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TOURISM



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Carbon Footprint of Australian Tourism

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'Carbon Footprint'

- ❑ **Climate change is the result of atmospheric build up of greenhouse gases (GHGs), chiefly carbon dioxide (CO₂)**
- ❑ **Producing goods and services for tourism results in GHG emissions both in Australia, and abroad**
- ❑ **'Carbon Footprint' refers to the amount of GHG emissions (CO₂ equivalent) associated with the production and consumption of goods and services at the level of an individual firm, industry or entire economy**
- ❑ **A Carbon Footprint is essentially an accounting measure, to determine how GHG emissions intensive an industry is**



Positive proof of global warming.



**18th
Century**

1900

1950

1970

1980

1990

2006

Estimates of the Carbon Footprint of Australian Tourism

- ❑ Our measures are comprehensive and include all the GHG emissions produced by Australian tourism globally. They include:
 - **Direct** GHG emissions from tourism production- eg from the fuel used by tour buses, aviation, hotel operations, theme parks, restaurants etc,
 - **Indirect** GHG emissions from the outputs of industries that supply inputs to tourism. eg. GHGs emitted in production of electricity purchased by travel agencies or in construction of hotels, or manufacture of T shirts, ferries, agricultural produce etc.
 - GHG emissions from imports which are provided to tourists or the industry, and from the transport of those imports- these emissions do not come from Australian production

Importance of the carbon footprint

- ❑ Policies to *mitigate* and to *adapt* to climate change must be based on as much detailed information as is available regarding the emissions of GHG associated with economic activity
- ❑ The tourism industry needs such information if it is to maximise its input into policy formulation
- ❑ Australia, like other signatories of the Kyoto Protocol, has responsibility for its 'Kyoto' emissions and has committed to a target of reducing emissions by 60 per cent of 2000 levels by 2050
- ❑ The estimates that we shall present are the most comprehensive available to date

Objectives

To develop Carbon Footprint measures which are:

- **Comprehensive:** most comprehensive carbon footprint of tourism so far anywhere
- **Comparable:** can be compared to measures for other industries where data are available
- **Consistent:** industry definition is consistent with that in the tourism satellite account

Bases for Measurement

- **Production-** consistent with production by the industry as measured in the TSA
- **Expenditure:** consistent with estimates of expenditure on tourism products
- **Measures** are not very different, but provide information on some different aspects

Production based approach

Includes

- GHG emissions directly produced by tourism industries
- GHG emissions from of Australian based airlines (inbound and outbound services)
- GHG emissions from imports used as inputs in producing goods and services for sale to the Australian tourism industry

Excludes

- GHG emissions of non-Australian based airlines (inbound and outbound services)
- GHG emissions from production of imports directly purchased by tourists

Expenditure based Approach

Includes

- GHG emissions associated with expenditures in Australia by foreign and domestic tourists
- GHG emissions from air travel by tourists on Australian and non-Australian based airlines.
- GHG emissions associated with expenditure by outbound Australian residents within Australia prior to or following flights (hotels, internal transport etc)

Excludes

- GHG emissions associated with expenditure on outbound air fares
- GHG emissions associated with expenditure by Australian outbound travelers on goods and services in destinations outside Australia

Types of Emissions

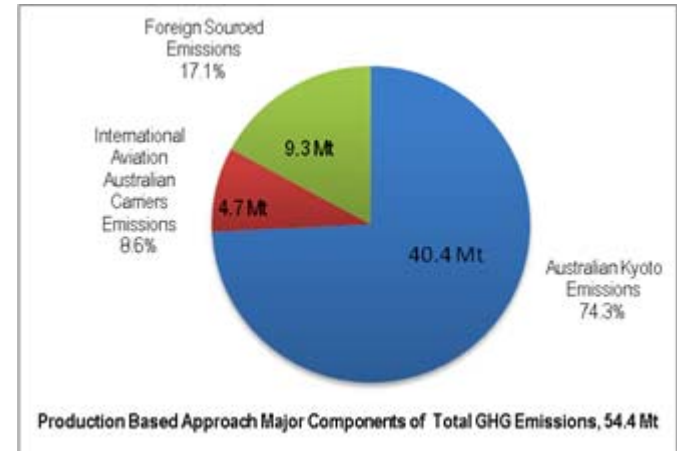
- 1 Australian based emissions subject to Kyoto agreement**
- 2 International aviation emissions, from Australian or foreign airlines- will be treated differently**
- 3 Emissions from production in other countries**



