



Submission to Infrastructure Australia 2008

contact: Jonathan Strauss, 10 Draper Pl, Cairns 4870, ph: 0431 683 088

Principal author: Svargo Freitag

"The Stone Age didn't end because of a shortage of stones."

Sheik Ahmed Zaki Yamani, Saudi oil minister

"What we should do is make a one-off investment to switch our energy infrastructure from one that depends on fuel that is dirty, dangerous, destroying the habitability of this planet and rising in price to a new global energy infrastructure that is based on fuel that is free forever: the sun and the wind and geothermal." former US vice-president Al Gore

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Summary

[CAST \(Cairns Action for Sustainable Transport\)](#) is a small community group from diverse backgrounds which has formed earlier this year to deal with the lack of public and sustainable transport. We have anecdotal evidence that similar groups are starting up all over Australia, an indication how concerned ordinary Australians are about the lack of decisive government action until now.

Switching to a fossil fuel free economy, reducing GHG (greenhouse gas emissions) and preparing for climate change effects need to be the most important goals and priorities for all and any infrastructure spending.

To continue our current fossil fuel dependency will threaten Australia's economic growth and standard of living and the sooner we move to alternatives, the stronger our future economy will be, even if in the short term there might be some disadvantages.

It is shortsighted and irresponsible to still provide over nine billion dollars a year in subsidies to fossil fuels, which are limited, increasingly costly, damaging to our environment and which cause global warming. CAST submits that all of these subsidies shall be phased out by latest 2012 and comparable amounts of subsidies shall be directed towards rail transport and truly renewable energies which are clean, free and limitless.

As a large country with huge reserves in solar, wind and wave power it is in Australia's economic interest to become a leader in sustainable energy and transport technologies.

CAST submits that no infrastructure shall be funded which continues to rely on or encourages fossil fuel usage, especially coal and oil, and that almost all Infrastructure Australia funds shall go towards infrastructure that facilitate a reduction in greenhouse gas emissions and most of the 20 billion funds shall be spent on fast rail infrastructure.

Electric rail powered by renewable energy generation is the only existing and feasible alternative technology for long-haul freight which is not reliant on fossil fuels and has the potential to significantly reduce GHG emissions, especially when combined with public transport and electric vehicles for personal transport requirements.

Four out of five specific projects which CAST submits for funding are to be located in Far North Queensland. While this might sound like a lot of money going to one region, CAST believes the about \$1-2 billion in infrastructure funding required to realise those four regional projects is a small price to pay for being able to create an interlinked regional model for sustainability that can showcase different aspects of the new economy, and it is in the national interest to create such a model for sustainability as soon as possible. We believe that the Cairns region is the perfect location due to its high number of visitors from all parts of Australia and the world, which will be able to visit and experience these projects. Cairns also stands to lose much of its Great Barrier Reef and World Heritage Tropical Rainforests if humanity fails to act fast enough on GHG emission cuts, which will add a sense of urgency for visitors to the region to study these solutions and lobby their governments all over the world to adopt similar measures.

We owe it to our children to be prudent and rather move too fast towards a new and sustainable economy than too slowly, even if that affects our present standard of living. We have no right to continue consuming valuable resources today if that is at the expense of tomorrow.

1. Features and Goals of Australian Infrastructure

CAST (Cairns Action for Sustainable Transport) notes that Infrastructure Australia currently lists 'Reduce greenhouse gas emissions' only in sixth position of its seven strategic priorities and puts 'Increased economic standards of living for Australians' as a goal above 'Environmental sustainability'. (*OZ-Infrastructure_DPI.pdf*)

We suggest that all other strategic priorities are doomed to fail at least in the long term, unless GHG emissions are significantly reduced in a timely manner and placing more emphasis on 'Increased productivity' is likely to have adverse effects on reducing greenhouse gas emissions.

Similarly we suggest that 'environmental sustainability and reduced greenhouse emissions' is by far the most important goal simply because better social outcomes and increased economic standards are impossible without it at least in the medium to long term. There is a growing body of evidence which suggests that without environmental sustainability and greenhouse gas reductions we risk losing our present standard of living and would move towards social instability.

Consequently CAST submits that the first and foremost goal of Infrastructure Australia shall be 'Environmental sustainability and reduced greenhouse gas emissions' and the topmost strategic priority shall be to 'Reduce greenhouse gas emissions'. Whenever expanding and increasing productivity and economic standards are in conflict with environmental sustainability and GHG emission reductions the latter shall take precedence.

