Australian Government

Department of the Environment and Heritage
Australian Greenhouse Office

Evaluation of Australian TravelSmart Projects in the ACT, South Australia, Queensland, Victoria, and Western Australia 2001-2005

Report to the Department of the Environment and Heritage and State TravelSmart Programme Managers

2005

TravelSmart
a better way to go
Australia

Report to the
Department of Environment and Heritage
and State TravelSmart Program Managers

Evaluation of Australian TravelSmart Projects in the ACT, South Australia, Queensland, Victoria and Western Australia: 2001–2005

For the Australian Greenhouse Office
Department of the Environment and Heritage

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Important Notice – Please Read

Declaration of interests

This report is an update of one was prepared for the Commonwealth Department of Environment and Heritage by RED^3.

Neither RED^3 nor its staff or directors has any association with any of the organisations that developed, implemented or evaluated the TravelSmart projects described in this report, nor with companies that manufacture monitoring equipment. This report is based on reports prepared for State TravelSmart projects.

introduction

About the evaluations covered in this report

This report updates an earlier report on TravelSmart projects around Australia, supported by the State and Australian governments. Like the earlier report it:

- collates recorded changes in travel behaviour
- outlines the benefits that these changes resulted in
- the methods used to bring about voluntary behaviour changes.

The evaluations cover three strands of TravelSmart in Australia: households, workplaces and schools. The projects and the evaluations fall into broadly two types:

- small-scale pilots (typically 20–150 participants, or 1–4 organisations)
- larger implementations (600–1600 participants).

Most, but not all, of the evaluations provide data on changes in travel behaviour. About half also assessed the administration or implementation of TravelSmart projects. Only a few examined the flow-on benefits of changing travel behaviour. In particular, only a few of the evaluations have estimated vehicle kilometres travelled (VKT) and reductions in CO_2 emissions—we have calculated these where possible.

The evaluations vary considerably in scope and focus, so many of the results are not directly comparable. Because of the small sample size of the pilot projects, and the large variability in travel behaviour, the results of travel surveys for these smaller pilots—while broadly consistent with the results of larger projects—are not statistically reliable. The pilot projects do however provide important information on implementation methods.

Evaluating TravelSmart

There is no such thing as a perfect evaluation. In an area like travel behaviour change, where behaviours vary greatly and are subject to many forces, any evaluation is necessarily difficult and partial. Even amongst experts, there are some disagreements on the most appropriate evaluation methods to use, suitable sample sizes, survey tools, and tests of statistical significance. There are two main criteria that need to be applied when judging the evaluations summarised in this report:

- the reliability of the data for reporting purposes
- the usefulness of the findings to guide future programs.

While the small pilots cannot reliably meet the first criteria because of their small sample sizes, *all* of the evaluations described here have provided valuable data for the second.

General findings

Households are the most thoroughly explored of TravelSmart projects. Larger household projects routinely show decreases in car use of 4–15%, and rises in use of walking, cycling and public transport. The sample sizes used in the smaller household pilots are too small to draw conclusions from, although two of the three provided showed similar results to the larger interventions. These results are consistent with findings from Europe and North America. There is also a small amount of evidence that changes appear to be sustained for at least five years without maintenance or further intervention.

Workplace results are much more variable, reflecting the diversity of organisations' travel needs, internal cultures, and locations. Projects have been evaluated in a variety of ways, so it is difficult to make direct comparisons between them. However, the data provided to us reports reductions in car use of 0–60%, increases in public transport of up to 50% (usually off low baselines), and modest increases in walking and cycling.

There are few figures for School projects, and no general results can be drawn, apart from the general observation that some reduction in family car travel does seem to occur, and there is strong support for Walking School Buses amongst schools, parents and students.

All the projects reviewed used some variation on community-based marketing principles, rather than mass-media approaches. The evidence from these evaluations support this emphasis. Factors that appear to be decisive in securing travel behaviour changes are:

- *personal engagement* at a one-to-one, household or local workplace level
- *functional* materials—such as public transport tickets, maps, and timetables—that allow people to explore new travel options, plan and make decisions
- *support* of local leaders—councils, senior company management, school boards
- *whole-of-community involvement*—larger interventions appear to have larger results, suggesting that individuals are supporting and reinforcing each others' behaviour
- *removing incentives* for car travel, *penalising* car use, or *rewarding* 'green' alternatives.

The future

Given the findings to date, the number of evaluations undertaken, and their consistency, Australia is now in a position to move beyond *piloting* TravelSmart to engage in *large-scale interventions* in all major metropolitan and large regional centres.

There is little further need to undertake major evaluations of household projects, as the Australian and international data is in broad agreement, and there is little need to demonstrate the effectiveness of methods used. It is however still appropriate to conduct small-scale pilots before initiating major projects, to ensure materials and implementation methods are well adapted to local conditions. The need to gather data

on greenhouse gas emissions could be managed by passive monitoring (such as with GPS and odometer readings) than the more laborious and expensive travel diaries currently being used.

More evidence could usefully be gathered on workplace and school programs —particularly on finding the most effective range of implementation and maintenance methods.

As important is for the States adopt a common framework for gathering, analysing and reporting data. The current fragmentation serves no one. Many of tools and methods required have already been developed by individual States; what is required is *agreement* on which to use—data required, sample sizes, collection tools, tools for analysing data, databases, and so on. Such a framework will require several modules and tools that can be combined to meet the specific needs of projects. We see great goodwill between TDM managers, and believe a common framework could be achieved easily and quickly.

households

Reports provided

WESTERN AUSTRALIA

- South Perth, 2000 *(evaluated by Socialdata)*
- Cambridge, 2002 *(evaluated by Socialdata)*
- Subiaco, 2002 *(evaluated by Socialdata)*
- Marangaroo, 2003 *(evaluated by Socialdata)*
- Melville, 2003 *(evaluated by Socialdata)*
- Fremantle, 2004 *(evaluated by Socialdata)*

VICTORIA

- Alamein Line Public Transport Project, 2003 *(evaluated by Socialdata)*

ACT

- 'Way to Go' pilot—Voluntary Travel Change Behaviour Project: Impact of personalised marketing campaign (2001–2002) *(evaluated by PBA International and Taylor Nelson Sofres)*
- 'Households on the Move' pilot, 2004 *(evaluated by Institute of Transport Studies, University of Sydney)*

SOUTH AUSTRALIA

- TravelSmart SA Travel Behaviour Change Pilot Test—Evaluation (2002) *(evaluated by Booz Allen Hamilton)*

QUEENSLAND

- TravelSmart Suburbs Brisbane Pilot—final report to the Project Manager (2002) *(Queensland Transport, based on evaluation by Socialdata)*
- Redlands, 2004 *(evaluated by Socialdata)*

Summary of achievements

Evaluating changes in household travel behaviour presents several major challenges:

- because personal travel behaviour varies greatly, evaluations require either very large samples or long-period surveys to produce reliable results—which, apart from being complex to organise, are also expensive to run
- it is difficult to get large numbers of householders to fill out travel diaries accurately

Consequently, all household surveys have to be limited in the type of data they collect.

Nine of the twelve household evaluations provided to us were conducted by Socialdata, and focussed on the effects of their Indimark® method in Perth, Melbourne

and Brisbane. Socialdata reported reductions in car driving of 4–14%, and corresponding increases in walking, cycling and use of public transport. This corresponds to a reduction in CO_2 emissions of 0.12–0.39 tonnes per person per year (car drivers only). The Indimark method does not appear to reduce the number of trips or number of activities per trip—only encourage people to change travel mode. The data appears highly reliable: sample sizes used are easily large enough to be reliable and the changes reported are statistically significant.

The remaining three pilot projects in the ACT and South Australia also used some variation on 'individualised marketing'. As pilot projects, all involved small target groups, which meant that, statistically, the samples sizes are too small to detect changes in household travel behaviour—although the results of the two ACT surveys are broadly consistent with the larger interventions in Perth, Brisbane and Melbourne. In brief:

- the Adelaide evaluation found no significant change in car use, a rise in public transport (50–60%) and cycling (26%), and a fall in walking (12%).
- the ACT 'Way to Go' pilot project reported a 7% reduction in private vehicle use, and changes in use of alternative comparable to the Perth results
- the ACT 'Households on the Move' was a small pilot of GPS technology, and reported a 7.5% reduction in car use.

Perth (6 projects, October 2000 to March 2004)

Implemented by: Socialdata
Evaluated by: Socialdata

All the Perth TravelSmart projects were undertaken by Socialdata using their Indimark® (individualised marketing) method. They were evaluated between October 2000 and March 2004. The results in each site have been broadly consistent: a reduction in car use by 4–15%, and a rise in walking, cycling and public transport. Changes in travel behaviour in first three sites were evaluated with surveys mailed to randomly-selected households; the other three were evaluated with randomly selected panels. In the South Perth report, Socialdata says results are statistically significant at the 99% confidence interval.

	SOUTH PERTH (2000) N= 1,454			SUBIACO (2002) (N= 490 HOUSEHOLDS)			CAMBRIDGE (2002) N= 1,030		
	before	*after*	*change*	*before*	*after*	*change*	*before*	*after*	*change*
by car (drive)	60%	51%	**-14%**	56%	49%	**-12%**	52%	47%	**-12%**
by car (passenger)	20%	21%	9%	17%	19%	12%	23%	23%	1%
motorcycle	0%	0%	-20%	0%	0%	-20%	0%	0%	0%
walking	12%	16%	25%	19%	21%	11%	13%	16%	25%
cycling	2%	3%	61%	3%	4%	25%	3%	4%	38%
bus	6%	7%	17%	5%	7%	39%	9%	10%	13%

	MARANGAROO (2003) N = 580			MELVILLE (2003) N = 1,300			FREMANTLE (2004) N = 1,301		
	before	*after*	*change*	*before*	*after*	*change*	*before*	*after*	*change*
by car (drive)	60%	58%	**-4%**	66%	56%	**-12%**	60%	57%	**-7%**
by car (passenger)	31%	29%	-7%	20%	22%	7%	25%	24%	-7%
motorcycle	0%	0%	0	0%	0%	25%	0%	0%	25%
walking	5%	8%	57%	10%	12%	22%	10%	11%	11%
cycling	1%	1%	140%	1%	2%	57%	2%	4%	67%
bus	3%	4%	22%	3%	4%	20%	3%	4%	13%

The main achievement of these projects—and the goal Socialdata set out to achieve —was to shift people from car travel to green travel modes. The figures show no change in distances people travel, activities per trip, numbers of trips, or reasons for travel. Apart from a shift in mode, the main changes noted were a small decrease in car travel time and a small increase in overall travel time.

	SOUTH PERTH			SUBIACO			CAMBRIDGE		
	before	*after*	*change*	*before*	*after*	*change*	*before*	*after*	*change*
trip distance (km)	27	26		26	24		25	24	
activities per trip	2.0	2.0		2.0	2.0		2.2	2.1	
number of trips per day	3.4	3.4		3.5	3.5		3.5	3.5	
work/education	35%	35%		27%	28%		17%	17%	
discretionary	21%	31%		38%	37%		37%	34%	
leisure	34%	34%		35%	35%		39%	41%	
trip time (av mins)	58	58	0	62	56	–8	55	56	+1
car trips time (av mins)	43	41	–2	45	38	–7	43	39	–4

	MARANGAROO			MELVILLE			FREMANTLE		
	before	*after*	*change*	*before*	*after*	*change*	*before*	*after*	*change*
trip distance (km)	30	30		30	30		30	30	
activities per trip	1.9	1.9		1.9	1.9		1.9	1.9	
number of trips per day	3.2	3.2		3.2	3.2		3.2	3.2	
work/education	21%	21%		21%	21%		21%	21%	
discretionary	36%	36%		36%	36%		36%	36%	
leisure	34%	34%		34%	34%		34%	34%	
trip time (av mins)	58	60	+2	58	60	+2	58	60	+2
car trips time (av mins)	48	45	–3	48	45	–3	48	45	–3

Melbourne (Alemein line, 2003)

Implemented by: Socialdata
Evaluated by: Socialdata

The Melbourne project was conducted by Socialdata between May and October 2003 and used the same Indimark® method they had employed in the Perth projects. This intervention focussed on communities within 400 metres of Alamein railway line in the City of Boroondara, Melbourne—an area which covers the suburbs of Canterbury, Camberwell, Ashburton and Glen Iris. The area included 5,000–7,500 households. The project was evaluated with a before survey in May 2003 and an after survey in 2003.

The results are consistent with the changes achieved in Perth: a reduction of car use by 10 per cent and an increase in other travel modes.

	before	*after*	*change*
	(n=1,126)	*(n=943)*	
by car (drive)	52%	48%	**-10%**
by car (passenger)	26%	25%	-6%
motorcycle	0.5%	0.5%	0%
walking	12%	14%	17%
cycling	1%	1%	18%
bus and train	9%	10%	12%

As in the Perth projects, the results from Socialdata show little change in overall travel distances, numbers of activities, numbers of trips or reason for travelling.

	before	*after*	*change*
	(n=1,126)	*(n=943)*	
trip distance (km)	25	22	
activities per trip	2.0	1.9	
number of trips per day	3.4	3.3	
work/education	31%	30%	
discretionary	37%	39%	
leisure	32%	31%	
trip time (avg, mins)	67	66	–1
car trips time (avg, mins)	47	43	–4

Brisbane (May–November 2001)

Implemented by: Socialdata
Evaluated by: Socialdata

The Brisbane pilot was run by Socialdata using their Indimark® methods. The intervention ran from May to November 2001, and involved 429 Brisbane households. At the time this report was being written, the final evaluation had not been released

(although we expect that it will follow the format summarised in the Perth and Melbourne sections above). Only the managers' report was available, which reported the following results:

	change
by car (drive)	-10%
by car (passenger)	-5%
walking	+16%
cycling	+6%
public transport	+33%
total VKT	–10%

The Manager's report says that 96% of households initially approached expressed interest in participating—the highest reported for any of Socialdata's projects.

