UNIVERSITY OF TECHNOLOGY SYDNEY

ENERGY & CARBON CATEGORY: AGIC SUSTAINABILITY RATING TOOL

THINK.
CHANGE.
DO

AGIC Conference

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Introduction

- Institute for Sustainable Futures (ISF) is a research institute at University of Technology Sydney, set up in 1996:

  To create change towards a sustainable future through independent, project-based research

- Energy and climate change research area - foresight, visioning, assessment of technology and responses, policy and planning, behaviour change
- AGIC project: Energy & carbon originally two separate categories (out of 8)

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Today's Presentation

- Energy & Carbon in Australia
- Project Approach
- Energy & Carbon in Infrastructure
- Vision for sustainable infrastructure
- Barriers
- Intent of the Energy & Carbon Credits
- Credits

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Energy & Carbon in Australia

- Australian Government committed to reduce GHG emissions by 5% between 2000 and 2020.
  - It is also committed to a long-term target of a 80% reduction on 2000 levels by 2050.
- Projected to increase to 24% above 2000 levels by 2020.
- Infrastructure key contributor to global warming
- Infrastructure is particularly vulnerable to climate change - flooding, extreme heat
- Decisions made now will be in place in 50 years

Energy Consumption trends by sector

Energy consumption in Australia by industry

	1974–75 PJ	1979–80 PJ	1989–90 PJ	1999–00 PJ	2008–09 PJ
Agriculture	39	47	55	72	95
Mining	65	81	160	273	429
Manufacturing	928	965	1 067	1 192	1 257
Electricity generation	540	743	1 066	1 427	1 744
Construction	29	38	41	29	26
Transport	701	825	1 012	1 267	1 435
Commercial **a**	87	104	151	219	277
Residential	246	262	322	392	434
Other **b**	59	66	69	77	76
Total	2 695	3 131	3 946	4 971	5 773

a Includes ANZSIC Divisions F, G, H, J, K, L, M, N, O, P, Q and the water, sewerage and drainage industries. **b** Includes consumption of lubricants and greases, bitumen and solvents, as well as energy consumption in the gas production and distribution industries.

Note: Totals may not add because of rounding.

Source: ABARES, *Australian energy statistics*.

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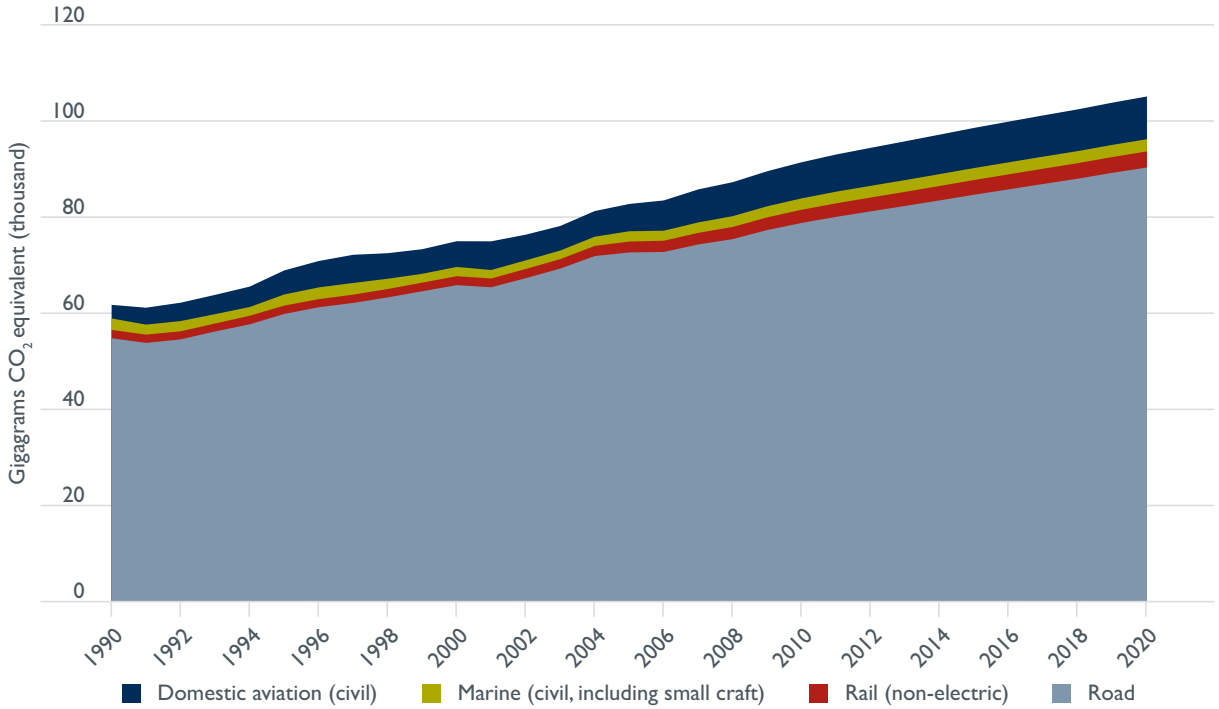
GHG projections - transport sector