CAST also submits that 'Switching to a fossil fuel free economy' shall be added as the second most important goal

CAST further submits that to 'Prepare for climate change effects' becomes one of the strategic priorities.

2. Problems - Identification, History and Impacts

The biggest threats our society is facing are peak oil and climate change, both of which expose significant inherent problems of our existing infrastructure.

Failure to deal with them in a timely manner may mean the end of society as we know it.

2.a History

For the last two hundred years Australia (and most of the world) has relied on cheap oil and coal to power and expand our economy and increase living standards, without giving much thought about their limitedness and causal effects on global warming.

Over the last three or four decades more and more warnings were given to governments, but they were ignored and Australia's fossil fuel dependency deepened further. Hundreds of billions were pumped into fossil fuel dependent infrastructure while alternatives like rail and renewable energies were effectively ignored and left to compete on an increasingly uneven playing field.

The fossil fuel industry used its lobbying power and millions of dollars in advertising to influence the debate and political decisions and to receive massive government subsidies.

Emerging solutions were either bought up by the fossil fuel industry (oil companies bought most Australian solar companies in the eighties) or they failed to attract significant support from governments and/or had to leave the country (for example Dr. Mills and Dr Zhengrong Shi).

In the last few years it has become obvious and widely accepted that fossil fuels are a limited

resource and cause climate change and that we need to drastically reduce greenhouse gas emissions and find alternative fuels. However government has refused to act or is very slow to do very little. Examples are support for hybrid cars, but not for electric plug-in cars and significant funds for so-called 'clean coal' but much less for renewable energies.

Another example is the failure by government to phase out the fringe benefit tax concessions for motor vehicles despite receiving many recommendation from numerous sources since at least eight years (*for example Senate report (2000) The Heat is On: Australia's Greenhouse Future*).

A 2007 report by the Institute for Sustainable Futures at the Sydney University of Technology commissioned by Greenpeace Australia (*Riedy, C.J. 2007, Energy and Transport Subsidies in Australia*) outlines how entrenched the reliance on and support of fossil fuels has become:

- Government support for the coal industry and coal-fired electricity is so generous that in some cases it has led to the construction of coal-fired power plants when other types of electricity generation would have been cheaper.
- The report identifies energy and transport subsidies in Australia during 2005-2006 of between \$9.3 billion and \$10.1 billion
- More than 96 per cent of that money flowed to fossil fuel production and consumption
- over 90 per cent of those subsidies lead to increased greenhouse gas emissions
- 74 % of taxpayer funds supporting fossil fuel industries flows to the transport sector
- 2005-06 road network costs were \$4.7 billion more than the revenue received from road users

Global fossil fuel and cement emissions increased by 38% from the Kyoto reference year 1990 until 2007. The growth rate of emissions was 3.5% per year for the period of 2000-2007, an almost fourfold increase from 0.9% per year in 1990-1999. This makes current trends in emissions higher than the worst case IPCC-SRES scenario, generating stronger climate forcing and sooner than expected.

Additionally the efficiency of natural carbon sinks in removing CO₂ has decreased by 5% over the last 50 years, and will continue to do so in the future. (*www.globalcarbonproject.org, 26 September 2008*)

The continuing subsidies for fossil fuels are disadvantaging and delaying the development of wind, wave, solar and geothermal electricity production.

CAST submits that to continue such massive subsidies to fossil fuels, which are increasingly costly, limited, damaging to our environment and which cause global warming, is shortsighted and irresponsible. CAST submits that they shall be discontinued and comparable amounts of subsidies shall be directed towards truly renewable energies which are clean, free and limitless.

2.b Peak Oil

Peak Oil is when demand outstrips supply and most oil industry experts voice concerns that world reserves of fossil fuel and especially oil reserves are so limited that demand is likely to outstrip supply in the next few years. (*www.aspo-australia.org.au*)

Australia has already experienced peak oil production in 2000, resulting in ever growing dependency on oil imports (39% of total consumption in 2006, up from 7% in 2000) and their negative contribution to our current account balance.

Australia uses about 45,000 megalitres of petroleum each year of which 80% is used in transport. (*www.aspo-australia.org.au 2005*) The Australian government expects petroleum import dependency to increase to around 80 percent by 2010. (*www.eia.doe.gov/emeu/cabs/Australia/Full.html*).

