Report

IUCN World Conservation Congress Greenhouse Gas Emissions Assessment

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Greenhouse Gas Emissions Assessment – IUCN Congress

Executive Summary

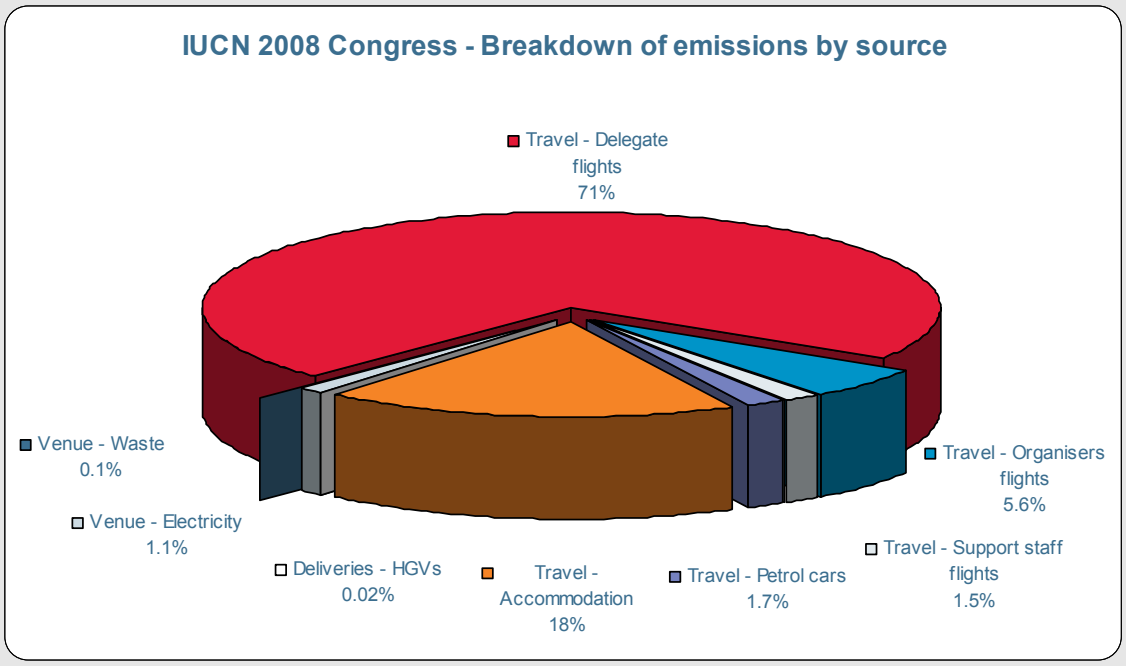
Background

This report identifies the greenhouse gas (GHG) emissions arising from the International Union for Conservation of Nature (IUCN) Congress held in Barcelona, Spain from the 5th to 14th October 2008 with more than 6,500 delegates attending the event from around the world.

Summary of Emissions

ECCM estimates that for the duration of the IUCN Congress, the GHG emissions produced were equivalent to **7,934 tonnes of CO_2**.

The chart below shows the IUCN Congress's emissions by source.



