

Achieving Zero Emissions for Melbourne's Transport

What is the Plan?

Executive Summary

The purpose of the forum was to examine ways in which deadlines for emission reduction targets can be met ie by progressing early emission reductions immediately with the ultimate goal of achieving zero no later than 2035.

Conclusions are as follows:

1. Rapid reductions in transport emissions can be achieved using a combination of technological refinements and behavioural change. Most of the measures required to achieve these are not new, are not difficult to implement and have been discussed at length for decades. Failure to progress these has been the result of a lack of vision and commitment by state and federal governments over several decades. Whilst reductions cannot be assessed precisely it should be possible to achieve reductions of at least 40% by 2030. But these reductions will not be sufficient and must be supported by additional measures to achieve a minimum reduction of 75% by 2030. These measures must be implemented immediately to accelerate change and adaption – any delays will make the task of achieving significant reductions in the short and long term very difficult and the ability to meet the required targets impossible.
2. Achieving zero transport emissions by 2035 for Melbourne's transport is not possible based on business as usual. Achieving this may ultimately be impossible but reductions that could result in outcomes close to zero are feasible within this timescale.
3. Transport emission reductions cannot be pursued in isolation: they impact and are impacted by changes in the broader economy, so an emission reduction strategy must be carried out as an integral part of a broader plan with a similar mindset.
4. The demand for travel and emissions generated are a function of
 - the broader economy (primarily local but also national and global)
 - the characteristics of the city itself and the way it has been planned and operates
 - and the social, economic and political environment in which it operates.All of these can and will change and provide potential levers that can be used to meet environmental targets.
5. Emission reductions must be an integral part of a zero-emission world in which restoration of the biosphere and limits to growth will become increasingly critical and determine the shape, size and level of social and economic activity that can be supported by the city and ultimately the magnitude and type of transport activity required to service it.
6. City growth and patterns of development have made it increasingly difficult and costly to service, in a way that has accelerated the need for travel and transport services and generation of greenhouse gas emissions. This process must be reversed.
7. It is anticipated population and economic growth trends will be determined ultimately by environmental factors of which climate change is only one, that will limit growth, reverse current trends and proceed at an accelerating rate of decline in the future. In its current form the city has no resilience or capacity to respond to the growing pressure of environmental change: failure and ultimate collapse is inevitable.

8. Ultimately government has a choice: commit to targets scientists have given or pursue a compromised strategy based on business as usual. If governments at all levels pursue the latter, and it is adopted globally, they must accept that such a path will put humanity on a hot house earth trajectory that will lead to mass extinction. This path will become increasingly unpleasant for all societies and later adaption strategies will become difficult and ultimately futile. The choice is a moral one and must be stated publicly at the outset.
9. The challenge for government is to find ways of meeting these targets in a way that engages the community and maintains support for change in the coming crisis.

Introduction

The purpose of the forum was to examine ways in which deadlines for emission reduction targets can be met firstly by progressing early emission reductions immediately and secondly by achieving the ultimate goal of zero no later than 2035. Whilst it is important to identify what actions are required, it is equally important to identify how these can be implemented to ensure points of resistance are overcome and strategies that can be used to achieve this.

The starting point however is the need to understand the environmental imperative and the implications if targets are not met.

