The Vital Link Between Bicycle Planning And National Environmental Planning

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Abstract

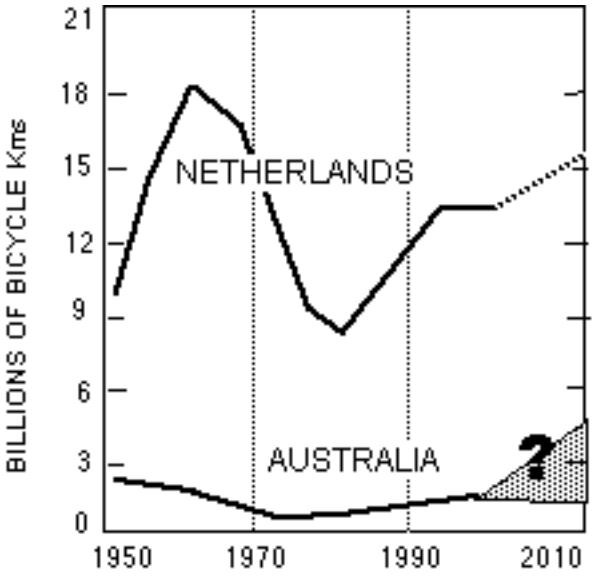
Transport plans for Australia's major cities all claim to produce sustainable outcomes when reliable data show a robust trend of increasing greenhouse gas emissions. Since the mid 1970s there have been steadily increasing levels of unsustainable motorisation and the collective decline of all the more sustainable forms of transport for the trip to work and for all trips generally. The most dominant trend is the growing proportion of Australian working women who are choosing to drive instead of riding public transport, sharing a car, walking or cycling to work.

Data from the Netherlands are presented showing that since 1989 motor vehicle dependence has been constrained and public transport increased to a targeted level by the implementation of the Netherlands National Environment and Policy Plans (NEPP 3). Furthermore "child safe" residential precinct planning and a high level of investment in bicycle infrastructure from 1975 has made non-motorised travel safer and just as many people walk for all purposes as they did 20 years ago; bicycle use has been increased and as many women cycle as men. The carbon dioxide and pollutant emissions of the Dutch car fleet and Australian urban car fleet are compared. The Dutch car fleet is far less polluting and far more fuel efficient partly because around 8 billion kms of bicycles trips have substituted for short car trips.

The Dutch experience shows what can be done given the relevant funding, tax and policy changes by all levels of government. Unless ecologically sustainable development (ESD) becomes embodied in an Australian equivalent to the NEPP then unsustainable levels of motorisation will continue to increase. Based on the Dutch experience sustainable tax and other policy measures are recommended for Australia to supplement the National Greenhouse Strategy, the National Bicycle Strategy and to pave the way to ESD.

Comparing Urban Australia And The Netherlands

The Netherlands cannot be compared with the sparsely populated inland continent of Australia which is mostly bush, desert and forest. Indeed there is 7 million sq km of Australia, an area 200 times larger than the Netherlands, that is mostly uninhabited.



NOTE: The population of urban Australia and the Netherlands are the same in 1996 which makes comparison easy, despite the fact that Australian data are for 9 years and over and the Dutch data are for 12 years and over.

DATA SOURCES: C.R.O.W. (1991). *Record 9. Cycling in the city; pedalling in the polder,* data for 1950 to 1991. *Evaluatierapport Masterplan Fiets* (Dec 1997) Ministerie van Yerkeer en Waterstaat, data for 1991 to 2010. INSTAT (1986) *Day-to-Day travel in Australia*, FORS publication CR 69 and estimates by author for Australia before and after that date.

Figure 1, Billions of bicycle kms travelled for all purposes in The Netherlands (12 plus years) and Australia (9 plus years).

International comparisons require that like must be compared with like. Here we compare urban Australia where 85% of Australians live (in cities of 10,000 population or more) with the Netherlands, both of which had the populations of around 15.6 million living on 35,000 square kilometres of land in late 1996. In 1996 Urban Australia and the whole of Netherlands had similar GDP, household size and most of the urban population are within cycling distance of the sea or major waterways. See table 1 for a comparison of 24 indicators.