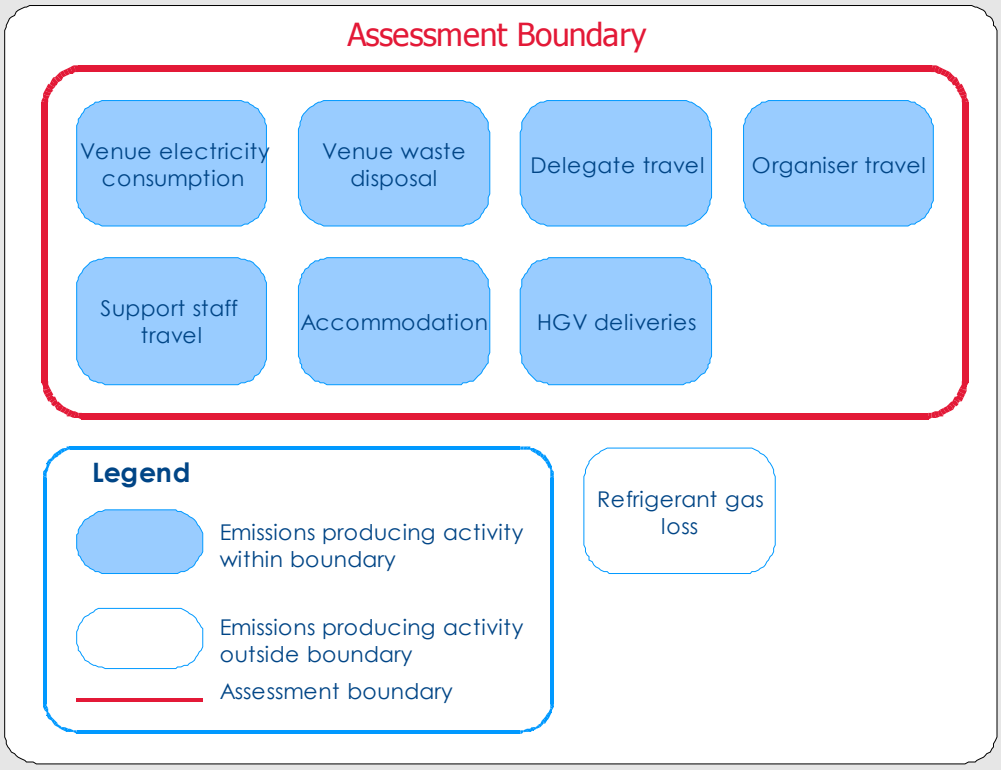
Delegate flights accounted for the largest proportion of emissions with **5,632 tonnes of CO_2e**, constituting 71% of the total. Accommodation contributed 18% of total emissions with **1,485 tonnes of CO_2e**. The remaining emissions were accounted for by petrol cars, organiser and support staff flights, venue electricity consumption and waste disposal and deliveries made by Heavy Goods Vehicle (HGVs).

Scope and Methodology

The assessment methodology follows the reporting principles and guidelines provided by the WBCSD Greenhouse Gas Protocol.

The scope of the assessment covers the GHG emissions associated with the hosting of the IUCN Congress which was held in Barcelona, Spain from the 5th to 14th October 2008.

The boundary of this assessment includes venue electricity consumption and waste disposal, associated delegate, organiser and support staff travel (flights and petrol cars), hotel accommodation and deliveries made by HGVs (see the diagram below). Emissions associated with refrigerant gas loss have been excluded from the scope of this assessment.



Recommendations

- For future assessments IUCN should continue to use an internal system for recording and submitting the data required for a Greenhouse Gas Emissions Assessment.

- The IUCN should repeat a Greenhouse Gas Emissions Assessment for all future Congress' so that any changes in emissions can be monitored. This will allow an emissions base line to be established against which targets can be set and progress can be monitored.

- The IUCN should encourage delegates, support staff and organisers to use less carbon intensive forms of transport for travelling to future Congress' e.g. use trains instead of flying where possible.

- The IUCN could encourage a reduction in the number of organiser and support staff that have to fly in to attend the Congress. These staff account for approximately 7% of the total emissions and so meaningful reductions could be achieved.

- In order to reduce emissions associated with the venue, IUCN could investigate hiring a site that sources all electricity from renewable sources and therefore reducing the electricity consumption emissions to zero.

1 Introduction

1.1 Background

Climate change presents a serious challenge for responsible business leaders in the 21st century. Most scientists now agree that rising atmospheric concentrations of greenhouse gases (GHGs), particularly carbon dioxide (CO_2), threaten to have severe impacts on food production, natural ecosystems and human health over the next 100 years. Industrialised and rapidly industrialising countries are the main sources of greenhouse gases. However, the greatest impacts will be felt by people in developing countries, particularly those in low lying coastal regions and marginal agricultural areas.

Figure 1 Flooding in Bangladesh

In response to the threat of climate change, the Kyoto Protocol was adopted in December 1997. Under the Protocol, industrialised countries have a legally binding commitment to reduce their collective greenhouse gas emissions by at least 5% compared to 1990 levels by the period 2008-2012. Russia ratified the Kyoto Protocol on 18th November 2004 and as a result it came into force on February 16th 2005. In December 2007 at the UN Climate Change Conference in Bali, the parties agreed on a work plan detailing the steps needed to reach an agreement on a new set of post 2012 commitments.

Spain ratified the Kyoto Protocol in 2002 as part of a joint ratification of the European Union 15 countries. The Spanish commitment is to limit its increase to 15 percent above 1990 levels as part of the Kyoto protocol.

1.2 Why carry out a Greenhouse Gas Emissions Assessment?

National governments around the world are taking a variety of steps to reduce GHG emissions. These include emissions trading schemes, voluntary reduction and reporting programs, carbon or energy taxes, and regulations and standards on energy efficiency and emissions.

A Greenhouse Gas Emissions Assessment provides the basis for further initiatives such as public reporting, target setting and implementation of mitigation activities.

