



Greenhouse Gas Inventories (Carbon Footprints)

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Environment Institute of Australia and New Zealand - ACT
Climate Change Skills Forum
20 August 2010



Overview



- » Importance of Numbers
- » Guiding Principles
- » Standards and Guidance
- » Voluntary and Mandatory Inventory Reporting
- » NGERS overview
- » How to do a footprint

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Importance of Numbers



PPM: 280, 350, 385, 450, 460, 550, 750

PPM/yr: 1.3 (70s), 1.5 (90s), 2.0 (2000-8), 2.3 (08)

Global carbon emissions (2007)

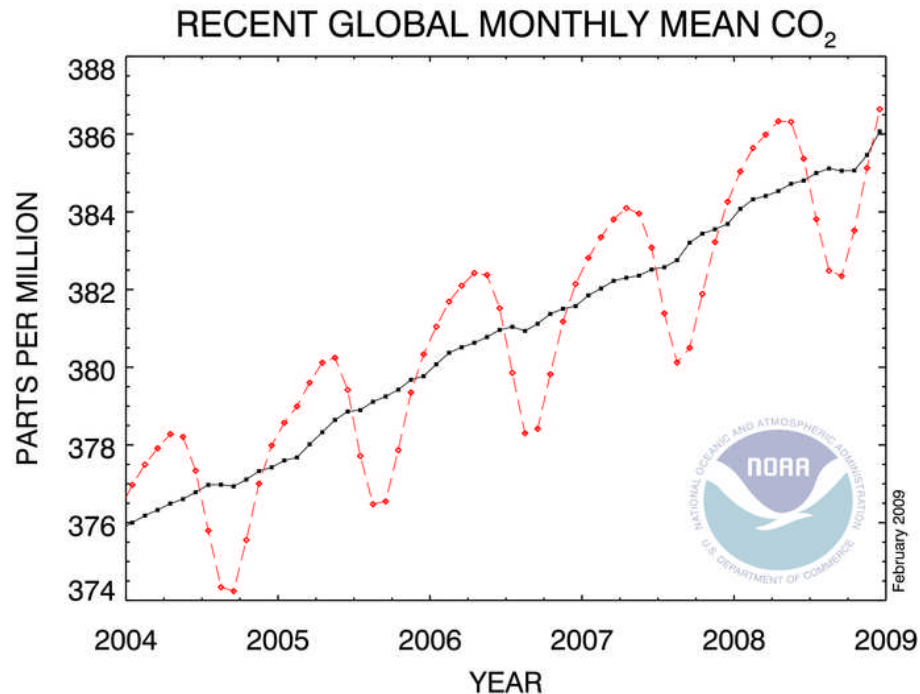
- » fossil fuel + cement: 8.5 billion tonnes
- » deforestation: 1.5 billion tonnes
- » total carbon: 10 billion tonnes

Total CO₂: 36,666,000,000 tonnes

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Atmospheric CO₂ Concentration



Year 2008
Atmospheric CO₂ concentration:

385 ppm

38% above pre-industrial

year	ppm	y ⁻¹
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2000	1.24	
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2001	1.85	
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2002	2.39	
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2003	2.21	
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2004	1.61	
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2005	2.41	
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2006	1.79	
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2007	2.17	
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2008	2.28	
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1970 – 1979: 1.3 ppm y⁻¹

1980 – 1989: 1.6 ppm y⁻¹

1990 – 1999: 1.5 ppm y⁻¹

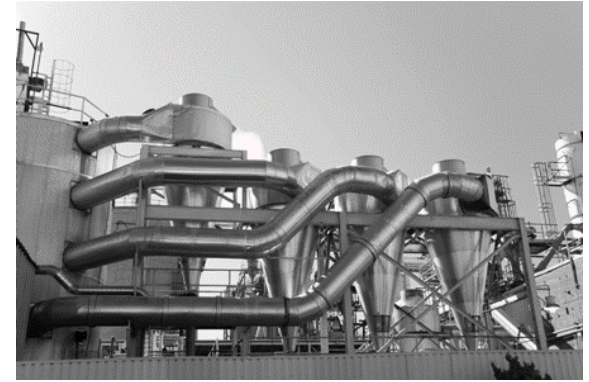
2000 - 2008: **2.0 ppm y⁻¹**

2008: **2.3 ppm y⁻¹**

Data Source: Pieter Tans and Thomas Conway, NOAA/ESRL



Importance of Numbers 2



Global Population: 6 Bn (now), 9 Bn (2050)

