the course and also because driving was more efficient. While there is suitable and reasonably frequent public transport to get people from the major Irish cities to Ennis (the nearest big town) there is no frequent service which links Ennis to Spanish Point. In addition, course participants must also then travel from Spanish Point to Tulla for day two of the course.

The reality in Ireland is that motorways now link most of the major urban centres (including Ennis) and this makes for faster and more time-efficient driving but not necessarily more emissions-efficient travel though. If one looks at the emission factors per kilometre travelled, one can see that a medium-sized car will generate around 140gCO_2/km whereas a train journey generates 44g CO_2e per passenger kilometre.

Another issue to consider, however, is that many of the course attendees are juggling work and family life in order to get to the course and so time is an important consideration for them. And finally, depending on where you are departing from and the type of public transport on offer, some people are left with no option but to drive.

5.2.3 How to reduce emissions from travel to the LCA CPD Course?

The questionnaire also asked people how the course could be made more environmentally friendly and most people referred to the issue of travel. *Appendix 5* shows the responses of participants. The two most popular responses were to change the location and car pooling while several other solutions were also proffered.

➤ 13 out of 28 people who made written comments suggested that the course should be located in a place that is more accessible and has public transportation options.
➤ Nine people suggested that car pooling should be encouraged.
➤ Also mentioned were:
  o Centralising the course to one location rather than two was also mentioned.
  o A coach service between two sites.
  o Coach service from major centres
  o Regionalised courses where people wouldn't have to travel as much and getting more people from that area involved (area engineers, planners etc..)

5.2.3.1. Course Location
Thirteen of the twenty eight people who responded suggested that the course should be located in a place which could more easily accessed by everyone, and served with public transportation. Also, a few people suggested centralising the course to one location rather than two.

The LCA CPD Course Coordinator states that changing the location of the course is not a viable option for several reasons. The course has gone through a rigorous process of development which involved significant funding, evaluation and fine-tuning. An initial course format was developed as a 'dummy run' which was evaluated by external landscape experts from the UK and developed further as a pilot. After further refinements the course was finalised in its current format. In addition, the course material including group exercises and fieldwork has been designed solely on the Spanish Point and Tulla landscapes. Given the current state of the public finances, it is highly unlikely that a cost/benefit analysis would support the relocation of the course at the present time. Finally while the location is remote, there are other benefits to be considered in terms of importance of the landscapes being studied there.

5.2.3.2 The status of public transportation to Clare
It is interesting to note that 28% of respondents cited that there was no suitable public transportation to get them to Clare, yet Ennis is served by link trains and buses from the major centres of Galway and Limerick City with national train services linking those cities from Cork and Dublin. In early 2010 the train link between Limerick and Galway via Ennis was re-established with the opening of the successful first phase of the Western Rail Corridor and daily trains provide a frequent service. However, Ennis isn't the final destination; it is Spanish Point a further 35kms west.

As the description of the train and bus services in Appendix 6 shows, there is suitable public transport linking Ennis with the major centres but there is only one public bus which could bring people from Ennis to Spanish Point (daily at 3pm). There is no frequent bus service which could bring people to Spanish Point, a shuttle would have to be hired to bring people the rest of the way or people have to tailor the schedules to make the 3pm bus. Clare Accessible Transport, a local bus service for the County, has three services a day from Tulla to Ennis and back. This service could possibly fit in with the schedule of the course for some individuals. If it didn't people would have to be shuttled to Tulla from Spanish Point and back to Ennis again for their return journey.

5.2.3.3 Carpooling
Carpooling was also suggested by course participants. If one looks at the Table 12 showing where people came from, there would appear to be scope to encourage people to car pool to the course. This would mean that the course coordinator would have to initially encourage people to carpool and set up a service to manage car pooling. This could be time consuming but attention to this detail could pay off in terms of emissions.

5.2.3.4 Other travel options suggested
Other suggestions included setting up of a coach service between the two training sites. This was done on past runs of the course but was discontinued because of costs. Setting up of a coach service from major centres was also suggested but considering that people come far and wide for this course, it is doubtful that there would be enough numbers from any one area to justify this suggestion. Another suggestion was the setting up of regionalised courses where people wouldn't have to travel as much and which could ensure that more people from a given area would be involved (area engineers, planners etc.). This would seem like a positive response to the usefulness of the course and its content and it would be ideal to be able to launch similar courses in each county but it is likely that this suggestion is not financially viable.

5.3 Emissions from Heritage Council, Armada Hotel, Tulla Courthouse
5.3.1 Heritage Council
The emissions from the Heritage Council are estimated based on a report conducted in 2009 on the environmental processes and carbon footprint of the headquarters in Kilkenny where the course is coordinated. Several recommendations were made as part of that report to ensure emissions reductions

including a switch to Airtricity from the ESB which was achieved. In addition, staff ensure that shutters are closed in the evening to reduce heat loss through the windows.

5.3.2 The Armada Hotel

As was previously mentioned the Armada Hotel is a participant in the Green Hospitality Programme and it must display continual improvement in order to maintain this award. The hotel first got involved with the programme in 2008 and through specific efficiency actions they have achieved significant energy savings. Between 2009 and 2010 (when the most recent relevant data available[14]), the hotel saw an increase in guests of 11% yet electricity usage only increased by approximately 1.5%. The amount of diesel used for heating went up by around 20% though this could be attributed to the very cold weather extending into April of 2010 which resulted in extra deliveries of heating fuel. Full data on the number of meals sold in 2010 was not available the time of publication of this report but LPG usage for cooking was reduced by 5%.