The most important difference is how the Dutch develop their cities, manage the demand for car travel and car parking and have provided the best bicycle infrastructure in the world. Urban sprawl, or suburbanisation, has been contained and cities no longer grow into one another. Figure 1 shows that there is a very high level of bicycle use. Table 1 (bottom line) shows that the Dutch have one of the best road safety support systems in the world, with a road death rate 30% less than Australia .The death rate for cyclists per 100,000 km cycled and is very much lower low (Parker 1999), as many women cycle as men and there is much more cycling.

Data for 1996	Urban Australia	The Netherlands	Netherlands % Difference
Surface area in Square kilometres	34,700	34,000	-2%
GDP per person in $Australian	20,296	20,261	2%
Population	15,600,000	15,500,000	2%
Numbers of households	5,523,000	6,282,000	14%
Passenger car fleet	7,370,000	5,740,000	-22%
Car VKT per person per year	7,332	5,567	24%
Car fleet VKT per year – billions	111	86	-22%
Car VKT per car per year	13,100	16,270	24%
Households with no car: percent	12.8	24.3	112%
Households with one car: percent	38.8	60.3	55%
Households with two cars:percent	35.5	14.3	-60%
Households with 3 or more cars:percent	13.1	1.1	-91%
Age of the average car in the fleet	11.3 years	7.7 years	-32%
Price of Petrol in $ Australian	$0.80	$1.70	112%
Car fuel use MJ/per vehicle km	3.8	2.8	-26%
New cars fuel use: Average litres/100km	9	7.9	-14%
Driving cars: km per person per day	20.1 km	16.5 km	-22%
Car Passenger: km per person per day	10.4 km	9.3 km	-10%
Public transport: km per person per day	3 km	4.5 km	50%
Bicycling: km per person per day	0.32 km	2.9 km	810%
Walking: km per person per day	0.52 km	0.9 km	73%
Total travel: km per person per day	37.5 km	35 km	-7%
% of car trips less than 2.5 km	45%	20%	-78%
Road death rate per 100,000 persons	10.8	7.6	-30%

Table 1 Transport data for urban Australia and the Netherlands in 1996

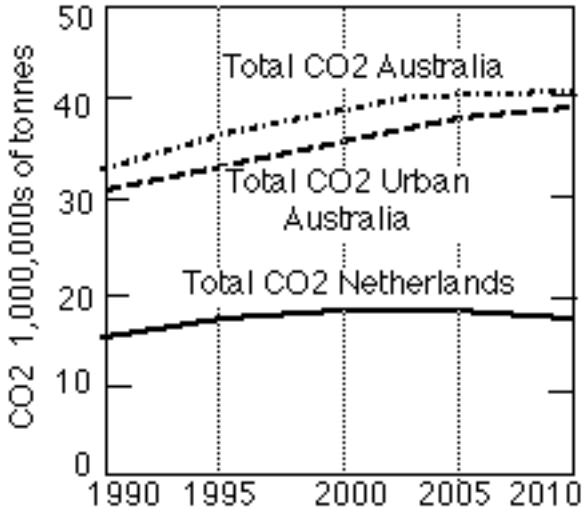
Nearly all residential and urban development is subject to “spatial planning controls” that exist for all levels of Government and have been creating the ‘compact urbanisation’ at the edge of existing Dutch cities since the 1970s. This is not just a policy of increasing the average density but to do it in such a way that it reduces the need to travel by car and this has greatly contributed to bikeway networks being so heavily used.

In historic Dutch city centres the only way to fit in more car traffic would be to fill in many of the canals and make them into roads and that is not going to happen because the Dutch peoples civic pride would not allow it to happen. Such widespread community awareness does not exist in support of environment policies in Australian cities.

Reducing Greenhouse Emissions From The Dutch Car Fleet.

In the passenger transport sector the Dutch are reducing greenhouse gas emissions. This is the result of many small differences that all add up to a very big improvement in the efficient use of their car fleet. Current predictions of carbon dioxide emissions from cars for urban Australia and the Netherlands from 1990 to 2010 show that per capita emissions are half that of Australia in 1996 and will reduce to around one third by 2010 (See figure 2).

Table 1 shows that Dutch petrol is more than twice as expensive, there are twice as many Dutch households without a car and bicycles substitute for many short car trips. The improved fuel efficiency is due to several other factors as well. For example there are 24 % fewer cars in the Dutch car fleet, the average car is smaller and it uses 26% less fuel. Indeed 41% of passenger cars are powered by LPG which produces 14 % less GHG and significantly less air pollution.