Brisbane, Redlands (2005)

Like the earlier Brisbane pilot, the Redlands project was run by Socialdata using their IndiMark® method. It engaged 5,279 households. The project was evaluated using a combination of seven-day questionnaire and telephone surveying. The results achieved are comparable with the highest rates of change achieved in Perth and better than either their Melbourne or Adelaide projects. The before survey was conducted in June 2004 and the after survey in October–November 2004.

	before *(n=2,357)*	*after* *(n=2,831)*	*change*
by car (drive)	61%	56%	**-11%**
by car (passenger)	28%	28%	+2%
motorcycle	0%	0%	+25%
walking	6%	9%	+55%
cycling	1%	2%	+29%
bus and train	4%	5%	+27%

Like other Socialdata projects, the evaluation found no substantial changes in trips, distances, activities or reasons for travel, although the reduction of time spent in car travel was the largest reported by Socialdata.

	before *(n=1,464)*	*after* *(n=1,795)*	*change*
trip distance (km)	32	32	
activities per trip	1.7	1.7	
number of trips per day	3.0	3.0	
work/education	32	32	
discretionary	40	38	
leisure	28	30	
trip time (avg, mins)	61	60	-1
car trips time (avg, mins)	51	44	-7

Adelaide (October 2002)

Implemented by: Steer Davis Gleave
Evaluated by: Booz Allen Hamilton and Market Equity

The South Australian TravelSmart pilot took place in two Adelaide Suburbs (Kingswood and Hawthorn) in late 2002 and involved 353 households (about 625 people). The before–and–after evaluation compared changes in these areas against two control suburbs (not named in the evaluation report). The before evaluation took place in October 2002 and the after survey in April 2003. Participants completed a three-day travel diary and a seven-day odometer survey.

The main findings reported by Booz Allen Hamilton were:

- no significant changes in the overall number of trips, travel time or VKT
- a decrease in the amount of walking by 12%
- an increase of 50–60% in the use of buses and trains
- a 25% increase in the number of cycling trips, but no extra time cycling
- no significant differences in car use, either as a driver or passenger

The following table summarises the changes in travel patterns in the two pilot areas (relative to the control suburbs) after the TravelSmart pilot.

	NUMBER OF TRIPS		TRAVEL TIME		VKT	
	%	*trips*	*%*	*mins*	*%*	*kms*
car driver	+2%	+0.3	-2%	5	+2%[c] +1%[d]	5[c] 4[d]
car passenger	-0.6%	-0.4	-3%	-3		
walk	-12%[a]	-0.6	0%	0		
cycle	+26%[b]	+0.1	-1%	0		
bus	+48%[a]	+0.3	+63%[a]	+10		
train	+84%[b]	+0.1	+59%	+2		
total	**-1%**	**-0.2**	**+1%**	**+5**		

[a] *significantly different at 95% confidence interval*
[b] *significant at the 90% confidence interval*
[c] *VKT increase for all trips made by car*
[d] *VKT increases for trips made by car, excluding unusual events.*

In its report, the Booz Allen Hamilton said it felt that the travel patterns were probably influenced by:

- weather and changes in daylight hours—which made walking and cycling less attractive options in the after period
- reduced petrol prices (down from 90.1¢ to 84.4¢)—which made cars more attractive in the after period.

The evaluators from Booz Allen Hamilton also noted that the evaluation used a relatively small sample: 154 people that participated in the program. They were compared with

242 people in the program area, and a control group in comparable suburbs of 248 people. While the changes in the number of trips by alternative modes are all significant at this population size, a much larger sample of 400–500 would be required to detect a 5% change in the number of car trips.

Canberra, 'Way to Go' pilot (September–November 2001)

Implemented by: PBA International
Evaluated by: Taylor Nelson Sofres (TNS)

The 'Way to Go' program trialled 'personalised marketing' to households in three Canberra suburbs (Curtin, Hughes and Chifley) in October 2002. Changes in travel behaviour were tracked with three surveys conducted with 2-day travel diaries: one immediately before the intervention, one in November a month after, and one five months after in March 2002. Changes were checked against a control group recruited at the same time. The table below shows trips and distances for the two-day periods.

	CONTROL GROUP (n=99)			MARKETING GROUP (n=57)		
	Oct 2001	*Nov 2001*	*March 2002*	*Oct 2001*	*Nov 2001*	*March 2002*
	HOUSEHOLD VKT (%)					
private vehicle	**80**	**84**	**81**	**81**	**83**	**75**
total alternative	**15**	**12**	**14**	**17**	**14**	**17**
walk	2	3	2	2	1	2
bus	7	5	8	7	7	9
cycle	2	2	2	3	1	3
share	3	2	3	4	5	4
	CHANGES IN VKT FROM INITIAL (KM)					
private vehicle	**–**	**+4.15**	**+1.32**	**–**	**+1.96**	**-5.80**
total alternative	**–**	**-2.14**	**-0.18**	**–**	**-2.25**	**+0.52**
walk	–	+0.62	+0.05	–	-0.88	-0.24
bus	–	-1.71	+0.53	–	-0.02	+1.27
cycle	–	-0.19	-0.37	–	-1.63	+0.11
share	–	-0.85	-0.39	–	+0.27	-0.62
total change in VKT	**–**	**+2.01**	**+1.13**	**–**	**-0.30**	**-5.28**
	TRIPS PER HOUSEHOLD					
single person trips	8.7	8.8	9.1	10.2	9.3	8.8
multiple person trips	4.0	4.4	3.8	4.0	4.6	4.1
	TRAVEL MODE (%)					
private vehicle	84	87	85	83	85	82
walk	2	3	2	2	1	2
bus	8	6	8	8	8	9
cycle	2	2	2	3	1	3
walk	4	2	3	4	5	4

The figures are generally consistent with other findings around Australia—such as the drop in private vehicle VKT—but they have to be treated with caution, as there are several problems with the evaluation.

First, only a small number of people received the program materials and participated in the evaluation. This is appropriate for a pilot, to test operational issues and the usefulness of the marketing materials. But the sample size (57 in the 'marketing' group, 99 in the control) is too small to detect the quantified changes in travel behaviour with any reasonable confidence. The report does not explain why the changes in behaviour are significant—either statistically or in real-world terms.

Second is the timing of the evaluation. The initial evaluation took place 4 days after the introduction of daylight saving in 2001, and the final evaluation took place 4 days before the end of daylight saving. Consequently, the first results would have reflected people's winter travel habits (when car travel is higher), and the later results reflect people's summer travel patterns (when car use is lower): the figures are not readily comparable.

Third, as the TNS evaluators noted, a significantly higher proportion of the intervention group was already using alternative travel modes: 65% of the marketing group compared with 44% of the control group. This means that the marketing group was firmly predisposed to change—an issue that does not appear to have been factored into the results reported. (It also means that the reductions in VKT and CO_2 extrapolated by TNS for the entire ACT are probably significantly over-estimated, as is the cost benefit.)

As in the Adelaide pilot, another factor affecting the Canberra results was the weather. From March 2002, Canberra had a period of warm weather, with temperatures 2–4°C above average. This would have made walking, cycling and public transport more attractive, and so lifted the figures on long-term change.

The value of this evaluation is not really in the changes in travel behaviour reported, but in the detailed analysis of the intervention and marketing materials. These are described below on pages 20–21.

Canberra, 'Households on the Move' pilot (2004)

Implemented by: Steer Davis Gleave
Evaluated by: Institute of Transport Studies (ITS), University of Sydney

'On the Move' was a pilot program targeted at people that were on the point of moving to a new home in Canberra or had just moved. (In practice, the project team found only the latter were practical to reach.) The program compared an intervention group of 102 people against a control group of 87 people. The before survey was conducted in February–May 2004, and the after survey in July–October 2004.

This evaluation differs from all of the others provided to us, because it used both GPS technology and travel diaries. GPS technology has been used for some time in Europe

and North America, but this is the first Australian project we are aware of evaluated using it. The GPS data includes a combination of car–based and portable GPS trackers. This project is as much an evaluation of the potential of GPS technology as a report on travel behaviours. One very useful finding is that GPS evaluation recorded 5 trips per day, whereas the diaries ranged from 3.7 to 4.5—a discrepancy that has also been noticed in overseas evaluations.

Results from GPS tracking

The GPS survey was initially intended as a week-long survey—which would have allowed the ITS evaluation team to use a fairly small sample size with high accuracy. However, some participants did not use the GPS every day of the week (chiefly because the GPS units used at the time were bulky to carry). Consequently, the evaluators analysed results in terms of single days. The following are GPS results per vehicle, not per household.

	TARGET			CONTROL		
	before	*after*	*change*	*before*	*after*	*change*
	(n=141)	*(n=174)*		*(n=106)*	*(n=107)*	
VKT/day (km)	36.8	35.4	-1.4	36.0	37.6	+1.6
time per trip (mins)	10.3	11.9	+1.6	8.1	12.9	+3.8
trips per day	5.0	4.7	-0.3	4.7	4.4	-0.3
vehicle occupancy	1.63	1.96	+0.33	1.34	1.52	+0.18

As the ITS evaluation team notes, the sample sizes were too small to establish if there was a statistically significantly difference between the GPS target and control groups. The only statistically significant changes reported in the before and after survey were:

- target group: car driver trips fell by 13.6%, and walking rose by 4.2%
- control group: car driver trips fell by 6.1%, and walking rose by 7.5%.

Results from travel diaries

The evaluation team had difficulty getting people to fill out travel diaries—only 16 were returned for the before survey and 11 for the after. With such a small data pool, they reported that there was little information that could be used, and none of the changes is statistically significant—and some of the figures are too small to be reliable.

	TARGET			CONTROL		
	before	*after*	*change*	*before*	*after*	*change*
	(n=10)	*(n=6)*		*(n=6)*	*(n=5)*	
total VKT/day (km)	16.7	18.5	11%	21.0	45.5	+117%
time per trip	–	–	+68%	–	–	+15%
change in trips/day	–	–	-20%	–	–	+12.5%
bus VKT	3.4	5.1	+50%	7.3	5.7	-22%
bicycle KT	0.0	0.0	0%	2.5	0.0	-100%
walking KT	0.8	0.5	-38%	0.8	0.6	-25%

Sustaining voluntary changes in household travel behaviour

Apart from the ACT 'Way to Go' pilot, all of the evaluations discussed so far are one–off before–and–after surveys. Only Perth has data on the sustainability of changes in household travel. Two types of data were provided to us:

- changes in travel behaviour South Perth over 4 years.
- changes in Cambridge bus patronage.

On-going South Perth monitoring

Evaluated by: Socialdata

The South Perth project was undertaken by Socialdata in 2000. Each year after the intervention, the WA Department of Transport commissioned Socialdata to survey travel behaviours in South Perth. The Department reports "little loss of impact after two and a half years even though no reinforcement of the behaviour change was undertaken."
The main findings were:

- decrease in car driving as mode share, in number of trips per year (75–102 trips), and average distance travelled by car (average 3–4 km per trip)
- increase in travel as a car passenger as a percentage of mode share
- sustained increase of walking as percentage of mode share and the number of trips (28–50 trips per year)
- increase in cycling
- decrease in overall average trip distance of 1–4 km, mostly by reducing travel as a car driver.

There was little change reported in the amount of time spent travelling, the number of activities people carried on each trip, or the overall number of trips taken.

PERCENTAGE MODE SHARE

	before	*after*			
	2000	*Oct 2000*	*Nov 2001*	*Nov 2002*	*Nov 2004*
car driver	60	52	52	54	54
car passenger	20	22	21	22	21
walking	12	16	16	15	16
bicycle	2	3	4	3	3
motorbike	0	0	0	0	0
public transport	6	7	7	6	6

TRIPS PER PERSON PER YEAR

	before	*after*			
	2000	*Oct 2000*	*Nov 2001*	*Nov 2002*	*Nov 2004*
car driver	696	599	594	606	621
car passenger	232	253	249	241	247
walking	139	188	189	167	179
bicycle	23	37	42	31	32
motorbike	5	4	4	4	4
public transport	70	82	76	63	70

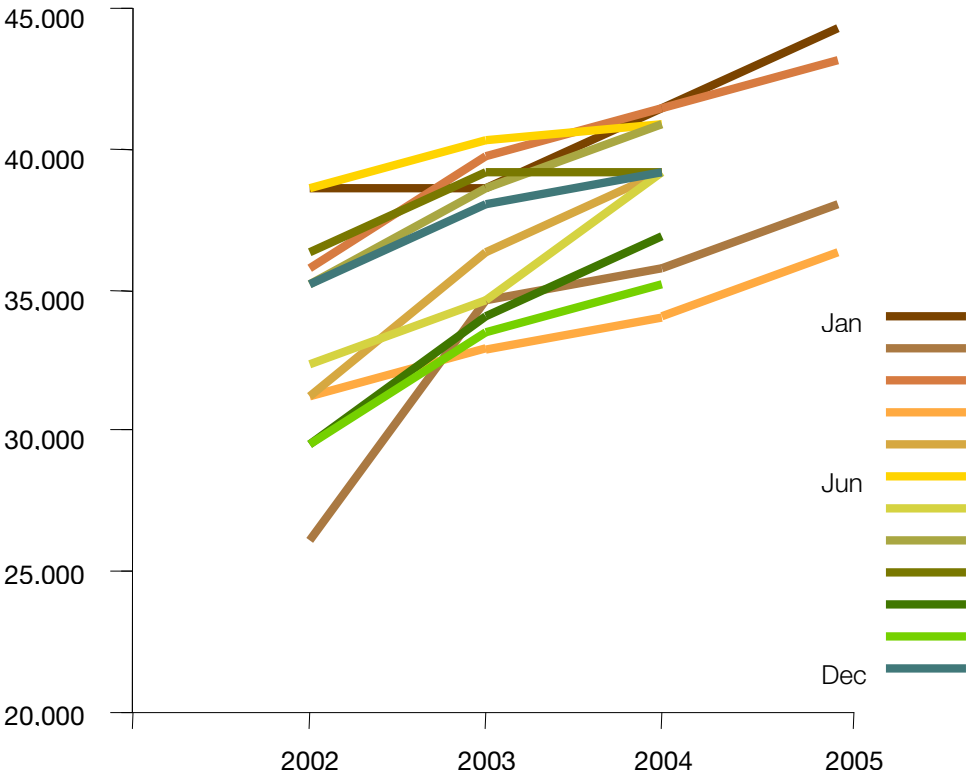
CAR USAGE

	before	*after*			
	2000	*Oct 2000*	*Nov 2001*	*Nov 2002*	*Nov 2004*
usage	79	73	73	75	75
trips	3.3	2.9	2.9	2.8	2.8
duration (mins)	45	38	38	39	39
distance (kms)	25	22	22	22	21
occupancy	1.3	1.4	1.4	1.4	1.4