KEY RESULTS

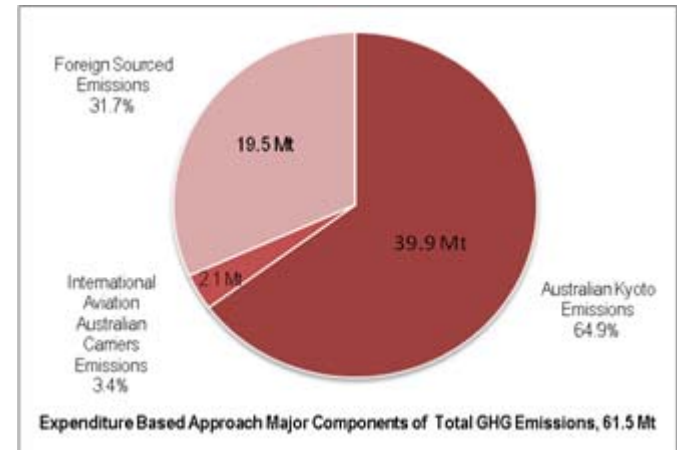
Production approach

- Direct GHG emissions : 26.3 Mt (48.4%)
- Indirect GHG emissions : 28.1 Mt (51.6%)
- Total GHG emissions : 54.4 Mt (100.0%)



Expenditure approach

- Direct GHG emissions : 29.5 Mt (48.0%)
- Indirect GHG emissions : 32.0 Mt (52.0%)
- Total GHG emissions : 61.5 Mt (100.0%)





Production based carbon footprint

Source	Kyoto	Non-Kyoto		Total GHG (Kyoto+non- Kyoto) Emissions	% Share of Total Direct & Indirect GHG Emissions
	Australian Kyoto Emissions	International Aviation Australian Airlines Emissions	Foreign Sourced Emissions		
1. Direct Emissions from Tourism Industries	10.5			10.5	19.30
2. Emissions from Tourism-related Private Motor Vehicle Use	11.1			11.1	20.40
3. Emissions from International Aviation		4.7		4.7	8.64
4. Total Direct GHG Emissions	21.6	4.7		26.3	48.35
5. Indirect Emissions from Tourism Inputs	18.8			18.8	34.56
6. Emissions from Imports			8.1	8.1	14.89
7. Emissions from Transport of Imports			1.2	1.2	2.21
8. Total Indirect GHG Emissions	18.8		9.3	28.1	51.65
9. Total Direct and Indirect GHG Emissions	40.4	4.7	9.3	54.4	100.00



Expenditure based carbon footprint

Source	Kyoto	Non-Kyoto		Total GHG (Kyoto + non-Kyoto) Emissions	% Share of Total Direct and Indirect GHG Emissions
	Australian Kyoto Emissions	International Aviation Australian Airlines Emissions	Foreign Sourced Emissions		
1. Direct Emissions from Tourism Industries	10.5			10.5	17.07
2. Emissions from Tourism-related Private Motor Vehicle Use	11.1			11.1	18.05
3. Emissions from International Aviation – Australian		2.1		2.1	3.41
4. Emissions from International Aviation – non-Australian Based			3.8	3.8	6.22
5. Total Direct GHG Emissions	21.6	2.1	3.8	29.3	47.97
6. Indirect Emissions from Tourism Inputs (excluding outbound aviation)	18.3			18.3	29.76
7. Emissions from Imports			7.7	7.7	12.32
8. Emissions from Imports Directly Purchased			3.2	3.2	5.20
9. Emissions from Transport of Imports			1.6	1.6	2.60
10. Emissions from International Aviation – Non-Australian Based			1.2	1.2	1.93
11. Total Indirect GHG Emissions	18.3		13.7	32.0	52.03
12. Total Direct and Indirect GHG Emissions	39.9	2.1	19.5	61.5	100.00