DATA SOURCE:
BTCE/FORS *Australian projections to 2010 from cars (ADR 37/01assumed).*
Netherlands data & projections in email to author from Geurs, K.T., R.M.M. van den Brink, J.A. Annema, G.P van Wee (1998),Verkeer en vervoer in de Nationale Milieuverkenning 4, rapportnr. 773002 011, Bilthoven: Rijksinstituut voor Volksgezondheid en Milieu

Figure 2, Australia and the Netherlands: Passenger Car Emissions 1990 to 2010 of CO2 emissions from passenger cars:

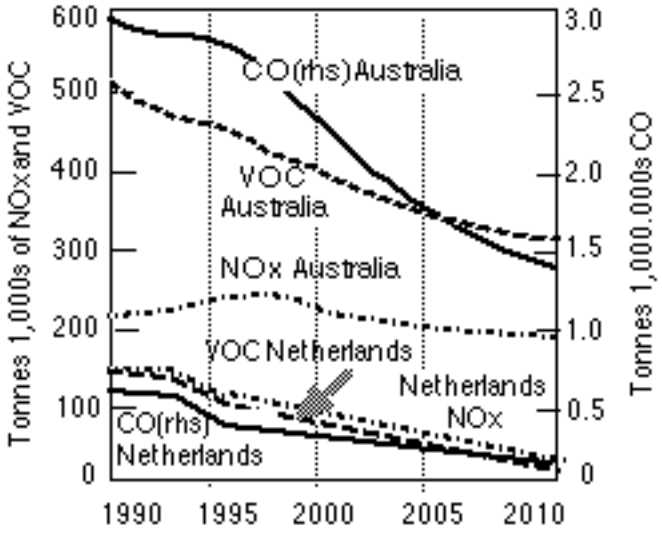
Even so the average Dutch car travels 3,170 km further each year and the reason for that is that Australia has many more old cars, many of which are not used very much. In marked contrast the Netherlands has low level of multiple car ownership with 60% fewer households with two cars and 90% fewer households with three or more cars. In 1996 only 23% of the Dutch car fleet was older than 10 years compared to 43% of the Australian car fleet and this means that the take up of more energy efficient cars will be much higher for the Dutch car fleet. Considering that the average Dutch person travels only 7% less per day (table 1) than an Australian but does so with 50% less GHG emissions this is a considerable achievement.

Figure 3 shows the lower level of air pollution from the Dutch car fleet. Low levels of pollution are also indicated by the data on table 1 showing that only 20% of Dutch car trips are less than 2.5 km compared to 45% of the trips in urban Australia. Bicycle trips in the Netherlands are substituting for around 8 billion car kms. Because most short car trips are made with cold engines that substitution greatly reduces air pollution.

Promotion of bicycling has never even been seriously considered by government agencies in Australia until 1999. That year the Victorian Environmental Protection Agency produced a plan for reducing pollution that included the promotion of walking and cycling for replacing 40% of the car trips in Melbourne which are 2km or less.

Unsustainable Car Fleet Emission Trends In Australia.

There is no evidence in Australia to expect a change to these unsustainable transport trends especially as the introduction of the General Services Tax this year will reduce motoring costs and increase the cost of public transportation. The average passenger vehicle fleet fuel consumption has not change significantly from 1976 to 1996 and there are now 70% more vehicles on Australian roads. New passenger car fuel efficiency has improved from 13 litres per 100 km to 9 litres per 100 kms in the same period but with an increasing proportion of four wheel drive recreational vehicles consuming nearly twice as much fuel it has not reduced per capita average



DATA SOURCES: BTCE/FORS Australian projections to 2010 from cars (ADR 37/01 assumed). Netherlands data & projections from Geurs, K.T., R.M.M. van den Brink, J.A. Annema, G.P. van Wee (1998), Verkeer en vervoer in de Nationale Milieuverkenning 4, rapportnr. 773002 011, Bilthoven: Rijksinstituut voor Volksgezondheid en Milieu

Figure 3, Passenger Car Emissions Projections to 2010 of NOx, CO & VOCs from cars: Australia and the Netherlands

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petrol consumption at all.(Schipper 1996) Also the rate of introduction of new hybrid cars and cars powered by fuel cells will be much slower due to the high proportion of old under utilised cars in the Australian car fleet.