The Armada achieved these savings by enacting specific practical actions. In the case of electricity, energy-efficient bulbs were installed in all bedrooms and more efficient usage practices of appliances was initiated. This included common-sense initiatives such as turning off appliances like coffee machines and fridges; appliances were not left on standby; dishwashers were only started when completely full etc. In 2011 the hotel management is hoping to install efficient lighting fixtures in the hotels hallways, bars, restaurants etc.

In relation to LPG, examples of previous unsustainable practices included the boiling of pots of water with no lids on them and leaving burners on permanently. These practices do not happen any more and more careful usage has resulted in savings for the hotel in both kilowatt hours (emissions) of energy used and costs.

5.3.3 Tulla Courthouse

The Tulla Courthouse Association should be encouraged to develop their own environmental policy and to consider ways in which they could be more environmentally friendly. The local restaurant, Flappers, supplies the soup and sandwiches for the course. They should also be brought into the fold and encouraged to be as environmentally friendly as possible. Most businesses though operate very cleverly in order to keep costs down, and often this also translates into environmental savings.

A suggestion was made that the plastic drinking cups used as part of the course be replaced with glasses. A representative of the Courthouse Association has been informed of this suggestion and communicated that the Association is open to changing the drinking cups and any other environmental suggestions.

5.3.4 Other Service Providers

Two service providers provided an environmental policy for their companies outlining their ethos and actions they put in place to reduce environmental impacts. If requested of other service providers, this is something that could encourage them to consider their environmental (Tulla Courthouse the pack designer, the printer) Audio/Visual Technician.

5.4 More Feedback from the Questionnaire

The course attendees and some trainers also suggested reducing the number of handouts and the volume of paper. While this audit did not assess the amount of paper used every effort should be made to reduce paper usage. Also suggested was turning off lights and AV equipment during breaks at the training room in the Armada Hotel.

---

[14] This data was taken from the 2009 and 2010 benchmarking data prepared for the Green Hospitality Award programme. It is not presented here in full since it is confidential to the hotel.

6.0 Recommendations on Emissions Reductions

6.1 Travel Emissions
Reducing the emissions from travel will be challenging because this is being considered in retrospect. It is also difficult to estimate what emissions reductions could be achieved by each recommendation because it is not known where future course participants will come from. However, implementation of the actions below should not only help to reduce the emissions generated from the course, it will serve to raise general awareness.

6.1.1 Set Up a Car Pool list
The most feasible solution to reduce carbon emissions from transport is likely to be encouraging participants to car pool. If one looks at the points of origin of course participants in Table 12 in section 5.2.1 one can see that 11 people out of 31 travelled from Dublin, 2 from Cork, 3 from Kilkenny, 2 from Belfast etc. If even half the people travelling from Dublin car pooled, then this could mean a 17% reduction in emissions from travel. However, encouraging people to choose the car pool option requires care and attention in order to be as successful as possible. There are a few choices open to the Heritage Council to structure a car pool initiative and the different choices require greater and lesser levels of management which could mean greater or lesser success.

6.1.1.1 Car Pool List Managed by the Heritage Council
Since the group of course participants is small enough (around 30 people), the Heritage Council could attempt to manage their own car pool list though this could be time consuming as it puts the Heritage Council as the intermediary communicating and matching drivers and those seeking lifts. Also, it could possibly put the Council in a position of responsibility if things didn't go right for the car poolers. The Heritage Council should ask its solicitor if there are any implications derived from actively managing a car pool initiative. A disclaimer might need to be considered to ensure that there is no liability and perhaps a reminder to those car pooling to ensure insurance is in place.

6.1.1.2 Online Carpool Websites
There are a few different car pool matching websites which could provide an external solution. The Carpool.ie site requires that those seeking a lift and those offering a lift register their interest on the website after which people can search for drivers which match their journeys. There does not appear to be a mechanism to allow a group to be formed however thereby making finding other LCA CPD Course participants more difficult.

Tripmi (www.tripmi.ie) is a car pool site allows the set up of a car pool group (called for example the LCA Course Clare). The Heritage Council would set this up for a fee of $25 and then send out email invites to all course participants to sign up to the group. People can then sign in as offering a lift or looking for a lift. The success of this service would lie in the course participants actively responding to the invite to join the site therefore attempts to encourage people to sign up to car pool from the beginning must be strong.

6.1.1.3 Active Encouragement of Car Pooling
Course participants will need to be actively encouraged to car pool. To encourage people to sign up the Heritage Council could offer a prize draw incentive for those who car pool to be announced at the training course. The benefits derived from car pooling should be spelled out including the obvious reduction of carbon emissions, reduction in stress and tiredness from driving, fewer cars on the road, sharing fuel costs, the ability to network with people with similar professional interests. This information should be included in the course pack.

6.1.2 Provide Information on Public Transport Options
If public transportation is going to be a viable consideration then a shuttle service might have to be organised to bring people from Ennis to Spanish Point and the logistics of this will have to be worked out to ensure that this is a viable option. All attendees should be informed of the excellent train and bus

services that currently exist between the major centres and Ennis. The Bus Eireann website (www.buseireann.ie) displays the timetables of the intercity and express bus routes.

