

Addressing oil vulnerability through travel behaviour change

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1 Introduction

In August and September 2005, Australian at-pump fuel prices jumped in line with a worldwide trend following restricted refining capacity in the southern United States as a result of Hurricane Katrina. This spike came on top of a steady increase in international oil prices, fuelled by strong underlying demand from newly industrialising economies, such as China and India.

Australian household travel behaviour change projects generally did not react to the change in fuel prices. This paper suggests that rising prices present an opportunity for such projects to go beyond existing ways of working and reach fresh audiences.

In 2005 Dawson and Sipe mapped “oil vulnerability” in three Australian cities through a composite index including variables of socio-economic status, household vehicle ownership and car dependence for work journeys. Unsurprisingly, outer metropolitan households with limited public transport services ranked as the most oil vulnerable locations.

Most household travel behaviour change projects concentrate on audiences in inner to mid-suburban locations with reasonable provision of alternative transport modes. This paper considers whether such projects might be tailored to meet the demands of the oil vulnerable in outer suburban locations as well as be more responsive to sudden shifts in fuel prices.

2 Travel demand management and fuel prices

Travel demand management describes policies and actions to decrease the travel of individuals and goods in an attempt to make better use of existing and future transport infrastructure.

Although the development of travel demand management pre-dates the first of the modern oil shocks in 1973, it was that crisis which gave the new field credence in the eyes of policy-makers. In the US, that newfound credibility translated into transportation management regulations administered by the Federal Highway Administration and the Federal Transit Administration (North Carolina Department of Transportation, 2006).

By 2005, TDM programs had become entrenched in North American transportation planning while they were still emerging as new methodologies in Australia. While North American programs concentrated primarily on commuting trips, governments in Australia have taken a more balanced approach but with a heavier emphasis on influencing household travel behaviour (Ker, 2003).

The Australian household programs have generally followed a version of individualised marketing. In its simplest form, this involves:

- contacting households within a defined geographic area;
- ascertaining whether they wish to receive information to assist them to make more sustainable transport choices;
- defining what that information might be; and
- sending a pack of tailored information.

The households take part in pre- and post intervention surveys to measure the degree of any travel behaviour change undertaken by their members. This is compared against the behaviour of a control group. Within the contact process, the contractors seek to categorise households as follows:

- I – interested in making a change in travel behaviour although has not done so to this point in time;
- R – regular users of forms of sustainable transport; and
- N – not interested in travel behaviour change.

This process of categorising the target audience allows the contractor to avoid spending much if any time with the group which is least likely to change, the N group, and concentrate its energies on increasing the use of sustainable transport amongst the R group and introducing the I group to sustainable transport and weaning them from car use. Once identified, the I group is assumed to be ready to receive information and follow through and make a change in travel behaviour (Brog and John, 2001).

As part of this process, there is a conversation conducted with members of this group to seek a better understanding of their motivations for change to target materials and incentives provided to the participating households. It should be stressed that some contractors place a greater emphasis on this conversation and the search for underlying motivations but often this is restricted by the need to deliver the project within a tight timeline.

Since 1995, state governments in Western Australia, Victoria, Queensland, South Australia and New South Wales have all trialled household travel behaviour change programs, with varying degrees of success. The longest record of travel behaviour change is from the Western Australian projects, as set out in Table 1, overleaf:

Table 1: Travel Behaviour Change in Western Australian Households in TravelSmart Projects

Project Area	Year	Population	Percentage Decline in Car Driver Trips
Fremantle (WA)	2003	17,000	- 12 %
Vincent (WA)	2003	15,000	- 9 %
Subiaco (WA)	2002	15,000	- 12 %
Wanneroo (WA)	2002	11,000	- 4 %
Cambridge (WA)	2002	24,000	- 7%

These projects are generally large scale and require months of planning with a tight timetable for delivery to the household. They are generally delivered by contractors and seek to contact as many households as possible within a restricted time.