Cambridge bus patronage

In the first twelve months after the Cambridge project (2002), patronage of local buses increased by an average 16%. In the 28 months after the project—with no further intervention—patronage increased by a net 25%. Data in the graph below shows patronage in each month for 2002, 2003, 2004 and the first four months of 2005. Virtually every period shows an increase in year-on-year bus patronage.

month-on-month increases in bus patronage: Cambridge WA, 2002–2005



Reductions in VKT and CO_2 emissions

Only the ACT and SA projects calculated reductions in VKT, and only the ACT 'Way to Go' calculated reductions in co_2 emissions. We have calculated these figures for each project, basing the calculation on reductions in car driving (and ignoring figures for

travelling as a passenger). The figures given are reductions per person per annum. CO_2 emissions are calculated using the following formula:

GHG emission (tonnes CO_2-e) = Q X EF

Q = quantity of fuel used = distance travelled x fuel consumption
(assumed at 0.113 L/km for petrol cars)

FC = full fuel coefficient (2.5 tonnes CO_2/kL petrol: point source emission)

PROJECT	*VKT per household per day (pre-change)*	*change in VKT (%)*	*VKT saved per annum*	*petrol saved (kL)*	*CO_2-e per annum per hhold (t)*
South Perth, WA	27	-14%	1380	0.16	0.39
Subiaco, WA	26	-12%	1139	0.13	0.32
Cambridge, WA	25	-12%	1095	0.12	0.31
Marangaroo	30	-4%	438	0.05	0.12
Melville, WA	27	-12%	1183	0.13	0.33
Fremantle, WA	25	-7%	639	0.07	0.18
Alemein, Victoria	24	-10%	876	0.10	0.25
Brisbane pilot	—	-10%	—	—	—
Redland, QLD	32	-11%	1285	0.15	0.36
Adelaide pilot	42	+1%*	-153	-0.02	-0.04
ACT 'Way to Go' pilot	40	-7%*	1022	0.12	0.29
ACT 'On the Move' pilot	37	-4%*	540	0.06	0.15

** sample size too small to be statistically significant.*

Other benefits

Other benefits which reduced household car use might produce include:

- reductions in travel time
- decongestion
- reductions in induced traffic
- savings in vehicle operating costs
- increased safety and personal security
- increased health and fitness
- better environmental outcomes (air pollution, noise pollution, water pollution, greenhouse gas emissions, waste)
- improved parking
- reduced load on road systems
- increased fare payments for public transport.

None of these were assessed in the evaluations provided.

Methods used in household projects

All of the projects evaluated used variations on community-based 'individualised marketing' to encourage behaviour change. However, different organisations appear to mean different things by this term. They varied in the extent that they personalised their information or engaged potential participants.

All of the evaluations focussed on changes in travel behaviour, not on the effectiveness of the implementation method. The reports provided to us only describe the methods used:

- the Perth, Brisbane and Melbourne reports by Socialdata describes the Indimark® method in some detail, although they do not include any examples of the materials provided to households
- the SA TravelSmart pilot was evaluated independently of the group that developed and implement the program, and the evaluation report by Booz Allen Hamilton includes no details of the project intervention
- the evaluation of the ACT 'Households on the Move' pilot by Steer Davis Gleave gives a detailed picture of their method
- the evaluation of the ACT 'Way to Go' pilot describes only the brand development and pack contents, but little on how the materials were used, or on other organisational aspects of the project.

Socialdata (Perth, Brisbane, Melbourne)

All of the nine projects conducted by Socialdata have followed the essentially the one method—which Socialdata has also used across Europe and North America.

1. A target area is selected.

2a. Letters from local Mayors and Transport Ministers are distributed to all households in the area introducing the project.

2b. Notices about the project are placed in shopping centres, local media, community noticeboards and at bus stops.

3. Potential participants are contacted by telephone, and screened for interest and relevance, then sorted into three groups:
   - those interested and likely to change (I)
   - regular users of alternative transport (R)—they are given further information on other alternatives (if they want it), along with a small reward to encourage them
   - those not interested in participating (N).

4. Those interested are sent a list of all information available about travel options, from which they may select what is interesting to them (so they do not receive a flood of unnecessary material).

5. Information packs are collated by Socialdata, then distributed in person by bicycle. Where participants are at home at delivery time, project staff can discuss the contents and answer questions.

6. Selected participants also receive further services—such as a visit from a bus driver or cycle expert.

Socialdata reports the following percentages of people in I, R and N groups for the nine projects:

project	*target population*	*interested*	*regular*	*not interested*
South Perth, WA	35,000	46%	17%	37%
Subiaco, WA	15,000	35%	28%	37%
Cambridge, WA	24,000	38%	22%	40%
Marangaroo, WA	11,000	49%	17%	34%
Melville, WA	19,000	49%	17%	34%
Fremantle, WA	24,000	48%	25%	27%
Alemein, Victoria	[6,500 h/holds]	37%	26%	37%
Redlands, Qld	10,000	44%	17%	39%

The materials in Packs are adapted to each location. They may include:

- a brochure on TravelSmart
- information on how to save money by using alternative travel modes
- cycling pamphlets and maps
- personalised public transport timetables
- public transport timetables, maps, fare guides and bus stop timetables
- free public transport tickets
- gifts—such as a backpack, a tote bag, a cycle computer, or a TravelSmart hat.

This combination of materials has not been specifically evaluated in Australia and none of the eight Socialdata reports provided examples of these materials. But the reports present anecdotes suggesting that individual bus-stop timetables, personalised timetables, fare information, and brochures on ways to save money were well received.

Socialdata also provided data on the scale of work required to achieve its results:

project	*households participating*	*telephone calls*	*packs delivered*	*items of information*
South Perth, WA	7,795	29,000	6,000	42,000
Subiaco, WA	3,807	14,000	3,000	39,000
Cambridge, WA	4,120	20,000	3,300	44,000
Marangaroo, WA	1,452	9,000	1,500	19,000
Melville, WA	3,940	12,000	3,100	57,000
Fremantle, WA	4,901	14,000	3,800	65,000
Alemein, Victoria	—	—	2,900	36,000
Redlands, Qld	5,425	—	5,000	50.000

PBA International's 'Personalised Marketing' (ACT 'Way to Go' pilot)

The PBA report does not provide a detailed description of the engagement process used in ACT 'Way to Go' pilot.

It appeared to consist of three steps:

1. 150 households were selected at random in three Canberra suburbs, and recruited by computer-assisted telephone interview. (A control group for the pre-intervention evaluation was recruited at the same time.)

2. Each home was visited by marketing staff, who presented the marketing materials and asked each household to fill out a travel diary (as part of the evaluation).

3. Marketing packs were then sent to the 99 homes which returned their travel diaries (33% attrition). The packs appear to have been standardised, and only the bus timetables appear to have been personalised.

4. One month after the materials were distributed, participants were asked to fill out a second travel diary. 70 diaries were returned (53% attrition; control 40%).

5. In the final evaluation, five months after the intervention, participants were asked to fill out a third diary. 57 were returned (62% attrition, compared with 48% attrition in the control group).

The final evaluation included a survey of attitudes to travel. Only two questions showed any sizeable change in the marketing group after receiving the project:

- "I would like to use public transport on a regular basis"—agreement rose from 26% of participants to 44% of participants
- "I can make a contribution to a better environment by sometimes using public transport rather than driving my car"—up from 63% to 75%.

The evaluation does not provide corresponding data for the control group, so it is not clear how significant any changes are. Nor is it clear that what the significance of any attitudinal change is: at best they appear to have *followed* changes in travel behaviour—they do not seem to be a predictor of change.

The final survey—five months after the intervention—also included questions about the use of the pack items. 88% of respondents said they had used some of the pack items and still had some. Participants were also asked to rank the usefulness of each item:

	very useful	*fairly useful*	*not useful*	*n/a*
complimentary bus pass	64%	13%	19%	4%
'Way to go' cap	57%	26%	13%	4%
water bottles	47%	38%	11%	4%
red drawstring bag	40%	34%	23%	4%
Canberra cycleways map	32%	36%	28%	4%
explanatory brochure	25%	55%	9%	11%
fridge magnets	17%	38%	30%	15%
Woolworths Homeshop voucher	13%	8%	60%	19%
Canberra Cycles discount voucher	9%	23%	51%	17%

Worth noting is that the commercial gifts were rated the least useful.

Steer Davis Gleave's voluntary behaviour change (ACT 'Households on the Move' pilot)

The ACT 'Household on the Move' project focussed specifically on people that were about to move or had just moved to a new home in the ACT, as it has long been recognised that such people are particularly open to adopting new travel modes. The SDG method also focussed on the frustrations people experienced with car travel to motivate them to change their behaviour. This makes the project quite different from the other household projects evaluated.

Locating potential participants

The SDG team located participants by:

- door-knocking in recently settled areas
- using real-estate websites listing recently sold or rented properties
- real estate agencies
- Defence Department Housing and university accommodation agencies
- through recent electricity connections
- Visitor's Centre and Migration centre.

The SDG team found that the first two methods produced 90% of participants:

- 58% of people contacted door-to-door fitted the profile of new movers, and 74% of these were interested in participating. Recruiting took approximately one hour.
- 64% of those contacted from the real estate website fitted the profile, and 47% were interested in participating—but this was far more resource intensive than door-knocking, because it involved driving to each location up to 6 times: recruiting a household could take up to 3 hours.

Overall, 59% of people contacted were interested in participating.

The SDG team also suggested that recruiting through university and Defence housing agencies would be effective in January, when most people move. Although real estate agents had initially been interested in the project, in practice they had not referred people to the program. Privacy concerns made contacting people through electricity utilities difficult.

The team found it was only practical to locate people shortly after they had moved: only 2 of the 102 participants committed to participating before they moved house.

Engaging participants in 'Households on the Move'

Once households had been identified as potential participants, they were engaged in the following way:

1. A letter was sent to them, introducing the project
2. Potential participants were engaged in conversations (mostly face-to-face but sometimes by telephone). The goal of these conversations was to:
   - get people to think about how they travelled around Canberra
   - find out what frustrated them about current travel
   - find ways to resolve issues (supported by a tool-kit of resources)
   - secure their commitment to try travelling in the ways identified.

3. Those interested in participating were mailed a selection of relevant tools, including:
    - journey plans
    - advice on ways to travel that would save money, save time, be more healthy or less-stressed, help the environment, become more independent (separate brochures for each)
    - ideas tool—a record of what ideas the participant had had in the engagement conversation
    - children's activity pages
    - kilometre monitor
    - local activities guide.
4. The SDG team followed up with phone calls to reinforce messages.

The team did not formally assess the effectiveness of the conversations or information materials, but they did note that the tools were well received, particularly the local activities guide. They also suggest future projects could include information on working from home and a 'memory jogger' to get people to look at their travel behaviour after moving. Since the number of involved in this pilot was small, it is not possible to assess whether the method used was any more effective than the community-wide approaches used in the other household projects.

What appears to engage households in TravelSmart

There appears to be a correlation between changes in travel behaviour and:

- personal engagement
- individualising materials to people's particular circumstances
- scale of the intervention—securing community support, as well as individual participation
- public visibility of the project (this is less important than the other points)

The exception appears to be the ACT 'Households on the Move' pilot, which differs from the other approaches in several ways. First, it targets people that have just moved rather then everyone in an area. Consequently, it is more focussed on individual households, with no flow-on effect on community behaviour. Also, it focuses mainly on the frustrations of travel, whereas the other projects support a wider range of reasons that people might wish to change. Because only a relatively small number of people were involved in this pilot, and none of the changes were statistically significant, it is not possible to know whether these differences in approach are significant.

All of the evaluations stress the importance of personal engagement—face to face, not over the telephone. In its reports, Socialdata stresses that it avoids using people trained in telephone marketing techniques. This finding is consistent with behaviour change in other areas, such as public health and community building. Personal engagement serves several crucial purposes:

- it gets participants engaged *as people*, so helping secure their commitment
- it focuses people's attention and interest

- it allows the program and issues to be adapted to a participant's individual circumstances, in a way that no written information or telephone protocol can do
- it gives participants an opportunity to ask questions and raise issues
- it helps build participants' confidence in their ability to change and adopt new behaviours.