In addition, information should be provided on the bus service from Ennis to Spanish Point and the Clare Accessible Transport service from Ennis to Tulla. If public transportation is to be encouraged the issue of getting people from Spanish Point to Ennis/Tulla must be addressed. There is a bus from Ennis to Tulla but no bus from Spanish Point to Ennis. People would need to car pool or be taken by hired shuttle bus. In presenting information on public transportation estimated travel times should be stated. The benefits of using public transportation should be explained (saves on emissions, less stress from driving, can still get work done etc.). This information should be given to those signing up for the course and included in the course pack that attendees receive.

6.1.3 Provide Incentives to not Drive
The Heritage Council should consider a reduced course fee for those who car pool or take public transportation. If the Heritage Council had to pay for the carbon emissions of the course and the price of carbon was substantially higher than it is now, this could be a viable solution to encourage people not to drive. However, because of the recession and budgetary cuts to the funding of entities such as the Heritage Council in late 2010, this suggestion is not viable at this time but is included in the future if the financial climate changes.

6.2 Other Emissions
6.2.1 Heritage Council
The Heritage Council should ensure that the recommendations made in the *2009 Review of Environmental Processes and Carbon Footprint* are implemented to reduce emissions identified then and report back for the next carbon footprint of the course.

6.2.2 Armada Hotel
The Armada Hotel is on track to achieve more significant savings in direct and indirect emissions in the future as further energy efficient practices are implemented such as for example replacing light fixtures in public areas of the hotel among others. The hotel also wishes to reduce its food waste amounts and costs and is researching various technologies and services to achieve this. Food waste when sent to landfill creates methane as the food breaks down.

6.2.3 Tulla Courthouse
6.2.3.1. Provide Information to Courthouse Association
The Courthouse Association should be provided with a copy of the carbon footprint of the course.
2. A list of recommendations specific to the Courthouse should be discussed with them in draft format.

6.2.3.2. Ascertain energy information
A meter reading should be taken on the morning of the course before any equipment has been turned on and after when everything have been turned off. In addition, a reading should be taken the week before to see what the credit union uses in an average day in order to isolate the energy used by the Courthouse.

6.2.3.3 Environmental Policy
The Association should be encouraged to draft an environmental policy and outline current actions being taken to reduce environmental impact of activities and also consider any further actions which could be taken. The topics of energy, waste and recycling, and environmental behaviour should be considered.

6.2.3.4 Plastic Cups
The plastic cups currently provided at Tulla Courthouse for drinking water during the course should be replaced by glasses if possible or biodegradable versions.

6.3 General

6.3.1 All future course participants (attendees, trainers, service providers etc. should be informed of the findings of the carbon footprint audit and actions being implemented.

6.3.2 All service providers including members of the Training Team should establish an environmental policy for the company. The environmental policy of Countryside Training Partnership is provided as an example at Appendix 7.

6.3.3 All course packs for attendees should include a short summary of the carbon footprint including the positive actions by the Heritage Council Team, Armada Hotel and Tulla Courthouse Association. Also a course environmental statement/policy should be included, as well as reminders on wise-usage of energy, water etc. at the hotel, driving habits which reduce emissions and an estimate of what the emissions would be if people drove to the course (an average 1.4 car emits 155gCO_2 per kilometre).

6.3.4 The volume of paper used should be considered and reduced. All printed material should be double-sided and printed on 100% post-consumer waste recycled paper.

6.4 Planning for the next LCA CPD Course in May 2011

The main source of emissions is from car-related travel to the LCA CPD course in Clare and this should be the primary focus of planning for the next course in May 2011. The recommended actions to reduce travel emissions should be implemented and the results should be measured to analyse emissions reductions. The process used to establish the baseline month (September 2010) should be repeated to ensure consistency.

7.0 Carbon Neutrality

7.1 Reduce, Reduce, Reduce

The most environmentally sound way to take action on a carbon footprint is to implement all possible actions to reduce the footprint and only after those have been implemented and should carbon credits be purchased to offset the emissions which cannot be avoided. An organisation could achieve carbon neutral status simply by buying enough carbon offsets without taking any other action but this does not demonstrate any social responsibility to stop environmentally destructive actions. This is essentially buying one's way out of the problem.

Without going into an in-depth presentation on the subject, climate change is currently the most important issue the world has to contend with. Many governments are setting national commitments to reduce emissions even in the absence of an international agreement to replace the Kyoto Protocol which expires in 2012. In December 2010 the Government published a draft *Climate Change Bill* which calls for 2.5% reductions in 2008 levels of emissions per annum until 2020. By 2050 the target to be achieved is an 80% reduction in emissions. These targets, if they are agreed by Government, will set Ireland on its course to a low-carbon economy. It is very important that we all play our part in reducing our footprints at home and in the workplace. Setting out carbon strategies and policies play an important part in setting an organisations course to reduce their carbon footprint. In addition, it is good corporate social responsibility to put in place measures to reduce one's carbon footprint and this message is usually received positively by the one's peers and by the public.

7.2 Buying Carbon Offsets

There are many different types of offsets one can buy and there are some important factors to consider when purchasing. Those include ensuring that offsets are created by projects which are verifiable by a third party and to a recognised standard where additionality[15] is proven and leakages[16] are acknowledged. Also, permanence needs to be proven especially in relation to carbon sink projects such as forestry. Finally, guarantees in relation to offsets being used more than once (double counting) should be sought.