In Australia the practice in recent years of subsidising large car use as part of the salary package and, before that, company car tax allowances, has locked people into car dependency (Hawes 1999) and increased single occupant car commuting Change is not likely because no state government has an effective demand management strategy that encourages a combination of car pooling, car sharing or Dutch style shared ownership schemes (Bakker 1995).

As yet no country in the world has made a total commitment to achieve ESD least of all in passenger transport. Australia has become less sustainable and the Australian National Greenhouse Strategy (NGS) bluntly states that:-

“Transport was responsible for 24% of emissions produced through activities involving the use of energy in 1996Ö.Cars were responsible for 56% of these emissionsÖ. In the absence of further measures to limit greenhouse emissions, domestic transport emissions will increase by 42%, on 1994 levels by the year 2015Ö.P 55”

Surveys of trips to school in Australia and the 1976 to 1996 Census data for the journey to work in Australia suggest that the following trends will continue for many years:

1. The over use of the motor car generally and the decline of informal car sharing for the trip to work results in single occupant cars causing more congestion in the large cities.
2. The declining use of public transport and walking generally and in particular walking and cycling to school (ABS 1995) and cycling to stations.
3. The very small increase in commuter cycling, in most cities despite a high level of recreational cycling and bicycle ownership by children and adults.

Comparing All Trips: The Netherlands, Melbourne

The decline of the more sustainable transport modes in the Netherlands (see right side graph on figure 4) is far less than for Melbourne. The most marked contrast is between the 28% of bicycle trips in the Netherlands and the 2% for Melbourne over 18 years. Unfortunately data of this quality for Melbourne does not exist for other Australian cities.

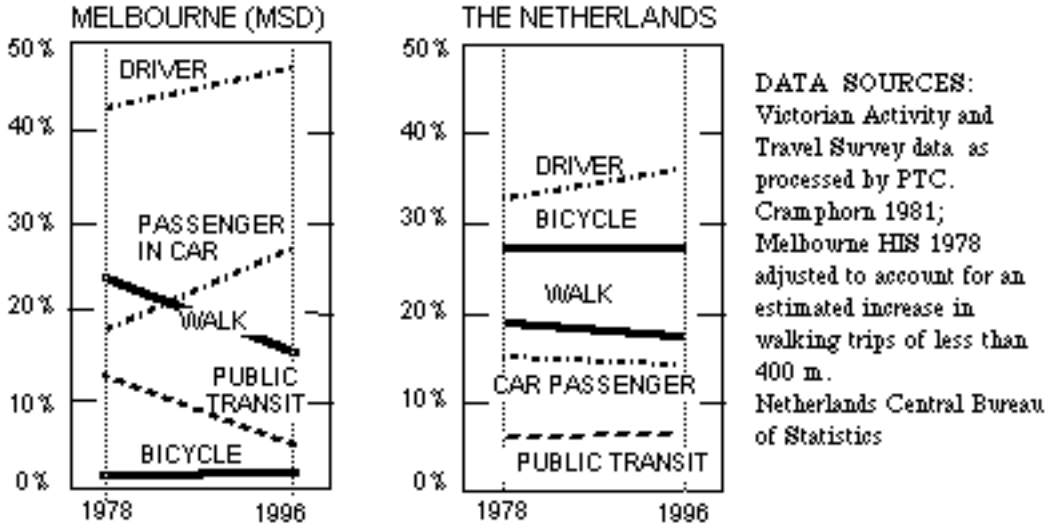
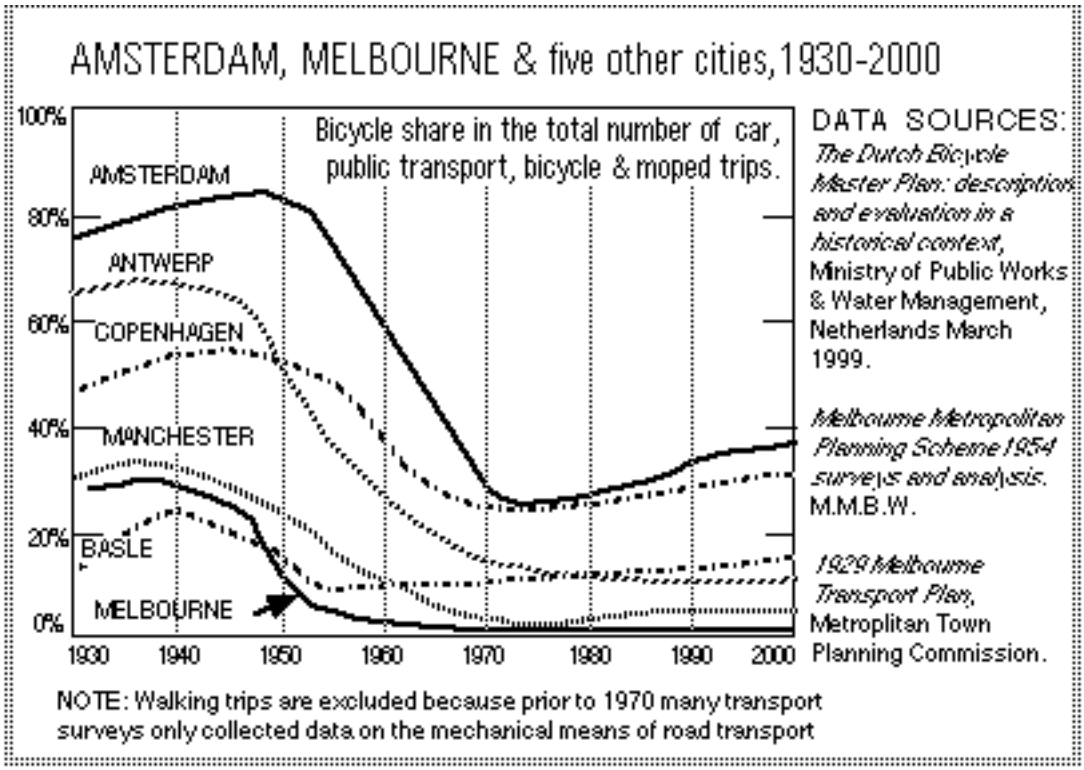