The Environmental Imperative

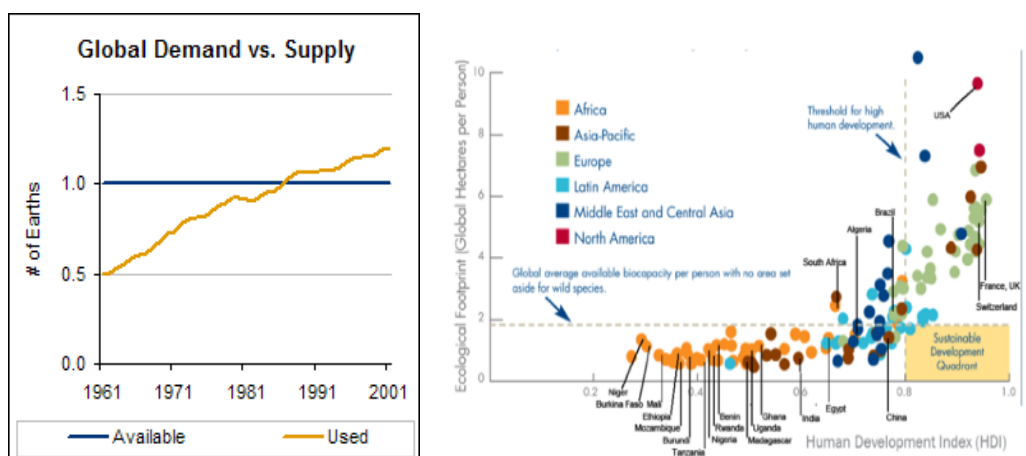
The environmental imperative must provide the foundation for this report and all recommendations in it. This is outlined briefly below.

The environmental imperative was discussed at TfM's forum in December 2020 – *The Future We Must Plan For* – a future that will be dominated by environment change – including climate change. As professors David Karoly and Will Steffen said, there is an imperative to reduce emissions now. David advised that to limit global warming to 1.5 degrees – the limit accepted by the G7 group of nations to avoid “dangerous” climate change, it was necessary to reduce emissions by 125% by 2030. Expressed in terms of the “carbon budget” required to limit warming to 1.5 degrees on the basis of current trends this would be spent by 2028. Prof Will Steffen has since advised that if we miss the 2030 deadline by only 5 years, the best we can hope is to limit global warming to 2 degrees.

These figures almost certainly are an underestimate, and more bad news is in store that will shorten this deadline, some of which Prof Karoly discussed after the forum last year.

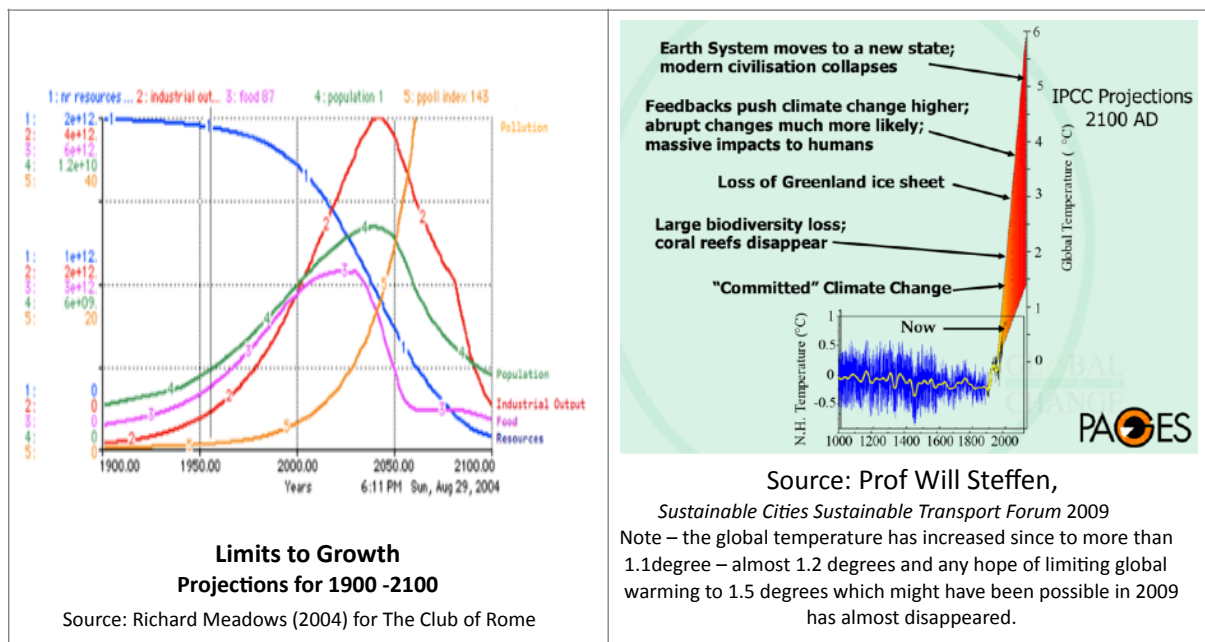
These figures highlight how quickly the climate situation is changing and the need for a plan. The imperative has shifted from 2050 to achieving major reductions before 2030 – a message that was demanded at the COP26 conference in Glasgow this November with dire consequences if this is not achieved.