Australian Pop'n: 21 Mn (now), 35 Mn (2050)

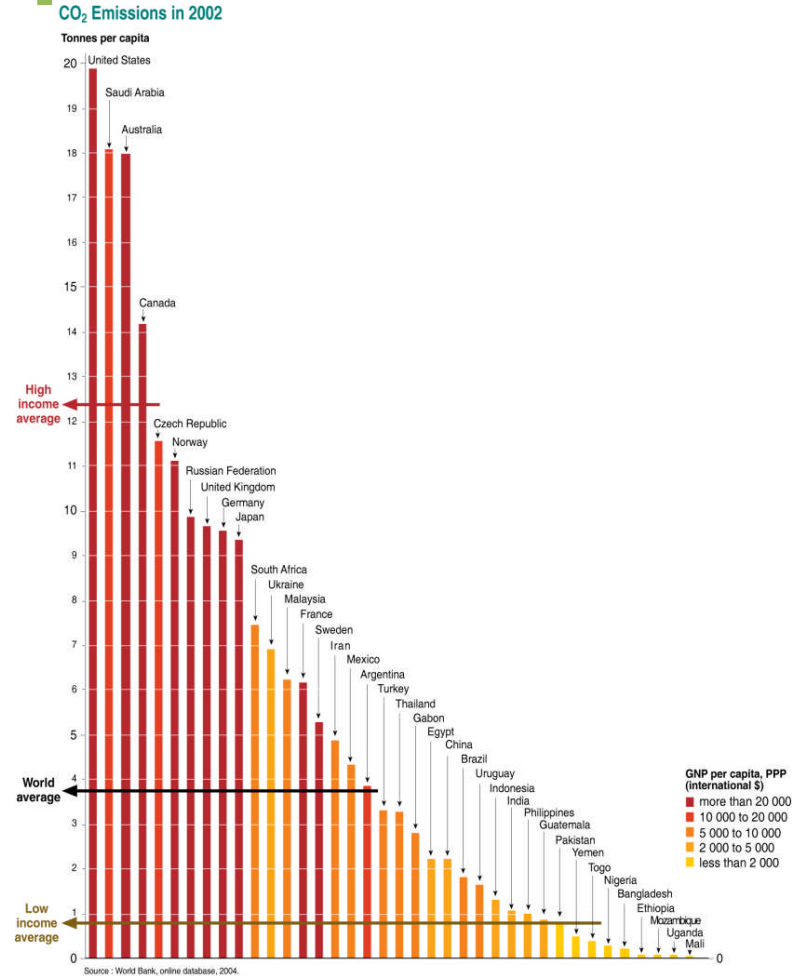
Per capita: 25 t (USA), 4 t (China), 1 t (India)

Australia: 597.2 Mt, 21 M, 28.4 tpp

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Per Capita Emissions



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Guiding Principles



➤ Accurate

- » measured quantity's closeness to real value
- » reduce bias and uncertainty

➤ Completeness

- » all relevant emissions & abatement within reporting boundary

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Guiding Principles 2



➤ Conservative

- » assumptions, estimates and procedures ensure that:
 - emissions are not underestimated
 - abatement not overestimated

➤ Consistent

- » data comparable across years
- » useful data for greenhouse management

Guiding Principles 3



➤ Transparency

- » factual and neutral
- » understandable to users
- » assumptions and calculations documented;
- » exclusions explained

➤ Relevant

- » greenhouse information only reported

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Standards



➤ AS ISO 14064.1

» Organisation level for the quantification and reporting of greenhouse gas emissions and removals (AS ISO 14064.1:2006)

➤ AS ISO 14064.2

» **Project level** for quantification and reporting of greenhouse gas emission reductions and removal enhancements (AS ISO 14064.2:2006)

➤ AS ISO 14064.3

» **Validation and verification** of greenhouse gas assertions (AS ISO 14064.3:2006)