Figure 4, Melbourne MSD and The Netherlands: Percentage of all trips for all purposes 1978 to 1996

The overall historical trends for six cities including Melbourne and Amsterdam are shown on figure 5. Some progress has been made in Melbourne but it is invisible at the scale shown. Not only is there no commitment to serious change by the Commonwealth of Australia but the state government responsible for Melbourne makes only token provision for bicycle facilities. The Australian Bicycle Strategy (Austroads 1999) has totally inadequate funding provisions and remains more of public relations exercise than a real commitment to cycling.



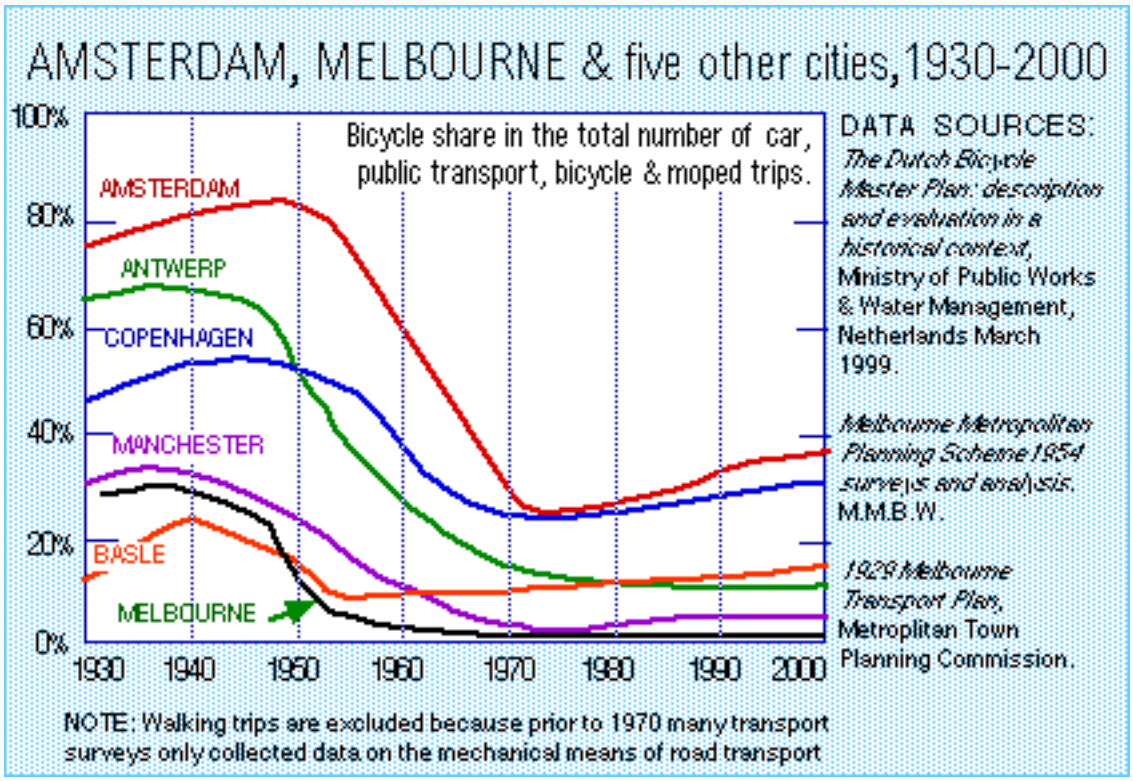


Figure 5

Compared to Australia The Netherlands has 14 times as many person trips by bicycle yet the overall road death rate per 100,000 population for all road users is much lower (table 1). The practice since 1975 of physically separating bicycle traffic from motor vehicle traffic at speeds of 50 km/hour or more is working well.(see figure 6) However it is not as simple as that and a lot more is involved in making cycling safe than bikeway network provision.

The Dutch Philosophy Of Sustainable Road Safety

Dutch road safety policy is based on the philosophy of "sustainable road safety" which in practice results in fewer and fewer road users being exposed to injurious mechanical forces in collisions that produce death or crippling injuries. The philosophy recognises the vulnerability of non-motorised road users and gives priority to their safety needs. Furthermore it is supported by a travel and road safety data collection process that ensures that non-motorised modes are taken seriously by decision makers.