These figures ignore the finite nature of the planet we live on, the need to restore the damage to the biosphere and limits to growth presented in the figures below.



The first shows the global footprint of the human enterprise on planet earth. It increased from half a planet earth in 1960 to more than 1.25 planet earths by 2000 and will be much greater now. Clearly humanity is living well beyond its means and doing so by mining the planet's natural resources. But that is only an average. It is only the poorest countries that are living within the means of planet

earth. “Advanced” countries require many planet earths to maintain their lifestyles. The US requires about 5 and Australia is not far behind.



Limits to Growth projections do not include the impact of climate change, the projections of which are shown above and make the planet increasingly less habitable and support fewer people. The global population by the end of the century under this scenario could easily be reduced to zero.

Ultimately the scenario is one of negative growth and the need to consume less of the planet’s resources – not more – for all activities and that includes transport. In the transport context this means less travel and transport less often, less frequently, over shorter distances and more efficiently. Responding to this challenge will require a very different mindset to the one that exists today.

Greenhouse Emission Reductions and Actions to Reduce Them

Context, Situation Appraisal and Review

Emission reduction trends

- All heavy lifting to date done by electricity generation, driven to a large extent by roof top solar
- Minimal if any reductions in all other sectors, some still increasing
- Emission reductions from carbon capture proposals by government unproven and unlikely to be realised
- Transport: Car emissions still increasing, freight and aviation emissions are expected to increase
- No reductions by rail based public transport
- Transport emissions accelerated by
 - population and economic growth
 - urban growth/spread

- infrastructure policies that promote mobility – particularly by car and other fossil fuel powered vehicles
- declining fuel economy overall for passenger vehicles
- absence of, or inadequate standards for fuel and vehicle emissions.

Economic trends

- increasing economic pressure – local and international, and economic decline. High debt levels (federal, state, and household) make the local economy vulnerable as interest rates rise.
- budget repair by Victorian and federal government will take decades, with the prospect of future cuts in many services.
- Federal government budget (and living standards) largely propped up by mineral exports, particularly coal and iron ore which must decline in coming years.
- Longer term future of oil and gas – decline and eventual removal will leave fossil powered transport sector stranded. Legal case against Royal Dutch Shell to set a precedent that will accelerate this decline. Challenges for agricultural sector to lower and reduce emissions very difficult – particularly for beef and livestock sector generally, which is one of the largest emitters of emissions.
- Anticipate rising prices for food, other essential goods and services, energy particularly for industry and transport which will put additional pressure on communities, particularly those on the margins or with substantial mortgages.
- Longer term future for agriculture challenging, particularly for major food bowls such as the Murray Darling.

Social trends

- Increasing gap between rich and poor.
- Burden of change will fall heavily on those least able to cope.
- Declining living standards and material comfort overall.
- Declining social stability and governance.
- Global population trends expected to continue along trajectories based on limits to growth projections by the Club of Rome, but a succession of environmental tipping points will accelerate this decline.

Political pressure for change increasing and increasingly broad based from:

- industry that wants government leadership and intervention to put us on this path. Industry is already leading government in many areas.
- market pressures that will force change to a lower emission world and expose Australian vulnerability in many areas.
- the community which will vote accordingly.
- international pressure commitments made at COP26 this year and from other governments and countries who see us as a laggard and will seek to impose penalties of all kinds to encourage us to lift our game.
- an increasing body of environmental case law which will impose penalties on recalcitrant governments, and corporations. Two cases in the Haig are relevant – one against the Dutch government itself and one against Royal Dutch Shell. It is likely more will follow.

- scientists who continue to present evidence that demands action and positive responses to our environmental challenge.
- changes in the natural environment itself and the capacity of the planet to support life which will put increasing pressure on communities to adapt.

