# The Role of Behaviour Change in Reducing CO₂ Emissions *

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**Abstract:**

This paper describes approaches to reducing energy use in transport, energy, water and waste. The differences between supply and demand management are clearly articulated and it is argued that the increasingly widely used method called 'behaviour change' is a separate approach. Furthermore the two different ways of implementing behaviour change projects are described – one top down (social marketing), and the other bottom up (an individual community development approach).

The community development approach is then described in detail showing how (particularly in transport, it focuses on the individual and household helping themselves to bring about changes that **they** want (ranging from saving time and money, through to keeping their children safe, getting to know people in the community, and even losing weight)! In achieving these goals, people and communities often also reduce kilometres and greenhouse gases.

Some of the most valuable outcomes of bottom-up approaches are the unexpected benefits. These range from building a community building a playground, to the creation of artworks, to the opening of a medical centre. The paper then puts these into perspective and describes why, although the exact outcome cannot be predicted, it is not unusual that a community of people that are able to shape their own lives are also likely to create a new environment for themselves and others.

Finally it is shown how one component of the community development approach (teaching people to deal with similar issues in the future) will become increasingly relevant in the areas of emissions reduction in water, energy and waste – as well as in transport.

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## 1.    INTRODUCTION

At a time when climate change is being thoroughly discussed throughout all parts of society, and more and more evidence is revealing the impacts of long-term climate change, it is important to review the interplay between supply and demand management approaches and to understand where the so-called 'behaviour change' approaches fit in.

## 2.    SUPPLY MANAGEMENT

Supply management simply means that when there is a growth in demand for utilities and services, more of that utility or service is supplied. Hence more waste means more waste facilities, more energy used means more electricity and gas supply, more water use means more water supply and more kilometres travelled (e.g. cars on the road) means more roads built.

This approach worked well while demand was well below supply and was the primary approach around the world at least until the mid 1980s or early 1990s.

## 3.    DEMAND MANAGEMENT

However, in many areas it became apparent that the supply management approach could not continue. For example, the SACTRA report into roads in the UK stated clearly that the provision of new roads simply meant the creation of the demand to fill them (SACTRA, 1994).

In addition to the inability to supply more infrastructure (often due to a lack of space or of resources) there was a growing unwillingness to continue to supply more infrastructure or services because of their environmental impact. In short, more electricity or gas use, more land fill and more roads meant more greenhouse gas emissions.

Hence demand management measures became more common. Demand management generally means changes to reduce the negative (environmental) impacts of a utility or service *without the construction of major infrastructure..*

Broadly this can be done in 5 ways:

*'Infrastructure' changes* could include moving from coal-fired sources of electricity to solar (photovoltaic) sources or to off peak hot water supply or the building of bike paths to encourage less car travel.

*Regulation* would include measures such as restricting the use of water or the supply of parking spaces.

*Pricing* measures include increasing the price of water, power, petrol or car registrations

*Technological changes* include offering alternative ways of using energy (less environmentally damaging) such as hybrid vehicles, low flow shower heads, compact fluorescent light globes.

*Education and awareness* methods include awareness campaigns of any sort, and also the provision of information via internet, through school curricula and so on.

### 3.1 Applications and Definitions of Demand Management

Many applications of demand management are related to the specific needs of the authority. For example the West Australian Office of Energy has the following definition that relates to its specific need of supplying **energy** in a cost efficient way (Office of Energy, 2006):

*Demand management is the use of financial incentives, education or other programs to modify the demand for energy. It can be designed to shift the peak load to another time of day, cut the peak load, or reduce the total load by increasing end use efficiency.*

Similarly in the Energy Division of the South Australian Department of Transport, Energy and Infrastructure (2002) demand management in relation to **energy** is seen as giving the following benefits:

- Reduced upward pressures on energy cost to consumers
- More cost effective utilisation of energy infrastructure
- Improved energy security
- Reduced greenhouse gas emissions
- Improved productivity through the more efficient use of energy

The Energy Division notes that "The objective of Demand Management activities is to flatten (and lower) the demand curve, so that the peak load is reduced in relation to the average load. This should result in greater system reliability, lower electricity prices and reduced greenhouse gas emissions."