This concentration on delivery of a product allows little opportunity to respond to new influences on the behaviour of the target population. Generally, it is assumed that these influences are static or low key and directly supportive of the project, such as new public transport infrastructure. Sudden, large scale influences, such as a spike in petrol prices, may be viewed as having generally positive impact on a household travel behaviour program already underway. There may be some distortion in the final results, but this must also be viewed against a generally changed transport environment for the broader population.

3 The 2005 oil spike

In August and September 2005, world oil prices spiked following restricted refining capacity in the US Gulf Coast as a result of damage wrought by Hurricane Katrina. Katrina shut down both offshore oil platforms and onshore wells, and wrecked an estimated 10 percent of the region's refining capacity. The Gulf Coast oil sector accounts for a quarter of US domestic production.

The impact was immediate in the US and flowed on around the world as US demand for imported refined oil increased to replace lost domestic production. The price of crude oil on the New York Mercantile Exchange doubled from \$33 a barrel in January 2004 to \$66 a barrel immediately following Hurricane Katrina (New York Times, 2005).

This spike came on top of a prolonged period of rising world oil prices, driven primarily by increasing demand by both the industrialised nations of the West as well as the largest newly industrialising countries, such as China and India. In the US, the average at-pump cost of petrol rose from around \$2.35 a gallon in late July to \$3.15 by mid-October, a 34 percent price increase in just over two months (Energy Information Administration, 2006).

Australia followed suit with all state and territory capitals recording price increases, as detailed in Table 2, overleaf:

Table 2 At-pump petrol price increases in Australian capital cities, 2005

City	Average Price per Litre (cents), June 2005	Average Price per Litre (cents), September 2005	Percentage Increase
Adelaide	106.1	131.7	24.1 %
Brisbane	98.5	122	23.8 %
Canberra	104.2	135.4	29.9 %
Darwin	113.6	133.6	17.6 %
Hobart	113	136.8	21.1%
Melbourne	106.6	124.4	16.7 %
Perth	103.3	129.4	25.3 %
Sydney	108	130.5	20.8 %

(Australian Automobile Association, 2006)

Following the spike, prices dropped back but then started to climb again as world oil prices were influenced by continuing instability of production from markets such as Nigeria, lower than expected production from Iraq following the war and continuing high demand from China and India (Bloomberg, 2006).

The effects on consumer behaviour were immediate. In Australia, by March 2006, 57 percent of households that owned a car for which they must buy fuel reporting that they had been affected somewhat with 27 percent reporting they had been affected a lot. These households reported adjusting their habits through a range of measures, including:

- using vehicle less 61 percent
- trying harder to combine trips 57 percent
- cutting down on non-essential living expenses 29 percent
- using public transport more 19 percent

(AC Nielsen, 2006)

AC Nielsen repeated the poll in June 2006 to find that as prices continued to rise, households continued to adjust their behaviour with 46 percent of respondents to a nationwide poll reporting using their car less and 40 percent reducing their spending on other items (Sydney Morning Herald, 20 June 2006).

Australians were not only driving less; many were switching to alternative modes. The Australian Bureau of Statistics noted a 2.3 percent increased spend on bus use in New South Wales in the year to March 2006, while the spend on driving dropped almost five percent (Daily Telegraph, 21 June 2006). In Victoria, public transport operators reported an 8.2 percent increase in patronage in the year to September 2005 (The Age, 2005)

In the US, as the at-pump price climbed above \$US3 a gallon, the economy suffered its worst consumer spending figures in four years in August 2005, dropping by 0.5 percent (BBC, 2005).

4 Travel demand management and the 2005 oil spike

In 2005, US travel demand management agencies reported jumps in people registering to carpool and vanpool, as well as increases of between 4 and 8 per cent in use of public transport and requests for information about alternatives to driving.