Early conclusions

- Early reductions in transport emissions are possible and must be progressed immediately
- Almost all recommendations are not new, have been presented to government before but not actioned
- Actioning these will require government leadership and a change in political thinking and priorities
- Achieving zero transport emissions by the deadlines required to avoid a pathway to hothouse earth and ultimate extinction will not be achieved based on business as usual
- Principal lesson learnt from collapse of earlier civilisations is a very common recourse to using technology, rather than changing behaviour - we are repeating the follies of the past
- Reliance on technology alone will result in failure – it must support behavioural change as the principal driver of change
- Technology will play an important role but there is insufficient time to wait for new and unproven technology – to do so in the words of the UN would be reckless and irresponsible
- There will be no simple single fix solutions – will require multiple actions on many fronts involving all levels of government.
- Lessons can be learnt and applied from earlier crises which did not end in collapse but created a sense of emergency which resulted in a changed mindset and new priorities that accelerated the process of change required to adapt.
- Achieving this will require a radical departure from business as usual and thinking that underpins it
- Emission reduction calculations for transport must include imbedded energy in vehicles and supporting infrastructure and achieving zero for each may never be possible.
- The city of Melbourne in its current form has limited capacity to adapt to a zero-emission world – the dimensions, scale and complexity of the challenge is huge.
- Failure and ultimate collapse is inevitable under a business as usual, and survival will require a radical transformation to a new city model but there is little time left to achieve this.

Actions to Reduce Emissions

1. Broad Based Actions

The demand for transport is derived from the functioning of the city itself and the economy (local/regional/national and global) in which it operates. Actions can be taken in response to some of the changes that occur or can be anticipated in this context. Some of which are the subject of a series of reports by the Grattan Institute highlighted below

The reports in this series build on three previous Grattan reports to provide fresh analysis and smart policy to reduce emissions across the economy



Reports in the *Towards net zero* series

Towards net zero: Practical policies to reduce transport emissions (July 2021)



Towards net zero: Practical policies to reduce industrial emissions (August 2021)



Towards net zero: Practical policies to reduce agricultural emissions (September 2021)



Towards net zero: Practical policies to offset carbon emissions (October 2021)



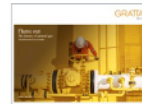
Towards net zero: A practical plan for Australia's governments (October 2021)

Previous Grattan reports

Start with steel (May 2020)



Flame out: The future of natural gas (Nov 2020)



Go for net zero: A practical plan for reliable, affordable, low-emissions electricity (April 2021)



A similar response is required at the city level, recommended by John Stanley in his presentation.

It is argued that more broadly based environmental change will soon demand more radical change and thinking about a new city model that will survive in a zero-emission world. It will be a city that consumes less of everything, has a circular economy that wastes nothing, and restores much of the biosphere that had been lost in it. It would be a city that was designed for negative growth not the positive growth and endless sprawl we have today, that faced the reality of limits to growth (one of the environmental imperatives identified at the beginning of this report), and the need for population and economic decline in a materially poorer world. Reduced mobility would become the driver for reshaping the city.

2. Transport Specific Actions

These are addressed in presentations and reports by Prof John Stanley and Tony Wood for the Grattan Institute and summarised in Appendix A. They are based largely on vehicle efficiency, and standards for vehicle and fuel quality and include opportunities for behavioural change. It must be recognised that 80% of transport emissions are from road based transport so this where the biggest gains must be achieved and very quickly.

Immediate adoption of mandatory emission standards and road pricing to reduce travel and behavioural change including modal shift are critical. It is argued these measures must be implemented as a package to be effective, and linked to changes in city planning and development. These measures are not new and many could be implemented immediately if there was the political will to do so.

Barriers to Change and Strategies to Overcome Them.

Most of the barriers to emission reductions are of a political nature, supported by appalling economic modelling designed to prove the political argument is sound. This applies to most of the critical actions that need to be addressed immediately including:

1. Introduction of mandatory emission intensity reduction standards and more fuel efficient vehicles
2. Road pricing reform
3. Appropriate city planning and development

4. Promotion of mode shift to more efficient forms of transport, particularly active and public transport, but also more efficient use of private transport such as increased vehicle occupancy etc and need to reduce trip distances and frequency of travel.