Currently the price of a tonne of carbon is around €10 a tonne and can be bought through Irish sources. A new voluntary domestic offset scheme, Cosain, is in the process of being established in Ireland where buyers and sellers can trade carbon credits. When up and running in 2011, the offsets traded through Cosain[17] will be audited and verified by a third party to the ISO 14064 standard. Cosain sources offsets from projects developed by companies which generate emissions reductions through energy saving, and through community offset projects. In addition, offsets can bought through Emission Zero which is a division of a cement manufacturing company called Ecocem who has developed a type of cement which has much less embodied carbon than regular cement. The emissions offset through this production have been verified by an independent third party.

In the international arena there are many providers selling offsets and care is required in choosing a reputable source. The Gold Standard Foundation[18] is recognised as one of the leading providers offsets in the world. It registers projects that reduce greenhouse gas emissions in ways that contribute to sustainable development and certifies their carbon credits for sale on both compliance and voluntary offset markets.

---

[15] *Additionality* is a concept, which must be proven by all offset or carbon credit generating projects. Through different analytical tools it must be proven that the emissions reductions are additional to what would have happened anyway. Additionality ensures that projects don't receive extra credit if they should have happened anyway (i.e. through national legislation, common practice etc.)

[16] Leakages implies that there is no increase in greenhouse emissions outside of the project boundaries, even if the project itself provides a reduction.

[17] www.cosain.ie

[18] http://www.cdmgoldstandard.org/

Appendices
Appendix 1 Questionnaire for Course Participants

Carbon Footprint Audit of the LCA CPD course
Questionnaire for Course Participants

Aim of Audit
The Heritage Council wishes to audit the carbon footprint of the LCA CPD course, and to minimise this footprint as much as possible through a subsequent action plan.

How the Carbon Footprint will be audited?
An audit of the carbon emissions generated by the execution of the course will be conducted by Oonagh Duggan, Environmental Consultant and qualified carbon auditor to the ISO 14064 standard in greenhouse gas auditing. The audit will look at the following areas:

- The emissions generated through travel of all people involved with the delivery of the course to and from County Clare (participants, trainers and suppliers)
- Energy use, heating/air con, water, food at the hotel and at Tulla Courthouse, and paper/ sundries.

Questionnaire
In order to conduct the audit of carbon emissions we need some information from you and would like you to answer the questions below please. Your participation in this exercise is greatly appreciated.

Oonagh will contact you via email/phone the week after the course for return of the questionnaire!!

1. Name and Organisation

   _____

2. How did you travel to the course in Spanish Point, Co Clare (car, train, plane, other)?

   _____

3. Please state the name of the place where you started your journey (village, town, city, bus/train station)?

   _____

4. If you flew by plane or travelled by boat, please state the airport or port you **departed from** AND the airport or port that you **arrived into**?

   _____

5. If you drove please estimate the number of **kilometres** that you travelled to get to Spanish Point and then back home?

   _____

6. If you drove **all or part** of your journey, please tell us the **YEAR, MAKE, MODEL** and **ENGINE SIZE** of the vehicle your drove? (Ford Focus e.g. 1.2cc, 2.2cc, hybrid etc.)

_____

7. Is the car petrol or diesel? _____

8. Did you drive or carpool to Tulla from Spanish Point? _____

9. If you drove, please inform us which of the following is the most relevant reason for driving, please put 1 by the most relevant and 4 by the least relevant:

   a. There is no suitable public transport near me that would get me to Clare   ____
   b. Driving was faster and more efficient time-wise   ____
   c. I didn't know other people on the course in order to car pool.   ____
   d. I had other stops to make for my work and driving was the only option   ____
   e. Other…   please   state:

    _____
    _____
    _____

    Any further comments on this:

    _____
    _____

10. Did you stay at the Armada Hotel or elsewhere, please state where (B & B, town, village) etc..?

_____

11. Do you have any suggestions on how this course could be made more environmentally friendly and reduce emissions?

_____
_____
_____

If you have any queries about this questionnaire, please contact Oonagh Duggan, Céirseach Consulting (A Carbon and Environment Consultancy), ceirseachconsulting@gmail.com, 086-8893990.

Oonagh Duggan has been working in the environmental field for 15 years having worked with An Taisce and The Heritage Council before starting her own consultancy. In 2010 she became qualified to undertake greenhouse gas audits using the ISO 14064 standard for carbon accounting. She has conducted a carbon footprint of the Heritage Council headquarters in Kilkenny, and the emissions reductions generated by a wind turbine at an Irish food processing company.

THANK YOU VERY MUCH FOR YOUR TIME AND COOPERATION!

This document has been printed on 100% recycled paper made from 100% post-consumer waste, saving 51.2 litres of water, 10.5kwh of energy per ream compared to ordinary virgin white paper.

Appendix 2: Armada Hotel, Spanish Point, Clare: Environmental Policy

Armada Hotel, Clare
Environmental Policy

The Armada Hotel recognises the effect our business can have on the environment and we have taken steps to minimise that effect.