**Travel** Demand Management in Australia is widely defined as:

*Travel Demand Management is intervention (excluding provision of major infrastructure) to modify travel decisions so that more desirable transport, social, economic and/or environmental objectives can be achieved, and the adverse impacts of travel can be reduced.* Institution of Engineers (1996)

The South Pacific Geoscience Commission (SOPAC, 2006) bases its definition of **water** demand management on work reported in Butler and Memon (2006)

*There are typically two potential responses; either 'supply-side', meeting demand with new resources or 'demand side', managing consumptive demand itself to postpone or avoid the need to develop new resources. Worldwide there is considerable pressure from the general public, regulatory agencies, and some governments to minimise the impacts of new supply projects (e.g. building new reservoirs or inter-regional transfer schemes), implying the emphasis should be shifted towards managing water demand by best utilising the water that is already available.*

### 3.2 Summary of Demand Management Approaches

The above sections, and the numerous references to demand management on websites and in policy and strategy documents throughout Australia and New Zealand, suggest that demand management strategies are almost always implemented through the use of change instigated externally to the individual. This is sometimes referred to as a top-down approach.

The top-down approach is extremely valuable in bringing about change as has been evidenced by many demand management programs such as recycling, reduction in water use and even those in areas outside of the environment such as smoking reduction.

However, increasingly there is seen to be a need for the addition of a bottom-up component to bringing change in environmental impacts. This is usually called a behavioural change approach.

## 3.    BEHAVIOUR CHANGE

Behaviour change approaches are now being used to bring about environmental outcomes in many areas ranging from travel (e.g. TravelSmart projects in Australia), natural resources (e.g. in natural resources in NZ [Parminter 2006]), in energy (e.g. AMCOR in New South Wales (Department of Energy, Utilities and Sustainability 2006) and in water (e.g. Syme and Nancarrow, 2002).

This paper now looks at two different types of behaviour change approaches: one which could be described as top-down and another which can be described as bottom up in the sense that people work through the process of change themselves. Both of these approaches have been shown to be extremely useful and can be complementary. It is useful, however, to understand the differences as they are likely to have different long-term benefits. In particular the bottom-up approach is likely to have many benefits *in addition to the behaviour change that it was originally trying to influence.*

### 3.1    Top-Down Behaviour Change - Social Marketing

The well-known social marketing approach is based on the notion that if marketing encourages people to buy Nike, it can also encourage people to adopt behaviours that will enhance their own and fellow-citizens' lives.

Social marketing is summarised well by Weinreich (Weinreich Communications 2006):

Social marketing works to help people change their behaviours to become healthier or to improve society or the world in some way. On the continuum of methods to bring about health and social change are the two used most often: education, which uses rational facts to persuade people to change their behaviours, and coercion, which forces people to adopt a behaviour under threat of penalty for not doing so.

Weinreich goes on to say that "Somewhere in between those two points lies social marketing -- the use of commercial marketing methods to persuade people to change their behaviours for reasons that go beyond the rational facts to appeal to their core values. So often, people know exactly what they should be doing and why, and they still disregard what their head tells them. Social marketing adds heart back into the mix and utilizes emotional appeals to resonate with the part of the brain that determines what people actually do, as opposed to what they know they should do."

Weinreich summarises by concluding that social marketing is:

- A process that uses commercial marketing techniques to promote the adoption of positive health or social behaviours
- An approach that benefits the people who are adopting the behaviours or society as a whole, rather than the organization doing the marketing

This definition helps clarify the definitions used in this paper.

First, it makes clear the difference between demand management measures (often done to achieve the aims of the organisation [e.g. for many utility providers]) and social marketing (for the benefit of the society as a whole).

Second, it confirms the persuasive or top-down approach of social marketing, differentiating it from the bottom-up approach discussed in the next section.

## 3.2 Bottom-up: A community development based approach

This section shows how a methodology intended to be used at the community level has been adapted to operate at an individual level to achieve the same goals as Deming (1958) aimed at when he developed the approach.

### Community development originated at a community level

A community development-based approach is based on working with people to 'reflect on their lived reality, to make an analysis of the root causes of that reality and to develop a plan of action for changes' (Ife, 1996). At all stages the individual works in partnership with whatever external resources or expertise are available. It is a bottom-up collaboration based on linking individual energy and aspiration in partnership with external support and vision.

Community development programs were originally designed to effect behaviour change in some critical area of social activity – health promotion, education, family function are some of the more familiar ones. More recently they have been adapted to patterns of resource usage, as in voluntary travel behaviour change programs in travel and in the areas of reducing water, waste and energy use (e.g. Australian Greenhouse Office, 2002).

Much has been written about the theory and practice of community development, and there are many ways of describing effective practice. As noted above, the principles were first proposed by Edwards Deming (Deming, 1958) in the 1950s, but since then have been widely adapted to situations where lasting change in behaviour and collective thinking are required. The community development approach can be characterised as an unstructured, evolving response by a community to their particular individual needs or problems.