In comparison there is a data vacuum in Australia generally and many of the needs of vulnerable road users are notable by their absence in National Road Safety Strategies promoted by the Federal Office of Road Safety.(Parker 1998)(Parker 1999) From the limited data that is available in Australia we know that there were 3.5 male cyclists km ridden for every female cyclist km ridden by bicycle in 1985. (INSTAAT 1986) More recent data for the trip to work and school confirms that this ratio has not changed for the better which indicates a serious deficiency in the road safety support system and an underlying male sexist approach in road safety planning and provision.

We have known that young women cyclists are more traffic sensitive than men (Elliot, 1985), but little has been done to address their needs. As 50% of all potential cyclists are women, the failure to take the needs of young female cyclists into account is serious problem. It indicates that the potential to substitute short car trips by bicycle trips is not take seriously at all by Australian agencies responsible for road planning and road building and transport funding.

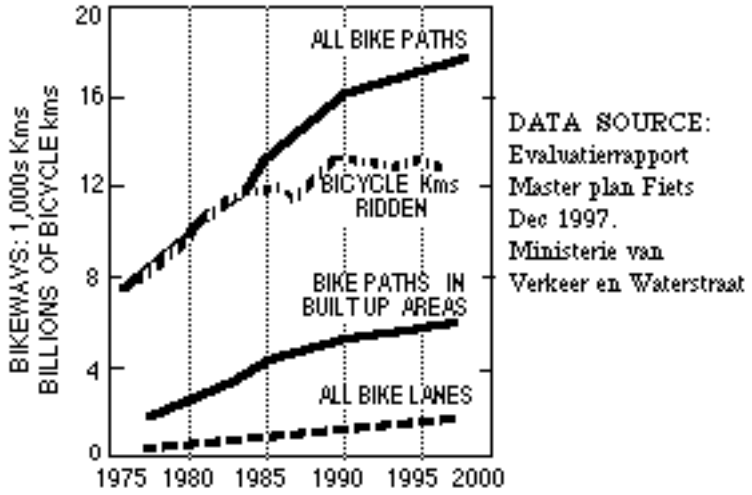


Figure 6. The Netherlands: length of bikeways (kms) and billions of kms ridden by bicyclists.

Furthermore studies conducted for the Dutch Bicycle Master Plan have dispelled the myth that cycling is inherently unsafe compared to driving. For example if we compare like with like, that is car drivers and bicycle riders in the same age group, we find that young drivers of 18 to 24 years of age are more at risk than bicycle riders per million km travelled (Wellemen 1999). What is even more telling is that the pedestrian death rate per million km walked is one fifth of the Australia rate.