The ACT 'Way to Go' project was the only one to formally evaluate the pack contents, and the results are correspondingly valuable. However its results, and the anecdotal comments from the Socialdata and 'Households on the Move' reports, are broadly consistent with the findings of the Workplace projects. This suggests the following about materials provided in packs:

- functional information—that helps people plan, make decisions and act—appears to be better received and more influential than non-functional gifts or exhortations
- the most influential gifts are those that allow participants to explore alternative travel modes without cost to themselves—bus and train tickets
- non-functional gifts—such as hats and waterbottles—may generate short-term interest in receiving a pack and exploring the contents, but they have little long-term value in travel change
- the most valuable information in the longer-term are timetables
- personalising information to a person's interests:
  - in the type of travel alternatives they feel are relevant to them
  - in the personalisation of timetables
  - in the provision of individual bus-stop or train-station timetables

There does not appear to be any natural limit to the number of people that can be engaged by 'community-based' methods at any one time. The main limitation is organisational: the number of staff available to call households, collate and deliver materials, and engage people individually.

The available evidence does not indicate whether interventions are best done within a short space of time—so all households in an area are engaged within a period of, say, a fortnight—or whether engagement can be done continuously. We suspect the former: a public profile should be established—through letters and notices and local media—then followed fairly promptly be telephone calls and home visits, to maintain momentum and get all people within a community changing at once.

workplaces

Reports provided

QUEENSLAND

- GHD staff travel survey results *(evaluated by Marketing and Public Education Unit, Queensland Transport)*
- Townsville City Council Final Report *(evaluated by Community Partnerships and Development Unit, Passenger Transport Division, Queensland Transport)*
- Stanwell Corporation Final Report *(evaluated by Community Partnerships and Development Unit, Passenger Transport Division, Queensland Transport)*
- QUT Kelvin grove Staff and Student Final Report 2004 *(evaluated by Community Partnerships and Development Unit, Passenger Transport Division, Queensland Transport)*

ACT

- 'Way to Go', workplaces pilot *(evaluated by Booz Allen Hamilton)*

WESTERN AUSTRALIA

- Schlumberger Evaluation Survey Report (July 2004) *(evaluator unstated)*
- Technip Evaluation Survey Report (November 2004) *(evaluator unstated)*
- WA Department of Agriculture Evaluation Summary report (November 2004) *(evaluator unstated)*
- WA Department of Industry and Resources Evaluation Survey Report (May 2005) *(evaluator unstated)*

We were also provided with one PhD and one Master's thesis, examining the effectiveness of workplace programs, as well as two summary documents:

- TravelSmart Workplace Program
- The effectiveness of Green Transport Plans in Perth (2004)

VICTORIA

- Victorian TravelSmart Workplace Extension Program—Stage 3 (2003) for Monash University and The Alfred Hospital *(evaluated by PBA International and Taylor Nelson Sofres)*
- Monash University (2004) *(evaluated by Institute of Transport Studies, Monash University)*
- Alfred Hospital staff travel survey 2005 *(evaluator unstated)*

Summary of achievements

The organisations evaluated here are more diverse than the households covered in the previous section, and the results reflect this diversity.

- Between 2001 and 2003, car trips in a Brisbane CBD engineering firm fell from 34% to 16%, and public transport use increase from 57 to 74% of all trips
- The four Western Australian employers all recorded declines of 6–15 percentage points in car trips for commuting, and some rises in walking, cycling and other green travel alternatives
- After the 2003 project at Monash University, 69% of students reported travelling less by car, and 33% reported using public transport more
- A before-and-after survey (2003–2004) of first year students participating in the Monash University program recorded a drop in driving from 40% to 31%, an increase in car passengers from under 8% to nearly 12% of all trips, and an increase in travel by bus from under 20% to over 25%.
- In 2003, 19% of staff from The Alfred Hospital in Melbourne said they used the car less after the project, and 25% said they used public transport more.

None of the evaluations involved travel diaries or odometer readings. Only two of the Western Australian workplaces calculated trip distances or provided estimates of VKT and CO_2 emissions.

Some of the evaluations included descriptions of methods and materials. Main findings were:

- support of senior management is essential
- incentives to car travel—such as allocated parking—need to be removed
- direct engagement of participants produces the largest changes in travel
- the most valuable materials are 'enablers' that allow people to try out alternative ways of travelling at no cost to themselves, and information (such as maps and timetables) that helps people plan and make decisions. Gifts also help attract interest in the short term
- there appears to be no clear correlation between attitudes and behaviour—at best, attitude changes behaviour change
- prior knowledge or use of public transport is the strongest predictor of uptake.

Changes in work travel behaviour

Queensland (2001–2003)

Implemented by: unstated
Evaluated by: Marketing and Public Education Unit, Queensland Transport

The one Queensland evaluation provided covers the Brisbane office of the large engineering firm, GHD. A benchmarking survey was conducted in 2001, and a follow-up survey in 2003. 137 surveys were returned in 2001; 198 in 2003. Surveys included a snapshot of employees' travel behaviours on a single day. Key results were:

- trips to and from work using public transport increased from 57% to 74%
- travel to work by car (as a driver or passenger) fell from 35% to 16% of trips
- 6% of employees cycled to work.

Figures from the 2003 survey show that staff were slightly more likely to use a car to travel work than on the way home (when they are more likely to take public transport or walk). About two-thirds of staff walked to and from bus and train stops.

These large changes are encouraging, but the sample size for a one-day travel diary is too small to be more than indicative. Several factors may be influencing these fairly large changes.

1. completion of the survey was self-selected, so people who participated may have had more reason to complete the survey than those who were not involved
2. GHD moved its offices to a GHD location in 2002, making car-parking more expensive and driving to work less attractive when the second survey was run
3. GHD greatly expanded its Brisbane workforce in 2002, so the before and after figures do not represent comparable populations
4. the company undertakes a large number of environmental and transport projects. It would be reasonable to assume that an internal TravelSmart project might attract more professional interest than in many other types of companies
5. GHD has a strong emphasis on corporate social responsibility, which may have spurred some staff to adopt low-emission travel options, as well have secured senior management support.

Three Queensland workplaces and destinations

Implemented by: unstated
Evaluated by: unstated

In Queensland, TravelSmart projects have been implemented and evaluated in three major workplaces:

- Townsville City Council (2003–04)
- Stanwell Corporation, Brisbane (2004)
- QUT Kelvin Grove Campus (2004).

A report of TravelSmart at Townsville's James Cook University was also provided, but it covered only the implementation process without any travel figures.

A problem with all three reports is that they provide few absolute figures (whether numbers of participants or VKT or proportions of mode share), only changes in travel behaviour expressed as percentage differences. The Townsville City Council report in particular provides only three absolute figures: VKT in the before and after surveys, and the total VKT saved over a year. It has not beenpossible to recalculate the figures.

The strength of these projects is not in the detail of their results, but in the methods they used.

	QUT	STANWELL	TOWNSVILLE
before survey	3 Oct 2003 *n = 1,468*	16 Nov 2003 *n = 49*	July–Aug 2003 *n = 70*
after survey	7 Oct 2004 *n = 876*	6 Sept 2004 *n = 51*	Dec 2004 *[n unknown]*
VKT before	17.5	35.7	9.43
VKT after	12.9	28.4	5.77
change in VKT	-4.6	-7.3	-3.66
no. households	11,486	93	310
reduction CO_2 per year (tonnes)	5,747.4	73.85	n/a

The Townsville City Council report does not calculate a reduction in CO_2 emissions, and does not report the number of people involved, but it does claim a reduction of 322,000 vehicle kilometres travelled—which would equate to 102.72 tonnes less CO_2 per year.

The 'after' surveys asked participants whether TravelSmart had influenced their travel behaviour on weekends: 14% of QUT respondents indicated it had; 20% of Stanwell respondents and 69% of Townsville City Council staff.

Each report summarises changes in travel mode. The QUT and Townsville figures are calculated from the number of trips taken; the Stanwell figures by the distance travelled by each mode. The QUT and Townsville reports do not, unfortunately, provide the actual number of trips taken—only percentages and percentage changes.

	QUT	STANWELL	TOWNSVILLE
car as driver	-33%	-9%	-7%
car as passenger	+66%	-8%	+45%
motorcycle	+200%	-100%	+3%
walk	+680%	0%	+216%
cycle	+150%	-25%	+202%
car pool	—	—	+231%
train	+180%	-24%	—
bus	+69%	+27%	+115%
ferry	+500%	+200.0%	—

An anomaly of the Townsville data is that it reports a reduction in VKT of 39% (down from 9.43 km to 5.77 km) but a fall in the number of trips as a car-driver of only 7% (while travel as a passenger and in the car pool both rose). This implies that each member of staff must be travelling, on average, at least 50km on each trip (rather than the 9.43 km reported in the 'before' survey). Unfortunately, the Townsville report does not provide the data necessary to check these figures.

Three points need to be made about the very substantial changes reported at the QUT Kelvin Grove campus. First, the 'after' survey was conducted (unavoidably) in the

student holidays, and the response rate was less than half the 'before' survey. Since students made up 90 per cent of the target population, the large increases reported may simply be an artefact of the survey. (Unfortunately, data was not collected on the proportion of staff and student responses.) Second, as the evaluation report notes, the increase of 680% in the amount of walking may reflect, in part, a change in the survey tool. In particular, the before survey asked only the main travel mode on a trip; the after survey allowed several modes to be reported (so travelling by bus would also include walking to and from bus stops—hence the 'after' survey would include this travel). Third, this project included the provision of major new infrastructure—two new bus routes, a major new bus terminal and free shuttle buses—all of which probably contributed to the increase in bus use.

Another factor that had a positive effect on the Stanwell and QUT projects was the introduction of TransLink on 1 July 2004 in Brisbane—three months ahead of the 'after' surveys. It brought all Brisbane transport under a single authority, allowing single-ticket travel across Brisbane. The introduction of TransLink also led to reductions in bus fares and most ferry trips. Bus fares in particular dropped by up to 60%. Train fares increased by about the same amount. Victorian TravelSmart reports stressed the role of cost and complexity in commuters' travel plans, so the Translink changes doubtless contributed to the TravelSmart outcomes.

In the Townsville City Council project, a factor that may have led to the reduction in car use was the loss of inner city car-parking during the project. These closures prompted the Council to offer free convenient parking to staff that chose to carpool. It also signposted spaces allocated to carpooling (which in turn generated interest from people interested in carpooling). Another factor that encouraged walking and cycling was the provision of end-of-trip facilities at the Council offices.

The substantial increases in use of all forms of sustainable transport options in Townsville and QUT illustrates the power of combining TravelSmart behaviour change methods with infrastructure development—such as the provision of new bus routes, removal of car-parking, and provision of end-of-trip facilities.

Western Australia—four workplaces

Since 2001, the Department of Environment has worked with fifteen employers to develop Green Transport Plans (GTP). These cover 24 Perth workplaces, that together have over 10,000 employees. Most workplaces have reported reductions in car use. The following section summarises results from four organisational surveys. All appear to have been conducted using variations on the WA Department of Environment's survey, which covers travel mode, trip distances over a week, reason for mode choice, consideration of trip switching, and most recent travel modes. Most were implemented online, but one involved an intercept survey. All responses were self-selected, so it is not clear how representative the results are—especially where the return rate was low.

Schlumberger Oilfields and WesternGeco (2004)

Implemented by: Schlumberger

Evaluated by: unstated

Schlumberger began implementing a Green Travel Plan in September 2002. A baseline intercept survey was conducted in October 2001, and two on-line post-implementation surveys in March 2003 and May 2004. The following tables give percentage of weekly mode share for commuting and business trips.

	October 2001 *n = 121* *(67% staff)*	*March 2003* *n = 77* *(53% staff)*	*May 2004* *n = 59* *(32% staff)*	*Change 2001–2004*
		COMMUTING		
car driver (incl. company car)	42%	30%	27%	-15
car pool	13%	16%	13%	—
park'n'ride	2%	4%	3%	+1%
public transport	35%	28%	44%	+9
walking	6%	2%	1%	-5
cycling	1%	9%	7%	+6
work from home	0%	1%	0%	—
		BUSINESS TRIPS		
car driver	30%	23%	17%	-13
car pool	2%	8%	4%	+4
taxi	0%	18%	13%	+13
public transport	52%	27%	21%	-31
walking	16%	13%	32%	+16
motorbike	0%	8%	—	—
other	—	—	13%	—

The 2001 and 2003 online surveys collected data on commuting distances. The company found that, between 2001 and 2003, weekly travel distances by car decreased from 5,138km to 2,979km. Thempany calculated the following reductions in emissions (assuming VKT for 50 weeks per year and a 1.6L petrol car engine).

pollutant	*emission rate per VKT* *g/km*	*annual emission car driver trips 2001* *kg*	*annual emission car driver trips 2003* *kg*	*annual emission car driver trips 2004* *kg*	*change 2001–2004* *kg*
CO_2	200	51,380	29,800	19,000	**-32,380**
hydrocarbons	1.3	333.9	193.6	123.5	**-210.4**
NO_x	1.9	488.1	283	180	**-308**
CO	15.0	3,853.5	2,234.5	1425	**-2,428**
PM10 (particles)	0.5 x 0.74	95	50.4	35.7	**-60**

Technip (2004)

Implemented by: Technip

Evaluated by: unstated

Technip developed a Green transport Plan in 2003–2004. As part of the process, it conducted a baseline survey in November 2003 and a post implementation survey (using the same online questionnaire) in November 2004. Main achievements were:

- reduction of 15 percentage points of car travel mode share (from 37% to 22%)
- increase of green travel modes increased 20 percentage points.

The following table summarises changes in commuting travel over a one-week period before and after the Green Travel Plan was implemented.

