Clean air, climate change and traffic congestion
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2.

Clean air

The Clean Air Society of Australia and New Zealand is one of the most respected environmental NGOs, and its scope spreads well beyond ‘clean air’.

Though originally about fighting air pollution, the CASANZ agenda now includes environmental management more broadly – including of course climate change.

Interestingly, as you well recognize, carbon dioxide is far from being an air pollutant. Its presence in the air is essential to support life on Earth. To quote from your excellent fact sheet on Greenhouse, without carbon dioxide the world would be a snowball, with an average global surface temperature of -18 degrees centigrade.

Tonight I want to talk mainly about traffic, which is a cause of unclean air, but also a cause of climate change.

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Of course I don’t mean to diminish the other problems vehicle traffic makes for public health viz:

- Air pollution: 37,600 deaths in just one nation where they bothered to measure it.
- Vehicle crashes: 1.2 million and rising worldwide.

4.

But the risk of climate change is another matter. It does worry us.

So I first want to mention some of the more worrying concerns of the climate scientists, before getting on to my favourite topic just now: congestion.

Why congestion? Because relief of congestion is the benefit we are supposed to derive from the billions of dollars spent every year on new and improved roads. If building roads does not in fact deliver a benefit, why do we keep building them?

First then to climate change.

5.

Climate change

Professor Garnaut in his Draft Report talks a lot about 'dangerous climate change'. He says that:

> A concentration of greenhouse gas in the atmosphere of 450 ppm (CO2e) gives about a 50 per cent chance of limiting the global mean temperature increase to 2°C above pre-industrial levels (Garnaut 2008: 75 citing Meinshausen 2006). 550 ppm is the level which implies a 50 per cent chance that temperatures will increase 3°C above pre-industrial levels

6.
Garnaut, nevertheless, goes for the 550 ppm target. Should that worry us?

The concentration of GHG in the atmosphere is currently about 380 ppm, increasing by 2 ppm per year and rising. So if that increase continues, we will reach 450 ppm in 35 years and 550 ppm in 85 years. At present, as I said, the rate of increase is actually growing, so we may well reach 550 ppm within 50 years.

So within 50 years we are looking at a one in two chance of a 2-3 degree rise in global mean surface temperature locked in.

What does a 2-3 degree rise in global mean temperature mean?

Here is a small sample of some of the effects of 2-3 degrees of warming.

These observations are reported in a book called *Six Degrees* by Mark Lynas, who has gathered the evidence from the top science journals like *Nature* in the UK and *Science* in America.

7.
Carbon cycle and methane feedback effects.

8.
The oceans will become more acidic leading to the reduction and eventual extinction of the photosynthesising phytoplankton that form the base of the food chain for all other ocean life. They also absorb carbon dioxide and emit oxygen into the seas.

The Japanese, with their scientific killing program, have found that Minke whales are weighing in at 9% less than they did 18 years ago.

A report in *The Age* of October 14th this year was headed 'The Krilling Fields'. 'Captive bred krill at the Australian Antarctic Division developed deformities and lost energy when exposed to the greenhouse gas levels predicted globally for the year 2100'.

If the phytoplankton and krill die, so do whales, seals, penguins, sea birds and a large variety of fish.

During the Eamian interglacial period 125,000 years ago, when global mean temperatures were just one degree higher than today, sea levels were 5-6 metres higher than today.

Melting in both the Greenland and West Antarctic ice sheets has been thought responsible. The Greenland ice sheet alone contains enough water to raise sea levels by 7 metres. If the Antarctic ice sheet were also to melt we would be facing a sea level rise of 200 metres.

The speed of this happening is what matters. Are we talking about 100 years or 2000? James Hansen, the NASA scientist who put greenhouse on the global agenda in 1988, points out that at the end of the last Ice Age 14,000 years ago sea levels rose by a metre every 20 years.

A European team of scientists was more optimistic, putting the Greenland melt threshold at 2.7 degrees of warming. But the problem here is that the poles are warming much faster than the global average, so 2.7 degrees may equate with a 1 degree global average.

In a study published in *Nature*, in 2004, a team led by ecologist Chris Thomas reported that, with a global mean temperature increase of 2 degrees by 2050, over a third of all species on the planet would be committed to extinction.

Three million years ago we find a 3 degree hotter world in the period called the Pliocene – before the ice ages. Geologists, Jane Francis and Robert Hill found evidence of fossil wood and leaves from beech trees in a rocky outcrop just 500 kms from the South Pole. A similar discovery was found in Canada's Arctic indicating winters some 15 degrees warmer than today supporting bears, shrews, and even a small horse. Grassy woodland of larch and birch was thought to cover the polar lands – and not ice!

Three degrees of warming will see the death of the Amazon rain forest. The UK Hadley Centre's model suggests that Amazonia would become a desert unless global warming levels off at 2 degrees. Rainfall will decline in this critical region to near zero and daytime temperatures soar to Sahara levels – averaging 38 degrees.

