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MAKING SUSTAINABLE TRANSPORT POLITICALLY AND PUBLICLY ACCEPTABLE: LESSONS FROM THE EU, USA AND CANADA

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1. Introduction

In recent years much of the literature has supported the need to achieve greater sustainability in the transport system. Even though there still remains some uncertainty about the effectiveness of alternative policies, many promising measures have been implemented in an increasing number of cities and countries throughout the world. The next steps must be to encourage a more widespread adoption of best practice in the implementation of sustainable transport policies. Thus, the most pressing problem is how to make sustainable transport policies more acceptable, both among the general public and their elected politicians. In this chapter, we investigate ways to increase the acceptability of such policies, using case study material from the USA, Canada and the EU.

There has also been much discussion over the nature of sustainable transport (Black and Nijkamp, 2002), and here we want to discuss it both at the national and the international levels. The broad aim of a *sustainable transport strategy in mobility terms* must be to allow the output from transport to be maintained or increased, but at the same time to reduce the energy inputs, particularly in terms of the use of non-renewable resources. This would mean a reduction in emissions (including CO₂), improvements in air quality, and the use of alternative fuels. Other dimensions of sustainable transport would include congestion costs, and those costs relating to accidents, noise and the consumption of space. A stronger sustainable transport argument would require both transport output and energy input to diminish over time, through a combination of policy measures and technological innovation (Banister et al., 2000). Moreover, it is important to evaluate the consistency of sustainable transport strategies with policies that address other dimensions of *sustainable development*, including sustainable economic growth, distributional and equity issues, and intergenerational concerns.

In 2001, transport accounted for 32.2% of all energy use in the EU, 28.7% in Canada and 26.8% in the USA (Eurostat, 2003; Natural Resources Canada, 2003). Within the EU, oil makes up 46% of all final energy consumption, and transport accounts for

70% of all oil consumption. Fuel prices are also very different in the EU as compared with the USA and Canada – the latest equivalent prices (\$ PPP per US gallon – 3.8 litres) for 2004 are UK \$6.41, Germany \$5.44, US \$2.16 and Canada \$2.39. But it should be noted that the importance of oil is receding in terms of the dependency of economies on it for energy in all sectors except transport, which is still almost totally dependent on oil.

In this chapter we develop the concepts of sustainable transport and energy use through reviewing trends and the policy measures being proposed in the EU, the USA, and Canada. We then explore the case of political and public acceptability for change, and look to developing some guidelines for action. Our focus is primarily in the passenger transport sector.

2. Political Acceptability

2.1 Action at the Federal Level in the US - There are considerable differences between the approaches to sustainable transport adopted by the EU, the USA and Canada. Even though the USA took the initiative on air quality in the 1960s and 1970s with increasingly strict emissions standards for new vehicles and compulsory catalytic converters for all new cars, there has been little action on reducing CO₂, the major contributor to greenhouse gas (GHG) emissions. Within the EU, there is a strong imperative to take action to achieve the 8 % GHG reduction targets set by the Kyoto Protocol, and it has been legally binding on EU Member States since April 2004. In fact, there is a desire to exceed those levels in some countries (e.g. UK, Denmark, Germany and Austria), but air quality standards, catalytic converters and the continued importance of diesel use in both the passenger and freight vehicle stock has questioned their resolve to meet the targets set. This contrasts with the situation in the US and Canada where the use of diesel in cars is much less than in the EU.

Whatever the political acceptability of various sustainable transport policies may turn out to be in the EU, it is certain that most of them will be less acceptable in the USA. As observed in recent years, the USA has lagged far behind other OECD countries in adopting measures that would save energy and reduce global warming. Under the Clinton Administration, the USA refused to ratify the Kyoto Protocol, and under the Bush Administration, they are being ignored completely (National Energy Policy Development Group, 2001). Greenhouse gas emissions in the USA rose by 1.2 percent per annum from 1980 to 1990 and by 1.4 percent per year from 1990 to 2002. The USA is currently responsible for about a quarter of global GHG. In Canada, which saw similar rates of growth in GHG emissions to those of the USA during the 1990s, global climate change has had a much higher political profile than in the USA. Canada ratified the Kyoto Protocol in 2002 and accelerated a number of federal initiatives to identify, implement and fund GHG reduction. However, in order to meet the Kyoto targets, Canada sought carbon sink credits from improvements in agricultural and forest management practices, and not just reductions in source emissions. Because air pollution has generally been less severe in Canadian cities than in American and some EU cities, air pollution controls have had a lower profile in Canada. Nevertheless, even in Canada, improvements in air quality are becoming priority issues in the largest conurbations.

Although energy efficiency in transport has lagged behind in the USA, leading to continued growth in emissions of greenhouse gases, impressive advances have been made in other areas of environment protection. Since about 1970, governments at every level have implemented a wide range of innovative policies to reduce the environmental impact of transport. Most of those efforts have involved either mandated improvements in vehicle technology or increased funding for public transport, walking, and cycling. In some instances, they have also involved restrictions on land development and transport projects that would cause significant environmental harm. So far, however, virtually no level of government in the USA has tried to increase the environmental sustainability of the transport system by restricting car use or increasing its price.

Starting in the early 1970s and continuing to the present, almost all environmental policy initiatives have emanated from the federal government. The pioneering National Environmental Policy Act of 1969 and the Clean Air Act of 1970 were followed by numerous updates, amendments, and related laws. Since then, transport projects have been subject to increasingly strict environmental standards (US Environmental Protection Agency, 2004a). Every major transport project is subject to a thorough examination by means of the required Environmental Impact Statement (EIS). The standards are so high that hundreds of projects have been greatly delayed, modified, or even cancelled as a result. Indeed, new highway construction has been brought to a virtual halt in most metropolitan areas, and even public transport projects have incurred expensive modifications to minimize environmental damage.

