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Dear Infrastructure Coordinator,

Total Environment Centre welcomes the opportunity to make this submission on the distribution of the Building Australia Fund. Total Environment Centre believes that the Building Australia Fund provides a once in a generation opportunity to provide the infrastructure required for Australia's entry into a sustainable future.

To this end Total Environment Centre believes that the Building Australia Fund will be best allocated towards:

1) Commissioning of large scale zero emissions baseload power plants
2) Smart electricity grid & smart metering systems
3) Metropolitan public transport infrastructure
4) Facilities to shift freight from road to rail and shipping

We look forward to seeing the outcome of your deliberations.

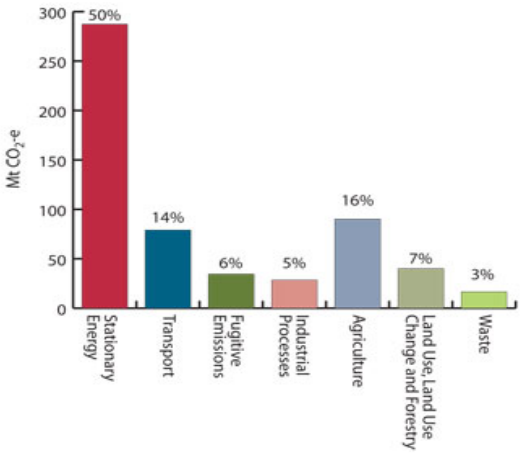
Yours sincerely,

Jeff Angel
Executive Director
Total Environment Centre

1 Large scale zero emissions base load power plants

Stationary Energy is the largest source of Australian greenhouse gas emissions, accounting for 50% of total emissions. The sector is also the fastest growing source of emissions having grown by 40% between 1990 and 2006. These two facts ensure that any real attempt to reduce Australian greenhouse gas emissions will require a step-change in the stationary energy sector

Figure 1: Australia's estimate greenhouse gas emissions by Kyoto sector 2006



Source: National Greenhouse Gas Inventory 2006. P.1
Department of Climate Change. Commonwealth of Australia

Figure 2: Growth of Australian Greenhouse Gas Emissions by Kyoto Sector. 1990 - 2006

	Emissions Mt CO_2-e[4]		Percent change in emissions
	1990	2006	1990 - 06
Energy	286.4	400.9	40.0%
Stationary Energy	195.1	287.4	47.3%
Transport	62.1	79.1	27.4%
Fugitive Emissions	29.2	34.5	18.1%
Industrial Processes	24.1	28.4	17.7%
Agriculture	86.8	90.1	3.8%
Waste	18.8	16.6	-11.4%
Land Use Change[5]	136.5	62.9	-53.9%
Forestry[19]	0.0	-23.0	NA
Australia's Net Emissions[19]	552.6	576.0	4.2%

Source: National Greenhouse Gas Inventory 2006. p.1
Department of Climate Change. Commonwealth of Australia

Many Australian states are currently considering installing new base load generation capacity. This comes at a time when Australia is considering greenhouse gas emissions reductions in the order of 25-40% on 1990 levels by 2020 and at least 60% reductions on 2000 levels by 2050.

In this environment it is crucial that any new installed capacity be zero emissions generators. Zero emissions base load generation technology is already available and is being installed in countries throughout the world. Australia's most feasible options for zero emissions base load electricity generation are geothermal, sustainable biomass, solar thermal technology, and wave power technologies.

The use of Infrastructure Australia funding to provide for such projects will not only go a long way towards securing stable energy supplies, but will also ensure that Australia is able to make meaningful greenhouse gas emissions reductions in the short to medium term.

2 Energy Efficiency, Smart Electricity Grid & Smart Metering Systems

Energy efficiency is the fastest and most cost-effective means of reducing Australia's emissions but requires significant infrastructure investment. The McKinsey Report showed that Australia could reduce its emissions by 20% on 1990 levels by 2020 ***at no net cost to the economy***, largely because there remains a vast, untapped potential for energy efficiency, which is cost negative.[1] Demonstrating this potential, the National Framework for Energy Efficiency (NFEE) showed that the residential and commercial sectors could reduce consumption by over 70% on investments with an average 4 year payback.