	November 2003 *n = 56* *(33% staff)*	*November 2004* *n = 51* *(25% staff)*	*Change 2003–2004*
car driver (incl. company car)	37%	22%	**-15**
car pool	9%	15%	**+6**
park'n'ride	6%	9%	**+3**
public transport	23%	29%	**+6**
walking	7%	6%	**-1**
cycling	8%	13%	**+5**
did not work	2%	2%	**0**

Both surveys also collected data on commuting distances. It found the average commuting distance for the 65 employees that completed the first survey was 3,098 km per week; for the 51 employees that completed the second survey, the distance had fallen to 1,228 km a week. Assuming that all Technip staff achieved this change (a generous assumption, given that 46% of staff said they were not contemplating change in 2003), the company reduced VKT of 49%.

Assuming a reduction of 46% across the organisation, the following reductions in emissions were achieved.

pollutant	*emission rate per VKT* *g/km*	*annual emission car driver trips 2003* *kg*	*annual emission car driver trips 2004* *kg*	*change 2001–2004* *kg*
CO_2	200	95,335	48,156	**-47,177**
hydrocarbons	1.3	619	313	**-306**
NO_x	1.9	905	457	**-448**
CO	15.0	7,150	3,611	**-3,539**
PM10 (particles)	0.5 x 0.74	176	89	**-87**

A useful piece of data collected by the surveys concerns the travel alternatives that staff were considering. Most striking—despite the strong reduction in actual car travel—is

the substantial increase in staff not considering changing their travel mode (from 46% to 66%). The only mode to increase its share as a considered alternative was cycling (up from 15% to 20%) . There is essentially no correlation between the changes people said they were considering in the 2003 survey and the actual changes reported by the 2004 survey. This confirms a finding in several other TravelSmart surveys that what people say they are considering bears little relationship to how they actually behave.

	considered November 2003	*actual change 2003–2004*	*considered November 2004*
no change	46%	—	66%
drive car on my own	4%	-15	2%
car pool	—	+6	—
park'n'ride	6%	+3	2%
public transport	18%	+6	6%
walking	4%	-1	2%
cycling	15%	+5	20%
other	9%	—	2%

Western Australian Department of Agriculture (2004)

Implemented by: Department
Evaluated by: unstated

The Department of Agriculture developed a Green Travel Plan to reduce car trips to its Perth four offices. A baseline survey of staff was completed in November 2003, and an identical post-implementation survey in November 2004. Main achievements across the Department were:

- reduction of 6 percentage points of car travel mode share (from 73% to 67%)
- increase of green travel modes increased 2 percentage points.

	November 2003 *n = 200 (28% staff)*	*November 2004* *n = 148 (24% staff)*	*Change 2004–2005*
car driver (incl. company car)	73%	67%	**-6**
car pool	11%	9%	**-2**
public transport	3%	3%	**0**
walking	2%	4%	**+2**
cycling	7%	8%	**+1**
did not work	4%	6%	**+2**

Western Australian Department of Industry and Resources (2005)

Implemented by: Department

Evaluated by: unstated

DOIR developed a Green Travel Plan to reduce car trips to its Perth four offices. A baseline survey of staff was completed in February 2004 using the DOE'S online survey, and an identical post-implementation survey in May 2005. The results varied considerably across its four sites. Main achievements across all four offices were:

- reduction of 8 percentage points of car travel mode share (from 33% to 25%)
- increase of green travel modes increased by 4 percentage points.

The following table summarises changes in commuting travel over a one-week period before and after the Green Travel Plan was implemented.

	February 2004 *n = 383* *(46% staff)*	*May 2005* *n = 295* *(~35% staff)*	*Change 2004–2005*
car driver (incl. company car)	33%	25%	**-8**
car pool	13%	14%	**+1**
park'n'ride	5%	7%	**+1**
public transport	36%	39%	**+1**
walking	2%	2%	**0**
cycling	6%	7%	**+1**
did not work	5%	4%	**-1**

Western Australia—Effectiveness of Green Transport Plans (2004)

This evaluation was a Master's Degree project, conducted by David Wake, using data from 15 Perth organisations that had established Green Transport Plans (GTPs).

The 15 workplaces were located in either the Perth CBD or inner Perth suburbs. Together they employed about 4,500 staff.

As part of their GTP development, each conducted a survey of their staff travel patterns. Most asked staff about their travel in the preceding week.

		CAR MODE SHARE		
workplace	*staff*	*before*	*after*	*reduction*
1	250	34	27	21%
2	80	81	67	17%
3	90	57	86	-51%
4	452	24	19	21%
5	177	9	9	0%
6	600	49	50	-2%
7	132	56	48	14%
8	247	11	9	18%
9	293	24	19	21%
10	185	54	52	4%
11	400	80	83	-4%
12	180	42	28	33%
13	768	64	54	16%
14	90	63	54	14%
15	600	26	14	46%

The data was generated by individual companies in a variety of ways—some responses were self-selected; others were intercept surveys. The period between before and after varied from 5 to 41 months. Consequently, the results are not directly comparable and calculating statistical significance is not straightforward. However, the results above indicate the wide variety of changes following implementation.

ACT: Travel behaviour change pilot (2002)

Implemented by: PBA International

Evaluated by: Taylor Nelson Sofres (TNS)

This pilot was conducted as part of the ACT 'Way to Go' pilot (discussed above on pages 12–14) 55 employees from IP Australia (formerly the Patents Office) were recruited. 27 were allocated to a 'marketing' group, 28 to a control group. Changes in travel behaviour were tracked with three surveys conducted with 2-day travel diaries: one immediately before the intervention, one in October a month after, and one five months after in March 2002. The final sample analysed was 37 people over a period of two days.

	CONTROL GROUP (N=15)			MARKETING GROUP (N=22)		
	Oct 2001	*Nov 2001*	*March 2002*	*Oct 2001*	*Nov 2001*	*March 2002*
	VKT PER EMPLOYEE (KM)					
private vehicle	**44**	**53**	**47**	**47**	**46**	**40**
total alternative	**8**	**8**	**5**	**5**	**11**	**9**
walk	1	1	1	1	1	1
bus	5	3	0	1	3	3
cycle	1	3	3	1	1	1
share	0	1	0	2	5	4
	CHANGES IN VKT PER EMPLOYEE (KM)					
private vehicle	**–**	**9.14**	**3.00**	**–**	**-1.10**	**-7.30**
total alternative	**–**	**0.81**	**-2.97**	**–**	**5.67**	**3.62**
walk	–	0.05	-0.18	–	0.11	0.19
bus	–	-1.61	-4.78	–	2.33	1.80
cycle	–	1.66	1.66	–	-0.19	-0.04
share	–	0.70	0.33	–	3.42	1.68
total change in VKT	**–**	**9.95**	**0.03**	**–**	**4.6**	**-3.6**

Because the sample size is very small for this pilot, and the report does not state the total number of employees of IP Australia, it is unclear how representative or reliable these figures are. All that can realistically be said about the results above is that:

- both the marketing and control groups increased their private car travel in the month after the marketing campaign
- both groups dropped their private car use
- both groups also dropped their use of alternative travel options between the second and third surveys.

Because the workplace results are analysed in terms of individual travel, it is not possible to compare them directly with the household results recorded at the same time for the ACT.

Victoria—Monash University (2003)

Implemented by: PBA International
Evaluated by: Taylor Nelson Sofres

Background the Monash University project

Monash University's Clayton campus has approximately 20,000 students and 4,000 staff. The project targeted first year students.

A pilot was run in August–December 2002. It found that about 60% of students drove to the University; less than 20% took public transport, and slightly over 10% walked or

cycled. The pilot study also identified several disincentives to students using of alternatives to private car travel:

- the cost of a student concession card ($79.20) was more expensive than a full-year campus parking voucher ($77)
- nearby train stations were beyond easy walking distance
- although many students live nearby, they found walking and cycling difficult.

Implementation

The main intervention in 2003. It had five strategies to encourage use of alternative travel:

- for students that could use public transport:
  - a free concession card, a free one-month Metcard, and information on the public transport system (Pack 1)
  - a free one-month Metcard, and information on the public transport system (Pack 2)
  - information on the public transport system (Pack 3)
- for students that could walk or cycle—a cycle map, a T-shirt and a waterbottle (pack 4)
- students for whom driving was the only option—5 two-hour Metcards and car-pooling information (Pack 5).

Students were recruited during the academic enrolment process. Following screening, they were allocated to one of the five groups above and asked to collect a Pack (3–14 March 2003).

Evaluation the effects of the project

Four weeks after the packs were distributed, the project was evaluated using a 10-minute CATI survey (7–23 May 2003). 456 students completed the questionnaire. The survey covered:

- use and usefulness of items in each pack
- attitudes to changing travel behaviour
- use of concession cards (where relevant)
- actual changes in behaviour.

The evaluation by PBAI and TNS found that 80% of students had considered using public transport. This was highest amongst those who received a concession card or Metcard (Packs 1 and 2), and lowest amongst those that received only information on public transport (Pack 3). Even those targeted for walking, cycling or car-pooling—Pack 4 and 5—had shown greater interest in using public transport than those that had received just information.

TNS also reported that:

- 69% of students said they had used public transport more after receiving a pack, and
- 33% said they had used the car less.

Participants were asked to rate how much they had increased or decreased their use of travel modes on the following four-point scale: 25%, 50%, 75%, 100%. Overall, participants said they had used:

- cars 25% less, and
- public transport 50% more.

People receiving a Metcard or concession card recorded dropping their car use by 50%. Generally, Packs 1 and 2 had the greatest impact on reported travel behaviour change.

These reports in behaviour change are significantly higher than the household evaluations—where people used travel diaries to record their travel rather than trying to recall their travel behaviour unassisted. Self-reported behaviour, especially when it relies purely on individuals' memory, can be highly inaccurate. Even on a general scale like the one used in this project, people may be fifty per cent out in their estimations. The consequence is that, the best way of interpreting these estimated reductions is to say that the process can increase public transport and decrease car use slightly.

Monash University (2004)

Implemented by: unstated

Evaluated by: Institute of Transport Studies (ITS), Monash University

In 2004, Monash University conducted another evaluation of its Clayton Campus TravelSmart project. It ran a before-and-after survey of all first year students (comparing May 2004 with October 2003). It also conducted a second survey of attitudes to travel among all students who enrolled in TravelSmart in 2004.

The TravelSmart intervention in 2004 was a simplification of that used in 2003. 2,126 first year students were recruited during their university enrolment process. They were screened by TravelSmart staff at the time of enrolment to ascertain their travel options, and were then given an appropriate Information Pack.

The Pack contained a mix of generic and tailored items. Generic items were:

- cover letter
- local area map showing bus, walking and cycling routes
- Melbourne Public Transport map
- cardholder
- concession card application form
- car pool postcard.

While the TravelSmart staff engaged students in conversation to find out their travel options, they added items that students expressed interest in, including:

- appropriate bus and train timetables
- a daily public transport ticket
- information such as cycling materials.

Reported changes in travel behaviour

A month after the intervention, students were surveyed using an on-line survey. In 2003, 15% of students responded; in 2004 the figure rose to 21%. The changes in mode share reported were:

	2003	*2004*	*change*
drive to campus	40%	31%	**-9.2%[a]**
passenger in car	7.7%	11.9%	**+2.8%[a]**
walk	15%*	14%*	**-2.3%**
bicycle	1%*	1%*	**+0.3%**
motorcycle	0%*	0%*	**-0.2%**
bus	19.5%	25.4%	**+5.9%[a]**
carpool	3%*	5%*	**+1.4%**
train	14%*	15%*	**+0.06%**
tram	0.5%*	0.5%*	**+0.4%**
taxi	0%*	0%*	**+0.1%**

** estimated from graph—may not be accurate*

[a] = statistically significant at 95% confidence level

Statistically significant changes were:

- drop in driving to campus of 9.2% (12.5% amongst domestic students)
- increase in car passenger drop offs by 2.8% (3.1% for domestic students)
- increase in bus use by 5.9% (15.5% amongst international students)
- increase in train use amongst domestic students of 3.8%—but a fall of 8.6% amongst international students.

Attitudes to changing travel behaviours

An online survey was also sent to all first year students that enrolled in TravelSmart in 2004. The goal of this survey was to gather demographic data and information on their travel behaviour, including:

- current travel patterns
- travel patterns they anticipated at the time they enrolled
- impact of TravelSmart
- which parts of TravelSmart they valued most
- attitudes to travel
- primary motivators for their current travel behaviour
- barriers that discourage use of alternative ways of travelling to campus.

573 students responded: 22% of those enrolled in TravelSmart.

The majority of students (57.9%) said they either always or regularly used environmentally-friendly transport modes. There was also a smaller pool thinking about great travel modes but had not yet tried them.

The survey also found that, at the time students enrolled in TravelSmart, 20 per cent expected to be travelling by non-environmentally-friendly modes but, at the time of the

survey, 33 per cent were using these modes. As in other workplace surveys, this suggests that people routinely over-estimate changes they will make.

Thirty per cent of respondents said the TravelSmart program had influenced their thinking, or in trying or using environmentally-friendly travel modes. The most valued items provided in the Information Packs were functional public transport information followed by free public transport tickets. Students living near the campus also said they valued information on walking and cycling. Students living further away valued information on car-pooling. About 5 per cent of students said that the value for them was in the publicity about alternatives to car travel and making them feel part of a program that promoted alternatives.

Amongst 11 attitudinal questions, students said that the major reasons they were using or considering alternatives to car travel were 'cost' and 'being environmentally friendly'.

Finally, the survey asked about barriers that still remained to modes of environmentally friendly travel. The main results were:

- for walking—distance, too many hills, walking at night, and commitments before or after university
- for cycling—distance, not owning a bicycle, lack of confidence riding in traffic, weather, need to carry books
- for public transport—takes too long, limited services available, lack of direct services, and commitments before or after university
- for car-pooling—not having anyone to carpool with, not wanting to be tied to a fixed schedule, lack of flexibility, not thinking the savings would be worthwhile, not wanting to travel with strangers, and commitments before or after university.