Many of the requirements for Environmental Impact Assessments in the EU are based on the American experience. Similar rigour has only been in operation in Europe since 1988 (EC Directive, 1985), with the most recent requirements for Strategic Environmental Assessment coming into effect in July 2004 (CEC, 2001).

The already considerable US federal government support for public transport, cycle and walk was greatly reinforced by the highly innovative transport laws passed in 1991 (Intermodal Surface Transportation Efficiency Act – US Department of Transportation, 2004a) and 1998 (Transportation Equity Act for the 21st Century – US Department of Transportation, 2004b). Both of these major transport laws further codified environmental protection provisions in other federal laws, and also provided substantial new funding for public transport, walking, and cycling. For example, federal funding for the *most* sustainable modes, walking and cycling, rose from only \$6 million in 1990 to \$422 million in 2003 (U.S. Department of Transportation, Federal Highway Administration, 2004). In addition, increased funding for projects exclusively intended for walking and cycling, every highway project must now include provisions to accommodate pedestrians and cyclists. Moreover, federal law requires that every state department of transport have a special unit that coordinates pedestrian and bicycling programs and policies throughout their state (Clarke, 2003).

Similarly, federal funding for public transport rose from about \$3 billion in 1990 to \$8 billion in 2003 (U.S. Department of Transportation, Federal Transit Administration, 2003). Indeed, most federal funding for surface transport can now be used for any mode of travel, with the choice left to the discretion of state departments of transport and metropolitan planning organizations. TEA21 also introduced more balance in the tax treatment of free employee parking that had long encouraged car use. Thus,

public transport users can arrange with their employers to have the price of monthly transit passes deducted from their pre-tax income (equivalent to a tax deduction), while employees driving to work must now pay taxes on the implicit subsidy of free employee parking in certain circumstances. The situation in the USA is different from that in Canada and some EU countries in this respect, as outlined in Section 3.

Unfortunately, support for environmental protection and energy efficiency has greatly diminished since 2000 under the Republican Administration of George W. Bush. For example, many environmental regulations and efficiency standards are now being relaxed, repealed, or simply not enforced. And there is no federal support at all for any policies that would reduce car dependence or suburban sprawl in American cities. Even before Bush, the federal CAFE standards for fuel efficiency had not been raised in almost twenty years, so that average fuel efficiency of personal vehicles (miles per gallon) in the USA has stagnated. Indeed, with light trucks increasing their share of new personal vehicles to 50.4% by the end of 2004, the overall energy efficiency of personal vehicles actually fell from 26.2 mpg (9 litres/100 kms) in 1987 to only 24.5 mpg (9.6 litres/100 kms) in 2002 (Oak Ridge National Laboratory, 2004).

Thus, the extraordinarily progressive federal environmental initiatives of the 1970s and 1980s have largely dissipated under recent federal governments, most notably under George W. Bush. Recent sustainability initiatives have been mainly at the state and local level. But even here, petrol taxation, parking fees, and other user charges in the USA remain among the lowest in the world, only a fraction of EU levels, and proposals to raise them even slightly are usually met with furious political opposition and public outrage (Transportation Research Board, 2001).

2.2 Action at the State and City Levels in the USA - With the prompting of federal environmental and transport legislation from 1969 to 1998, state and local governments became increasingly active in environmental protection. Since 2000, however, they have become an even more important source of environmental initiatives. There is enormous regional variation in the extent of environmentally friendly policies and programs, with states on the West Coast and in the Northeast far more active and innovative than those in the South, Midwest, or Rocky Mountain areas. California has been at the forefront of virtually every innovative environmental policy, while Texas and the states of the Deep South (such as Mississippi and Alabama) have generally done the minimum required by federal law.

Even as early as the 1970s, California's vehicle emissions standards were much stricter than those of the federal government, forcing auto manufacturers to produce special California cars to meet the higher standards (US Environmental Protection Agency, 2004b). This is also true today, and California's legislature even passed a law requiring a set percentage of new cars to be zero-emission vehicles. Since that currently seems infeasible, the state has switched to requiring so-called "super ultra-low emission vehicles" (SULEVs). Several states in the Northeastern USA (such as New York, New Jersey, Massachusetts, and Connecticut) have been considering adopting the California emissions standards to reduce air pollution in their urban areas, suggesting that successful action can be initiated at the state level.

California also pioneered several other sustainable transport initiatives. For example, Regulation 15 was enacted in 1987 requiring all firms with 100 or more employees to

offer incentives to increase carpooling, public transport use, walking, and cycling as alternatives to single-occupant car commuting to work (Dunn, 1998). While it did increase carpooling, it was so unpopular politically—and allegedly burdensome for firms to comply with—that Regulation 15 was weakened in 1997 (only applying to firms with 250 or more employees) and then completely rescinded. Parking policy is another area where California has been innovative. Since 1992, firms with over 50 employees have been required to offer employees the option of cashing out the implicit subsidy of free parking instead of driving to work (Hill, 2002). Although this policy is innovative in theory, in practice it applies to such a restricted category of free parking (leased by the firm for its employees) that it affects only 3 percent of free parking spaces in California. Thus, it has had virtually no impact on travel behaviour. Just as at the federal level, policies are generally only acceptable at the state and local level if they are relatively painless for motorists and employers.