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Other Guidance



- » International Standard ISO 14040 series: Life cycle assessment)
- » International Standard ISO 14065: Greenhouse gases – Requirements for GHG validation and verification bodies (ISO 14065:2007)
- » *GHG Protocol – A corporate accounting and reporting standard (revised edition)*
- » *GHG Protocol for Project Accounting*
- » The National Greenhouse and Energy Reporting Act 2007 (NGER Act)

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Greenhouse Emissions Reporting



➤ Voluntary

- » Carbon Disclosure Project
- » Annual Reports, Sustainability Reports, Environmental Reports
- » Government and industry programs

➤ Legislative

- » National Greenhouse and Energy Reporting Act (NGER)

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NGERS: Determining Participation



- **Constitutional Corporation**
 - » With whom does the buck stop.
- **Do we cross one of the Thresholds?**
 - » Does the Facility or Corporation emit emissions, produce and/or consume energy at or above certain values
- **Calculation of emissions**
 - » NGERS focuses on Scope 1 and 2 emissions, **not** Scope 3
 - » Covers 6 Kyoto gases

NGERS: Thresholds



	Reporting Period			
	2008/09	2009/10	2010/11	2012/13
Facility Threshold	25 kt 100TJ	25 kt 100TJ	25 kt 100TJ	25 kt 100TJ
Corporate Group Thresholds	125 kt 500TJ	87.5 kt 350 TJ	50 kt 200TJ	50 kt 200 TJ

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NGERS Timelines



	Reporting Year			
	2008/09	2009/10	2010/11	2011/12
Corporations to apply for registration by:	31 August 2009	31 August 2010	31 August 2011	31 August 2012
Corporations to provide data report by	31 October 2009	31 October 2010	31 October 2011	31 October 2012
Government to publish data by	28 February 2010	28 February 2011	28 February 2012	28 February 2013

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Greenhouse Gas Inventories



- 6 Kyoto gases - CO₂, N₂O, CH₄, SF₆, PFC, HFC
- Categorise emissions into Scopes 1, 2 and 3
- Produce an emissions report which includes assumptions, methods & emission factors used
- Tool to track and manage your emissions profile

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Carbon Footprints (The Process)



- » Determine the organisation's boundary
- » Identify organisation's GHG emissions sources within boundary
- » Collect activity and emissions data
- » Document emission factors used and calculation methodology
- » Document assumptions used
- » Document all exclusions and their justification
- » Calculate footprint.

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Scopes 1, 2 and 3

➤ Scope 1 Emissions

- » Direct release into atmosphere
(i.e. emissions from burning fuel)

➤ Scope 2 Emissions

- » Energy consumption emissions directly produced by others
(i.e. power station emissions generating your electricity)
- » Relates to electricity, heat , cooling supplied to you

➤ Scope 3 Emissions

- » Produced by others supplying fuels, goods & services



Emission Factors



➤ Units of emissions per unit of product

- » Use the latest National Greenhouse Accounts Factors
- » All scope 1 and 2 EF also have scope 3 EF
- » Solid fuels EF can vary depending on where sourced from
- » Liquid and most gaseous fuels same EF across Australia
- » Natural gas EF varies across Australia
- » Electricity EF varies across Australia

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Electricity Carbon Intensity



- » Australia's electricity on average highest in OECD
 - » one of the highest in the world
- » Victoria third highest in the world
 - » beaten by Gibraltar, Togo followed by Libya and Kazakhstan
- » Our electricity's carbon intensity is on average:
 - » six times NZ; four times Canada's
 - » roughly twice as high as US, UK, Japan and world average.
 - » France, (nuclear) less than one tenth as intense as Australia.
- » Iceland, Norway, Paraguay and Zambia
 - very close to carbon neutral.

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Australian Electricity EFs



One kWh of electricity results in FFC CO₂e emissions of

- » 0.2 kg in Tasmania (hydro-electricity)
- » 0.8 kg in NT (natural gas)
- » 0.9 kg WA (black coal)
- » 0.9 kg SA (mix of local brown coal, Vic electricity & natural gas)
- » 1.0 kg Qld (black coal)
- » 1.1 kg NSW/ACT (black coal)
- » 1.4 kg Victoria. (brown coal)

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Thank You

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