1.3 Client Details

The first International Union for Conservation of Nature (IUCN) Congress was held in Fontainbleau, France in 1948. The IUCN Congress 2008 was held in Barcelona, Spain in October 2008 with more than 6,500 delegates attending the 10 day event. IUCN helps the world find pragmatic solutions to our most pressing environment and development challenges.

2 Assessment Methodology

2.1 General Procedure

The assessment methodology used here follows the reporting principles and guidelines provided by the Greenhouse Gas Protocol. These are published by the World Business Council for Sustainable Development and the World Resources Institute (WBCSD/WRI Protocol). In line with the WBCSD/WRI Protocol, ECCM, with client input, uses the following procedure to undertake a Greenhouse Gas Emissions Assessment:

1. Establishing assessment boundaries (including the selection of: greenhouse gases, organisational boundaries and operational boundaries)

2. Collection of client data

3. Evaluation of data quality and client data sources

4. Calculation of emissions using appropriate conversion factors

5. Results

The assessment procedure and a summary of results are presented in the main text of the report. A glossary of climate change terms is found in Appendix I. A detailed description of emissions calculations and associated assumptions are presented in Appendix II.

2.2 Greenhouse Gas Emissions

A Greenhouse Gas Emissions Assessment can include all six greenhouse gases covered by the Kyoto Protocol. The six Kyoto gases are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulphur hexafluoride (SF6), perfluorocarbons (PFCs) and hydro fluorocarbons (HFCs).

The global warming potential (GWP) of each greenhouse gas may be expressed in CO2 equivalents (see Table 1). For those gases with a high global warming potential, a relatively small emission can have a considerable impact.

Table 1 The global warming potential of the Kyoto gases

Kyoto gas	GWP*
Carbon Dioxide (CO_2)	1
Methane (CH_4)	25
Nitrous Oxide (N_2O)	298
Sulphur Hexafluoride (SF_6)	22,800
Perfluorocarbons (PFCs)	4,800 – 9,200
Hydro fluorocarbons (HFCs)	12 – 12,000

***Note: The 'Global warming potential' of a gas is its relative potential contribution to climate change over a 100 year period, where CO_2 = 1. (See Glossary for a full definition). Source: IPCC (2007)**

2.3 Greenhouse Gases – IUCN Congress

This Greenhouse Gas Emissions Assessment covers CO_2, CH_4 and N_2O emissions arising from fuel combustion and CH_4 emissions arising from landfilled waste.

2.4 Assessment Boundaries – Overview

It is important to draw clear assessment boundaries. The WBCSD/WRI Greenhouse Gas Protocol sets boundaries that are consistent with the assessment boundaries used for financial reporting purposes. When reporting on third party companies, clearly defined concepts of 'control' and 'equity share' should be used when apportioning emissions (see Appendix I: Glossary).

WBCSD/WRI protocol provides a three scope reporting framework.

Scope 1 covers direct GHG emissions from natural gas consumption and refrigerant gas losses.

Scope 2 includes net indirect emissions from energy imports and exports, particularly imported and exported electricity and steam.

Scope 3 includes other indirect GHG emissions such as delegate travel, product transport by third parties, outsourcing of core activities and off-site waste disposal/management activities.

Event activities and their associated GHG producing activities are outlined, and classified according to the appropriate scope, as illustrated in Figure 2.

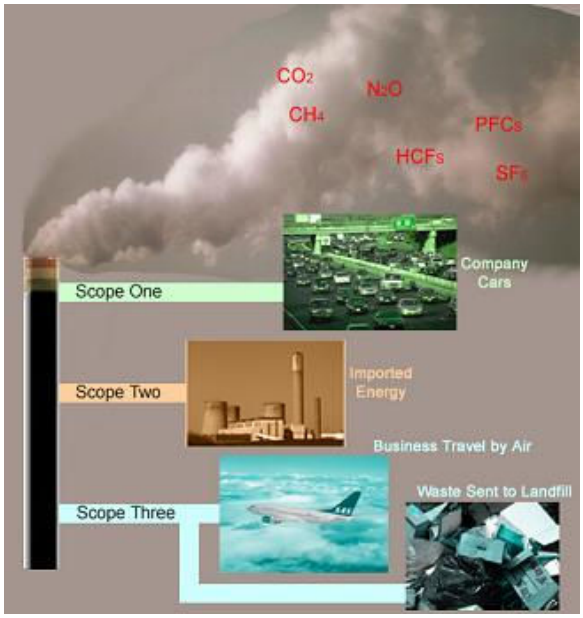


Figure 2 The three scopes of the WBCSD/WRI Protocol

The WBCSD/WRI Protocol recommends that Scopes 1 and 2 are reported as a minimum. From experience, ECCM suggests that the majority of emissions associated with events are scope 3 emissions (including delegate travel and accommodation). For a comprehensive assessment of total climate change impact, relevant Scope 3 activities should also be included.