At this time State and Federal governments are not remotely interested in the first two, have given up on the third and been largely ineffective with the third. Government thinking (federal government in particular) remains focussed on technology and use of market forces to deliver greenhouse emission targets, denying the need for government intervention to change behaviour, or show any leadership on this matter. Changing government thinking is essential for all of the above and must be top priority. Without it the prospects for achieving any of the environmental targets by scientific experts are non-existent.

Tackling the easiest “bits” such as creating a safe environment for active transport, using a city like Copenhagen as a model for excellence and establishing ambitious targets for take up would be an excellent place to start and reinforce the need for change and a new approach to addressing environmental concerns. This could use inner and middle municipalities as demonstration projects for wider implementation throughout the entire city as a low-cost measure that can be implemented quickly in a number of municipalities at once. It could be linked to systematic improvements in public transport services based on customer service criteria similar to the approach recommended in TfM’s ministerial submission in 2019.

This would be reinforced by a public relations campaign that highlights this as a positive and practical step to reducing emissions, supported by other messages that reinforce the need to change.

In general terms the strategic approach may be as follows:

1. Identify opportunities where improvements can be achieved to a standard of excellence, very quickly at minimal cost.
2. Use these to demonstrate excellence, provide confirmation that the strategy works and provides the expected benefits and use it as justification for wider replication.
3. Promote success and case for acceptance at all levels (political, business and community) for expansion and behavioural change that accompanies it and reward it.
4. Progress to the next easiest opportunity, develop a snowball effect (leaving the most difficult to last).

Note: it is critical that each stage of the development be carried out to a standard of excellence – failure to do so only reinforces the notion that the concept itself is a failure.

Models of excellence may be used to reinforce a change in mindset for more difficult decisions such as mandatory emission standards and road pricing. These measures need to be “sold” highlighting benefits and costs of not proceeding, anticipating all objections and responses to counter each of them. This can be reinforced by inclusion of the threat of adverse consequences such as trade or legal reprisals that result in material economic, or political damage that arises from not proceeding.

This includes exposing fraudulent claims and modelling. Demonstration that these measures can be carried out easily and successfully is critical and must be reinforced by credible and persuasive advocates (community, business etc, local and international) that apply pressure to help make it happen.

Starting point for change and levers to reinforce it.

Managing the change process will be critical and applied at all levels to ensure optimal outcomes. Governments must accept responsibility as agents for change and establish administrative structures and infrastructure necessary to manage the change process. Starting the process will require identification of a critical idea or event that triggers the need for change and turbo charges to rate of change – well beyond what is expected from business as usual. A declaration of a state of emergency would provide this in much the same way as occurred at the start of WW2, the OPEC oil crisis during the 1970's, the Ozone crisis or even early responses to Covid which resulted in the develop of vaccines within a year instead of the norm of 15.

Summary

There is an opportunity to significantly reduce transport emissions by 2030 – by the order of 50%. These reductions will not meet environmental targets and must be supported by additional measures to achieve them. Measures identified include a mixture of technological improvements and behavioural change. Measures proposed are not new and could be implemented quickly with very quick results. The barriers are political (at state and federal government level) and must be addressed as a matter of urgency. Mandatory emission controls and road pricing are key – unless these are addressed opportunities for significant reductions are minimal.

Emission reductions for transport requires a systems based approach that is linked to a zero emission plan for the city and the broader economy – it cannot be carried out in isolation.

Emission reductions must be driven by behavioural change. Reliance on technology alone will result in failure, Technology must be used to support behavioural change – not as a means in itself and not as a means to promote business as usual.

Achieving zero transport emissions is not possible – certainly not based on business as usual and the thinking that underpins it. This is a serious challenge that must be addressed but is a challenge that applies to all sectors of the Australian economy with the exception of the electricity sector. Achieving it will require a total transformation – not just for the transport sector but the Melbourne economy it services and include the structure and functioning of the city itself.