Should we continue or increase our high dependency on oil, this will significantly add to our current account deficit (by tens of billions each year), and thus threaten our standard of living.

We are already seeing significant price increases of fuel which in turn lead to increased demand for public transport.

Transport patronage in Melbourne urban rail has increased by ~9% from 2002/03 to 2004/05 and by over 22% from 2004/05 to 2006/07. In comparison Melbourne roads experienced a 2.5% increase from 2002/03 to 2004/05 while experiencing a 1% reduction in patronage from 2004/05 to 2006/07. (www.ntc.gov.au/filemedia/Reports/RailProductivityReviewIssueAug08.pdf) This is a clear indication that increasing fuel costs are already creating a significant demand increase for public transport while road infrastructure is becoming less urgent.

The CSIRO predicts that fuel prices might increase up to \$8 per litre by 2018 (*Fuel for Thought: Challenges and Opportunities, prepared by the CSIRO on behalf of the Future Fuels Forum, 2008*), which would undoubtedly make private car transport unaffordable for most Australians and would make freight transport prohibitively expensive.

The fuel cost percentage for a 12 tonne truck has already increased from 10.95% in 2005 to 18.01% in 2008 (*Victorian Transport Association*), but is still a relatively small part of total freight costs. Fuel prices of \$8/litre are likely to increase fuel cost percentage to over 75% of total freight costs, making freight transport not just significantly more expensive, but also highly sensitive to any movement in the oil price.

This data makes it imperative that Australia switches as soon as possible to non-oil based transport, a switch that has to happen sooner or later anyway.

However Australia's current high level of fossil fuel consumption is not just unsustainable and a threat to our economy, but it is also contributing to global warming.

2.c Global Warming

Thousands of leading scientists are highly concerned about global warming and warn of irreversible and catastrophic climate change effects if any of several imminent thresholds are passed

(www.ipcc.ch/ipccreports/ar4-syr.htm).

Scientists are inherently and historically very conservative and careful in their statements.

These two facts make it imperative that unconditional, significant and immediate action be taken to drastically reduce our greenhouse gas emissions as soon as possible.

CAST submits that this consideration shall be the most important criteria for any infrastructure funding.

Reducing GHG (greenhouse gas) emissions too slowly or by too little risks the loss of the Great Barrier Reef (*IPCC report 2008*) and World Heritage tropical rainforests (*WTMA report 2005*) and ultimately human survival, making it imperative that Australia shifts to 100% renewable energy and a transport system that is independent from fossil fuels.

CAST submits that we owe it to our children to be prudent and rather do too much than too little, even if that affects our present standard of living. We have no right to consume valuable resources today if that is at the expense of tomorrow.

2.d Identifying the worst affected Sectors

To enable effective GHG reduction using infrastructure funding one needs to identify the sectors which are likely to show the biggest benefits.

Stationary power generation (50%), agriculture (15.7%) and transport (14.4%) were the largest sources of Australian GHG emissions in 2005.

While agriculture has experienced a very modest 0.2% increase of GHG emissions between 1990 and 2005 stationary energy generation and transport have experienced massive increases with 42.6% and 29.9% respectively in the same period, making them the most significant sources of GHG emissions. (www.abs.gov.au/AUSSTATS/).

Australia currently generates over 85% of its electricity from coal

(www.australiancoal.com.au/electricity.htm), which is the single biggest contributor to our GHG emissions (www.climatechange.gov.au/inventory/2006/index.html).

Australia presently is heavily reliant on individual cars for almost all personal transport and on diesel trucks for most freight transport. "In 2001-02, Australia's domestic freight task totalled 2.3 billion tonnes. Rail carried 25% of this tonnage as compared to 73% by road transport and 2% by sea." (<http://www.ntc.gov.au/filemedia/Reports/RailProductivityReviewIssueAug08.pdf>)

Australia's current transport and electricity infrastructure is highly dependent on the use of fossil fuels.

CAST submits that to continue fossil fuel dependency will threaten Australia's economic growth and standards of living and the sooner we move to alternatives, the better our future economy will be, even if in the short term there might be some disadvantages.

3. Addressing the Problems

Finding solutions to those problems requires fundamental changes in order to remove the underlying dependence on fossil fuels by our society and its existing infrastructure.

The shift to a fossil fuel free society will require massive infrastructure investment and is going to take decades, making it even more important that we start this task immediately.