2.5 Assessment Boundaries – IUCN Congress

Activities included with the assessment boundary are electricity consumption and waste disposal of the venue, flight travel and accommodation associated with delegate, organisers and support staff, transport by petrol car and all deliveries made by HGV. Emissions associated with refrigerant gas loss have been excluded from the scope of the assessment.

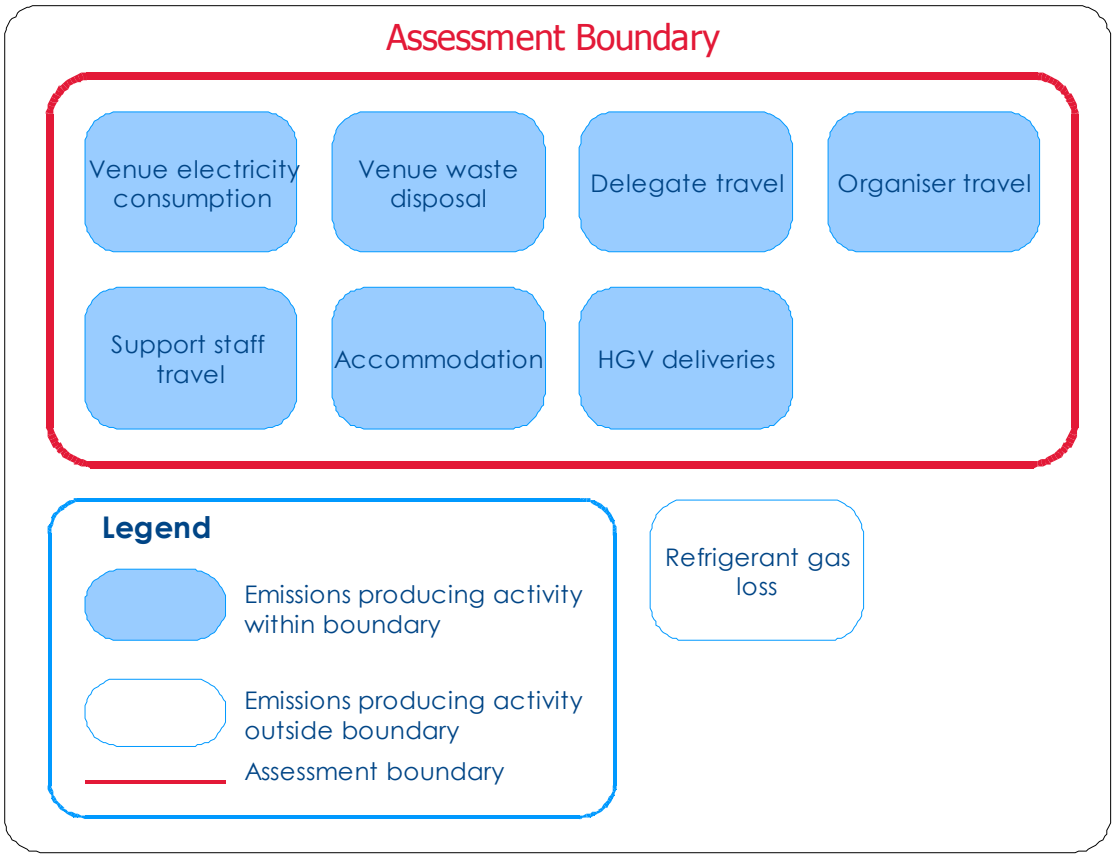
The scopes of these activities are identified in Table 2 and Figure 3.

Table 2. Information on activities within the assessment boundary

Category	Activities: Energy inputs	Data	Activities: Waste outputs	Data
Premises	Electricity consumption	✓	Waste disposal	✓
Transport	Delegate travel • Flights • Petrol car • Accommodation	 ✓ ✓ ✓/e		
Deliveries	HGV	e		

Key: ✓ - complete e – estimated ✓/e – combination of complete and estimated data

Figure 3 Assessment boundary



2.6 Reporting Approach

ECCM does not base its Greenhouse Gas Emissions Assessments on direct measurements of emissions. Assessments are based on estimates of material and energy consumption (principally weight or volume of fuel, but also weight or volume of waste) from which estimates of emissions can be derived. This is done by applying relevant conversion factors (i.e. amount of CO_2 produced per unit of fuel consumed). This approach is considered the most practical as the quantity of key greenhouse gases produced in most combustion and manufacturing processes is well understood. The certainty of waste emission estimates is lower, but direct measurement is rarely a realistic option.