To facilitate these savings, a National Energy Savings Fund of at least $700 million over five years, based on the NSW model which provides both direct incentives for energy savings as well as saving consumers on their electricity bills. The purpose is to stimulate investment in, for example, replacing inefficient lighting, air-conditioning, heating, refrigeration, stand-by settings, motors and appliances with high efficiency equipment.

The creation of a 'smart grid' is also critical and will involve both the removal of institutional and regulatory barriers to cogeneration and trigeneration, and the prioritisation of demand management over inefficient 'poles and wires' by regulators of electricity networks.

Particularly important is the fast-tracking of the roll-out of smart meters with in-home displays (to provide information and engagement of electricity consumers) to all Australian households participating in the National Electricity Market. While the states have agreed to roll out smart meters subject to cost benefit analyses, this is not due to be completed until 2017, and in-home displays are only optional. The roll-out should be brought forward and in-home displays should be a minimum requirement.

3 Transport infrastructure

The transport sector is the third largest and second fastest growing source of Australian greenhouse gas emissions. The transport sector can be largely divided between two subsectors: passenger transport and freight transport. While the majority of transport emissions are associated with passenger transport it is the freight transport sector that has contributed most to the growth of emissions from the sector. While emissions from the transport sector grew by 27.4% between 1990 and 2006, emissions from freight transport grew by over 40%.[2]

If Australia is to achieve meaningful reductions in greenhouse gas emissions, it will need to address the emissions intensity of both passenger and freight transport.

a. Passenger Transport

The lack of real public transport infrastructure within, and between, Australian population centres has led to the dominance of car travel. The figure below demonstrates the relative carbon intensity of car travel over heavy rail and bus transport.

[1] McKinsey and Company, *An Australian Cost Curve for Greenhouse Gas Reduction,* 2008, P.15
[2] TEC. 2008. Freight Transport & Climate Change: Exposures & Opportunities.

Figure3: Relative emissions intensities of personal transport modes

Transport mode	g/CO2e/passenger-km
Coastal Shipping	301
Light Rail	187
Passenger Vehicles	166
Air[3]	129
Heavy Rail	124
Motorcycles	122
Buses	87

Source: Analysis of Recent Trends and Greenhouse Indicators (2007) p.71. Department of Climate Change. Commonwealth of Australia

While the above table seems to suggest that plane travel is one of the least carbon intensive forms of passenger transport it is important to recognise that this figure is highly misleading. Aviation generates a number of enhanced climatic impacts at altitude that dramatically increase the impact of air travel.

The enhanced impacts of aviation at altitude are measured by what is termed the 'Radiative Forcing Index.' The Intergovernmental Panel on Climate Change (IPCC) estimates that the RFI of aviation lies somewhere between 2 and 4, with a median figure of 2.7.

The RFI is to be used as a multiplier. That is, to get a true indication of the full impacts of aviation at altitude the CO2e emissions of aviation need to be multiplied by 2.7 (if using the median IPCC RFI of 2.7). Multiplying the aviation figure in the table above renders aviation the most climatically damaging form of passenger transport.

Infrastructure investments that ensure a prominent role for aviation in intercity passenger movements would lock in the most damaging form of passenger transport. Fast rail links between cities would provide the infrastructure required for the progressive decarbonisation of Australian passenger transport.

If Australia is to address the rapid growth of greenhouse gas emissions from the transport sector it will need to encourage a growing number of passengers to use lower emissions public transport. The priority for such investments should be along both future and existing growth metropolitan growth corridors.

b. Freight Transport

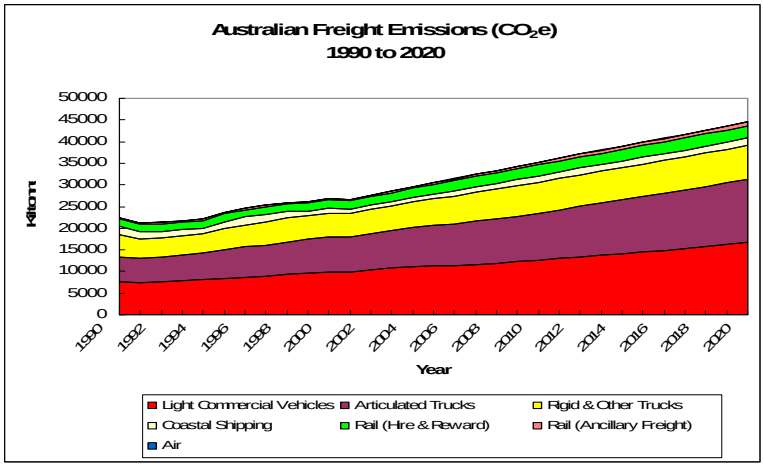
The growth of emissions from the freight transport sector has recently outstripped that of personal travel. While transport emissions as a whole grew by 27.4% between 1990 and 2006, emissions from the freight transport sub-sector grew by around 40%.