Notable for its absence in all of these is 'lack of information'—TravelSmart appears to have provided the information that students needed.

The evaluation did not include questions about how far students travelled (beyond whether they lived nearby or not), so it is not possible to calculate either VKT or reductions in CO_2 emissions.

Victoria—The Alfred Hospital (2003)

Implemented by: PBA International
Evaluated by: Taylor Nelson Sofres

Background to The Alfred Hospital project

The Alfred hospital has approximately 5,000 staff on site (one-fifth of which are employed by organisations other than the hospital). Over 60% drove to work, 17% used public transport, and 13% walked or cycled. At the time of the project, there were 1,400 car spaces on site, with priority allocation going to medical and nursing staff.

Pilot

A small pilot was run in August–December 2002, and the main intervention from February 2003. These were run in parallel with the Monash University project and drew insights from it.

Main implementation

The target of the project were permanently employed hospital staff that regularly drove to work. Staff were recruited on site in February 2003, and profiled using a CATI survey. 1,118 staff were recruited and invited to collect an Information Pack.

Four packs were used:

- for people that could use public transport—a monthly Metcard and information on public transport (Pack 1)
- for people that could walk or cycle—a T-shirt and waterbottle and, for cyclists, a discount at a cycle shop (Pack 2)
- people for whom driving was the only travel option:
  - a two-hour Metcard and information on public transport (Pack 3)
  - information on car-pooling and public transport (Pack 4)

Packs were collected in early April 2003.

Post-implementation evaluation (2003)

The project was first evaluated in May 2003 by PBAI and TNS, using a ten-minute CATI survey. 481 staff completed the survey. The survey covered:

- attitudes and perceptions of the packs and the TravelSmart process
- attitudes on social behaviour change
- changes in travel behaviour.

The evaluation found that, overall, 46% of participants had considered using public transport, although figures varied considerably with the materials they were given:

- Pack 1 (public transport) 57%
- Pack 2 (walk/cycle) 47%
- Pack 3 (drive—with Metcard and information) 45%
- Pack 4 (drive, information only) 35%.

Pack 2 also showed an increased consideration of walking and cycling.

Overall, 41% said they considered using the car less, with the highest response amongst those receiving Pack 2 (walking/cycling)—47%.

Actual changes in travel were close to the options that people considered. Overall, 25% of people had used public transport more:

- Pack 1 (public transport) 52%
- Pack 2 (walk/cycle) (unstated)
- Pack 3 (drive—with Metcard and information) 45%
- Pack 4 (drive, information only) 35%.

Overall, 19% said they had used the car less. The greatest impact was for Pack 1 (45% of people used the car less), and least impact for Packs 3 and 4. Amongst people receiving Pack 2 (walking and cycling), 20% reported cycling more, and 21% reported walking more. People receiving Pack 1 reported they had walked more.

Participants were asked to rate how much they had increased or decreased their use of travel modes on the following scale: 25%, 50%, 75%, 100%. Overall, participants reported they had used:

- cars 25% less, and
- public transport 25% more.

The evaluation found that age and length of employment had little impact on changes in travel behaviour. However, prior knowledge of public transport did predispose people to increase their use of public transport. Those that regularly used public transport before the program showed the greatest increase in their use of public transport. Only 30% of people that had never used public transport before the project used it during the month after the packs were distributed. Walking followed a similar pattern.

People who had allocated car spaces showed less change in car use or alternative travel modes. People with allocated car parks were about as likely to share trips as people without.

Staff travel survey 2004 and 2005

Staff at The Alfred were surveyed in January 2004 and March 2005. The main results were:

- percentage of staff driving to work continued to decline
- cycling increased—which may reflect a strong effort by Bicycle Victoria
- train, tram and bus use increased.

	January 2004 (n= 647)	*March 2005 (n unknown)*	*change 2004–2005*
car driver	57.7%	54.4%	**-3.3**
car passenger	5.7%	3.3%	**-2.4**
motorbike	1.2%	0.8%	**-0.4**
walk	9.8%	8.0%	**-1.8**
cycle	6.2%	7.2%	**+1.0**
tram	6.6%	8.2%	**+1.6**
staff bus	—	0.3%	**—**
bus	1.2%	1.6%	**+0.4**
train	7.1%	9.2%	**+2.1**
work from home	0.2%	0.3%	**+0.1**
on leave	—	6.1%	**—**
other	—	0.7%	**—**

We were provided only with a summary of results for these two surveys. The summary did not describe the survey methods, how staff were sampled, or how the figures were generated. The sample size of the 2005 survey was not included. Also, it is unclear

whether the survey was conducted for a whole week, or a shorter period within the survey week. Consequently, we cannot say how reflective these results are of the entire 5,000 staff at the Alfred hospital.

Methods in workplace projects

All of the projects evaluated in this section used a variation on the following pattern to develop and implement workplace travel plans:

- secure support of management and the organisation
- identify opportunities for, and barriers to changing travel behaviour (usually involves surveying existing travel behaviours)
- develop a travel plan—including travel options, changes to organisational policy and infrastructure
- seek approval from management
- develop supporting materials and train recruiters
- engage participants—either in person or by telephone
- screen them and, if information is being personalised to participants, provide appropriate advice and supporting information.

In the large, more complex organisations—such as The Alfred Hospital and Monash University—implementing the later stages usually involved detailed planning, training, and organisation to provide appropriate information to large numbers of people.

Organisational and management support

While most of the workplaces evaluated relied on the initiative of enthusiastic employees to get underway, long-term sustainability appears to require the support of management. In particular:

- permitting staff to spend time developing and implementing travel plans
- providing funds to support activities, produce materials, and install facilities
- making facilities available—such as bicycle storage, change rooms, subsidised travel, and shuttle buses
- encouraging staff to be involved
- setting an example
- overcoming organisational barriers and removing disincentives.

That said, the review of 15 Perth workplaces found that management support did not translate into behaviour change—although staff coordinators felt it was crucial to getting time and resources needed to act.

Wider workplace support is also important to getting TravelSmart plans adopted. Participants need to feel ownership of their organisation's travel plans and value what they get from it—both in the short-term gains from information packs, and longer-term changes to their own lives and the organisation.

Selecting workplaces where alternatives are achievable

The evaluations suggest several types of organisations where TravelSmart may not be practical or have only limited impact. Three reasons are particularly important:

- where participants do not work 'regular' office hours, and so a car provides an easier mode of transport than public transport, cycling or walking
- workplaces are some distance from major transport centres—such as CBDS or major suburban centres
- the nature of the organisation makes cars are essential—for example, to conduct site visits.

Infrastructure

The review of 15 Perth workplace found that some of the largest reductions in car use occurred where workplaces removed parking privileges, or paid incentives for staff to surrender parking places. The 2003 Monash University pilot found that a major disincentive to using public transport was that the concession card (which entitled students to 50% discount on fares) was more expensive than a full-year parking voucher.

More generally, TravelSmart projects appear to be more successful when they remove incentives for car travel, such as:

- allocating car parking or providing free car parking
- providing company cars as part of salary packages.

The converse also appears to be true: TravelSmart is most attractive when workplaces provide incentives for people to use alternatives to cars, such as:

- concession cards and free tickets
- improvements to travel alternatives and facilities
- free car parking for car-poolers.

Personal engagement

Several of the evaluations report on the importance of recruiting people *personally* —rather than by intranet, mailouts, or displays. This is consistent with the importance placed on home visits in Household TravelSmart projects.

One of the Western Australian surveys compared three ways of engaging, and found that the greater the personal engagement, the greater the change in travel behaviours. Reasons this appears to be important include:

- engaging potential participants *as people* in conversation
- putting changes to travel behaviour into the context of people's lives
- explaining and interpreting supporting materials
- answering questions and addressing issues
- encouraging people that they can make changes.

This not a universal rule however—for example, some of the 15 workplaces reviewed in WA had only modest engagement with staff. Their success may have been due to other factors.

Packs

Packs with individualised information and incentives were distributed to participants of the largest workplace projects—The Alfred Hospital, and Monash University—as did the ACT 'Way to Go' pilot. The WA, Alfred Hospital and 2003 Monash projects concluded that three types of packs are sufficient:

- for people that could use public transport
- for people that could walk or cycle
- for people for whom driving is the only option.

The 2004 Monash evaluation used a single generic pack, but as project staff screened participants in conversation, they added materials on public transport relevant to participants—bus, train and cycling materials. The WA reviews of workplaces do not record in detail what information was provided to staff or how it was provided.

The ACT, WA and Victorian evaluations all reviewed the use and usefulness of each element of their packs. They all tend to divide the contents into:

- 'information'—maps, timetables, personalised letters, exhortations
- 'incentives' or 'gifts' (which have some value)—concession cards, public transport tickets, waterbottles, T-shirts, discounts at cycle shops or for grocery delivery.

The results of the surveys suggest a better distinction:

- information that helps people plan and make travel decisions—such as maps and timetables
- 'enablers' that allow people to try out new alternatives at no or little cost to themselves—such as tickets and concession cards
- 'gifts' which have no direct connection with the travel but which have some value—such as waterbottles and T-shirts
- promotional material, exhortations to change, and general information on the alternative to car travel.

Generally, people rated the first two as the most useful and used of the pack contents. General information that did give specific advice on how to plan or travel rated lowest. Packs with the first two also brought about the greatest use of public transport. The following table shows falls in car mode share, ranked according to these types of Pack contents. (The figures have been estimated from a graph and rounded to the nearest 5%.)

	Monash	*The Alfred*
information only (public transport)	20%	10%
info + waterbottle + T-shirt (walk/cycle)	30%	20%
info+ ticket (drivers and public transport)	30/35%	10/20%
info + concession + ticket (student public transport)	45%	—

Incentives—whether functional like tickets or gifts such as waterbottles —appear helpful in gaining people's interest, and persuading them to collect and investigate information packs. Packs that contain information alone produced smaller changes in behaviour.

Collection of packs

The evaluators of The Alfred and 2003 Monash projects noted a correlation between the perceived value of items in the pack—as we ranked them in the previous section—and the number of people that collected the pack. The following shows the percentage of packs collected:

	Monash	*The Alfred*
information only (public transport)	53%	73%
info + waterbottle + T-shirt (walk/cycle)	49%	73%
info + 5 x two-hour ticket (drivers)	57%	74%
info + one-month ticket (public transport)	87%	80%
info + concession + ticket (student public transport)	89%	—

Relationship between usefulness and behaviour change

The Alfred and 2003 Monash evaluations refer to 'high value' items (tickets, concession cards) and 'low value' items (maps, timetables). The surveys did not explicitly ask people what value they gave to each item—so we presume that it is an interpretation on the part of the evaluators or the price of the items. However, the evaluators do note a correlation between the value of items in the pack, and the use and usefulness people attribute to the pack.

> *Packs 1, 2 and 3 users [at Monash University] were all aimed at public transport and each included the same information, however, Pack 1 included a monthly Metcard and concession card and Pack 2 contained just a concession card, while Pack 3 just contained information.*
>
> *Recipients of packs 1 and 2 rated the information items in their packs consistently higher than the recipients of pack 3. They also considered the information items to be more useful. (p24)*

The evaluators class 'enabling' items (like tickets and timetables) together with 'gifts' (waterbottles, T-shirts). The former tended to encourager longer-term changes in travel behaviour. The latter "can have relatively short term value but act to encourage initial participation and create interest in the program" (p65).

They suggest that it might be appropriate to allow people to select their incentives. We advise against this. What is attractive to people before selecting a pack may not prove to be the most useful to them, and it may not do much to adopt sustainable travel behaviours. We suggest that the priority be given in the following order:

- enablers (tickets and concession cards)
- directional information (maps and timetables)
- gifts (waterbottles, caps)
- general promotional materials.

schools

Reports provided

- WA TravelSmart Schools, 2001–2004 *(evaluator unstated)*
- Victorian TravelSmart Schools, Methodology Report, 2003 *(evaluated by Dynamic Outcomes)*
- SA Walking School Bus Pilot Scheme (Mitcham) 2003 *(evaluated by Walsh & Associates)*
- Queensland, Victoria Point State School School Project (2004) *(evaluator unstated)*
- Queensland, Coolnwynpin State School School Project (2004) *(evaluator unstated)*

We also reviewed the *Victoria's 2001 Walking School Bus Pilot Program* (2003) prepared for the Victorian Health Promotion Foundation by Victoria University's Wellness Promotion Unit. Although its concern is health rather than transport, it does provide important advice on successfully running Walking School Buses. It reports that VicHealth has funded 33 local governments to support Walking School Buses, and 145 Victorian schools were either running or establishing WSBs.

Changes in travel behaviour

Perth

Implemented by: unstated

Evaluated by: unstated

Walking School Buses have been run in Perth since 2001, although the DPI only became involved in 2002. It provided the following summary of involvement in WSBs each year:

	2004	*2003*	*2002*	*2001*
schools	17	13	6	1
students	320	130	80	n/a
volunteers	90	50	22	—
routes	22	14	9	2
no. of trips	7,800	1,648*	n/a	n/a

** Number of trips in 2003 is calculated only for Term 3 + 4.*

Melbourne, TravelSmart Schools

The Victorian Travelsmart School program is targeted at Year 5 and 6 students, and involves 20 hours of classroom programs. Its goals are to help students:

- understand why travel is important and build positive attitudes

- understand the impact of travel on the environment and their health
- learn and adopt strategies to help them travel smarter.

It also involves whole-of-school activities to engage the school community, as well as parents and other family members.