The validity of all estimates depends on the accuracy, relevance and completeness of the data provided by the client and on the conversion factors used. ECCM's approach is to set out as clearly as possible all the assumptions and conversion factors used, so that the report is as transparent as possible and the estimate of emissions are founded on 'best evidence'.

ECCM is guided by the precautionary principle. Where there is any doubt over activities undertaken, or where there is a choice of published figures available for calculating greenhouse gas emissions, a conservative 'worst case' scenario is assumed, unless otherwise specified.

2.7 Emissions factors

In order to establish the tonnes of CO_2 equivalent emitted from the energy consuming activities default conversion factors were applied. These were taken from; 'Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard – Revised Edition' published by the World Business Council for Sustainable Development (WBCSD 2006) and 'Environmental Reporting: guidelines for company reporting on greenhouse gas emissions' published by the UK government (Defra 2008).

The WBCSD and Defra guidelines do not provide conversion factors for non-CO_2 greenhouse gases arising from fossil fuel combustion. Methane (CH_4) and nitrous oxide (N_2O) can make a significant contribution to total emissions depending on the fuel and the combustion technology. Emission factors for these activities are derived from the Intergovernmental Panel on Climate Change (IPCC 2006 and 1996) where appropriate (see Appendix II).

The CO_2 conversion factor for hotel accommodation was derived using an energy model to which the relevant emissions factors were applied. In order to calculate the CH_4 emissions from waste disposal, conversion factors were taken from typical UK waste data in Brown et al. (1999) and Smith et al. (1999).

3 Data

3.1 Data sources and quality

The data used to calculate IUCN Congress's emissions were collected by David Huberman and Pamela Grasemann.

The data provided relates to the period of the 5th to 14th October 2008.

Where preferred data were missing, estimates were made by the client and by ECCM based upon information provided by the data co-ordinators. These are outlined throughout the results and detailed in Appendix II.

3.2 Data assumptions

The fundamental assumption underlying the assessment is that all data provided by IUCN was accurate and complete as possible.

The following specific assumptions were used in the assessment:

Venue – Waste

- As a worst case scenario, ECCM has assumed that all non-recycled waste is disposed of via landfill sites.
- ECCM has assumed that Spanish landfill sites have equivalent methane capture rates as UK sites.
- ECCM does not attribute the emissions associated with recycling to the entity that disposes of the material. The emissions associated with recycling are attributed to the entity that processes the recycled material or the entity that consumes the product made from the recycled material.

Travel – All flights

- ECCM has assumed that all flight origins will be from the capital or major city.
- ECCM has assumed that all flight destinations will be Barcelona International Airport.
- All distances are source from Air Routing International.

Travel – Petrol cars

- As a worst case scenario, ECCM has assumed that all delegates, organisers and support staff travelling from within Spain, travel by petrol.
- ECCM has assumed that the distance travelled from the Barcelona airport to IUCN Congress venue is 21 km (www.google.maps.co.uk).

- ECCM has assumed that delegates travelling from the Barcelona region travel 25 miles on average.
- ECCM has assumed that delegates travelling from the Perpignan region travel 75 miles on average.
- ECCM has assumed that delegates travelling from the Madrid region travel 450 miles on average.
- ECCM has assumed that delegates travelling from the Sevilla region travel 700 miles on average.
- ECCM has assumed that all delegates travelling from Andorra do so by petrol car, travelling an estimated distance of 202 km (www.google.maps.co.uk).
- ECCM has assumed that each passenger travelled separately (as a worse case scenario).
- ECCM has assumed that emissions from petrol cars in Spain, France and Andorra are equivalent to petrol cars in the UK.

Travel – Accommodation

- As accurate data regarding organiser and supplier staff could not be gathered, ECCM have assumed that the number of nights stayed in hotels by these staff is equivalent to the data provided prior to the Congress taking place.
- ECCM has assumed that one person stays in one hotel room per night.

Deliveries – HGV

- ECCM has assumed that all HGV deliveries are used exclusively for the 2008 IUCN Congress.

4 Results

4.1 5th – 14th October 2008

ECCM estimates that over the events duration (5th – 14th October 2008) the GHG emissions associated with the IUCN Congress were equivalent to 7,934 tonnes of CO_2.