Since transport and electricity generation are highly dependent on infrastructure funding and are major sources of greenhouse gas emissions, appropriate government infrastructure funding to those sectors has the potential to facilitate significant greenhouse gas reductions.

CAST submits that almost all Infrastructure Australia funds shall go towards infrastructure that facilitates a reduction in greenhouse gas emissions and no infrastructure shall be funded which continues to rely on or encourage fossil fuel usage.

Preference shall be given to infrastructure which initiates and facilitates fundamental and structural changes to alleviate our society's dependence on fossil fuels.

The Australian government has several options which together can initiate and facilitate a speedy change to power generation and transport sectors with very low or zero GHG emissions.

Subsidies and tax incentives

Australia's governments currently subsidise fossil fuels with over nine billion dollars every year (*Riedy, C.J. 2007, Energy and Transport Subsidies in Australia*) and thus are still encouraging increased GHG emissions and deepening our reliance on oil, a globally fast dwindling and locally nearly exhausted resource.

CAST submits that these direct and indirect subsidies and tax incentives be cut at least in half by 2009/2010 and totally phased out at the very latest by 2012. They shall be replaced by subsidies and tax incentives given to truly renewable energies (wind, solar and wave) and rail transport.

Legislative Requirements

Government has the power to pass legislation that requires manufacturers to develop and implement energy efficiency and GHG emission standards.

Legislation requiring electric products to not draw any power when switched off is an example for a simple piece of legislation that has the potential to save vast amounts of energy and GHG emissions.

Taxes on products with high GHG emissions and registration fees on cars which are dependent on their emissions are further examples of effective legislative tools which can help facilitate a carbon-neutral economy.

Product labeling informing customers about the energy requirements and GHG emissions of products will also be a useful tool.

CAST submits for all these suggestions to be implemented.

Grants and other incentives

Government can also assist by providing incentives and financial support to specific projects demonstrating the required new technologies, including proof of concept projects as well as commercial scale projects.

For example governments can offer land and/or subsidies to electric car manufacturers or manufacturers of solar, wind and wave generators to open factories in Australia

3.a The New Economy of the 21st Century

Becoming a world leader in the changes required to move beyond the age of fossil fuels will have technological advantages and create significant employment and export opportunities, some of which are outlined in the United Nations Environment Program report "Green Jobs: Towards Decent work in a Sustainable, Low-Carbon World,":

- The global market for environmental products and services is projected to double from US\$1.37 trillion per year at present to US\$2.74 trillion by 2020, according to a study cited in the report.
- In Germany for example, environmental technology is to grow fourfold to 16 per cent of industrial output by 2030, with employment in this sector surpassing that in the country's big machine tool and automotive industries.
- Renewable energy already generates more jobs than employment in fossil fuels.

(http://www.unep.org/labour_environment/features/greenjobs.asp)

CAST submits that the last statement is very significant and indicates the huge positive potential a significant increase of renewable energies will have on employment and the economy.

Australia is at risk of being left behind and has already lost excellent opportunities due to the failure of the previous federal government to support emerging technologies and commit to a renewable energy infrastructure.

Leading experts like Dr Zhengrong Shi and Dr. David Mills have gone to China and the United States respectively where they have found much more conducive conditions to commercialise the

very technologies they developed while working at Australian universities.

CAST submits that as a large country with huge reserves in solar, wind and wave power it is in Australia's economic interest to become a leader in sustainable energy and transport technologies.

3.b Electricity Generation Solutions

Portugal aims to generate 39% of its electricity from renewable energies in 2010.

Australia aims to generate 20% of its electricity from renewable energies in 2020.

Considering that Australia's solar, wind and wave energy resources are orders of magnitudes bigger than Portugal's, it is a shame for our country to not aim for higher targets.

CAST submits that the choice of projects receiving funds from Infrastructure Australia can help to exceed the 20% target and asks this to be considered when choosing projects for funding.

CAST submits that 'clean coal' is a deliberate misnomer to extend a dying industry and that effective carbon capture and storage (CCS) as a tool to reduce GHG emissions is not feasible for the following reasons:

- it is too expensive - the 275MW FutureGen facility was cancelled by the US Energy Department after costs rose to over US\$1.5 billion, five times as much as standard coal power plants (*US Department of Energy*)
- it requires 20-30% more fuel and thus reduces the efficiency of coal power stations (*2005 IPCC special report on Carbon Dioxide Capture and Storage*)
- it can achieve no more than a 36% reduction in CO₂ emissions by 2030 and probably much less, which is too little to late: "an average emissions intensity target for coal-based generation of 650 kilograms of CO₂ per megawatt hour (currently 1017) or less could be at least theoretically achievable by 2030" (<http://www.coal21.com.au/reportspub.php>)
- there is no assurance that sequestered carbon is going to remain safely locked in geological formations for thousands of years

CAST submits that no Infrastructure Australia funds go towards coal or any supporting infrastructure.