Perhaps most surprising, 29 states and the District of Columbia have established sustainability plans aimed specifically at reducing greenhouse gas emissions (US Environmental Protection Agency, 2004c). They tend to focus on stationary source emissions, but most have at least some transport component. All emphasise improved technology as the main approach for reducing emissions, and all are voluntary plans, more suggestive of what could be done, as opposed to actual policies that will be implemented. For example, some plans propose increasing the use of alternative fuel vehicles in the state government's own fleet. The California plan—which is by far the most advanced and detailed—briefly mentions possible pricing measures such as higher petrol taxes, carbon taxes, per km vehicle use taxes, gas-guzzler taxes, and rebates for purchases of more fuel-efficient, less polluting cars (especially alternative fuel vehicles). But those measures are only presented as theoretical possibilities, with no further discussion about actual implementation. The federal EPA even coordinates these plans by offering some general guidelines and posting them all on the federal EPA website. Clearly, however, the plans have no enforcement power at either the federal or state level.

State and local land use policies affecting transport have involved more actual change, with greater enforcement power through both positive and negative incentives. Especially on the West Coast and in the Northeast, several states and metropolitan regions have established land use plans that call for curbing low-density sprawl, preservation of open space and farmland, protection of ecologically sensitive areas, and concentration of new development in existing urbanized areas. Such policies are variously referred to as smart growth or growth management. In some states, they are purely suggestive, with no actual implementation power. In other states, the land use guidelines are actually reinforced through a range of measures.

In New Jersey, for example, the state can simply refuse to issue development permits in environmentally sensitive areas (New Jersey Office of Community Affairs, 2004a). It has also re-zoned much undeveloped land for rural use (i.e. 10-acre lot sizes or larger) in order to prevent suburban housing development. While most protected lands remain in private ownership, the state cooperates with counties and municipalities (on a 60/20/20 funding basis) to buy up the more profitable development rights, and thus compensate private landowners for its reduced market value. In some cases, however, the state purchases the land outright and reserves it for especially environmentally friendly uses. By comparison, the state accelerates the

permit approval process for developments in designated smart growth locations. For compact in-fill developments in existing urban areas, the state and local governments in New Jersey also grant density bonuses, reduced parking requirements, low-cost loans, reduced tax rates, priority in public infrastructure provision, and facilitated access as well as special funding from a wide range of government departments, agencies, and programs. New Jersey also has an extensive Transit Villages Program that yet further promotes compact, mixed-use development within a mile of rail transit stations (Renne and Wells, 2004; New Jersey Office of Community Affairs, 2004b). All of these land use policies appear to be having an impact, since recent studies show suburban areas in New Jersey now growing slower than urban areas, while only ten years ago, suburban areas were growing many times faster (Hughes and Seneca, 2004). Unfortunately, such recent shifts in development patterns appear to have had no impact whatsoever in reducing the growth in private car use.

Perhaps the most celebrated case of sustainable transport and land use planning in the USA is Portland, Oregon. Not only does it have an urban growth boundary, but it has implemented a range of policies promoting public transport, walking, cycling, and inner city revitalization (Jun, 2004). Indeed, many car advocacy groups in the region have complained that most transport funds are being spent on non-highway projects, thus causing increased roadway congestion while facilitating travel by alternatives to the car, or discouraging trips altogether. Even critics admit that Portland has succeeded in reducing the private car's share of total travel and increasing development densities within the growth boundary. Unfortunately, they also show that much development has simply spilled over into the adjacent portions of Washington State, not subject to the same controls, partly due to the sharp increase in housing prices within the growth boundary. Moreover, total car use has continued to increase at a rate not much slower than other US metropolitan areas without growth boundaries. The future of the growth boundary is now in doubt as the recent referendum (November 2004) voted overwhelmingly to require compensation (retroactively) for landowners whose property values have decreased due to environmental or land use regulations.

In short, while a number of interesting and potentially promising sustainability initiatives can be found at the state and local level, they are not very powerful, in general, and often are only suggestive plans or small-scale experimental programs, as opposed to major policies with real impact.

Moreover, the real test of the actual sustainability of transport policy must be on the basis of measurable outcomes, not theoretical plans or interesting ideas as to what might be done, as in the case of the state sustainability plans. It is worth noting, for example, that in spite of huge increases in funding for public transport, walking, and cycling over the past two decades, the private car's share of urban travel in the USA has continued to rise year after year. Meanwhile, the average occupancy of cars used for the work trip has fallen to only 1.1 persons, and consumers have increasingly shifted from smaller conventional cars to larger SUVs that are less energy efficient (Pucher and Renne, 2003). Thus, it is no surprise that total greenhouse gas emissions from all transport sources have continued to rise in the USA, by 21% from 1990 to 2002 (Oak Ridge National Laboratory, 2004). That does not suggest much actual progress, at least not on that one particular dimension of sustainability.

The main reason that Americans oppose most sustainable transport policies is that virtually all settlements in the USA are extremely car-dependent. Even in metropolitan areas like New York, sprawling suburban developments result in long distances between residences and virtually every other type of land use, making the car a virtual necessity. Since the vast majority of Americans perceive no good alternative to their cars, and have become accustomed to the high level of mobility, comfort, and convenience of their cars, they usually reject policies that would force them out of their cars or curtail their usage in any way. Free roads, free parking, cheap petrol, and universal, cheap driver licensing are widely viewed as a natural right.