Figure 4 shows the emissions associated with the IUCN Congress by source.

Figure 4 Breakdown of emissions by general activity

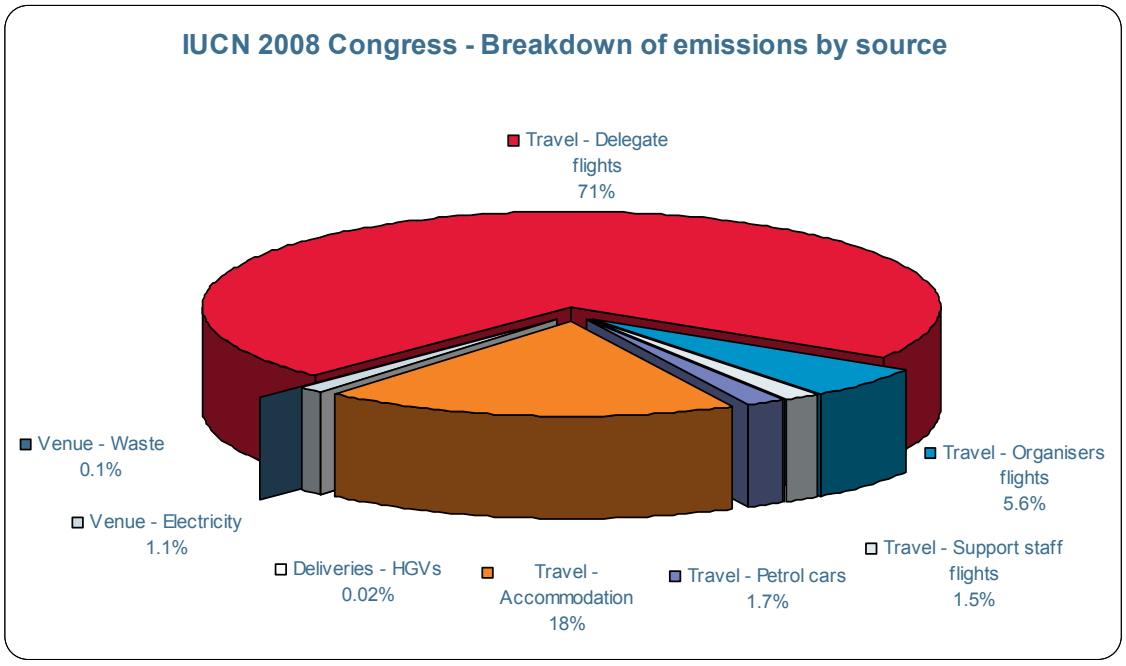


Table 3 and Table 4 break down the total emissions, firstly by general activity and secondly by WBCSD/WRI protocol scopes.