To this end the management & staff of the Armada Hotel are committed:

To achieving sound environmental practices across our hotel
To complying fully with all relevant legislation
To minimising our waste and ensure steps are taken in all areas to recycle appropriate materials
To reducing our energy usage through good practices and through improved technology
To providing our employees with the training and resources they need to play their part
To informing our guests of what we are doing and how they can participate
To using local suppliers as much as possible and to invite all suppliers and contractors to participate in our programme
To constantly reviewing our efforts and to learn from our colleagues in our industry

The following actions have already been taken to minimise our impact on the environment:

Recycling programmes in all guest bedrooms
Energy Audit in every department
Use of environmentally friendly chemicals in all properties
Reduction in amount of cardboard, wood being used by suppliers
Encouraging our guests to walk while staying with us
Participation in Irish Hotel Federation Green Hospitality Awards
Participation in Failte Ireland Best Practice Programme
Installation of energy saving bulbs in all departments
Recycling of paper, cardboard, glass, plastics, cooking oil
Increased use of ezines, email and internet to deal with our customers and colleagues to reduce paper usage

Appendix 3: Transport Calculations
Spreadsheet 1

Travel Details And Travel Emissions Calculations (31 attendees + 12 trainers/service provider)						
Trainers/Service Provider	**Origin**	**Mode**	**Kms Driven**	**Emission Factor**	**Emission Factor Source**	**kgs/ CO_2**
David Mount	England midlands	train, ferry, bus, luas, train, lift, X2	0	See App 4	See App 4	54
David Sankey	England south	bus, train, ferry, dart, luas, train, lift, X2	0	See App 4	See App 4	85
Xavier Sabate	Spain, north east	Flight, bus, train, taxi, lift, bus	0	See App 4	See App 4	318
Alison Harvey	Co Kilkenny	car	484	140g CO_2/km	CMT	68
Julie Fossitt	Galway	car	216	155gCO_2/km	CMT	34
Karen Foley	Dublin	car	540	170gCO_2o2/km	CMT	91
Martin Critchley	Co Wicklow	car	560	225gCO_2/km	CMT	126
Brian McCarthy	Co Clare	car	66	155g CO_2/km	CMT	10
Ruth Minogue	Co Clare	car	140	190g CO_2/km	CMT	27
Grainne Shaffrey	Dublin	car	550	170g CO_2/km	CMT	93
Anne Barcoe	Co Kilkenny	car	390	190g CO_2/km	CMT	74
Dave Kelly-stagetek	Co Laois	van	374	190g CO_2/km	CMT	71
		Trainers Travel Subtotal:	**3320**			**1051**
Participants	**Origin**	Mode	**Kms travelled**		CMT	**kgs**
Emer Dennehy	Co Kildare	car	432	140g CO_2/km	CMT	60
Leigh Barker	Co Wexford	car	560	140g CO_2/km	CMT	78
Ed Danaher	Co Roscommon	car	160	190g CO_2/km	CMT	30
Mairead McLaughlin	Co Wexford	car	499	225g CO_2/km	CMT	112
Melanie Mc Quade	Dublin City	car	743	140g CO_2/km	CMT	104
Mary Teehan		car got a lift	0		CMT	0
John Olney	Co galway	car	204	170g CO_2/km	CMT	35
Pat Doherty	Dublin City	car	500	190g CO_2/km	CMT	95

Rachel Freeman	Tallaght	car	500	190g CO_2/km	CMT		95
Gerry O'Donnell	Dun Laoghaire	car	400	225g CO_2/km	CMT		90
Andrew Bunbury	Belfast	car	575	140g CO_2/km	CMT		80
Michael Waldvogel	Cork	car	400	155g CO_2/km	CMT		62
Dan Egan	Dublin	car	500	190g CO_2/km	CMT		95
Shanti Mc Alister	Belfast	car	1010	140g CO_2/km	CMT		141
Seamus Donohoe	Dublin	car	300	170g CO_2/km	CMT		51
Jonathan Gannon	Dublin	car	578	225g CO_2/km	CMT		129
Conor Frehill	Surrey, England	car (flight separate)	54	155g CO_2/km	CMT		8
Aodhan O'Murchu	Cork	car	500	224g CO_2/km	CMT		112
Jimmy Green	Galway city	car	175	170g CO_2/km	CMT		30
Bernadette Collins	Co Clare	car	170	190g/ CO_2/Km	CMT		32
Barbara Olwill	Co Cavan	car	580	155g CO_2/km	CMT		90
Arnold Leahy	Limerick City	car	140	190g CO_2/km	CMT		27
David Browne	Dublin	car	500	225g CO_2/km	CMT		112
Ruth Bradfield	Dublin	car	546	225g CO_2/km	CMT		123
David Leahy	CO Limerick	car	140	260g CO_2/km			36
Michael Mc Grath	Cavan Town	car	460	190g CO_2/km	CMT		87
Rory Murphy	Dublin	car	540	170g CO_2/km	CMT		92
Dorothy Hayden	north Co Dublin	car	570	190g CO_2/km	CMT		108
Niamh Ui Loinsigh	Co Meath	car-Got a lift	0				0
Clare Mc Evaney	Co Meath	car	550	170g CO_2/km	CMT		93
Robert Murtland	Derry City	car	820	140g CO_2/km	CMT		115
Conor Frehill		Flight from London to Shannon					157
		Attendees Travel Subtotal	**13106**				**2479**
		Total Trainers and Attendees Travel	**16426**				**3530**
		kms					**kgs**

Spreadsheet 2

Calculations for Travel by Trainers from England and Spain							
Name	**Detail**	**Mode**		**Distance KM (total)**	**Emission Factor**	**Source**	**Total Emissions KgCo2**
David Mount	Edale to Holyhead	train,	return	466	56.5g CO_2/ passenger Km	National Rail DEFRA	26.32
	Holyhead to Dublin port	ferry	return	230	19.3g CO_2/passenger/km	DEFRA	4.439