Until now, any sustainable transport policy, that would restrict driving or make it more expensive, has been a non-starter in the USA. Only in the event that an immediate crisis is perceived in the USA itself would Americans be willing to sacrifice their use of the car for virtually all travel. Energy use is not viewed as a crisis at all, and both air pollution and congestion are concentrated in a few especially problematic metropolitan areas. Thus, the only sustainable transport policies that are currently feasible in the USA are those that could be achieved through technological measures without affecting the travel behaviour or lifestyle of Americans.

2.3 Action at the EU Level - In the EU, transport is embedded within the demands of enlargement¹ and sustainable development, and it is argued that “a modern transport system must be sustainable from an economic and social, as well as an environmental viewpoint” (EC, 2001, p10). This statement has resulted from the Cardiff Council (June 1998), when the EU Transport Council was requested to establish the means by which transport can be integrated within sustainable development. A joint expert group was set up to report on the means to define an environmentally sustainable transport system, together with the appropriate measures and likely impacts on transport demand and behavioural change. This review was undertaken in 2000, and it resulted in further work to set up environmental targets for transport policy, a legal framework for the Transport Environment Reporting Mechanism (TERM), and the impact of e-commerce on transport (2001). Currently, the joint expert group is looking at sustainability impact assessment methodologies for transport, strategic environmental assessment and the trans-European transport networks, enlargement and transport, and transport and health. The process involves extensive review of the main problems to be resolved and the necessary actions to achieve targets.

The White Paper (EC, 2001) recognises that transport energy consumption is increasing and that 28 % of CO₂ emissions are now transport related (p10). In 1990, 739m tonnes of CO₂ were released from the transport sector, rising to 900m tonnes in 2000. Further substantial increases are forecast for 2010 when 1113m tonnes will be produced. Road transport accounts for 84 % of the 2000 figure, and the total will increase substantially with the enlargement of the EU, even though the level of motorisation in the accession countries is much lower.

The EU target (by 2010) is to achieve an average CO₂ emissions figure of 120 g/km for all new cars, but there is considerable opposition from the car manufacturers to

¹ In May 2004, the EU expanded from 15 European nations to 25 nations. Most of the data and actions referred to in this paper relates to the EU15 rather than the enlarged EU25.

this figure. It seems that an easier target of 140g/km will be achieved by 2008 for all new cars (the current levels for petrol cars are 186 g/km and for diesel cars 141 g/km). The means to reach this target are:

- a) Voluntary agreements with the car manufacturers to improve vehicle technology;
- b) Fiscal means to ensure a move towards more fuel efficient cars;
- c) Improved information on fuel economy of cars.

The transport sector is heavily dependent on technological improvements to reduce energy consumption and CO₂ emissions, but this must be set against the forecast growth in demand. There is no question that governments are prepared to enter into voluntary agreements with industry to deliver “cleaner” vehicles, but the real issue here is whether there is sufficient resolve to go further than this to use pricing mechanisms to reduce air travel and car use, and to encourage a substantial switch to public transport.

The EU in their policy statement to 2010 (EC, 2001) forecast a growth of 24 % in passenger km (1998-2010), but a growth of only 10 % in vehicle km with their Option C². This would lead to an increase of only 1 % in CO₂ emissions. With respect to air and car travel, there are a series of proposals from the EU:

- a) Controlling the growth in air transport:
 - Strong regulation, more efficient use of air space, consultation on social issues relating to air traffic control, closer cooperation, and enforcement;
 - Rethinking air transport taxation and the introduction of a kerosene tax and differential en route air navigation charges. The latest thinking here (December 2004) is that nothing will be done before 2008;
 - Discuss the future of airports to make best use of existing capacity, review airport charging systems, integrate air transport with other modes and determine what new airport infrastructure is required;
 - Present a new slot allocation system to improve access, whilst taking account of the need to reduce environmental impacts of airports;
 - Negotiate with the USA a joint transatlantic aviation agreement.
- b) Car travel:
 - Halving the number of people killed annually on EU roads by 2010 (to 20,000);
 - Framework directive for the infrastructure charging system offset by the removal of existing taxes allowing cross financing;
 - Alternative fuels to make up 20 % of total consumption by 2020, and that hydrogen and biofuels should be tax exempt;
 - Harmonisation of taxation for commercial (not passenger) road transport fuel.

The EU seems gradually to be moving towards sustainable transport in terms of its policy objectives, even though the environmental imperative has been demoted, as economic and social issues have again become more important. Two unresolved

² Option C is the strongest of three options for achieving sustainable transport, and it consists of pricing (Option A), promotion of alternative modes and targeted investment in the Trans European transport network. It assumes that there will be substantially higher vehicle occupancy levels in cars, airplanes, buses and railways.

issues need to be highlighted. It seems to be extraordinarily difficult to get agreement, even within the EU, on the actions that should be taken at the highest political level. The importance of appropriate pricing policies in aviation and the reluctance to impose common pricing strategies or mandatory targets on industry reflects on the weakness of the politicians and the power of the various interest parties. Secondly, the EU has never been easy in its role as compared with those of the national and local governments (the subsidiarity principle). On the one hand, it wants to be seen to coordinate and lead action at the European level, but on the other it does not want to antagonise the different national priorities. This is a key policy dilemma for sustainable transport. Strong leadership is required for effective action at the EU level, but there is a concern about how much responsibility should be given to the European Parliament and to the Commission.

At the political level, there is also the problem of the necessity to implement innovative policies, some of which require primary legislation within national governments to enact EU Directives. With a political cycle of four or five years, this means that innovative policies on sustainable transport need to be introduced soon after the politicians are returned to power, and it is often the case that transport does not feature high enough on the political agenda to command immediate action. Hence, little happens until later in the political cycle, which in turn means that good intentions may not be translated into policy action until after the next set of elections. In the meantime there may have been a change in political control.