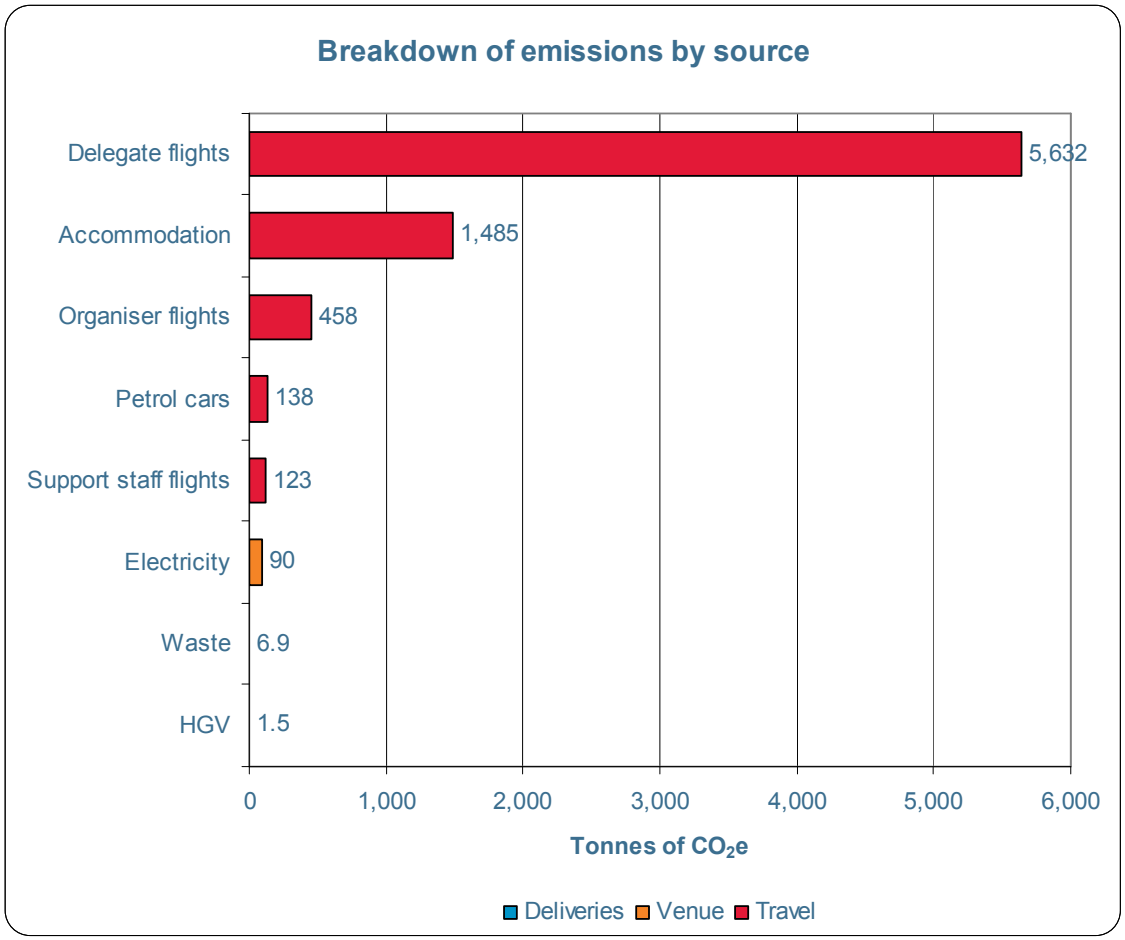
Table 3 Breakdown of emissions by general activity

Source of emissions	Equivalent emissions		Proportion of total (%)
	CO_2e (t)	C (t)	
Venue – Electricity	90	25	1.1%
Venue – Waste	6.9	1.9	0.1%
Travel – Delegate flights	5,632	1,536	71%
Travel – Organiser flights	458	125	5.8%
Travel – Support staff flights	123	34	1.6%
Travel – Petrol cars	138	38	1.7%
Travel – Accommodation	1,485	405	19%
Deliveries - HGVs	1.5	0.4	0.02%
Total	**7,934**	**2,164**	**100%**

Table 4 Breakdown of emissions by source (WBCSD/WRI Protocol)

Source of emissions	WBCSD Scope	Equivalent emissions	
		CO_2e (t)	C (t)
Venue – Electricity	Scope 2	90	25
Sub-total		**90**	**25**
Venue – Waste	Scope 3	6.9	1.9
Travel – Delegate flights		5,632	1,536
Travel – Organiser flights		458	125
Travel – Support staff flights		123	34
Travel – Petrol cars		138	38
Travel – Accommodation		1,485	405
Deliveries - HGVs		1.5	0.4
Sub-total		**7,844**	**2,139**
Total		**7,934**	**2,164**

Figure 5 Breakdown of emissions by source



As show in Figure 5 shows, emissions associated with travel account for the largest portion of emissions with 7,836 tonnes of CO_2e (99% of the total emissions). Further analysis of these emissions indicates that delegate flights were responsible for 71 of the total emissions, accounting for 5,632 tonnes of CO_2e. Accommodation accounted for the next greatest source of emissions with 1,485 tonnes of CO_2e (19% of the total). The remaining travel emissions were accounted for by organiser and support staff flights and petrol cars.

After travel; venue emissions gave rise to the second largest source of emissions, accounting for 1.2% of the total (97 tonnes of CO_2e). A breakdown of these emissions shows that electricity consumption was responsible for 90 tonnes of CO_2e (1.1% of the total). The remainder of venue emissions were accounted for by waste disposal and accounted for 6.9 tonnes of CO_2e.

The smallest portion of emissions was accounted for by HGV deliveries, which generated 1.5 tonnes of CO_2e (0.02% of the total).

Careful attention should be paid to the calculation assumptions outlined in Appendix II, when interpreting the results.

Table 5 shows a breakdown of emissions per delegate. By normalising emissions using these metric, underlying changes in emissions can be tracked, as well as changes in absolute emissions resulting from the expansion or contraction of future Congress'.

Table 5. Breakdown of emissions per delegate

Source of emissions	No. of delegates	CO_2e (t)	Emissions per delegate (t)
Emissions per delegate	*6,697*	7,934	**1.2**

It is not possible to compare one event to another as there are differences in the type of transportation used and the distances travelled. The IUCN Congress should consider reassessing the emissions associated with hosting the next Congress in order to establish whether meaningful reductions have been achieved.