The program was evaluated in 2003 using a one-week survey of household travel, and recordings of odomoter readings over a three week period. 238 students and 206 parents completed the surveys (The sample is large enough to detect small changes in the number of car trips with confidence, but probably not enough to reliably detect changes in public transport trips). The following table shows the number of trips students took:

	week before	*week after*	*% change*
walk	1,408	1,517	7.7%
cycle	844	910	7.8%
public transport	158	409	158.9%
car passenger	2,658	2,315	-12.9%

The large increase in public transport use seems to have come mainly from one school that also ran the public transport safety program, Travel On. The increase in cycling is due largely to one school including a Bike Ed bicycle safety program.

Melbourne (Walking School Buses)

Implemented by: Victorian Department of Health
Evaluated by: unstated

No figures for participation rates or changes in travel behaviour were given.

Adelaide (Mitcham trial, 2003)

A Walking School Bus program was part of the Mitcham trial. Two schools (810 families) were involved in a trial of a Walking School Bus in Mitcham, Adelaide. A survey before the WSB was introduced found.

families walk to school	>25% (>200 families)
families drive to school	<75% (<600 families)
school travel is sole reason for travel	31% (251 trips)
school travel by car involves going out of the way	70% (567 trips)

The program organised 8 routes. Six months after its introduction, 53 families (75 children) were participating.

had walked/cycled to school before WSB	10 (19%)
had been driven to school sometimes before WSB	10 (19%)
had been driven to school regularly before WSB	33 (62%)

Assuming that all the students had been driven to school before the WSB was introduced, then the program increased the number of families walking to school by about 25 per cent, and reduced car trips to school by roughly 5 per cent.

Queensland (Redlands: three schools, 2004)

Implemented by: Community Partnerships and Development Unit, Queensland Transport
Evaluated by: unstated

As part of its Redlands TravelSmart project, the Community Partnerships and Development Unit delivered School programs to the three government schools in the Redlands Shire: Coolnwynpin State School, Victoria Point State School and Redland Bay State School. Evaluations were provided for the first two, although some comparative results for Redland Bay State School were included in the other evaluation reports.

Each school was evaluated with a before-and after survey, measuring VKT and mode share. The after survey was conducted over a two-week period.

		Victoria Point[c]	*Coolnwynpin*[d]	*Redlands Bay*
average VKT[a]	*before*	18.8 km	15.4 km	na
	after	13.4 km	13.7 km	na
change in VKT		-5.5 km	-1.7km	+1.6km
percentage change in VKT		**-29.0%**	**-10.9%**	**+8.1%**
walked or cycled at least one day per week[b]	*before*	21.2%	29.6%	na
	after	54.9%	32.5%	na
bus at least one day per week[b]	*before*	5.5%	1.8%	na
	after	3.5%	2.5%	na

[a] *The reports do not indicate the time period over which trips were calculated.*

[b] *Number of students involved not stated*

[c] *Victoria Point before survey n = 146, after survey n = 85*

[d] *Coolnwynpin before survey n = 220, after survey n = 40*

Benefits of school TravelSmart projects

Perth (Walking School Buses)

The Perth report provides only figures on participation; no further benefits.

Melbourne (TravelSmart Schools)

The Melbourne pilot found flow-on changes in parental behaviour in transporting their children to school.

	before	*after*	*% change*
		MOTHERS	
walking	387	1,013	261.8%
cycling	51	150	194.1%
public transport	87	255	193.1%
car passenger	682	819	20.1%
car driver	2,601	2,223	-14.5%
		FATHERS	
walking	274	653	138.3%
cycling	105	159	51.4%
public transport	98	179	82.7%
car passenger	430	414	-3.7%
car driver	2,144	1,907	-11.1%

Curiously, these figures show an 8.5% per cent increase in the number of fathers, and 17% increase in the number of mothers, involved in taking their children to and from school.

Melbourne (Walking School Buses)

The VicHealth report outlines five type of benefits that participants derived from participating in Walking School Buses:

- helped adult participants meet new people and increased community engagement
- increased community perception that streets were safe
- volunteers enjoyed the training course
- children made new friends and participated more with their school and local community
- the program builts positive partnerships between agencies—traffic engineers, police, VicRoads, schools, and other community agencies.

Although the goal of the project was to increase children's physical activity, the evaluation says "the program has a real impact on the development of new social connections within communities and strengthening existing ones" (p24). In turn, schools with strong networks—particularly active parent participation—had greater success in establishing Walking School Buses.

Adelaide

total VKT saved (53 families)	200km/day
VKT saved where school was the sole purpose of travel	88km/day
reductions in number of cars travelling to school	33–43/day
time saved driving to school	4 hours/weeks

The Walsh & Associates report says "In a school year, the eight currently operating WSBs, if they operated to and from school, morning and afternoon, 5 days a week, could save 35,000 motor vehicle kms on sole purpose school trips" (p7). It also says that, under the same operating conditions, the WSBs "could save parents 1,600 hours currently sitting in their cars going out of their way to school" (p7). It is not clear how either of these figures was calculated.

The after-implementation survey also explored whether parents thought the WSBs had met the WSB's objectives:

to give children more exercise	yes
to be environmentally friendly	yes
to reduce car use to school	yes
to reduce congestion at the school entrance	partially
to improve children's road safety skills	yes
to give parents more exercise	yes

Queensland (Redlands)

The two Redlands reports were the only schools projects to calculate reductions in carbon emissions.

	Victoria Point[c]	*Coolnwynpin*[d]	*Redlands Bay*
average VKT change per person	-5.5 km	-1.7km	+1.6km
percentage change in VKT	-29.0%	-10.9%	+8.1%
number of families in school	650	360	526
annual VKT saved[a]	1,219,075	208,692	-286,986
CO_2 savings (tonnes)	388.88	66.57	-91.55

[a] *annual kilometres saved = average VKT reduction x number of families x 341 (average applied for number of days in a year)*

[b] *CO_2 abatement in tonnes = annual VKT saved x 0.000319*

Other benefits of Walking School Buses

In half of the reports reviewed, environmental concerns are not the main priority. Other priorities are:

- get children being more active
- to relieve congestion at school
- to improve children's road safety skills
- to give parents more exercise.

Processes for getting people involved

The Victorian Walking School Bus project evaluated the process, and the Victorian Travelsmart Schools project includes a detailed description of method. They broadly agree on requirements for successful school programs:

- organisational support—from schools, school councils and local government
- recruiting volunteers
- training—for teachers and volunteers
- classroom programs (Travelsmart Schools only).

Organisational support

To be safe and sustainable, Walking School Buses require the involvement of a number of organisations. The Victorian WSB evaluation by Dynamic Outcomes emphasises the need for:

- commitment from the local government and school council—especially to make resources and staff time available
- a central management/reference group to oversee the WSB, particularly when setting up and establishing new routes
- a designated person at each school to coordinate volunteers and students
- schools need to commit time to organise buses and recruit volunteers
- good links to government groups responsible for roads, safety and the local community—including police, Neighbourhood Watch, State departments responsible for roads, local government traffic engineers, community safety, and local councillors
- community ownership of the buses.

As noted above, schools with strong community networks had greater success establishing and maintaining Walking School Buses.

The Victorian Travelsmart Schools evaluation stresses the need to engage all members of the school community at the outset: school councils, school principals, teaching staff, parents and students. The Schools program includes 'whole-of-school' programs which, it says, are important to engage the school community. It also noted that changes in travel behaviour were greatly increased where the program also coincided with other public transport and cycling programs. Synergy and engaging a whole community appear to be key enablers of change.

The two Queensland schools projects used publications to engage students: short stories and facts, a website, brochures and the local press (via media releases). Schools also displayed five posters on the themes of TravelSmart. The program also held a two-week 'Family Challenge', during which whole families were encouraged to cycle, walk and catch public transport. They were also supplied with TravelSmart literature, and sent Redlands Walking and Cycling options. The intervention ended with a carnival 'Celebration day', attended by local dignitaries, Shire Council, police and National Bus. Following the event, a display was mounted in the school library, to maintain enthusiasm.

Volunteers for Walking School Buses

All of the projects comment that recruiting and retaining volunteers is difficult. The Victorian WSB report also suggested that parents were not necessarily the only or best group from which to recruit volunteers. Other sources included:

- retired people
- elderly people who enjoy walking or need to exercise
- NESB community leaders
- senior students undertaking community subjects
- members of community neighbourhood houses.

The report also suggests that informal recruiting works best, and that parents should be encouraged to approach people they think might be interested in participating.

Volunteers should require police checks and be registered with a volunteers register (most councils maintain these for their local community). Registering with Councils also provides public lability insurance.

Promotion

The Victorian WSB report underlines the need for continual and innovative promotion to:

- encourage parents to involve their children in WSB
- maintain involvement of participating families
- recruit volunteers.

The two Queensland projects used articles in school newsletters, media releases, displays in the school library, publications for students, and posters around the school.

Training

Both Victorian reports emphasise the need for training—for teachers presenting courses, and volunteers supervising WSB.

Coordination and continuity

The Two Queensland reports stress the importance of having a TravelSmart coordinator in the school. In the projects evaluated, one coordinator had been a school principal, the other a vice-principal. Both had heavy workloads, which meant that contact was often difficult. the reports suggested that, in future, a parent or teacher would be better placed to fulfil this role, and would be more able to take a 'hands-on' approach.

Another problem reported by the Queensland reports were discontinuities created by staff changes in the project team at Queensland Transport. this had delayed projects and caused some confusion. Both Schools reports suggested using a 'buddy' system in future projects, where each project is assigned a minimum of one supporting officer to help the officer responsible for delivering the project. The supporting officer would participate in all meetings so that, if the responsible officer leaves the project, there will be another person aware of the project status and needs.

future evaluations and monitoring

Re-examining the reasons for evaluating TravelSmart

Now is an appropriate moment for senior decision-makers to consider the future direction of TravelSmart evaluations.

As this report shows, there has been a great deal of work done around Australia evaluating projects. These results are similar to many other projects conducted in Europe and North America. Further evaluations are no longer required in some areas (especially households), and the resources could usefully be directed into less-well examined areas—such as workplaces and longer-term monitoring.

Any decision to undertake further evaluations needs to be considered against three needs:

- to assess the likely impact of a project—for government sponsors or participating organisations
- to trial project methods and resources before committing to a major investment
- for reporting purposes (such as monitoring Australia's greenhouse gas targets).

The need to assess impact

For households, predicting the effectiveness of a Travelsmart project is now essentially a solved problem. The eleven Australian projects evaluated here join over 50 other formal evaluations conducted internationally and many other informal assessments (See Ker 2003, Maunsell Australia 2004 and UK Department of Transport 2004 for a list of some other evaluations.) While individual outcomes vary with geographic location, what can be said broadly is that community-based household projects will achieve a reduction in car travel of 5–15%, and this change appears to be sustained for several years without further intervention. Methods for achieving these results are now well understood, and further evaluations are unlikely to add much to existing knowledge. We advise the State TDM Managers and senior decision-makers that further large-scale evaluation of household projects is not a good return on the very large investment involved. The one exception would be long-term tracking—such as the WA Department of Planning and Infrastructure has been conducting in South Perth.

For workplaces and schools, there is much less evidence available to demonstrate the effects of TravelSmart programs. Although they are run on broadly similar 'community-based' marketing methods, and evaluations project materials show similar patterns of value, it is difficult to predict in advance the scale of change that might be achieved. The results we have collected in this report range from 0% to 60% reduction in car travel. The location of an organisation, its culture, and its dependence on transport will be the main factors affecting travel behaviours. While firm estimates cannot be made of

the likely impact, what can be said generally is that workplace and school projects will have an impact if:

- they have the support of senior management
- sufficient staff and resources are allocated to support the project
- staff or students are engaged personally
- people are provided with resources practical advice on how to act (such as maps, timetables, tickets and concession cards)
- incentives for car travel removed or penalised, and
- in the case of schools, the local community and councils are actively involved.

The need to trial project methods

As number of the evaluators cited in this report have urged, project materials need to be adapted to local circumstances before substantial resources are committed. Also, the methods for recruiting participants, and the processes for collating, storing and distributing resources, all need to be trialled before full-scale implementation, so potential problems can be identified before they become real problems. It is therefore appropriate to conduct a small pilot or a process walk-through before finalising the main implementation method and resources. Such trials do not need to be large:

- close behavioural observations of a few *dozen* people will be sufficient to check the appropriateness and usefulness of information resources
- a detailed process check can be done with key project staff.

Such methods are entirely standard in Information Design and Project Management. Larger trials will provide project managers with little extra information, but will be substantially more expensive.

Pilots and trials are appropriate only for checking materials, processes and management. It is important to stress that changes in travel behaviour observed in small trials usually cannot be extrapolated to large populations. As we will discuss below, because of the large number of variables affecting people's travel decisions, only monitoring of large or 'saturated' populations can produce reliable results.

Australia is now at a point where it is no longer necessary to prove the effectiveness of TravelSmart methods. Further piloting will not help eliminate the uncertainty in outcomes —that is a inherent of the greatly-varying environments in which the methods have been used, rather than the methods themselves. Decision-makers should be looking instead to implement what has been learnt at a much larger scale—further attempts at refinement will yield little return.

The need to report

The third reason for conducting evaluations of TravelSmart projects need to report on:

- expenditure of resources
- Greenhouse Gas emissions.

The first does not require major evaluation—especially as the cost of some evaluations can exceed the cost of implementing the program. We strongly advise TDM managers

to inform senior management of the potential costs of conducting an evaluation—and unnecessary use of resources—if its primary purpose is to justify expenditure of public resources. Senior decision makers also need to be made aware that the outcomes of TDM projects —particularly household projects—are increasingly well understood and the need to 'prove' the method is diminishing rapidly.