Within democracies, this may present insuperable problems for the implementation of innovative policies, with the net result that policy is always incremental. To circumvent such barriers requires support for innovation from all parties and continuity in government. Such a situation may be more likely at the EU level where there is considerable cross party support for sustainable transport in the European Parliament and perhaps greater continuity in policy than is apparent at the national level. Whatever the political difficulties, it is also suggesting that there needs to be a consistency in direction with respect to policies on sustainable transport in progress is to be made towards the targets set for 2010 in the White Paper (EC, 2001).

2.4 Action in Canada - Canada presents a political history for transport and the environment that is different from either the USA or the EU. From the earliest days of the confederation, the role of the federal government in transport has been mostly limited to aspects of the inter-provincial and international movement of passengers and freight, and construction regulations for vehicles. Other than within national parks, there is no federal highway system and no direct involvement in the governance of urban transport. A fluctuating indirect role exists through federal grants for infrastructure (including some roads), public transport systems and demonstration projects, but this represents much less leverage than the US federal government has at its disposal.

Canada also has, in general, a political tradition that is amenable to moderate government intervention in areas such as public health and land-use planning. However this has not translated into strong federal and provincial regulation in all areas. For example, Canada is far behind the USA in the protection of endangered species. The political acceptability of sustainability policy is conditioned by the realities of trade with the USA. In particular, the energy intensity and tailpipe

emissions standards for motor vehicles have long been harmonised with those adopted under US federal law. In 1965, 29 years ahead of the North American Free Trade agreement, the USA and Canada enacted the “Auto Pact”, which facilitated the cross-border movement of new motor vehicles or their components under continental manufacturing arrangements. In the case of the CAFE standards, the Canadian parliament passed a CAFE law with the same standards as those in the USA. It is on the statute book but has not been activated. It will not be proclaimed for as long as industry, under the integrated manufacturing arrangements, meets the standards. The use of this law to pursue more stringent CAFE standards for vehicles sold in Canada has been discussed, but there is a stronger domestic market for fuel-efficient vehicles than is found in the US, and concern over the loss of manufacturing jobs, have combined to make this unlikely.

Canada’s GHG production from transport sources in 2002 was about 26% of the 731m tonnes of GHG from all sources, and about 32% of 592 m tonnes of GHG from energy combustion. Transport GHG increased by 24% from 1990 to 2002, while overall GHG increased 20% (Environment Canada, 2004, using IPCC accounting methods). Those increases are higher in percentage terms than the corresponding increases in the USA (24% vs 21%, and 20% vs. 16%, respectively), but of course the quantities are much smaller, about one tenth. A severer climate is also a factor. Federal programs and policies already in place (since ratifying the 1992 UNFCCC³) are projected to reduce greenhouse gas emissions by about 35% of the Kyoto target, which is to reduce emissions to 6% below the 1990 level by 2008-2012. After the Kyoto ratification (2002), Canada has announced a strategy for a further 40% of the target and outlined a number of current and potential actions aimed at the remaining 25% reduction. According to Environment Canada (2004), “...these programs lay the groundwork for long-term behavioural, technological, and economic change and give individual Canadians the tools that they need to do their part.” The programmes include the Climate Change Action Fund (CCAF), which funds actions, including some research, in all energy-use sectors, as well as public education and outreach. The federal transport, environment, natural resources and health departments have undertaken wide consultation and have built a substantial number of other programmes and policies that address transport sustainability, both in support of communities and of new vehicle and fuel technologies. A brief overview can be found in Gilbert and Irwin (2004).

There are other indications of the political acceptability of sustainable transport at the federal level. Since the mid 1990s, the Sustainable Transportation Strategy of the Canadian government included studying the full costs of transport – including social costs - and their implications for pricing. In 2003, the transport minister made at least the *understanding* of full costs a matter of government policy (Transport Canada, 2003). In 2004, a Federal-Provincial Task Force started work on cost estimation for different modes and an analysis of the implications for provincial transport policy. While this has no immediate impact on provincial and regional issues such as urban road pricing, it sends a strong contemporary signal. Secondly, the National Round Table on the Environment and the Economy (NRTEE) was created by the federal parliament in 1994 as a “blue ribbon” independent advisory body on sustainable development, with its members being appointed by the Prime Minister. NTREE has

³ UNFCCC is the United Nations Framework Convention on Climate Change

acted also as a channel for the output of both federal and provincial “Issues Tables” on climate change. One of 15 federal Issues Tables (1999-2000) was on transportation. A further interesting indication is that a Commissioner of the Environment and Sustainable Development (CESD) was created in 1995 as part of the office of the federal Auditor General (AG). No analogous Commissioners exist for other policy domains. The CESD, like the AG, must report to Parliament on the value for money of relevant federal programmes: sustainable urban transport programmes were the focus of a CESD audit in 2003. In parallel to federal government initiatives, NGOs and professional groups have promoted the understanding of sustainability challenges, particularly among municipal planners and the general public, for example through the Briefings series of the Transportation Association of Canada (TAC, 1993, 1998 and 2004).

The powers of Canadian provincial governments in transport, the environment and natural resources are, in general, closer to those of member countries of the EU than to those of states within the USA. Each province follows, with varying degrees of vitality, its own standards for mitigating the environmental effects of transport. This is true both at the level of assessing construction projects and regional public transport policies, and at the level of trying to influence transport’s contribution to total provincial GHG emissions. For example, in the months leading up to the 2002 Kyoto ratification, Canada saw provincial government actions that ranged from a publicity campaign against the Protocol in Alberta to a very detailed multi-agency, multi-stakeholder GHG action plan in Québec that sought to exceed the Kyoto targets. Some provinces have also used fiscal policy to encourage markets for clean and fuel-efficient vehicles, such as Ontario’s feebates in the early 1990s.