If the IUCN wanted to offset all emissions generated by the Congress in Barcelona, Spain, they would need to purchase **7,934 tonnes of CO_2e**.

Figure 6 Landfill methane capture projects and technology investments such as wind power.

5 Recommendations

- For future assessments, the IUCN should continue to use an internal system for recording and submitting the data required for a Greenhouse Gas Emissions Assessment

- The IUCN should repeat a Greenhouse Gas Emissions Assessment for all future Congress' so that any changes in emissions can be monitored. This will allow an emissions base line to be established against which targets can be set and progress can be monitored.

- The IUCN should encourage delegates, support staff and organisers to use less carbon intensive forms of transport future Congress' e.g. use trains instead of flying where possible.

- The IUCN could encourage a reduction in the number of organiser and support staff that have to fly in to attend the Congress. These staff account for approximately 7% of the total emissions, so meaningful reductions could be achieved.

- In order to reduce emissions associated with the venue, the IUCN could investigate hiring a site that sources all electricity from renewable sources and therefore reducing the electricity consumption emissions to zero.

6 References

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APPENDIX I – GLOSSARY

GLOSSARY

Carbon Dioxide Equivalent (CO_2e). The universal unit of measurement used to indicate the global warming potential (GWP) of each of the 6 Kyoto greenhouse gases. It is used to evaluate the impacts of releasing (or avoiding the release of) different greenhouse gases.

Climate change. A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability over comparable time periods (Source: United Nations Framework Convention on Climate Change).

Control. The ability of a company to direct the operating policies of a facility or organisation. Usually, if the company owns more than 50% of the voting interests, this implies control. The holder of the operating licence often exerts control, however, holding the operating licence is not a sufficient criteria for being able to direct the operating policies of a facility or organisation. In practice, the actual exercise of dominant influence itself is enough to satisfy the definition of control without requiring any formal power or ability through which it arises.

Direct emissions. Emissions that are produced by organisation-owned equipment or emissions from organisation-owned premises, such as carbon dioxide from electricity generators, gas boilers and vehicles, or methane from landfill sites.

Equity share. The percentage of economic interest in/benefit derived from an organisation.

Global warming. The continuous gradual rise of the earth's surface temperature thought to be caused by the greenhouse effect and responsible for changes in global climate patterns (see also Climate Change).

Global Warming Potential (GWP). The GWP is an index that compares the relative potential (to CO_2) of the 6 greenhouse gases to contribute to global warming i.e. the additional heat/energy which is retained in the Earth's ecosystem through the release of this gas into the atmosphere. The additional heat/energy impact of all other greenhouse gases are compared with the impacts of carbon dioxide (CO_2) and referred to in terms of a CO_2 equivalent (CO_2e) e.g. Carbon dioxide has been designated a GWP of 1, Methane has a GWP of 25.

Greenhouse gases. The current IPCC inventory includes six major greenhouse gases. These are Carbon dioxide (CO_2), Methane (CH_4), Nitrous oxide (N_2O), Hydro fluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulphur hexafluoride (SF_6).

IPCC. The Intergovernmental Panel on Climate Change. A special intergovernmental body established by the United Nations Environment Programme (UNEP) and the World Meteorological Organisation (WMO) to provide assessments of the results of climate change research to policy makers. The Greenhouse Gas Inventory Guidelines are being developed under the auspices of the IPCC and will be recommended for use by parties to the Framework Convention on Climate Change.

Indirect emissions. Emissions that are a consequence of the activities of the reporting company but occur from sources owned or controlled by another organisation or individual. They include all outsourced power generation (e.g. electricity, hot water), outsourced services (e.g. waste disposal, business travel, transport of company-owned goods) and outsourced manufacturing processes. Indirect emissions also cover the activities of franchised companies and the emissions associated with downstream and/or upstream

manufacture, transport and disposal of products used by the organisation, referred to as product life-cycle emissions.

Kyoto Protocol. The Kyoto Protocol originated at the 3rd Conference of the Parties (COP) to the United Nations Convention on Climate Change held in Kyoto, Japan in December 1997. It specifies the level of emission reductions, deadlines and methodologies that signatory countries (i.e. countries who have signed the Kyoto Protocol) are to achieve.

APPENDIX II– EMISSIONS CALCULATIONS & ASSUMPTIONS

Creating a sustainable low carbon society

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