The data required to calculate emission levels is essentially VKT and vehicle type. This data does not need to be collected through one-off *evaluations* as has been done to date, but might be better managed through routine passive *monitoring* or surrogate measures. Because on-going monitoring (for instance, using GPS technology) can be carried out over a longer time, the sample sizes can be reduced without sacrificing statistical rigour. We know that several tools are currently being developed that use surrogate measures—for example, by knowing the postcode where people live, and collecting data on commuting mode use, it is possible to derive a figure for VKT and hence GHG emissions for workplace commuting, and also knowing the error rates involved. While far from perfect, the data for such surrogate measures is easy to collect over period of a week without the expense or burden of a major evaluation. Data collected from the evaluations covered in this report could also be combined to give a reliable portrait of Australian travel patterns, which could then underpin tools used in such surrogate measures.

One thing that is important for the calculation of greenhouse gas emissions is *agreement* amongst the States on a common dataset and units of analysis. Currently, the variety of data and means of collecting it means calculating a national—or even State level—figure for GHG emissions is difficult and open to challenge.

Engaging participation and securing political support

One other reason for evaluating a TravelSmart project—particularly in the formative stages—need to be mentioned. An evaluation is sometimes a useful way of drawing participants attention to their travel behaviours and ways they can change. Such an evaluation can also help secure the support of senior management and community leaders. The function of an evaluation in this case is primarily political and promotional. This influences the type of questions that it is useful to ask. For example, if the purpose of an evaluation during the formulation of a Green Transport Plan is to motivate people, then it is important that it draws attention to changes they can make, not be burdensome, and not gather data which they themselves cannot use or have no commitment to (however useful it might be to TDM managers or for tracking GHG emissions).

Cost

We had hoped to look at the costs of evaluating TravelSmart projects. We had heard from TDM managers that the costs of evaluation could easily exceed the cost of implementation. Unfortunately, many of the projects were unable to provide the cost of evaluation, separate from implementation fees. Many also did not include staff costs,

which form the main cost in any evaluation. A number of the projects that could supply evaluation costs did bear out the comments made by TDM managers—evaluating small pilots in particular is expensive. For some of the larger projects, with established survey methods, evaluation was substantially cheaper.

Because the figures we received were fragmentary and varied greatly, we do not feel it is helpful to provide them here—any conclusions drawn from them would be misleading.

Surveying techniques

The evaluations covered in this report used a number of methods to gather data. It is useful to divide them into four groups:

1. methods that ask participants to record travel details when they travel
   - travel diaries
2. methods where participants gather objective measures
   - odometer readings
   - travel logs (for company cars)
3. methods that rely on people remembering and reporting their travel behaviours
   - face-to-face intercept surveys
   - on-line surveys
   - telephone surveys
4. methods that passively monitor people's travel behaviours
   - GPS monitors
   - public transport tickets used.

All have strengths and weaknesses.

Participants recalling and recording their travel behaviour

All methods that rely on people remembering habitual behaviours or activities they do not pay attention to—such as travel—are notoriously unreliable. People typically under-report. Even with travel diaries covering more than one day, many people will try to remember their travel behaviours rather than recording data as they travel. As the ACT 'Households on the Move' evaluation noted, figures gathered using GPS technology recorded 5 trips per day, whereas travel diaries ranged from 3.7 to 4.5; similar discrepancies have been noted overseas. TDM managers need to be aware that, while CATI and online surveys in particular are useful for screening potential participants, they are not good tools for gathering data on travel behaviour or behaviour change.

Travel diaries also have the disadvantage that they impose a burden on the community —and in the case of household surveys this can be many hundreds of people. The practical upper time period for a travel diary is 2 days, which means that comparatively large sample sizes are required to manage the variability in individual travel behaviours.

There is also the large expense involved in collating the data—regardless of whether the forms are processed manually or read by machine.

Participants recording traces of their travel behaviours

Odometer readings have the virtue that they are hard objective evidence of car distances travelled. They have several limitations:

- they are limited to vehicle travel—and cannot be used to monitor cycling, walking, or use of public transport
- it is often impossible to disaggregate data into individual drivers, and analysis is also complicated where a household has several vehicles, or vehicles are used for both domestic and business travel
- there are difficulties getting people to remember to collect the readings at the right time.

Travel logs are another useful—if limited—source of data for business travel in workplace vehicles, as it is already gathered for insurance and tax purposes. We suggest that the TDM Managers contact the Australian Bureau of Statistics, as their Motor Vehicle Use survey relies on odometer readings and travel logs, and they will already have addressed problems of data quality.

Passive monitoring

Public transport ticketing systems are a useful way of tracking changes in travel behaviour. Although tickets numbers are mostly below actual traveller numbers—because of fare evasion and people not revalidating long-term tickets—ticket numbers are useful for tracking changes in travel use.

In principle, GPS technology presents another relatively easy way to gather detailed data about individual travel across all travel modes. It can also greatly reduce the burden of data collection on participants—all it requires from them is to carry the GPS unit (which are no longer the bulky items of only a few years ago—recent models now fit easily on a glovebox, pocket or handbag). GPS technology also allows surveys to be carried over much longer periods than is practical for travel diaries—which means that samples sizes can be much smaller than necessary for travel diaries. Manufacturers also say that it can be used to track speeds, which makes tracking mode use easier, as well as permitting more accurate calculations of GHG emissions.

GPS technology is evolving rapidly, and it is still not a perfect tool for monitoring travel behaviours. It is not possible to give ownership of the data-gathering and data-processing to individuals, households, workplaces or schools—it has to be done by whatever organisation owns the GPS units. Also, we understand there are still some problems processing data, and discriminating between different travel modes. These problems need to be weighed against the incompleteness and inaccuracies that all paper-based recording systems are prone to. Unfortunately, there does not appear to have been any comparisons between the two for error and attrition rates—so we cannot advise whether GPS provides a significant improvement in data capture or not.

Methods we suggest

On balance, we would suggest that future TDM evaluation avoid methods that place large burdens on survey participants and rely on their memories. Therefore, we suggest that TDM evaluations should prefer:

- paper-based travel diaries for one- or two-day surveys of small-scale pilots
- GPS technology for larger or longer evaluations.

To triangulate data from these methods, it may also be appropriate to ask participants to gather 'hard' data such as odometer readings.

We are aware of the cost of purchasing GPS-based monitoring systems. We are not aware of any cost comparisons of GPS monitoring to traditional paper-based data collection, but we anticipate a GPS system would be substantially cheaper in the medium term. We urge the State TDM managers and DEH to explore forming some type of consortium, to purchase and share equipment and data nationally. Apart from spreading the cost, this would have the advantage for forming the nucleus of a national dataset, and enforce a consistent method for collecting and processing travel data.

Sample sizes, sampling methods, variability and statistical methods

In some of the reports evaluated, there appears to have been misunderstanding of statistical methods used to interpret results, and hence problems in the sample sizes, sampling methods and evaluation periods employed. Undersized or overly-large samples can add great expense to a project, while delivering little value. The following comments are intended for managers unfamiliar with basic statistical concepts, to help them become aware of the issues involved—evaluators themselves ought to be familiar which what follows.

Essentially, all statistical tests for change work by comparing two sets of data—before and after implementation data in the case of TravelSmart evaluations—and judging whether they are similar or different. If they are the different, a change has (probably) occurred; if they cannot be distinguished, then a change has (probably) not occurred. To decide if two sets of data are similar, all tests have to assume that they fall into a distribution of some kind. Different tests assume different type of distributions, or else compare distributions in different ways. Some tests can also estimate the degree of change. Because statistics uses discrete data—not the complete distributions—differences or similarities have to be judged in terms of probability of an overlap.

In principle, this type of test assumes that differences between two data tests can be attributed to a single cause. In the case of travel behaviour, however, there are many factors that might lead to different changes—weather, season, day of the week, changes in the price of petrol, illness, changes of employment, finances available, and so on. Consequently, an evaluation may appear show a change that is, in fact, due to the natural variation in people's travel behaviours. Therefore, any test has to take into

account the natural variability in the sample being evaluated—and this is where some of the smaller evaluations covered in this report have problems.

There are broadly three ways to deal with variability in travel behaviours:

- by using a large sample, within which individual variations averages out
- by using a longer time period, within which day-to-day variations average out
- by including a control group alongside the intervention group.

Using the first two options requires detailed knowledge of the degree of variability in the behaviours being evaluated. Until recently, Australia has lacked the necessary primary data on variability for household projects, and has had to rely on European estimates (see Richardson 2002). There does not appear to be any data available for workplaces or schools—although since household travel will intersect with travel to these destinations, some extrapolations can be made. A difficulty with workplace and school samples however is that they may have relatively small populations—less than a few hundred—and so the total group may be too small for individual differences to average out.

Apart from variability, other factors that affect the sample size needed for reliable results include:

- whether before and after results will be gathered from
  - the one group of people (a 'panel' design), or
  - two separate groups selected from a larger population, or
  - a census of the entire population
- whether participants will be selected randomly within the population or self-selected
- the degree of reliability required (the 'confidence level')
- what level of change the test needs to detect
- whether the unit of measurement will be an individual's travel behaviour or a household's
- how long the evaluation will last for.

Where the program being evaluated has targeted only a small number of people, then the sample being evaluated can easily approach to one hundred per cent of the total—which is unnecessarily large. Most statisticians suggest the use of a finite population correction, which reduces the sample size (and hence also reduces the cost of the evaluation).

The third option to deal with variability in travel behaviours is to employ a control group, subject to all of the same forces as the intervention group, except that it does not exposed to the TravelSmart program. In theory, 'subtracting' the control group data from the intervention results will leave only the influence of the program. Using a control group means that the sample size may be reduced, but it does also add a degree of complexity to the statistical analysis. Even so, the sample size still needs to take account of the natural variability of travel behaviours in both the control and intervention groups.

Given the number of variables involved, not surprisingly, there is some disagreement amongst expert statisticians on exactly the way to calculate sample sizes or evaluation periods necessary to account for variability.

Self-selected participants

One concern of several TDM managers is that many evaluations rely on participants 'self-selecting'—that is, they decide whether to participate or not. There can be no guarantee that such a sample will reflect the overall behaviour of the whole population. Indeed, self-selected responses tend to come from people that are motivated and positive towards the program—and as a result, people that are uninterested and uninvolved are under-represented. Even people selected at random to participate in a before-and-after panel evaluation tend to self-select, as people drop out of the 'after' survey.

Ultimately, the problem of self-selection is unavoidable in TDM evaluations because people's involvement is voluntary. There is no test or method for avoiding this problem, other than encouraging or rewarding widespread involvement. This might be through:

- prizes or gifts
- encouragement of senior management or community leaders
- reminders from the evaluation team.

Where the purpose of the evaluation is primarily to generate interest or draw attention to potential for change, self-selection is not a major problem. In this case, the evaluation has to be judged on political and promotional grounds—not the perfection of the data.

Real-world significance

TDM managers need to draw a distinction between *statistical significance* and *real-world significance*. Any result can be made statistically significant, so long as a sufficiently large sample size is used. But just because statistics show that a change in behaviour has occurred, doers not mean that the change is important. That judgement is a matter of policy, not statistics.

Data

Travel data

The main types of travel data that TravelSmart programs need to gather have long been identified:

- travel mode (such as car driver, car passenger, walk, cycle, bus, tram, train)
- distance travelled
- date or dates of travel
- purpose for travel (such as commuting, business, leisure)
- travel time
- unit of analysis (household, individual, work unit).

From this, other key travel data—such as VKT, GHG emissions and changes in behaviour —can be readily calculated.

The difficulty with all of this data has been the methods used to gather it—which imposes limits on what it is practical to collect. For example, an online survey may only be able to capture the single main trip or mode used on a day—not multiple trips or multiple modes. The order of items in the list above reflects the general usefulness of information. For example, if it is only possible to gather one fact, then travel mode is more important than travel time, because at least mode can be used to track some changes in behaviour.

Project management and materials data

Information on the project management and materials is harder to characterise, because it needs to be adapted to each environment. We have described the elements involved in a previous report to the Department of Environment and Heritage: *Framework and questions for evaluating TravelSmart* (2004).

Consequences for TDM managers

We recognise that there is some disagreement amongst experts about the best way to conduct TDM evaluations. We suggest that State TDM managers and the DEH collaborate to:

1. decide on a minimum *standard data set* be gathered in evaluations in all States —allowing direct comparisons and pooling of results. As we noted above, most of the travel data required has long been identified, and the real problems in consistency have stemmed from the methods used to collect it.

2. develop a suite of:
   - *standard survey questions*—in a modular form, from which questions appropriate to a particular program can be selected
   - *tools* for gathering data—such as Victorian DOI has begun incorporate into its Workplace tools and the WA DPI uses for Workplace surveys
   - *statistical* tests for assessing data gathered.

   Many of these have already been developed or are under development now. What is required is agreement to share and use them, and work in consistent ways.

3. agree a *single method* for determining minimum sample sizes—taking into account different evaluation methods that might be used, and the nature of the intervention (household, workplace, school or community)

4. establishment of a *national database*—subject to National Privacy Policy principles—containing all primary data gathered during TravelSmart evaluations.

While this will not resolve all disagreements between experts, Australia will at least have a single approach to calculating VKT, emission levels, and effects of TDM programs. Consistency of method is probably more important than finding a perfect assessment tool; the current fragmentation serves no one. By retaining a standard dataset, TDM managers will also be able to recalculate these results, should they decide to change assessment methods in the future. A single dataset will also help determine the natural variability of Australian travel behaviours with more accuracy than is possible at present. Finally, having a standard approach will avoid the unfortunate position in some of the evaluations we reviewed, where the sample sizes are clearly insufficient to support the conclusions drawn from them—a cost that no one needs.

We recommend that the first of these steps be taken before any further large evaluations are commissioned.

RED^3 does not have the necessary data to suggest appropriate sample sizes or period for TravelSmart evaluations.

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