	Dublin Port to Connolly	bus	return	3.8	82g CO_2/ passenger km	Dublin Bus	0.3
	Connolly to Heuston	Tram	return	6.6	77.3g CO_2/passenger km	DEFRA	0.51
	Lift Ennis to Spanish Point	Lift	return				0
	Dublin to Ennis	Train	Return	516	44g CO_2/Passenger/km	Irish Rail	22.7
						Subtotal:	**54.269**
David Sankey	London Bus (whitechapel to Moorgate)	London Bus		5	89.1g CO_2per passenger km	DEFRA	0.44
	Moorgate to Euston	Underground		12	74g CO_2per passenger km	DEFRA	0.88
	Euston, UK to Holyhead, Wales	Train	Return	800	56.5g CO_2/ passenger Km	DEFRA	45
	Holyhead to Dun laoghaire	Ferry	return	218	19.3g CO_2/passenger/km	DEFRA	4.2
	Dart Dun Laoghaire to Connolly	Train	return	26	44g CO_2/Passenger/km	Irish Rail	11
	Luas Connolly to Heuston	Tram	return	6.6	77.3g CO_2/passenger km	DEFRA	0.51
	Hueston to Ennis	Train	return	516	44g CO_2 /Passenger/km	Irish Rail	22.7
	Lift Ennis to Spanish Point	Lift	One way				0
						Subtotal	**84.73**
Xavier Sabate	Sants Estació to Barcelona	Train	return	26	26.19g CO_2 per passenger Km	RENFE	0.33
	Barcelona to Dublin	Plane	return	2936	97g CO_2/km	DEFRA	284
	By bus: from Dublin Airport to Dublin Heuston	Bus	bus	20	82g CO_2/ passenger km	Dublin Bus	1.64
	Heuston to Ennis	Train	one way	258	44g CO_2/Passenger/km	Irish Rail	11
	By car (taxi): from Ennis to Spanish Point	Taxi	one way	36	153.5g CO_2 per Km	DEFRA	5.5
car	Spanish Point to Birdhill via Tulla	Lift	one way	0			0

bus	Birdhill to Dublin Connolly	Bus	one way	179	37g CO_2/ passenger km	DEFRA	6.6
	Connolly to Dublin Airport	Bus	one way	18	82g CO_2/ passenger km	Dublin Bus	1.4
						Subtotal	**310.47**

Appendix 4: Emission Factors

TRANSPORT

Mode	Emission Factor	Source
Trains in Ireland	0.0443kgCo2/per passenger km	Email from Irish Rail 2010
Taxi	0.1535KgCo2/km	DEFRA 2010, page 26 (Irish Sources use Defra data)
Bus Dublin	0.082KgCo2/Km	2009 Emission Factor. Pers comm Frank Kerr, Dublin Bus
Bus Eireann coach	0.037KgCo2/km	DEFRA 2010, page 26 (no source at Bus Eireann)
Uk national Rail	0.565KgCo2/passengerKm	DEFRA 2010, page 31
London Underground	0.074KgCo2/passengerkm	DEFRA 2010, page 31
light rail/tram	0.0773KgCo2/passenger/km	DEFRA 2010, page 31
London Bus	0.0891KgCo2/passengerKm	DEFRA 2010, page 26
Foot Passenger on Ferry	0.0193KgCo2/passenger/km	DEFRA 2010, page 33
ShortHaul flight	0.097KgCo2/km	DEFRA 2010, page 48
Domestic Flight	0.1715Kg Co2/km	DEFRA 2010, page 48
Train in Spain	0.02619Kg Co2 per passenger Km	RENFE 2009 Annual report (Spanish Train Company)
Petrol Cars (engine size)		
<0.9 litre	120gCo2/km	SEI, 2008
0.9-1.2 litre	140gCo2/km	SEI, 2008
1.21-1.5 litre	155gCo2/km	SEI, 2008
1.51-1.7 litre	170gCo2/km	SEI, 2008
1.71-1.9 litre	190gCo2/km	SEI, 2008
>1.9 litre	225gCo2/km	SEI, 2008
>3.0 litre	260gCo2/km	SEI, 2008
Diesel Cars (engine size)		
1.2-1.5 litre	140gCo2/km	SEI, 2008
1.51-1.7 litre	155gCo2/km	SEI, 2008
1.71-1.9 litre	170gCo2/km	SEI, 2008
> 1.9 litre	190gCo2/km	SEI, 2008
ENERGY	kgCO2/kWh	
Liquefied Petroleum Gas (LPG)-Calor	0.229KgCo2/kWh	EPA Change CMT Emission Factor Sources, page 5.
Natural Gas Bord Gais	205.6KgCo2/kWh	Bord Gais 2010
Kerosene	0.259KgCo2/kWh	EPA Change CMT Emission Factor Sources, page 5.
Airtricity	0.142KgCo2/kWh	CER 2010
ESB	0.625KgCo2/kWh	CER 2010
REFERENCES		
2010 Guidelines to Defra / DECC's GHG Conversion Factors for Company Reporting: Methodology Paper for Emission Factors		
SEI 2008		
CER 8/2010, Single Electricity Market 2009 All Island Fuel Disclosure Mix		
Vehicle Emissions Data from SEI published in Environmental Protection Agency's CMT Emission Factor Sources.		