The primary tools of a community development approach are listening **and facilitating change rather than 'telling'** and **helping people to help themselves.**

### Community development has been modified for use at an individual level

Beginning in travel behaviour change projects, the community development approach has been developed for use at the individual as well as the community level (Ampt, 1999, 2003).

Using the principle of helping people to help themselves, the first step in any interchange is listening to see what problems or issues people may have and then working with them to find a solution. This means that in many cases the problem they solve (e.g. losing weight by walking more), while possibly addressing the decision maker's goal (e.g. to reduce congestion or emissions) may not be seen by the individual as having anything to do with that goal.

The core element of the community development approach is a conversation in which an individual is asked about the key issues that are bothering them about a given behaviour.

For example, in a voluntary travel behaviour change project, the conversation might begin by confirming the importance of the car in our daily lives, but asking what frustrations the person has with getting around in the car. This almost always leads to an answer ranging from those that are directly related to the environmental problems caused by the car (I really wish I was able to reduce my emissions) through to others such as "I'm always grumpy when I drive the kids around", "I'm always late because it takes so long to park", "It's costing us a lot to run both cars", and so on.

This would then lead on to a facilitative process where the conversationalist works with the person to find a solution to their specific problem. In almost all cases the solution results in less car kms (i.e. less $CO_2$ emissions).

The conversation structure is shown in Figure 1.

```
            ┌─────────────────────────┐
            │      Introduction       │
            └─────────────────────────┘
                        │
                        ▼
      ┌───────────────────────────────────┐
      │ Establishment:                    │
      │ Last time in car and didn't want  │
      │ to be?                            │
      │ Hassles getting around town?      │
      └───────────────────────────────────┘
                        │
                        ▼
      ┌───────────────────────────────────┐
      │           Conversation            │
      └───────────────────────────────────┘
                      │   ▲
                      ▼   │
            ┌─────────────────────────┐
            │   Resources to assist   │
            │         change          │
            └─────────────────────────┘
                        │
                        ▼
            ┌─────────────────────────┐
            │       Action Plan       │
            └─────────────────────────┘
                        │
                        ▼
            ┌─────────────────────────┐
            │     Tools sent and      │
            │    behaviour change     │
            └─────────────────────────┘
```
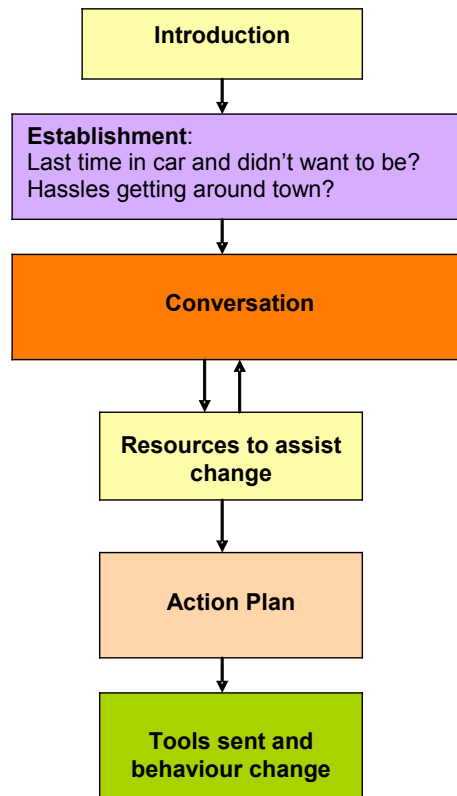
**Figure 1: The conversation process in a community development approach**

As can be seen from the figure, the conclusion of the conversation is an 'action plan'. This is where the conversationalist works through with the person what will happen next (e.g. if they receive resources to assist with their behaviour change, how will they use it, who will they use it with, when will they be able to start to change).

***The community development teaches the principles of change, and the change is long-term***

Our experience (primarily in travel) has shown that not only do people change their behaviour to reduce emissions as a result of this approach, but that the method brings about other changes not related to the original goal (e.g. the reduction of kms). These are described in more detail in the next section.

## 4.	UNEXPECTED COMMUNITY BENEFITS OF THE APPROACH

The community development approach has led to significant changes in travel behaviour (e.g. Stopher et al., 2006). However, here we concentrate on the other changes that have resulted.

**4.1    Outcomes related to social benefits to the community**

There are many examples of changes that have resulted in social benefits to the community. These include:

- **Improvement in local facilities in cases where people have done this themselves or been able to constructively ask authorities to make changes**. In Christies Beach in South Australia, the neighbourhood built their own community playground to overcome a frustration expressed by many people as part of the project – 'travelling a long distance to find a decent playground'.