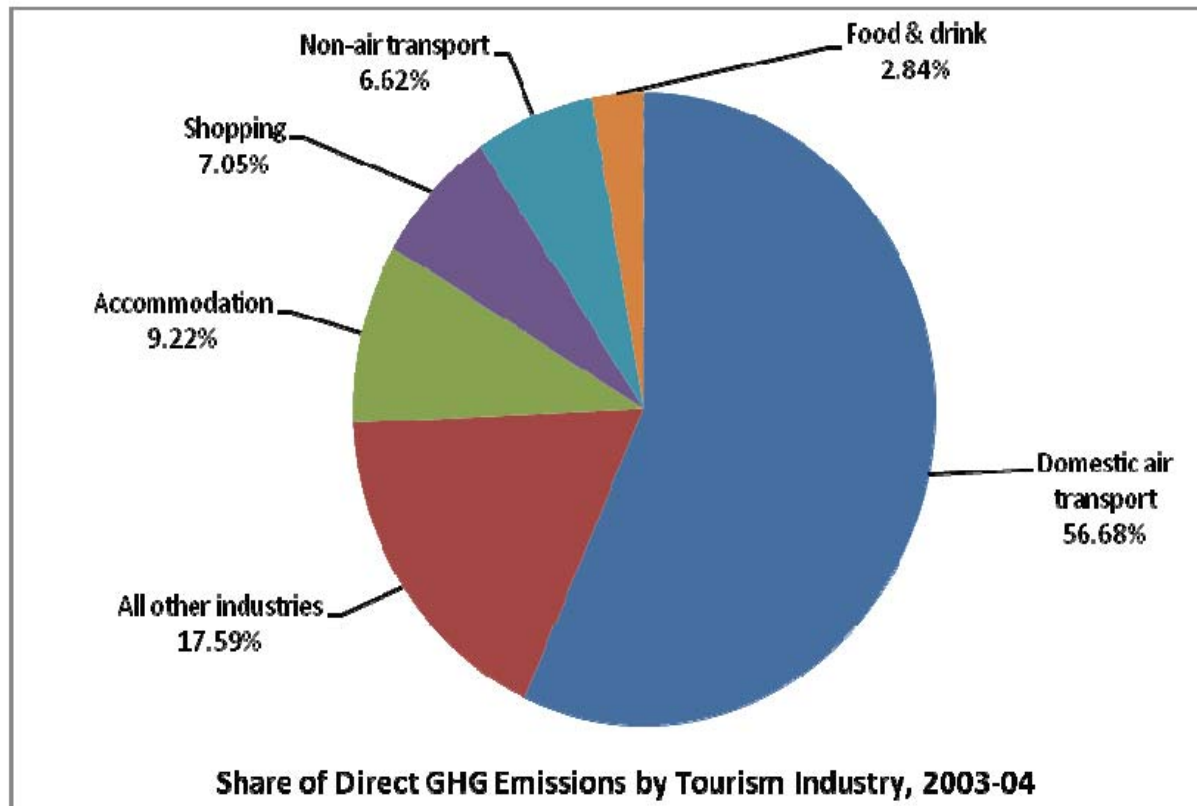
Direct Emissions

- **Mainly transport based**
- **Some tourism industries directly generate emissions- e.g. Hotel which uses gas for central heating; remote tourism business which uses fuel oil to generate electricity**
- **Domestic aviation accounts for 5.9Mt out of 10.5Mt**
- **Measures are based on emissions/ output for each industry, from:**
- **Monash MMRF Green model of the economy with Dept. of Climate Change emissions data**



Share of direct GHG emissions by Tourism industry

Figure 3 Shares of Direct GHG Emissions by Tourism Industry 2003–04



Tourism Motor Vehicle Use

- Emissions are also produced from tourism consumption
- Use of motor vehicles by tourists (Tables 1, 2)
- Tourism is around 14% of total motor vehicle use
- Total emissions 11.1Mt
- While this is tourism consumption, we count this in the direct emissions from the tourism industry

Indirect Emissions 1

- **Tourism uses electricity, which produces emissions**
- **Tourism uses IT, which uses electricity and as, which produce emissions**
- **Tourism uses retail, which uses IT, which uses electricity and gas etc, etc**
- **Need to trace back an endless chain of indirect emissions**
- **Can do this using the Input Output structure within the MMRF Green model**
- **Can do this to find the ultimate pattern of goods and services produced for tourism and consequent emissions**



Indirect Emissions 2

- **Comparable to direct emissions**
- **Dominated by:**
- **Electricity -37%**
- **Agriculture etc- 30%**



Emissions from Imports

- **Tourism industry uses imports, and tourists also buy imports directly**
- **Emissions from imports purchased by the industry- 8.1Mt (Tables 1, 2)**
- **Emissions from imports purchased directly by tourists- 3.2Mt (Table 2)**
- **Emissions from sea freight of imports- 1.2Mt**
- **While these are outside Australia's international commitments, they are part of the carbon generated by Australian tourism**



Tourism's Emissions Intensity

- **Can compare this with other industries for direct emissions**
- **Not for indirect unless data are available**
- **If motor vehicle emissions are included, tourism accounts for 4.7% of total industry and residential emissions**
- **Sixth most emissions intensive industry, after road transport and before mining (Table A7)**
- **Compare to 4.2% of GDP (from TSA, 2003-04)- slightly more emissions intensive than other industries**
- **Some tourism industries (e.g. Aviation) are more emissions intensive than the total**