Regional and municipal governments have also been actively interested in sustainability, including transport, although managing road congestion is most often the leading transport issue. Recent trends, especially in the most populous provinces, to devolve many responsibilities from provincial agencies to municipalities has helped reinforce the role of transport planning, especially where there has been merger of municipalities into “megacities” or city regions. Canada’s population was nearly 80% urban in 2001, and its four most populous city regions centred on Toronto, Vancouver, Montréal and Calgary-Edmonton together contain roughly half of all Canadians. In these regions, population growth is nearly twice the national average (Statistics Canada, www.statcan.ca). One example of policy interest can be found in an increasingly congested Greater Toronto, where a 1992 report of a study commission compared the consequences of alternative development strategies – continued peripheral development, redensification of central areas or compact polynucleic development. It concluded that it was infeasible to increase road capacity to return to even 1986 levels of service *under any one of the three strategies* (OGTA, 1992).

Urban form and its links to motorisation are the subject of much political debate in sustainable development. Aggregate motorisation statistics put Canada 20 to 30 years behind the USA, but this is misleading. Canada is not a “lagged replica” of the US. There is already substantial suburbanisation in Canada where private vehicle holdings are similar to those in US suburbs, but there are also many urban areas where car ownership is much lower. Mindful of this, provincial policies sometimes impose sustainability goals on municipalities, for example through required elements of

master plans, by targeting infrastructure investments (see for example, Québec's Action Plan on Climate Change 2000-2002). Private vehicle emissions inspection and maintenance programmes have also been introduced by some Provinces in urban regions, such as British Columbia's AirCare which since 1992 has covered the most urbanised parts of the province in and around Greater Vancouver. However, the stability of provincial sustainability policies is not assured. As in Europe, the life spans of legislatures are at most four to five years.

2.5 Comments on the Different Perspectives - These three sets of experiences are all very different, even though there may also be common elements. Two main points seem to encapsulate those differences. There is an uneasy relationship between the federal government (or the EU) and state (or national) governments in terms of responsibilities, initiatives and resourcing of actions for sustainable transport. In part this is reflected in the EU notion of subsidiarity, which is trying to devolve the responsibility for action to the lowest appropriate level. But there do seem to be certain actions that require legislation (e.g. regulations and standards) that have to be taken at the federal or EU level, and many actions on environmental issues come within that remit (e.g. taxation on fuel and emissions standards). The links with industry (including both the vehicle manufacturers and the oil companies) are required at both the federal (or EU) and local levels.

The second observation is that environmental concerns are not new, as both the USA and Canada have at least thirty years experience of using add-on technologies and regulations on emissions, often introduced through local referenda that have been used to introduce innovative measures. The EU has taken much longer to catch up. But Canada and the EU have a much greater concern over the new dimensions of the environment, principally the GHG emissions and the need to reduce the use of carbon based fuels in transport, partly through technology and regulation, but principally through pricing (more in the EU). In the USA, there is much less of a desire to reduce GHG emissions through regulation and pricing, and there is a strong belief in technological solutions, as the economic consequences of suddenly switching from a high-mobility, car-based transport system would be economically disruptive and thus politically infeasible.

Although similar paths seem to have been followed in each area, there are important differences, especially between the EU and the USA (Table 1). In the USA, very little priority is given to sustainable transport, as energy efficiency and reductions in emissions are not seen as being politically popular, and this perception is reinforced by industry. The risks of changing policy towards sustainable transport are high, and there is a belief that technology will provide the answer. Such thinking is again reinforced by the culture in the USA, which is one of self-reliance and individualism, and the thinking that there is no alternative to the car. In the EU, there has been substantial debate over sustainable transport, with clear directions to consumers and industry on emissions targets, emissions trading and the use of pricing to influence behaviour, but there is a tradition of a mixed approach to public policy (regulation, pricing, controls and persuasion), and a belief that sustainable transport is a reachable policy objective (Table 1). Canada represents, in a number of respects, a middle ground between the EU and US, particularly in under the "interests" and "behaviour" components in Table 1. As discussed above, the "institutions" component must be seen in the context of Canada's limited federal jurisdiction in transport.

Table 1: *Different Concepts of Political Acceptability of Sustainable Transport in the USA and the EU*

		USA	EU
Interests	Economic	Maximum economic growth, accepting the environmental consequences.	Strong environmental concerns, moderating economic growth objectives.
	Power	Major interests from industry, car manufacturers and energy suppliers.	Major interest from car manufacturers – seen as opportunity for change.
	Political	Major influence to realise political preferences and get re-elected.	Some influence to realise political preferences and get re-elected.
Institutions	Formal	Federal government not seen as having a major interventionist role, but some relevant standard-setting is accepted. Scattered instances of strong state and local commitment.	Environmental policy seen as a major area for EU intervention.
	Informal	Some public concern on environmental issues.	Strong public concern on environmental issues.
Behaviour	Risks	Belief in technological solutions. Culture of freedom and independence – no alternative to the car.	Belief in strong intervention through pricing and regulation – supported by technology – acceptance of restraints on the car.
Summary	Overall	Sustainable transport is low priority and high risk – pessimistic about change.	Sustainable transport is a high priority, with EU as a world leader – optimistic about change.
	Local	State action on emissions, but little action on pricing.	Regulations on emissions, emissions trading and pricing.
	Global	No action on CO ₂ reductions.	EU and national action on CO ₂ reductions

3. Public Acceptability

3.1 Public Support - Public acceptability drives political acceptability, and perhaps the only way to progress the debate is to establish whether there is sufficient public support for change, as this is the main way to influence political thinking. Decisions relating to long distance travel may be more economically rational, as they are not undertaken every day. Such long-distance trips may not be easier to influence, but the information and persuasion processes necessary to gain support for change may be different from those needed to influence more frequently taken, shorter distance journeys. This brings the discussion back to the city level and a continuation of addressing the “easy” elements of sustainable city transport rather than the “difficult” ones of sustainable long distance and rural transport.