The biggest rises in carpool matching took place in South Florida which saw a five fold increase in applications for the July-September period, compared to the same three months in 2004. The previous year had seen 3439 applications during the three months; that number reached 19351 in 2005. Other cities also noted big increases, including a 138 percent jump in carpool applications in Phoenix, Arizona, a 324 percent increase in Minneapolis and a 1028 percent increase in Detroit (NCTR, 2006)

A survey by the National Center for Transit Research and the Association of Commuter Transportation also found that some travel demand management agencies changed their promotional messages to focus more on rising fuel prices. However, agencies did not seek to fundamentally change the way they delivered their programs to customers. The survey also cited polling data showing that the percentage of Americans expecting fuel prices to remain high, had increased over the past 12 months (NCTR 2006).

In Australia, large scale household travel behaviour change projects proceeded in Melbourne, Adelaide and Perth with no change to the message or methodology to take account of the sudden rise in petrol prices. This was also the case with workplace and school programs.

5 Oil vulnerability

In 2005, Jago Dodson and Neil Sipe mapped “oil vulnerability” in three Australian cities through a composite index including variables of socio-economic status, household vehicle ownership and car dependence for work journeys (Dodson and Sipe, 2005)

The paper notes that, historically, households on the outer fringe faced a trade-off between lower land values and cheaper housing, and higher prices of public transport to access employment centres in the inner suburbs. This had been offset by the provision of relatively cheap access through widespread private vehicle ownership and relatively low operating costs. However, this factor has declined in impact as petrol prices have increased. Consequently, outer suburban households have returned to the original trade off between cheap land and higher transport costs.

Applying the composite index to census districts in Brisbane, Melbourne and Sydney, the study found that outer suburban households were more vulnerable to the rising costs of petrol, mortgages and inflation because of a combination of moderate incomes, housing debt and a reliance on travel by car. In contrast, wealthy inner city households in Australian cities were less likely to be affected by due to their higher incomes and the greater availability of public transport (Dodson and Sipe, 2005).

6 Travel demand management and oil vulnerability

Large scale household travel behaviour change programs in Australia have generally been delivered in areas in which there is spare capacity on public transport to absorb the growth and where there is enough alternative infrastructure (walking, cycling and public transport) for participants to switch their modes of transport for different trips. This has resulted in most projects being delivered in inner to mid-suburban settings.

When projects have been run in outer suburban settings they have achieved reductions in the number of car driver trips, but not to the same degree as in inner city suburbs (see Table 1 – Wanneroo and Cambridge are both outer suburban settings). However, while fewer car driver trips have been reduced, those that have been affected have generally been longer, so there has often been a greater saving in vehicle kilometres travelled. These outer suburbs

correlate with those identified for Brisbane, Sydney and Melbourne by Dodson and Sipe (2005). Therefore, while these outer suburban settings may not be as attractive for transport policy makers in government wanting to increase public transport use, they are worth considering from a point of view of wanting to reduce the length and number of car trips and reducing the exposure of households in these locations to rising petrol prices.

The question then arises: is the household approach which has so far been employed in Australia the most appropriate for these particular oil vulnerable households?

Firstly, let us consider alternative methodologies. The travel demand management methodologies for schools and workplaces are well established and can work to engage people through messages about fuel prices, but they rely on a third party (either the school or the workplace) to actually deliver the project.

It may also be argued that many school trips are of such short duration they are likely to have little impact on household expenditure on petrol, even if they were switched to an alternative. In these instances, the desire to change travel behaviour may have a stronger link to concerns about child health gains through walking and cycling.

The US experience of travel demand management agencies shows that messages about high fuel prices can be built into workplace programs that are constructed around direct contact with commuters and backed by media advertising. Australian agencies typically do not have this level of support and generally work through the workplace to influence individuals. This approach is good for encouraging cultural change within the workforce which translates into support for individual travel behaviour change, but may be less effective in delivering a specific message around petrol prices.

The advantage of the household approach is that it allows agencies to have direct contact with the target audience. The next question is how to approach the household?