In the electricity generation sector government shall subsidise renewable energy projects close to large scale commercialisation as well as pilot projects for promising emerging technologies.

Possible examples are solar thermal, wind and geothermal electricity plants in the 100MW to 1GW range, proof of concept and commercial size wave power plants, long distance high voltage DC transmission lines (enabling long-distance, low-loss transmission), and municipal waste methane capture or biogas projects.

CAST submits that a long-term guaranteed feed-in tariff for renewable energy shall be introduced. It can be an effective way to significantly increase renewable energy production as Germany has shown.

"Germany's feed-in law, introduced in 1990 has led to a massive boom in investment. There was a 3025% increase in its solar capacity from 64 million kWh in 2000 to 2 billion kWh in 2006."

(*Dr James Prest, Australian Centre for Climate Law and Policy*).

Australia has missed out on Dr. David Mills' first factory producing 700MW of electricity generation equipment annually (<http://www.ausra.com/pdfs/Ausrafactoryfactsheet.pdf>), however we can probably entice Ausra to build a similar facility in Australia. Similarly there are other emerging technologies close

to large scale commercial production, for example the silver solar technology (www.originenergy.com.au) or the base-load solar thermal graphite technology (http://www.dme.qld.gov.au/media_centre.cfm?item=393.0).

ANU, UNSW and the CSIRO Division of Energy Technology's are still world-renown leaders in solar technology. "A range of proven technologies exist for exploiting solar thermal energy input over temperatures ranging from 30°C to several 1000°C. Australia possesses the highest average solar radiation resource of any of the world's continents. In principle, we could meet all our primary energy needs through solar thermal technologies, using an area comparable to our existing roof area." (<http://solar-thermal.anu.edu.au/pages/pubs/IJES06.pdf>)

CAST submits that Infrastructure Australia offers incentives and funds so that all promising renewable energy technologies can be taken to large scale commercial production.

3.c Transport Solutions

"In simple terms, one train takes 150 trucks off the road, so that's 44 tonnes of greenhouse gases and 45,000 litres of diesel" (Bryan Nye, Australasian Railway Association)

In view of peak oil and the causal link between fossil fuel use and global warming Australia needs to urgently find feasible transport alternatives and implement them within one to three decades, the sooner the better.

While gas-powered trucks are a technical possibility, they are still in their development phase and a replacement of all diesel trucks by gas powered trucks would take decades.

However the use of natural gas instead of diesel can reduce CO₂ emissions by only about 15% for each liter burnt. The actual CO₂ reduction will be smaller due to higher consumption and fugitive emissions. (<http://www.environment.gov.au/settlements/transport/comparison/pubs/2ch9.pdf>)

Consequently CAST submits to not waste any government funds in developing such minimalist options.

CAST submits that electric rail is the only existing and feasible alternative technology for long-haul freight which is immediately available to replace diesel trucks and has the potential to significantly reduce GHG emissions, especially when powered by renewable energy generation and combined with public transport and electric vehicles for personal transport requirements.

Road freight requires three times as much fuel as rail for non-bulk freight on an 'average' interstate corridor (0.0085 litres per net tonne kilometre for rail, 0.0265 for road: (*Bureau of Transport Economics, Competitive Neutrality Between Road and Rail, working paper 40, 1999, p59*).

It is estimated that Australia's total freight task is expected to almost double by 2020 (*The 2004 Auslink White Paper*).

CAST submits that only timely investment in fast rail infrastructure can ensure that this increase does not further add to freight costs, our oil dependency or our GHG emissions. CAST further submits that most of the 20 billion Infrastructure Australia funds are to be spent on rail infrastructure.

There have been several disadvantages making it hard for rail to attract a larger portion of freight transport and to attract funds for rail infrastructure.

- Presently road transport can generally guarantee faster delivery than rail both due to very

slow train speeds and antiquated terminal facilities and practices.