This rapid growth is predicted to increase with emissions from freight transport predicted to grow by 100% on 1990 levels by 2020.

Emissions from freight transport are dominated by road based forms of transport. In 2006, 87% of freight transport emissions were accounted for by road based forms of transport.

[3] Aviation estimates do not include the enhanced impacts of aviation at altitude. IPCC (1999) estimates that the true climatic impact of aviation can be assessed by multiplying direct CO2e emissions by 2 – 4, with a median of 2.7.

Figure 4: Australian Freight Emissions (CO2e) 1990 – 2020



Source: TEC. 2008. Freight Transport & Climate Change.

The emissions intensity of freight transport varies greatly between competing modes. Figure 5 demonstrates the high emissions intensity of both air transport and light commercial vehicles. Whilst the emissions intensity of Articulated and Rigid Trucks is much less than that of Light Commercial Vehicles, it is clear that all forms of road based transport are much more carbon intensive than both Rail (Private & Government) and Coastal Shipping.

Figure 5: Relative emissions intensities of freight transport modes

Transport mode	g/CO2e/tonne-km
Air[4]	1422
Light Commercial Vehicles	1294
Rigid Trucks	183
Articulated Trucks	60
Government Rail	20
Coastal Shipping	13
Private Rail	5.4

Source: Analysis of Recent Trends and Greenhouse Indicators (2007) p.71.
Department of Climate Change. Commonwealth of Australia
*Does not include enhanced climate impacts of aviation at altitude

If Australia is to achieve meaningful reductions in greenhouse gas emissions it is clear that freight movements within Australia must be progressively moved away from emissions intensive road based transport towards rail and coastal shipping.

Any gain in avoided congestion losses from new road based infrastructure will not only be short-lived as more traffic is invited back on to the roads but will also be more than outweighed by the emissions intensity of road construction.

Within metropolitan centres intermodal facilities that take freight from ports into metropolitan centres by rail will be required. Between metropolitan centres this will require the provision of freight rail linkages and the expansion of ports required for greater freight volumes on coastal shipping.

[4] As above

4 Water Infrastructure

Population growth and climate change pose major challenges for the management of water resources in Australia. Australian cities use water inefficiently and as urban populations grow – the problems intensify. In addition, conventional urban water cycle infrastructure causes significant environmental problems.

At the heart of current problems with urban water management are unsustainable consumption patterns and a single use of water model of water cycle management.

Unfortunately responses to the challenges of water supply and demand have focused on unsustainable supply augmentation options such desalination and construction of new dams. There are a number of problems with this approach.

The preferred supply augmentation options of building new dams or desalination plants represent the most expensive, environmentally damaging and greenhouse intensive options for water supply. Desalination is highly energy intensive while large bodies of stored water are major sources of methane and other greenhouse gas emissions. Brazil's National Institute for Space Research (INPE) calculates that large dams contribute more than 4% of the total warming impact of human activities and are the largest single source of human-caused methane emissions, contributing around a quarter of these emissions.

Focus on supply augmentation also reinforces the single use of water model i.e. the wasteful, pipe in, pipe out approach that accentuates the problem of disposal of effluent to receiving waters.

A further problem is that focusing on major supply augmentation simply reinforces unsustainable consumption practices and does nothing to address the need to reduce demand for water and encourage efficient use.

Funding for water infrastructure should be directed to demand management programs, improving the efficiency of present infrastructure (such as leakage reduction) and major investment in water recycling (both potable and non-potable). This will address both the limitations of current supplies and the unsustainable nature of present demand.