Sustainable transport needs to be seen by the public as being of a sufficient importance, and the proposed policy package must be seen to actually deliver the

desired outcomes (effectiveness). For example, congestion is now accepted as a major constraint on individuals' quality of life and the efficiency of business. Increasingly, surveys of public opinions in the EU are indicating that change is essential and that action is expected. Both the general public and business support giving priority to environmentally friendly modes, and even decision makers agree (usual levels of support are about 80%). Yet the same people are less positive in their views of the support of others (e.g. the public's perceptions of the politicians' views) for the same policies (typically around 40%). This suggests that there is a greater than expected willingness to experiment to reduce trip lengths, to combine trips, to switch modes, or to cancel trips altogether and reduce the need to use the car. This is not an anti-car argument, as any such proposal is doomed to failure, but it is an argument about individuals and firms reducing vehicle kilometres travelled, particularly where there is only one person in the vehicle (or empty return trips for freight vehicles). Similar survey results have been found in Australia, but not in the USA (www.warren.usyd.edu.au/transport).

In addition, it seems necessary to understand the implications and expectations of the individual. There are two key elements to the personal (rather than the social) dimension. The first is that there is an acceptance that the policy package being proposed will work (the effectiveness test), and that it is efficient. The second is that it is fair, both to the individual travellers, and more generally to society as a whole.

3.2 Building Up Acceptability – A small initial change, if sufficiently well supported and publicised (like a Car Free Day or European Mobility Week – 16-22nd September 2004), can lead to new attitudes to the car. It is through the active involvement of users of transport in a partnership that change can be realised. There are many such events happening in cities through direct action (Reclaim the Streets), through the reallocation of spaces and streets to people (the World Squares initiative, pedestrianisation, street closures), through lowering speed limits (Home Zones), through travel plans, and through cycle networks and exclusive bus networks. It must be seen as an active process that is participatory and inclusive.

One soft means by which such a change can be facilitated is to demonstrate that sustainable transport improves public health (individually and collectively). Increasing evidence is linking transport-induced emissions with declining health, and there is now overwhelming evidence of strong links between exercise (or lack of it) and obesity. Walking, cycling and public transport are all more healthy than using the car. Physical activity “almost halves the risk of cardiovascular disease and also reduces the risk of diabetes, osteoporosis and colon cancer as well as relieving anxiety and depression” (www.warren.usyd.edu.au/transport). Active transport is good for you, but there are still the indirect effects emanating from pollution, which damages health and causes problems related to asthma, bronchitis, leukaemia, and lung disease. There are also the wider effects of increases in CO₂, ozone depletion, acid rain and smog. Environmentally sustainable transport offers improvements in individual health as well as a cleaner and healthier environment (Pucher and Dijkstra, 2003).

Healthy transport means strong action on separating people from traffic and having exclusive routes for people and cyclists. It also means the promotion of travel plans for all businesses and activities that are major generators of traffic. For example, every school in the UK will have their own School Travel Plan by 2010. It is often

thought that such policies are politically unpopular, but there now seems to be strong support for action and many decision makers have underestimated the strength of feeling for change. Even in the USA, there are 146 transportation management associations (TMAs) in 2003. These voluntary associations are generally funded by groups of private businesses, and seek to coordinate carpooling, public transport, and other alternatives to solo car use for the work trip on a regional basis (Center for Urban Transit Research, 2004).

Schools have also been one focus for healthier and more sustainable travel throughout Canada. A national “Active and Safe Routes to School” programme was piloted in 1,500 schools in 1999-2001. Examples of regional efforts in the same period included a programme focussed on the travel choices of teenagers in Vancouver and Victoria schools, and anti-idling campaign targeted at Toronto motorists picking children up from school. While their effects on public acceptance of sustainable transport policies are not well understood (CESD, 2003), there was substantial public participation in these and similar programmes, which even if temporary builds public knowledge and experience.

Most other state and local sustainable transport initiatives are in this category of painless policies. For example, many American states now have Safe Routes to School Programs (SR2S) to encourage children to walk to school instead of being driven by their parents. In the USA, the federal Centers for Disease Prevention and Control and the National Highway Traffic Safety Administration endorse such programs and even provide general guidelines for local governments to implement them (US Department of Transportation, 2004c). A few state departments of transport and public health agencies have been particularly vigorous supporters. Nevertheless, the programs remain entirely voluntary for local school district participation, and they receive minimal funding from a few states (\$25 million for all of California) and non-profit organizations such as the Robert Wood Johnson Foundation.

While the effects on public acceptance of sustainable transport policies are poorly understood, there has been substantial public participation in these and similar programmes which, even if temporary, builds public knowledge and experience – good or bad – can eventually lead to attitudinal and behaviour change.