- Due to underfunding rail transport is antiquated, slow and ineffective
- Currently incremental road infrastructure solutions are favoured over long-term rail solutions. Faster results are favoured by politicians focusing on the next election and incremental road solutions by definition are cheaper, allowing politicians to announce a new incremental upgrade every few years. This practice hides the real costs of the total road solution, introduces an artificial bias for road options and ignores the long-term benefits of rail infrastructure.
- Last not least billions of dollars of government subsidies favour roads and truck transport.

"The rail system has been underfunded in the past and has the potential to increase its share of the freight task if there are improvements to infrastructure and modernisation of operating practices."

(DTRS, *Auslink White Paper*, June 2004, p.62)

Modern rail will be vastly different from rail transport as we know it.

- High speed rail will give rail a significant time advantage over long-haul truck transport.
- Computerised freight handling combined with standardised containers of different sizes which can easily be shifted on and off local delivery trucks will vastly improve loading times.
- Fitting containers with electronic chips will allow real-time tracking of shipments.
- Trucks are three times as sensitive to the inevitable increases in oil prices

CAST submits that all direct and indirect subsidies for the trucking industry shall be replaced with subsidies for a modern rail freight transport system.

Rail also has a significant role to play in passenger transport.

An average petrol car will cost about 3.7 mega-joules (MJ) per passenger-kilometre (pkm). An electric train, however, operates at a rate of between 0.04 and 0.18 MJ pkm, making train transport as much as 92 times more energy efficient. (<http://www.ptua.org.au/myths/greenhouse.shtml>)

The recent House of Representatives report *Sustainable Cities* recommended that the Commonwealth should support provision of major urban public transport infrastructure. (*Sustainable Cities, 2005, recommendations 6 & 7*)

While most politicians and bureaucrats currently seem to favour buses over rail, CAST stresses the importance rail can play in reducing fossil fuel dependence and in minimising GHG per person kilometer.

Rail is also much safer and has the potential to significantly reduce the health cost of road transport:

"Nearly 2,000 deaths each year [are] attributable to transport accidents" and "36,000 people [are] seriously injured in transport accidents each year" (*Australian Transport Safety Bureau, Canberra, 2004*);

"competitive pressure contributed to 235 deaths in truck accidents last year"

(www.abc.net.au/news/stories/2008/09/26/2375520.htm)

CAST submits to ensure that all new rail infrastructure (including trains, track and bridges) is designed with consideration of sea-level rises, higher average and peak temperatures and the likelihood of increases in average and peak wind speeds due to climate change effects.

CAST further submits that Infrastructure Australia shall offer subsidies and/or tax incentives to encourage and entice manufacturers of electric and air-powered cars to set up factories in Australia.

4. Specific projects submitted for funding

Cast submits that the following related but independent projects shall receive full or at least significant partial funding from the Infrastructure Australia fund, with the exception of the Archer Point Wind Farm, which will require only very modest funding or tax incentives.

4.a Cairns Sustainable Public Transport

Cairns is uniquely situated as a model for sustainable transport for the following reasons:

- As the major access point to the Great Barrier Reef and the World Heritage Tropical Rainforest and with parts of the city already flooding during high tides and most of the city being susceptible to storm surges, Cairns has more to lose than almost any other Australian city from likely climate change effects.
- As one of Australia's largest tourist destinations Cairns is in a unique position to showcase sustainable transport solutions to millions of national and international visitors every year.
- Being a linear population center Cairns is ideally suited to a rail spine serviced by shuttle buses, especially if facilitating bike transport on trains
- Being a coastal community most roads are level and easy for bicycles to use
- The serviced but under-used existing rail line from Gordonvale to Redlynch can be used.
- 74% of respondents to the October 2007 survey by the FNQ 2025 planners said they are prepared to use an alternative form of transport to a car (www.localgovernment.qld.gov.au/?id=5612).

The last point indicates that the intensity of public transport usage in the Cairns region will increase dramatically once the geographical coverage, spread through the day and night, frequency and running times of services are radically improved, especially when these reach the point where they can provide the day-to-day travel needs of the majority of the urban population.

CAST proposes to aim for a 40-70 per cent intensity of public transport usage. We suggest that a dual-mode rail system (tram-trains) is optimal, given FNQ's combination of urban concentration and regional outlook, existing rail infrastructure and the anticipated population of more than 220,000 in the Cairns Regional Council by 2025. A fixed rail system also best provides for nodal development and integration of active transport because of its better capacity to carry bicycles and mobility assistance equipment.