Figure 1.1 Base case projections of direct greenhouse gas emissions (carbon dioxide equivalent) for Australian transport



Note: Emission estimates relate to energy end use, and exclude CO_2 released from the combustion of biofuels. Gigagrams = billion grams, equivalent to thousand tonnes.

Sources: BTCE (1996a, 1995a), BTRE (2006a, 2003a, 2003c, 2002a) and BITRE estimates.

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Project Approach

- Literature review
- Industry consultation
  - Workshop
  - Interviews with practitioners
- Iterative development of criteria and review
  - peer reviewers and AGIC global review panel

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State of the Industry

- E&GH within projects relatively adhoc although improving
- Data collection driven primarily by:
  - NGERS
  - project costs associated with energy
  - requirements of clients - sustainability
  - project approvals requirement
- Renewable opportunities
- Some examples of best practice in certain aspects but not holistically

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Energy & Carbon in Infrastructure

- Sources:
  - Energy use, transport fuels, electricity use, fugitive emissions, industrial processes, land management, wastewater treatment and waste disposal.
- Different in different phases
- Direct or indirect

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GHG Emissions in infrastructure

- Typical infrastructure project - energy use and transport >90%
- Lifecycle - e.g. for a road 95-98% emissions - users/vehicles

Table 1. Carbon Footprint of a Road and Sources of CO_2 Emissions

CO_2 Sources	Construction Materials	Fossil Fuels		Removal of Vegetation		Machinery/ Vehicles
Road Life Cycle Stages	Embodied Carbon	Embodied Carbon	Direct CO_2 Emissions	Carbon Sequestration Potential Lost	Direct CO_2 Emissions	Embodied Carbon
Road Construction	√	√	√	√	√	X
Road Operation	X	√	√	X	X	X
Road Maintenance	√	√	√	X	X	X

CO_2 = carbon dioxide.

Source: ADB 2010, Methodology for Estimation of GHG footprint of road projects: case study India

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GHG Emissions in infrastructure

- ***Construction*** emissions
- Example - VicRoads calculator - Mickleham upgrade
  - 75% embodied energy of materials
  - 22% on-site transport
  - 2% transport of material
  - 1% on-site electricity
- Note - Embodied energy/emissions in Materials Use Category

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Vision

- Zero emissions infrastructure (and beyond)
- Energy and GHG emissions considered in each phase of infrastructure lifecycle
- Measurement and monitoring - norm
- Typical footprint established -each project, each phase - allowing benchmarking
- 100% renewable energy sources employed

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Barriers to overcome

- Lack of incentives to reduce E&GH
- Highly regulated, risk averse - inflexibility
- Access to skilled people at appropriate points in lifecycle
- lack of project specific data

Intent of ENE Credits

- Encourage measurement, management, reporting and minimising use
- Heirarchy - avoid, efficiency, onsite, offsite
- Build industry capacity
- Build resilience and reduce exposure
- Facilitate collaboration
- Encourage systems thinking
  - Zero emissions

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Energy & Carbon Credits

- ENE - 1 - Reference footprint
- ENE - 2 - Identify and commit to savings opportunities
- ENE - 3 - Implementation of EGH Plan
- ENE - 4 - Internal Benchmarking
- ENE - 5 - Support for industry/project benchmarking
- ENE - 6 - Renewable energy

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Thank you

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