Appendix 5: Questionnaire Responses Regarding Travel and Making the Course More Environmentally Friendly									
				Why I drove?					
Trainers/Service Provider	**Origin**	**Mode**	**Kms Driven**	**a. There is no suitable public transport near me that would get me to Clare**	**b. Driving was faster and more efficient time-wise**	**c. I didn't know other people on the course in order to car pool.**	**d. I had other stops to make for my work and driving was the only option**	**other**	**Suggestions on how to make the course more environmentally friendly.**
David Mount	England midlands	train, ferry, bus, luas, train, lift, X2	0	0	0	0	0		None specifically given but his own Environmental Policy provided.
David Sankey	England south	bus, train, ferry, dart, luas, train, lift, X2	0	0	0	0	0		None Given
Xavier Sabate	Spain, north east	Flight, bus, train, taxi, lift, bus	0	0	0	0	0		To do it in a place with public transport (train or bus), To promote carsharing amongst attendees, To let attendees compensate their emissions with an extra cost in the fee (the attendee could pay 50% of the compensation cost, and the other 50% could be paid by the HC or any partner of the course).
Alison Harvey	Co Kilkenny	car	484					1	Will attempt to give information on public transport, car pooling, trip share train times etc for next course.
Julie Fossitt	Galway	car	216	1					locate event near public transport hub

Name	County	Vehicle	Distance						Comment
Karen Foley	Dublin	car	540				1		No response
Martin Critchley	Co Wicklow	car	560	1					No response
Brian McCarthy	Co Clare	car	66						No response
Ruth Minogue	Co Clare	car	140					1	car pool for participants
Grainne Shaffrey	Dublin	car	550					1	car pooling; provide public transport times for trains, buses, etc and facilitate collection and drop-off between train /bus stations and venue
Anne Barcoe	Co Kilkenny	car	390					1	By possibly moving it to a more central location which will still suit the course structure but also be easier to get to with public transport etc.
Dave Kelly-stagetek	Co Laois	van	374					1	Turn off lights & any AV equipment not being used during lunch break & field exercises.
Emer Dennehy	Co Kildare	car	432	1					The location of the course though beautiful and ideal for landscape character assessment, was very inaccessible. Also given the mid-week schedule of the course, it was not feasible to avail of public transport options which may have been available, given that participants had to complete a full days work on the Tuesday, with the course commencing 9am on a Wednesday morning. The course cannot become carbon efficient if the timetable and the location does not accommodate it. It is unreasonable to expect the use of public transport, when the course is not located in an area amenable to it. A location on a defined public transport route should be chosen. Course participants were not advised of any public transport options to Tulla.
Leigh Barker	Co Wexford	car	560	1					Host it somewhere more central.
Ed Danaher	Co Roscommon	car	160				1		A bus should be provided to and from Tulla from Spainish Point

Name	Location	Mode	Distance						Comment
Mairead McLaughlin	Co Wexford	car	499		1				It could be held perhaps where there is a rail link and you could organise a bus from station to conference
Melanie Mc Quade	Dublin City	car	743			1			A circular of delegates attending the course and from where would have given us options to car pool and would have been helpful
Mary Teehan		car got a lift	0	1					set up webnote support to reduce amount of printing. Course participants can constantly tap into these and save to computers.
John Olney	Co galway	car	204						No response
Pat Doherty	Dublin City	car	500	1					No response
Rachel Freeman	Tallaght	car	500	1					No response
Gerry O'Donnell	Dun Laoghaire	car	400				1		Provide a coach perhaps, car pool
Andrew Bunbury	Belfast	car	575	1					It's a long way from where the majority of people were travelling from. There is obvious plus points to that but it is not an area that is easy to access by public transport. Also the new road to Loughrea makes it very much easier to drive thus one is not inclined to search further for how to get to Spanish Point in an environmentally friendly manner. It may be wise to send out an email before the course to attendees suggesting car pool options.

Name	Location	Transport	Distance						Comments
Michael Waldvogel	Cork	car	400				1		a) Have everybody drive to one location (preferably the one nearer population centres), keep the private cars there, then on the second day use private bus hire IF we need to visit an alternative location (don't necessarily see the need for the 2 locations). b) Even if the system of private vehicles and 2 locations persists, then spend the first day at the one nearer to where most people travel from. Then on 2nd day travel to the one further away – carpooling for this day would likely be much higher. c) Prior to arrival, ask each participant if they want printed material at the course or if electronic documents would suffice (I would have chosen electronic). There was a lot of paper. d) At courthouse, plastic cups were not recycled (not sure they were able to be?). Use of recyclable plastic or paper cups (plus serviettes, etc.) with designated, well-signed recycling bins should be inherent. Also for the water bottles that were handed out. (Although, I will commend the group for using washable ceramic plates/bowls rather than disposable ones).
Dan Egan	Dublin	car	500	1					Organise coaches/mini buses from three major centres (Dublin, Belast, Cork)
Shanti Mc Alister	Belfast	car	1010			1			Circulate a request for delegates who were willing to car share and put them in touch with other people who are willing to do the same. Pick-ups could be made on route rather than just at the start of the journey, e.g. someone travelling from Belfast could collect people in Cavan or Dublin (depending on their route).
Seamus Donohoe	Dublin	car	300	1					No response
Jonathan Gannon	Dublin	car	578				1		Most of course participants are travelling from Dublin so possibly a more suitable location closer to the capital could be provided.
Conor Frehill	Surrey, England	car (flight separate)	54						Locate the course near a train station and ensure field trip work is based close by.
Aodhan O'Murchu	Cork	car	500		1				Consolidate to either Spanish Point or Tulla