Environmental imperatives must drive all priorities. This includes the need to achieve zero emissions and other environmental imperatives including restoration of the biosphere, limits to growth imposed by a finite planet, eliminate pollution and waste that degrades the planet and reduces its capacity to support life. This will require the adoption of a new mindset and values that underpin it. It will also require the abandonment of business as usual – which has got humanity into this mess in the first place.

Governments must accept responsibility as agents for change – to create the vision and lead by example and establish the environment and mechanisms for change and transition to a zero-emission world.

There is little time to make this transition so it is necessary to turbo charge the rate of change. This can be achieved by declaring a state of emergency with the appropriate instruments to force change and do what it takes to make it happen, with a reminder “this is our last chance saloon”.

Appendix A

Recommendations including additional measures to promote behavioural change and mode shift.

General

- Adoption of EU emission standards, or equivalent, ASAP is key to accelerating low emissions technologies (and needs renewable energy). Note 80% of emissions come from road transport.
- This needs partnerships between governments and other stakeholders.
- Behaviour change measures can impact more quickly
 - Requirements include integrated land use transport strategy (to reduce VKT), road pricing reform that charges for externalities, a large increase in PT (bus) services in outer/regional areas (EVs) and better infrastructure for active travel/electric micro-mobility.

Grattan Recommendations

Ensure emissions from light vehicles are systematically reduced, and that Australians have the widest choice of low-emissions and zero-emissions vehicles.

Set a mandatory fleet emissions standard, applied to the sale of all new light vehicles, tightening to zero emissions by 2035 to set an end date for sales of new petrol and diesel light vehicles.

Scrap inefficient taxes and regulations that slow Australians' take-up of zero-emissions vehicles
Including import duties and stamp duty on zero-emissions vehicles and waive luxury car tax on such vehicles for the rest of the decade.

Ensure buildings and the electricity grid are electric vehicle-ready

- Update the National Construction Code
- Require leased dwellings with off-street parking to have electrical access by 2030
- Plan now to ensure convenient, local vehicle charging is available by 2030 for all residents
- Plan the electricity tariff reforms necessary for smart management of vehicle charging

Test all options for reducing heavy vehicle and aviation emissions

- Support targeted trials of zero-emissions trucks
- Develop national standards and certification for renewable hydrocarbons
- Establish a renewable fuel standard for diesel, aviation fuel, and shipping fuel

Achieving net zero by 2050 will require government action today. Technology is not sufficient – policy and markets are crucial to meet targets on time and at lowest cost.

Emissions sources are either:

- easy to reduce at low cost
- possible to reduce, but cost or other barriers exist - heavy vehicles
- not yet technically feasible or with unknown costs - aviation

Governments should accelerate deployment for the first two categories, and boost R&D support for the last two. Offsetting will play an important role but cannot be relied on for substantial abatement but reducing emissions remains the priority.

Note

1. Difference in economic life of vehicles ie approximately 11 years vs life expectancy of 15-20 years highlights the need to introduce emission standards to enable current fleet to be phased out starting now, otherwise will have to work out strategies to get them off the road from 2030 onward.
2. Focus on hydrogen fuel for heavy vehicles but raises numerous question including how it will be delivered.

Additional Measures to Promote Behavioural Change and Mode Shift

These are based on earlier presentations and reports. This includes numerous reports by GAMUT (Governance and Management of Urban Transport, University of Melbourne), and others and also by TfM in earlier forums, 2018 and 2019 in particular. A ministerial submission based on TfM's 2019 forum was forwarded by TfM to the state government (Minister for Public Transport) in 2020. This forum was designed to provide ideas on how transport outcomes could be improved quickly at minimal or relatively low cost before any benefits from Government's Big Build infrastructure projects could be realized. Customer service criteria and maximising use of existing infrastructure

instead of building more were the principal mechanism for achieving this and greenhouse emission reductions that could be achieved in the process. Promotion of active transport – particularly cycling was a top priority.