The simplest approach for agencies currently engaged in household travel behaviour change programs is to simply apply this methodology to identified oil vulnerable suburbs, as has been the case in the Wanneroo and Cambridge projects.

One point to consider in this approach is that identifying motivations of the I group through the traditional individualised marketing approach may be easier in an oil vulnerable location. If the motivation for the target group is known – resentment over high petrol prices – the information and incentives to help this group of households change travel behaviour can be refined to a relevant point. However, the problem with this approach is identifying those households with that motivation. It may also be that the kinds of materials provided in such projects is not enough for these households who may need greater interaction with travel demand management professionals about their potential options for change.

A potential drawback with this approach is if the rollout follows a similar pattern to those household projects already conducted where a large number of households are contacted within a short time period. The pressure of delivery means that if there is another price spike, it is difficult for the contractors delivering the project to react.

A better approach may be to allow the target audience to approach the travel demand management agency. This methodology has been recently trialled in Brisbane in the Transport Café project which reached 2000 households. In this approach, the project was promoted through a local communications strategy at the heart of which was the presence of an information booth at a regional shopping centre. In this way, members of the I group identified themselves by approaching the booth to request information which was then tailored to their personal needs (TravelSmart, 2006). A similar approach is employed in the

Universities project run by TravelSmart Victoria which engages first year students as part of the enrolment process (Rose, 2005).

The advantages of this approach go beyond self-identification by the I group. The lower cost of this approach, compared to a traditional household individualised marketing program, allows the program to be run over a longer time period with less pressure to meet a target number of participating households. In turn, this low key approach over a longer time period allows the project delivery agency to react to any changes in the environment, such as sudden rises in petrol prices, which are likely to increase the motivation of participants as well as those considering whether to join.

Using an approach based on the motivation of reacting to high fuel prices also allows a project to feed off current media attention as well as a current background discussion topic. People are not standing around water coolers talking about how congested the roads are, how we should all be driving less to reduce greenhouse gases. They are talking about how much they are paying each week to fill up their car.

Whichever approach to the households is selected, once the I group has been identified, the travel demand management agency can be far more direct with the information and incentives offered to households than is presently the case. The motivation is clear and information and incentives can be shaped to meet that demand.

It also means the agency only needs to measure a limited number of factors reflecting behaviour change, the most obvious of which is an odometer reading for vehicles in the participating households. This will record car use, which may also be supported by surveys about what modes the households have shifted to and if there have been any changes in the amount of household expenditure spent on transportation.

7 Conclusion

The lack of a response amongst travel demand management agencies in both Australia and the US delivering programs during the August-September price spike last year is understandable given the aforementioned operational constraints. What is less understandable is the continuing lack of reaction in the time following that spike, when prices dropped and then rose again, this time past the point reached last August.

This determination to proceed as normal may be a missed opportunity. Both in Australia and the United States, drivers have historically benefited from low at-pump fuel prices and reactions have been more volatile when prices have risen. In Europe, where drivers have endured a long period of high fuel prices, mainly due to government taxation, the levels of driving have not dropped. Indeed, drivers continue to drive as the adjustment to their environment – rising prices – has been gradual enough to be incorporated into their behaviour (Christian Science Monitor, 2005). In Australia, the reaction of drivers without travel behaviour change interventions, suggests a greater price sensitivity. As this paper was completed the international oil price hit \$75 a barrel and the at-pump price in Australia touched \$1.50 a litre.

This paper makes a case for an alternative household travel behaviour change program which rests more on restricting participation in the program as defined by the motivation of the household. This motivation is sensitivity to fuel prices.

Perhaps the problem has been that travel demand management agencies are going about this the wrong way. The agencies are defining the problem – too many cars on the road – and the solution. As part of their delivery, they do seek what motivates people to change

(e.g. wanting to save time or money, improve health, save the environment), but maybe they would be better to start with the motivation and work from there.

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