The Dutch have monitored bicycle use since the 1950s and from 1980 many studies made so they know if their bicycle planning efforts are effective and that their long term target for the bicycle to substitute for many more short car trips is being achieved. There is a large bicycle use database that makes research possible. The historical overview of bicycle transport in the Dutch Bicycle Master Plan uses this database to clearly document their experiences in becoming world leaders in building urban road systems that constrain the growth in unnecessary car use by providing for the safe and convenient use of bicycles and pedestrians. (Wellemen 1999)

The Dutch National Environment And Policy Plan (Nepp)

In marked contrast to Australia the Netherlands has been moving slowly towards ESD in the transport sector as result of a commitment to a National Environment and Policy Plan (N.E.P.P 3. 1998) that drives national planning and the implementation of the Bicycle Master Plan.

The central goal of N.E.P.P 3 is:-

“decoupling economic growth from the growth in fuel consumption and use of non renewable resources which is seen as both a sound economic and environmental strategy”.

The transport objectives of the NEPP are that:-

- Vehicles must be as clean, quiet, safe and economical as possible.
- The choice of mode for passenger transport must result in the lowest possible energy consumption and least possible pollution.
- The locations where people live shop,work and spend their leisure time will be coordinated in such a way that the need to travel is minimised.

Without the NEPP it was expected that car kms would increase by 72% over the period 1986 to 2010. With the NEPP this increase will be lowered to 48%, a positive step towards ESD.

Recent and planned investment in the NEPP has or will be providing the following: high speed passenger train routes to reduce intercity air travel between Schiphol Airport and German and French airports; high speed rail freight links to get the trucks off the roads; highly efficient multi modal freight transfer systems in Rotterdam and other ports to decrease cost and energy use.

NEPP aimed to increase rail passenger traffic by 15% by 2010 through improving bicycle parking at stations and implementation is already well ahead of schedule. Netherlands Railways are well on the way to increasing rail passenger traffic from 9 billion passenger km in 1987 to 17

billion passengers in 2010 (RGI 1996). The seamless connectivity of public transport, and the special provisions made for carrying bicycles on all Dutch trains are most impressive

The measures taken to implement the NEPP show that “green taxes”(eco-taxes) have great potential to increase the quality of life while reducing greenhouse gas emissions and oil dependence. Some of these tax measures and their implementation date are as follows:-

1. The greening of the tax system, whereby there is a shift from the taxation of labour to the taxation of environmentally harmful activities. Direct taxation of wages and incomes will be reduced while taxes on consumption will be increased. (Depending on the environmental implications of that consumption).
2. Increase in fuel tax rates (1995); increase the variable component of motoring costs by increasing excise duty on motor fuels (1997). Petrol costs A$1.60c per litre at the pump.
3. Value-added tax incentives for employers to provide bicycles (1996) Reimbursement of cycle commuting costs in wages and income tax (1997)
4. Increase in scope and magnitude of the tax allowance for trip to work travel costs by means of public transport and the tax free reimbursement of public transport costs in wages and income tax (1997); increased allowance (1998)
5. Freeze on car commuting tax allowance (1997)
6. Incentives for tele-working in wages and income tax (1997) increased concessions (1998)
7. Widening and simplification of wages and income tax concessions for car pooling (1998)
8. The government is studying the scope for incorporating an environmental component in the excise levied on new vehicles and the annual vehicle tax so as to provide incentives for the purchase of clean, energy-efficient cars, and to optimise the fuel mix.

The most important lesson to learn from the Dutch experience is how difficult it is to change transport behaviour. The simplistic views of what is possible in Australia undermine any chance of achieving positive change. The Dutch are brutally frank about what is not being achieved and that is very necessary because bicycle planning in isolation will produce little unless planning to reduce car dependency and urban sprawl are seen as being equally important.

The crucial spatial planning policy is to put the “right business in the right place”. For example outer urban super markets surrounded by hectares of car parking or low rise spread out Australian Universities conveniently accessible only by car, are no longer built. Instead they are compact local shopping areas within walking distance or multi story campuses built alongside rail lines and if there is no local station they build one.

The Dutch national car parking manual (C.R.O.W. No 11) speaks volumes for the realism of Dutch transport planning which provides for bicycle parking but seeks to constrain car use when it states unambiguously on the first page that:-

“Definition: A coordinated car parking policy is directed to restricting car use. The aim is to encourage selective car use so as to make a favourable contribution to accessibility and the living environment by reducing car mobility which reduces congestion while at the same time stimulates alternative modes of transport. It also plays a part in the sharing of scarce space”.