Mountain glaciers feed the great rivers of India, China and South America. As much as 70% of the dry season flow of the Ganges and half the flow of the other major rivers (Indus and Brahmaputra) depend on snow melt from the Himalayas. If these glaciers melt, the flows of the rivers will greatly decline during summer destroying food production for half the world's population.

Southern China can expect more catastrophic floods, but Northern China will become much drier. China will struggle to feed its population even with the massive water transfer scheme from the Yangtze in the south to the Northern cities.

In Australia we can expect the rapid end of the Murray Darling basin as a region for food crops. We will see the convergence of drought and heat. Days of high temperature will increase by 3 to 6 times in NSW. Days of over 40 degrees will increase sixfold.

Northern Australia can expect increases in storms and flooding. But most of the rest of the country will move into a situation of chronic water shortages and agricultural collapse.

That's just a small part of the story. None of it is good news.

We know that transport emissions currently account for about 14% of greenhouse gases, but that is rising. As other sources from agriculture and industry reduce emissions, transport will be left with a higher percentage – as it is already in the USA where transport emits about 25% of the total.

So how do we justify building more and more roads? The answer is that road building ultimately saves people time in congestion.

9.

Congestion

For the record, congestion is defined in the dictionary as: 'abnormal accumulation – of the blood in a part of the body; of population, traffic etc.' (Concise Oxford Dictionary). But the dictionary definition does not get us far in understanding congestion.

Congestion is both a reality, and what's called a 'trope'.

10.

A 'trope' is a figure of speech 'i.e. using a word in a way other than what is considered its literal or normal form' (Wikipedia). When advocates of road building use the term 'congestion' they *direct* attention. They want to make us think that congestion is bad. But how bad is the reality?

11.

Most of the discussion of 'congestion' today employs the word as a trope. The advertisements for the City Link motorways that appeared in Melbourne

newspapers at the time of planning the roads, stated: ‘Having a triple bypass will do wonders for your sanity’.

The Lord Mayor of Brisbane during his election campaign allegedly placed a huge billboard featuring himself in earnest Mayoral pose above a road into Brisbane which was always jammed at peak hour. The sign said: ‘Congestion: I won’t stand for it!’ What a winning slogan. He was elected.

12.

The reality is what we experience when we are stuck in a traffic jam. It is annoying to almost everybody who experiences it. You are sitting in a car capable of speeds up to 180 kms per hour – or more – and moving along at walking speed. In reality most people stuck in traffic jams only experience at worst an extra 15 to 20 minutes added to their trips, in most cases much less.

Well, you may say, that’s true, but what about the aggregate of all those 20 minutes, or 5 minutes or 2 minutes lost. They add up to a huge amount of time. When we put a price on that time it adds up to an enormous sum. So we must consider the ‘costs of congestion’.

These alleged costs are regularly rolled out by politicians in billions of dollars to make us agree to a road building program costing billions of dollars ‘to relieve congestion’, to remove bottlenecks, to close the ‘infrastructure gap’. Congestion has become a trope to support road building.

<u>Costing congestion</u>

A rational way of dealing with congestion is first to specify the problem, and then to consider different ways of solving it. In a rational process, a variety of different kinds of solutions would be defined and costed.

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The range of solutions would include reducing the trips it is necessary to make, improving public transport to get some traffic off the roads, building new roads and road links, regulating land use to bring households and work destinations closer together, imposing restrictions on car parking at destinations, various forms of congestion pricing such that the costs imposed by an additional car on the road are borne by the driver. Then the lowest cost, most feasible, most economically rational solution would be selected. Why does this never occur?

14.

Instead the solution comes first. A road improvement or new road or road link is proposed (the solution). Then a narrow cost-benefit analysis is conducted using a completely non-transparent model (nobody is allowed to know the precise assumptions being fed into the model).

There are of course some monetary costs of congestion, but the alleged costs are probably enormously inflated – maybe by as much as ten or twenty times.

Who could possibly believe that process is rational? It is not. It is path dependent. Roads are built not on a rational basis but because 'that is how we do things here'.

The assumption is that time saved somehow feeds into the productiveness of the economy, so that taxes spent on building the road are compensated by the additional value of production afforded thereby to the economy.

But there is no empirical foundation for this assumption. We simply don't know if any time saved is spent by people in productive pursuits or in simply watching the telly or chatting around the water cooler.

There has not been a single study of whether time has actually been saved as a result of a particular road, or any other form of transport infrastructure, or whether that time is actually spent productively.

Relieving congestion

So what *does* happen when roads are built to relieve congestion?

There is nothing wrong with saving time in journeys. But what little evidence we have does not suggest that time in aggregate is being saved at all. If it were we would expect the total amount of time spent in travel to various activities to be reducing. Instead, with all the vast amounts spent on road building to 'save time' the amount of time spent in travel is increasing.