Proposed features of Cairns integrated public transport:

- Construct and operate dual-mode rail service from Edmonton (extending to Mt Peter) to Palm Cove. This should follow the transit corridor offered by cane train lines between Edmonton and Redlynch, with cane rails replaced with triple gauge to allow continuing cane train operation on this corridor, but subsequently parallel the Brinsmead-Kamerunga Road and Captain Cook Highway to better service Kamerunga, Caravonica, Smithfield and James Cook University.
- Construct a second track and operate dual-mode rail service from Gordonvale to Redlynch
- Establish dual-mode rail and bus interchanges at, for example, Mount Sheridan, Earlville, Aeroglen or Airport Ave, Redlynch and Smithfield.
- Introduction of suburban shuttle buses to connect with major bus routes and trains. These shuttle buses can have flexible routing and can be booked by phone, SMS etc.
- Establish dedicated bus lanes for all bus routes on all roads of three or more lanes, as well as any two lane roads where buses are slowed down by rush-hour gridlock. These should be

restricted to buses or vehicles carrying 3-4 or more passengers.

- Start introducing electric and other non-oil based buses.
- Fit buses and trains with bike carrying facilities to encourage active transport.
- Complete the Cairns bike network as outlined by CBUG (Cairns Bicycle User Group)
- Widen major bike lanes to provide for bicycles as well as electric bikes and scooters, including overtaking inside that lane.
- Provide bike parking and shower and change facilities in all shopping centres and precincts, suburban centres, industrial areas and other strategic locations including regional centres.
- Extend pedestrian and no-car areas in CBD and initiate such areas in suburban and beach precincts.
- Retrofit and re-design existing suburbs to facilitate active and public transport.
- Developers of new subdivisions shall be required to provide no-car areas and plazas, to design for and encourage active transport and to provide effective public transport infrastructure.
- Establish sustainable transport precincts (open only to electric vehicles and other renewable and non-polluting modes of transport).

This proposed sustainable transport system can be combined sooner or later with sustainable urban and house designs, sustainable water usage, recycling and waste treatment and with 100% renewable energy production in the region to make the Cairns region a showcase for sustainability and solutions for peak oil and global warming.

This in itself will attract tourists eager to learn about and use sustainable facilities, counteracting the already declining tourist numbers.

CAST submits that Infrastructure Australia commission an independent study of this proposal and offers to fund at least two thirds of the resulting project with the balance to be funded by state government.

CAST submits that the feasibility study shall include an assessment of secondary benefits of this proposal, including but not limited to health, air quality, GHG emissions, oil dependency, social benefits and tourism effects.

4.b Cairns Southern Rail Tunnel

Just like the Prius hybrid car is the proof of concept leading the world to electric vehicles, the Cairns southern rail tunnel can be the proof of concept for rail and road transport integration, showcasing the vast potential rail has in reducing our oil dependency and greenhouse gas emissions.

The QLD state government has identified the need for better access from Cairns to the Atherton Tablelands and in 2000 decided to widen the existing Kuranda range road to four lanes. While other options including rail options were considered at the time, biased assessments favoured the chosen road option. The rail options failed to consider electrification (requiring massive ventilation), did not allow vehicles to drive on/off and were overpriced.

In the meantime costs for the 4-lane-highway option has increased to a billion dollars and government has delayed the project by at least fifteen years.

The Southern Rail Tunnel proposal is an alternative solution, which has never been considered by state government and addresses the new issues of peak oil and greenhouse gas emissions.

Ideally it shall be combined with a limited upgrade to the existing range road, which provides some wildlife underpasses and a few overtaking lanes.

Please refer to the attached [Southern Rail tunnel information sheet](#) for details and advantages of this

proposal.

CAST submits that Infrastructure Australia commission an independent feasibility study and commits to fund at least two thirds of this project with the balance to be funded by state government.

4.c Very fast rail network powered by renewable energy

CAST submits that Infrastructure Australia investigates and funds a standard gauge electrified rail network initially connecting all major centres along the east coast (including Cairns) as well as Melbourne, Canberra and Adelaide. The network can later be extended. The network is to be generally double track to allow simultaneous operation in both directions and to facilitate both freight and people transport.

The network shall be constructed to a standard that allows VFTs (very fast trains) to use it. VFTs in Europe typically run at 200 to 350Km/h and in a record attempt on 3rd April 2007 the French TGV has achieved a top speed of 574.8km/h. VFTs are in use in most European countries from Russia to Portugal and U.K. to Italy, providing an increasingly popular and efficient means of transportation.