The Dutch Coordinated National Car Parking Policy (C.R.O.W. 11 1994) has been successful and large supermarkets sited inside massive car parks are very noticeable by their absence. However NEPP 3 proposes new car parking policies that constrain municipalities from competing with one another by the over provision of car parking spaces. (This is also an Australian problem)

Dutch experience with implementing the NEPP suggests that there is the potential for a shift of at least 10% of all long “drive alone” commuter trips to multiple occupant trips.There is great scope for using bicycles to substitute for short, dirty car trips of less than 2.5 km km and significant proportion of car trips of less than 7.5 km.(Wellemen 1999) There is also the potential to use the bicycle as an access mode to replace long “drive alone” commuting trips with van and car pooling, that use computer matching techniques for the selection of pool members.

Conclusions And Recommendations For Australia

In marked contrast, the Australian government's $180 million program for greenhouse gas reduction is not directed to forceful mitigation measures likely to reverse increasing car use. It is a wish list with very little in the way of funded programs. Most Commonwealth agencies in Australia ignore the need for uncoupling the growth of GDP from fossil fuel consumption.

In Australia little is actually being done to constrain the growth of motorisation; let alone reverse current trends because of market driven unsustainable development. The "Greening" of the tax system is necessary so that tax reform results in the implementation of the National Greenhouse Strategy by all levels of government, actually encourages ESD, honours the spirit of the climate treaty and conserves indigenous oil reserves.

ESD must becomes the preferred form of nation building. Having an Australian equivalent of the Dutch NEPP is necessary which would either include eco-taxes and regulations, or be supported by eco-taxes in other legislation. The following 13 measures are needed to supplement the National Greenhouse Strategy, the National bicycle strategy and to pave the way to ESD:-

1. An annual petrol and diesel tax increase at the pump to encourage fuel conservation and the use of fuel-efficient vehicles.These taxes to pay for rail infrastructure, bikeway networks and funded programs to support the introduction of viable alternative fuels, and "greener" Australian made cars.
2. Increased GST on energy wasteful vehicles and emissions standards for new vehicles match European standards by 2002
3. The government to exempt CNG and LPG from excise and to provide more funding for biofuels such as ethanol and methanol. Grants and regulations to ensure that PT vehicles, government fleet cars and salary packaged cars use these alternative fuels.
4. New design rules requiring all new car and LCV engines to be designed for easy conversion for the efficient use of CNG.
5. Tax measures designed to phase in a increasing proportion of CNG fuelled vehicles in private and government vehicle fleets and to discourage the import of vehicles that do not comply with this requirement.
6. Salary packaging schemes to encourage cycling and public transport and discourage car travel, car parking and car ownership.
7. Environmentally responsible taxation of workplace parking spaces to give car commuters an incentive to use other modes (Boyd 1998).
8. Fund research into the scope for effective coordination and harmonisation of both the provision and pricing of paid car parking and controlling the provision of public and private parking facilities so as to constrain unnecessary car use.Make the provision of secure bicycle parking mandatory in all new buildings and whenever a building changes ownership that the building is retrofitted with secure bicycle parking.
9. Public transport should be GST free. Secure bicycle parking should have priority over car parking at rail stations. Public transport should provide for the carriage of bicycles where ever possible. Except for urban end of line stations many of the existing railway car parks should be converted to high density Urban Village developments.
10. Encourage employers to reduce travel reimbursement costs for driving on work business and provide reimbursement for cycling on work business.
11. Urban consolidation should be reinforced by a policy of business location that prevents "employment intensive developments in areas not well served by public transport.
12. Urban consolidation regulations and forms of car and house ownership should be reinvented to encourage car free housing.(Hazel 1999 B) That is new sub-divisions where no car parking is allowed by the choice of future residents who choose not to own a car but use car sharing clubs when they need to, but use other more sustainable transport modes most of the time.(Bakker 1996)(Hazel 1999A)

13. Provide Commonwealth $200 million funding in the year 2000 budget for off the shelf programs that can quickly be implemented by all state and local governments. In particular Travel Smart programs (Ker and James 1999) and the implementation of bicycle strategy plans.

References

A comprehensive list of references can be found in :

Parker,A.A.(1999)
"The missing link between sustainable passenger transport and national environmental planning". p 1019 to 1036 13 figures. 23rd Australasian Transport Research Forum, September 1999, Perth Western Australia.