15.

There are much better figures for the UK than for Australia on time spent in travel. The British *National Travel Survey* provides data on travel behaviour. A recent book by transport analyst David Metz (2008) uses this data to show that the average time spent in travel in Britain has remained remarkably constant over the last 35 years despite a massive program of road building. In fact the time spent in travel has slightly increased since 1985.

16.

Distance traveled however has increased.

17. 18.

Data for Australia shows that very much the same pattern:

Minutes per day per	UK: 1990 Australia:	UK: 2006 Australia:

person	1992	2006
UK	61	63
Australia	70	74

Now if there is investment in the transport system such as to make journeys quicker, people always have two options, not just one: saving time in the journey or traveling a longer distance with the same time expenditure.

Metz argues that instead of choosing to save time, people have instead chosen to keep their travel time constant – or even extend it a bit, and instead **travel further**. He shows that the distance traveled in Britain, in average miles per person per year, has increased from around 4500 miles to over 7000. There is no comparable data for Australia, but we could expect a similar outcome.

Now I am not suggesting, and nor is Dr Metz, that facilitating travel is not a good thing, all other things being equal. If people are enabled to travel further, that extra travel is helping people to extend their range of choice of work options and other activities. But before we think about the *effects* of solving congestion we should also think about another point Metz makes about the typical approach to solving it.

19.

Back in the 1960s and 1970s transportation studies for Australian cities examined what would be required to solve congestion once and for all by building roads. The classic four step model was used to project the trip outcomes of land use and population growth.

20.
The argumentation in the documents is nearly identical to the argumentation supporting road building today:

> 'This is not a matter in which there are alternatives. Either a large-scale programme such as is recommended in the plan is instituted and maintained over a long-term period, or traffic congestion and greatly increased transport costs would become chronic features of the metropolitan road system' (Melbourne Transportation Study, Volume 3 The Transportation Plan p.47)

The Eddington Report in 2008 states:

> 'The evidence is clear: doing nothing is not an option. Melbourne needs better east-west transport connections to address core congestion problems within the transport network'. (*Investing in Transport*, 2008, Introduction p.6).

Like the Melbourne Transportation Study, the Eddington Report also included public transport improvements.

The Melbourne Transportation Study was, however, frank and open about what relieving congestion by building roads would mean for 1980 demand conditions: a grid of motorways across the whole metropolitan area.

Politically, however, that solution was untenable. The public revulsion at the proposal to destroy large swathes of inner Melbourne and compulsorily purchase large numbers of properties caused the Premier, Rupert Hamer, to declare motorway building in the inner city banned. The heart was taken out of the proposal because the public would not stand for it, and anyway the cost of the project was simply unaffordable. That solution remains unaffordable and unacceptable, as well as irrational.

In Melbourne the road builders shifted their strategy, but without abandoning their long term plan. The new strategy is to focus on specific bottlenecks and argue for more modest links to be built as the popular pressure of demand to 'relieve congestion' arose.

21.
This strategy will probably result in the Victorian Government adopting part of the Eddington road tunnel proposal to link a new motorway from the West with the City Link motorway. Once that is done the pressure of demand 'to relieve congestion' will eventually see to it that the rest of the link is constructed via a tunnel to the Eastern Freeway.

22.
David Metz, however, has a different view about bottlenecks. He argues that building roads to relieve bottlenecks transfers congestion to another place downstream, and encourages further traffic build-up over time on the 'decongested' stretches of road.

> 'Thus, bottlenecks may often play a useful and important function in regulating flows and controlling the level of congestion that occurs on a road network' (Metz, 2008, p.54)

The only way to solve congestion by building roads is to do what the Transportation Studies of the 1960s and '70s proposed. Filling in gaps piecemeal simply transfers congestion but does not solve it.

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San Diego, California, is an example of the road builders' utopia. But, the roads are still congested at peak hour.
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In fact:

- Congestion can have a positive function, inhibiting travel.
- Congestion is an automatic travel demand management measure, which plays an important role in keeping cities liveable.
- Congestion pricing monetises and socialises the cost of congestion paid by the motorist.
- If the price paid is invested in infrastructure improvement it will simply increase distance travelled unless there are complementary measures to inhibit travel such as car parking restrictions and land use controls.

Conclusion

My conclusion is simple. We cannot afford solutions to congestion that exacerbate global warming and endanger the planet and all it contains.

What is to be done about congestion? Congestion is not the main problem for transportation systems today.

Even filthy air is not the main problem.

Greenhouse emissions is the main problem.

We need our highly skilled engineers and planners to begin tackling this one urgently, with all the evidence at their disposal, and with all the ingenuity they command.

Perhaps in the process we might also just solve the problem of congestion and clean up the air.