At 250 to 300km/h a train from Sydney to Melbourne or Brisbane becomes a viable alternatives to air travel, especially when air transport is going to become more expensive due to increases in fuel costs.

CAST submits the consideration and use of special carriages as part of freight trains that allow vehicles including trucks and even B-doubles to drive on/off. The channel tunnel is the best known example of this practice, but many European rail utilities (especially in Switzerland) employ this simple technology.

On short hauls drivers can remain in their vehicle while on longer hauls they can relax in passenger carriages. Trucks can be driven on by one driver in say Sydney and then driven off by another in say Townsville.

This system will facilitate a smooth change-over from the currently truck based transport system to a future of rail based transport. It will also minimise double handling of freight while significantly reducing fuel costs and GHG emissions.

Further benefits include the removal of trucks from our national highways, which will significantly reduce related health issues, accidents and inconveniences experienced by other users. Last not least it will ensure affordable transport costs in the future despite of rising oil prices.

The electricity required to power this transport system shall be produced by truly renewable sources like solar, wind and wave and possibly some geothermal power.

While it is beyond the ability of a small community group like CAST to even guess the admittedly huge costs involved in this infrastructure, we are convinced that to continue Australia's current reliance on fossil fuel based transport will lead to massive cost increases, deteriorating standard of living and is risking dangerous climate change and economic collapse.

Doubtlessly the cost of 'business as usual' is going to escalate and eventually will be larger.

CAST submits that the sooner Australia will build this fast rail infrastructure, the earlier and bigger will be the benefits to our economy and the softer and less painful will be the inevitable transition to a non-oil economy.

4.d Archer Point Wind Farm

German firm IFE and Wind Power Queensland are interested to build a \$250 million, 120 MW, 60-turbine wind farm at Archer Point, 15km south of Cooktown

(www.news.com.au/couriermail/story/0,23739,23673370-3122,00.html). There seems to be some concerns and reluctance by financiers and modest government support is likely to make this project a reality.

CAST submits that Infrastructure Australia investigates the situation and makes an offer for tax incentives, a grant or part finance to the above companies to ensure this project proceeds.

4.e Tablelands Solar Thermal Power Station

The Cloncurry solar thermal power station (currently under construction) will provide flexible baseload power by early 2010. The technology is simple and able to provide energy on demand. The facility uses large heliostats arrays, which are simple flat mirrors with individual sun tracking facility, to focus sun light onto graphite blocks, which are mounted on towers and can provide heat storage for many days. Pipes running through the graphite blocks take heated water to a steam turbine, which in turn drives a generator.

While coal power stations run 24/7 and waste electricity at night and during low demand, and wind and other solar power stations provide intermittent electricity which does not match demand, this system has the huge advantages that the graphite heat storage elements allow electricity to be produced exactly when it is needed, following the demand cycle.

The 10 Ha Cloncurry project will cost \$31 million, of which the QLD government contributes 1/3rd, is rated at 10Mw, which is enough to supply all the electricity needs of Cloncurry (4500 people), and will create over 100 jobs during the construction period.

(www.lloydenergy.com/presentations/Cloncurry%20Solar%20Thermal%20Storage%20Project.pdf)

CAST submits that Infrastructure Australia offer subsidies of between \$100 to 500 million to private industry to build a 100 to 500Mw large power station of the same design in the Mareeba area or in another suitable location on the Atherton Tablelands.

Scaling the Cloncurry project up to say 300Mw means an area of up to 300 hectare is required, costs will be \$900 million (probably significantly less due to economy of scale), over one thousand jobs will be created during the 4-6 year construction period and enough electricity will be created to cover the needs of over 120,000 people. Since the project uses a modular design, electricity can be produced as soon as the first module goes on line.

Such a solar power station on the Atherton Tablelands has the potential to become a tourist draw card in its own right and will provide numerous flow-on benefits to the area. In combination with the Archer point wind farm and FNQ's existing renewable energy facilities it has the potential to provide the region with 100% renewable energy.

However the biggest advantage of this particular project would be proof of concept for a large base load solar thermal plant, the creation of a significant new industry and new export opportunities.

"Imagine for a moment if some of the stimulus packages that are now being developed could be targeted towards not maintaining and sustaining the old economy of the 20th century but investing in the new economy of the 21st century," UNEP Executive Director Achim Steiner