Strategies to improve public transport outcomes and transport outcomes in general have been developed over many decades based on accepted standards of best practice and internationally accepted models of excellence. It is not too late to progress these but there is little time left to implement them and funding will become increasingly difficult. There is also a risk that over investment may result in stranded assets (which become increasingly costly to maintain) if and when local and global economic situations change. Environmental change will challenge the relevance of many transport models and notions of sustainability and thinking that underpins them. Flexibility and adaptability and consideration of risk will become increasingly critical in an environment of increasing uncertainty and rapid change.

Examples of Opportunities for Early Reductions – low cost, quick to implement.

- Rapid Uptake in Active Transport

This is a low-cost strategy which can be implemented quickly and provide the cornerstone for a transfer to a zero emission world. Copenhagen has demonstrated the speed at which this can be achieved and potential market share. Implementation must be driven by service factors which were outlined in TfM's ministerial submission based on its 2019 forum. It will also require a major campaign and enabling strategies to address barriers for change at many levels to support it. This will include incentives to adapt and disincentives to maintain business as usual.

An outline of the system thinking and levers that can be used for system change are provided in Donella Meadows paper titled Places to intervene in a system in increasing order of effectiveness.

- Other examples of strategies for behavioural change – to force mode shift and reduce unnecessary trips by targeting specific activities/transport market segments include:
 - Primary and secondary school students and school chauffering

This activity was almost unheard of fifty years ago. The most appropriate policy should be one that promotes active transport as the first priority for school age children to get to and from school, with public transport as a second option for those that need it. Chauffering should be made as difficult as possible; to such an extent that it is no longer a practical option. Children with special needs may qualify for a subsidised taxi service or mini bus. Similar strategies should apply for out of school activities. Parking restrictions will be one of the levers designed to force change.

- Tertiary and other students old enough to get their driving licence

Similar strategies and priorities should apply but with increased focus on the need for access by public transport to reduce the need to buy a car.

- Local trips to district and service centres

Strategies are required to make car travel less attractive and public and active transport more attractive together with other options that eliminate the need to travel in the first place. This requires a comprehensive program. It is anticipated that introduction of parking restrictions/limitations and increased parking charges will be an important lever to moderate trips but will require other actions to make replacement options acceptable. These should be introduced first.

It should be noted that all programs must be developed on a case by case basis. It is likely that what works for one situation may not necessarily work at another or may need to be modified to suit local conditions.

A similar approach will be required for work related travel. Demonstration projects may become an important part of these strategies – to prove strategies work and gain support for their broader extension.

Examples of strategies to promote more broadly based behavioural change.

These use (reduced) mobility as the principal driver of change. Examples include

- introduction of reduced speed limits, traffic calming etc to encourage people to get out of their cars and use public or active transport. The recent introduction of a 30kp speed limit for the whole of Paris ref attachment is an example and introduced with popular support.
- reduction/contraction and reallocation of existing road transport infrastructure to reduce mobility instead of promoting it particularly for fossil fuel powered private travel, with a reallocation of road space and traffic signalling and other measures to give priority to active and road based public transport, and do so in a way that anticipates the need to ultimately plan for negative growth and the transformation to a city that can adapt to a zero-emission world.

Other Issues

Need to anticipate sunset industries and transport Implications - airline and shipping industries in particular.

Firstly, the airline industry. Challenges are considerable and it is difficult to see how it can achieve zero emission deadlines. Transport planning should proceed on this basis without any further provision to support it let alone any prospects for growth. Any growth that is achieved in the short term is likely to be short lived at best, together with the tourist and other industries it supports.

Secondly, shipping. Challenges are substantial but more realistic opportunities exist for transformation. But emissions from imbedded energy for the construction and disposal of the vessels themselves must be included. On the basis of a whole of life evaluation, including supporting infrastructure any prospect of the industry achieving zero emissions is impossible, but it will be a lot closer than the airline industry.

The airline and shipping industries and the industries they support including tourism are large employers and new jobs must be generated to offset their decline and ultimate demise. There are also trade implications including their impact on the supply of goods and services and ultimately government revenue and the services government can afford to provide. All have implications for transport as a service industry.