  The construction of the playground meant that dozens of people in the community interacted to raise money, work with a playground consultant. It also meant that they learnt how to approach a Council – first to find out where a playground could be located, then to choose 3 sites that would meet their objectives (not having to travel far), and finally to propose a design. They learnt that Councils are almost desperate to give money when it is initially refused! Finally, this playground brought together about 3000 people to construct it over a period of 5 days. Five years after its construction it is still bringing together people from the community, it has remained virtually graffiti free (in an area that is full of it) and the people who met through this now know each other and continue to bring about change.

- **Increase in relevant local activities** In Brisbane, a senior citizens group organized an historical walk in their neighbourhood, designed initially to allow people to carry out leisure activities nearby to reduce the need to travel further, but continues to provide a way to decrease the loneliness of residents.

**4.2    Economic Development benefits**

There are several examples of economic development benefits emerging from community development-based travel behaviour change programs. They include:

- Increase in local shopping – initiated by local people who realise they do not need to drive as far and spend as much time travelling and supported by businesses who encourage the local spending (see below)
- Improvement in marketing by local shops (e.g. in Brisbane where the business community created a directory of all goods and services provided locally)
- Redevelopment of local facilities to reflect current needs (e.g. a church building is being reshaped into a medical centre by the community in Brisbane). This is likely not only to reduce travel to distant doctors but to revitalise the pharmacy which suffered at the time the previous centre closed down.
- Increase in property prices when local community efforts increase safety or positive perceptions of the community (e.g. the community's traffic calming initiatives in Christies Beach are reported to have made one street more desirable than previously).

**4.3    Cultural Benefits**

In two different programs there have been unexpected outcomes giving cultural benefits to the community. They are:

- An increase in recognition of local heritage and culture in Christies Beach where it was discovered that the site of the playground was on a site of importance to the Aboriginal community and the subsequent involvement of Aboriginal community in design of the playground, planting of local flora and fauna and so on.
- An increase in 'cultural' products in local shops in Brisbane where it was found that the Muslim community was going elsewhere for products that could easily be stocked locally.

## 4.4     Community Development Outcomes

Community Development – defined simplistically as the process of helping people to help themselves – is an outcome of almost all *travel* behaviour change programs when people's recognition that they could make change (e.g. save time) when they thought it impossible has nurtured into them into thinking that they can solve other problems of their own. There are numerous examples:

- The decrease in number of complaints-without-solutions to Councils
- The increase in number of projects which can be listed as individual or group-initiated (not initiated by Councils or other authorities because they thought it would be a good idea!)

## 4.5     Health Outcomes

While the health outcomes of a travel behaviour change programs could be generally classed as 'expected' due to the likelihood of people being able to do more walking to lose weight or to use means of transport less stressful than the car, some changes are much more than expected:

- A 72 year old man in a recent Adelaide project reported giving up his years-long asthma medication entirely since he began walking and cycling.

## 5.     RELEVANCE ACROSS AREAS

This paper has outlined a framework for understanding the approaches to reductions in energy use in transport, energy, water and waste. It has also shown in some detail how a community development approach to behaviour change can give benefits that are not only unexpected, but also likely to increase the longevity of change – at least in the area of reducing kms.

A pertinent question is whether this can apply to areas other than transport. The answer to this is best understood by seeing the outcomes in transport as have two components:

- Making changes to reduce a frustration where the benefits relate to a person's key value/s meaning that the changes are likely to persist *because of the improvement to a key value*. For example, for someone is time-poor (i.e. values time highly) working at home one day per week is likely to be seen as getting more time to work, and they are likely to continue the behaviour because of its time-benefits.
- *Learning* how to make changes that can be translated into other areas. For example if someone who is money-poor (i.e. values money highly) has been facilitated in the thinking process to work out one way to save money (e.g. walk to the local shops

instead of drive), they may also work out other methods to save money (e.g. ring their partner to bring something home en-route rather than make a special trip).

There are a few examples of the improvement of a lifestyle due to the reduction of energy use. For example, it can be more comfortable in a house with insulation that one without, or it can save money to use less power. However, it is likely that the 'improvement to a key value' opportunity in transport is less likely to occur in energy, water or waste. These opportunities should however be canvassed.

However in terms of learning a behaviour change process, it would appear that the community development approach at an individual level holds much promise as a methodology for the future. Learning to work out which of the ways to reduce water use are most appropriate for me, and rejecting those that do not fit into my life style, as well as understanding the possibilities of inventing new ways, would appear to be relatively easy to use as the basis for future approaches in these areas.

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