Name	Location	Mode	Distance					Comment
Jimmy Green	Galway city	car	175				1	run buses from major cities or pre-arrange car pool.
Bernadette Collins	Co Clare	car	170		1			No response
Barbara Olwill	Co Cavan	car	580		1			Possibly by locating the course closer to Dublin would reduce the emissions generated by travel
Arnold Leahy	Limerick City	car	140		1			car pool
David Browne	Dublin	car	500		1			Less remote location, provide buses
Ruth Bradfield	Dublin	car	546				1	No response
David Leahy	CO Limerick	car	140	1				No response
Michael Mc Grath	Cavan Town	car	460		1			Regional courses would be of much better benefit; (a) less travel incurred by participants with the exception of tutors who could car-pool. (b) Participants would be from one area/region eg., planners/engineers/local authority/Architects etc. This would allow all participants to have the same understanding and insight as to what the course is about and a better collaboration would follow to achieve the goals. (c) Cost effective – no accommodation requirements for most participants.
Rory Murphy	Dublin	car	540		1			If it was held in a town assessable by train and a bus then hired for local site visits.
Dorothy Hayden	north Co Dublin	car	570	1				No response
Niamh Ui Loinsigh	Co Meath	car-Got a lift	0					Create a service where people can get in touch and car pool or relocate to where public transport exists, get a Coach.
Clare Mc Evaney	Co Meath	car	550		1			Maybe HC could get participants to get in touch with each other and car pool or relocate to a place where public transportation is available.
Robert Murtland	Derry City	car	820		1			Hold at a venue with good rail/bus connections but then there may be difficulty to find suitable locations for field work.

Appendix 6
Public Transportation to and within Clare
This information is taken from the Bus Eireann and Iarnród Eireann websites in November 2010.

Train to Ennis from Major Centres
Ennis is served by regular trains from Limerick and Galway (via Athenry) on the Western Rail Corridor. Since Limerick city is accessible by train from Cork, Dublin and Waterford (though often requiring a connection at Limerick Junction), there are options for people coming from these places. A random search of trains from Dublin to Ennis showed that there were 6 trains a day travelling to Ennis from the capital, via Limerick City. Realistically speaking though if people have to complete a full day's work before travelling there is only one option but that train would get them to Ennis in 3.5 hours which could compete with driving time. A train from Belfast to Ennis via Dublin and Limerick would take about 7 hours, two hours longer than travelling by car.

Bus
Getting to Ennis with Bus Eireann
Ennis is also served by intercity buses from Limerick City and Galway. A bus leaves Limerick City bus station every hour on the half hour from Ennis and the duration of the journey is 1 hour. There is also a direct bus service Cork City to Ennis which takes three hours (no. 51 service). This bus leaves Cork every hour at 25 minutes past the hour. There is also a bus service from Waterford to Limerick which then connects to Ennis. This bus leaves Waterford every two hours though the journey takes around 4.5 hours. It is possible to get the bus from Belfast via Dublin and Galway but it takes over 8 hours. The Bus Eireann website (www.buseireann.ie) displays the timetables of the intercity and express bus routes.

Getting to Spanish Point and Tulla
At 3pm daily there is a bus service from Ennis to Spanish Point, duration 1 hour 25 mins.
Also Clare Accessible Transport (www.catconnects.ie) has three daily bus services linking Ennis and Tulla and return. However, Clare Accessible Transport does not provide a bus service to Spanish Point.

Ennis to Scariff (via Tulla) Timetable
E1 Scariff - Ennis

Depart	Arrive	Mon	Tue	Wed	Thu	Fri	Sat
08.30	09.50	◉	◉	◉	◉	◉	
12.00	13.00	◉	◉	◉	◉	◉	
15.20	17.00	◉	◉	◉	◉	◉	

E1 Ennis - Scariff

Depart	Arrive	Mon	Tue	Wed	Thu	Fri	Sat
10.10	11.15	◉	◉	◉	◉	◉	
13.15	14.15	◉	◉	◉	◉	◉	
17.30	18.30						

Appendix 7:

Countryside Training Partnership

Environmental Policy

CTP Ltd works to minimise its environmental impact by reducing, re-using or re-cycling the resources required to carry out our daily operations. In undertaking this we will observe the following:

Office based activities:
- ❖ All paper supplies to be on recycled paper (the only exception being when this is not an option for specialist supplies).
- ❖ Any paper with an unused side to be kept and re-used.
- ❖ All fully used paper to be recycled.
- ❖ Give due consideration to the need for hard copy before printing off emails, documents etc on the computer.
- ❖ All computer ink cartridges to be recycled.
- ❖ Heating to be room specific and doors kept closed to retain heat. This to be balanced with optimum working conditions for staff.
- ❖ Lights and computers to be turned off when not in use and at the end of every work session.
- ❖ The electricity supplier at our registered office is 'Ecotricity', which has been described by WWF's Climate Chaos Campaign Director as "The only credible model for customers investing in new wind projects via their bill payments". We understand that 'Green Tariffs' offered by some other energy companies are used simply to fulfil those companies' renewables obligations – i.e. customers are paying extra to help the companies to do what they would have to do in any event.

Working away from base:
- ❖ Any staff travel to be by foot, cycle or public transport where possible and practicable.
- ❖ Under this section air travel is considered to be a non-sustainable form of transport and as such does not qualify as "public transport".
- ❖ When running training events and workshops we will encourage clients where feasible to choose venues which:
    - Are accessible by public transport
    - Which themselves adopt environmentally benign approaches in terms for example of energy conservation and serving local foods.
- ❖ We will arrange timings of events to fit in with train times etc.
- ❖ We will minimise the number of paper handouts, as an alternative offering trainees digital material either on disc or downloadable from the web.

This environmental policy to be reviewed on 31st January each year and any agreed improvements to be incorporated.