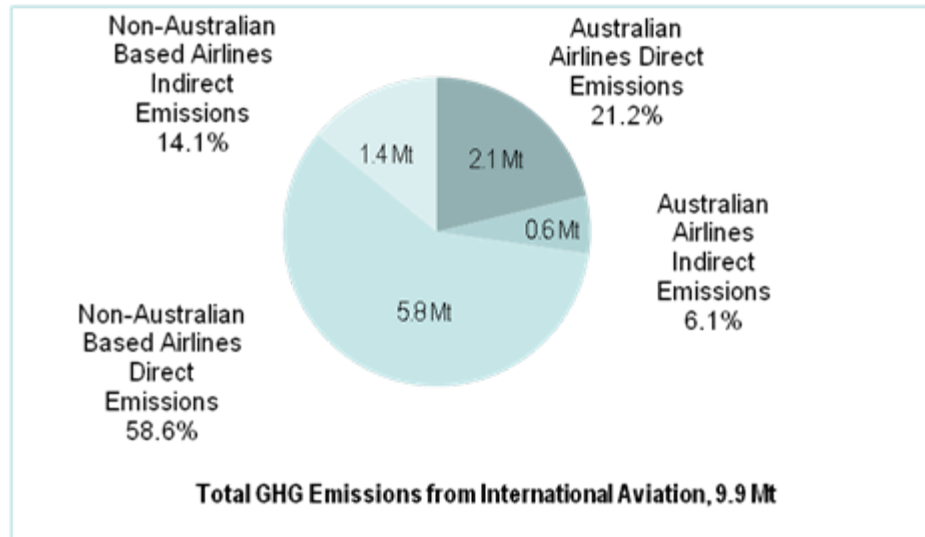
Australian International Aviation

- **As included in the TSA**
- **Based on international passenger kms, and emissions per passenger km**
- **Total of 4.7Mt (Table 1)**

Inbound International Aviation

- Includes Australian (Qantas) and Non Australian based (Singapore Airlines, Emirates) services
- Direct- estimated from passenger kilometres for different origins, with allowance for multiple destination journeys
- E.g. UK visitor stops off at Singapore
- Indirect: estimated as for other tourism industries

TOTAL GHG EMISSIONS FROM INTERNATIONAL AVIATION



- Total GHG emissions from International Aviation: 9.9 Mt
- Non-Australian based airlines direct emissions: 5.8 Mt (58.6%)
- Australian airlines direct emissions: 2.1 Mt (21.2%)
- Non-Australian based indirect emissions: 1.4 Mt (14.1%)
- Australian airlines indirect emissions: 0.6 Mt (6.1%)



Using the Footprint...

- **Many views about what should or should not be included**
- **Should motor vehicle use emissions be included?**
- **Which ever your view, the numbers are provided so that you can work out your preferred measure**

Observations

- **Transport (motor vehicles and aviation) account for a high proportion of emissions (esp Direct emission)**
- **Indirect emissions of same order of magnitude as direct emissions**
- **Tourism not a particularly emissions intensive industry in aggregate, though individual industries are quite emissions intensive**



Observations

- ❑ **tourism direct emissions *including* emissions from tourism industries, use of motor vehicles and the production of both Australian and non-Australian based international aviation services for inbound tourists represent 5.29 per cent of the total emissions from Australian industry and households, and international aviation**
- ❑ **total emissions from Australian industry are 558.15 Mt.. Tourism, with GHG emissions of 29.5 Mt. is Australia's fifth ranked industry in terms of emissions.**

Importance

- Information on tourism's carbon footprint, by type of characteristic and connected industry, can help industry associations and the managers of tourism enterprises to develop tools to actively manage their emissions as part of standard business practices, as a way to adapt to a carbon constrained future and to manage increasing input costs
- Emissions management (measurement, monitoring and reduction strategies) allows an enterprise to build awareness of energy consumption, identify inefficiencies and to implement strategies to achieve efficiency gains
- It also informs investment decisions, such as the value of investing in more efficient technology or renewable energy

FURTHER DIRECTIONS

- **Could be used to measure State Carbon Footprints using the state TSAs (as produced by CEP)**
- **Estimation of a more up to date Carbon Footprint of Australian tourism (current study constrained by data availability)**
- **A current further development of this work is a study of how the proposed emissions trading scheme (the CPRS) for Australia will impact on the tourism industry**
- **This uses computable general equilibrium model, of the sort that the STCRC Centre for Economics and Policy has done for other tourism issues**



THANK YOU !!