3.3 Demonstration Effects - To many people, environmentally sustainable transport requires a radical change in the way in which travel decisions are made. Naturally, people feel nervous about it, and they are reluctant to alter their behaviour. The implementation of radical policy alternatives will have substantial positive demonstration effects provided that it is well tested to avoid bad outcomes for even small numbers of participants. In the EU, there is an acceptance that transport users ought to pay their full external costs, and several pricing initiatives have been introduced under the umbrella of fair and efficient pricing (CEC, 1995). Some countries in the EU now relate the annual taxation for vehicles to their pollution profile. Germany has established different classes of cars for annual taxes levied on owners of cars. Electric cars are completely tax-free for the first five years. There are dramatically reduced tax rates for the more energy-efficient and least polluting cars, and much higher rates for large cars that are energy inefficient and more polluting. Cars meeting Euro IV standards are considered especially sustainable and benefit from large tax reduction (German Federal Ministry for Finance, 2003a). In the UK,

Annual vehicle taxation is related to the CO₂ emissions figures, with six bands (Table 2).

Table 2: Annual Charges for Vehicle Taxation (£ 2004)

Band	CO ₂ Emissions (g/km)	Diesel Car	Petrol Car	Alternative Fuel Car
AAA	Under 100	75	65	55
AA	101 –120	85	75	65
A	121-150	115	105	95
B	151-165	135	125	115
C	166-185	155	145	135
D	Over 185	165	160	155

Source: Driver and Vehicle Licensing Agency (2004)

Arguably, one of the more interesting demonstration effects is found in car-sharing, as an alternative to car ownership. Success came first in Europe, notably in Germany and Switzerland, and by 2004 reportedly had more than 70,000 members (<http://www.apta.com/services/intnatl/intfocus/020722carsharing.cfm>). In North America, Communauto, the first successful car-sharing associations of any size, started in Canada in Quebec City in 1994, then Montréal in 1995. By 2004, it had grown to more than 6,000 members in four cities (Communauto, 2004), and similar schemes are growing in other urban regions of Canada. Detractors of car-sharing see it as socialisation into car-use for younger people, whereas its promoters point to its integration with public modes, making the latter more widely used. It gives personal experience of what is in effect a new mode and is of strong relevance to the viability of urban environments with lower penetration of car ownership. Perhaps for this reason, car-sharing is experiencing a more modest success in the USA.

Probably the best example is the experience from congestion charging in Central London. This is the most radical transport policy that has been introduced in the UK in the last 20 years. It represents a watershed in policy action. The idea had been around for many years, but no politician had the conviction of actually taking it forwards. Even with a new Mayor hugely committed to congestion charging, it was a struggle to get it through the legal, planning and political processes within a 30 month period (1st July 2000 to 17th February 2003). This relates strongly to the issue of the conflicts between long and short-term strategies (Banister, 2003). The long term view is that congestion charging is an essential element of a sustainable transport strategy, whilst the short-term view is that it is almost impossible to introduce in a four-year electoral cycle (as exists in the UK).

To achieve public acceptability, there has been extensive consultation with all parties, resulting in much compromise. For example, under half (45%) of vehicles actually pay the full charge (£5 – raised to £8 in July 2005), while a further 29% have discounts of varying kinds, and the remaining 26% of vehicles are exempt. The large number of discounts and exemptions has reduced the effectiveness of the policy, and problems may be created later if these exemptions are to be reassessed. There was also a reduction in the proposed charge of £15 for lorries to £5, minor boundary changes, and a slight shortening of the charging period (07.00-18.30 on weekdays – now shortened to end at 18.00). Much analysis and monitoring is being carried out to determine both the transport and the non-transport impacts of congestion charging,

both within the cordon area and in the London conurbation as a whole (www.cclondon.com and www.open.gov.uk/glondon/transport/rocol.htm).

Such an example raises important policy dilemmas. The potential demonstration effects of the congestion charging scheme are substantial, as many other cities may learn from London and introduce their own schemes. But in order to achieve implementation, many concessions have been made, and these may in turn reduce the effectiveness of congestion charging. A balance must be struck between the desired scheme and an acceptable scheme. The potential risk is substantial, but such choices have to be made if radical environmentally sustainable transport policies are to be introduced at all. Conversely, implementation of a scheme could be seen as the first step in a process where incremental changes are then added to the basic scheme until the final goal of a full electronic road pricing scheme in London is achieved. In the first two years (February 2003 to 2005), the scheme and the technology have worked well and gained widespread acceptance, with measurable reductions in both traffic levels (15-20 %) and congestion (over 20 %) in Central London and around the congestion charging area. In this case, both the social norms and perceptions of its effectiveness were sufficiently high for implementation, and the outcome has exceeded expectations (Table 3).

Table 3: Impacts of Congestion Charging in Central London

<ol style="list-style-type: none">1. Traffic down 20% entering the Congestion Charging Zone and some 16% within the Zone.2. Speeds increased 10-15% within the Zone.3. Increase of 5% in traffic on Inner Ring Road around the Zone, but little change in traffic speeds.4. About 100,000 motorists pay each day.5. Most travellers have switched to bus services – which run more freely and services have been increased - +16% bus patronage, reliability improved (30% reduction in wait time) and speeds have increased by over 15% in the Central Area.6. Net benefits from the Congestion Charging Scheme are about £50 million per annum.7. Public acceptance is now 55% for the Scheme and 30% against it, when before implementation the figures were 40% for and 40% against.
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Source: Livingstone (2004)

Parking controls have been the main means to deter drivers from bringing their cars into the city centre, and most European cities have limited and expensive parking available in the centre. For example, many German cities have a systematic parking management plan, usually entailing rather expensive prices for parking, but differentiated by time and location to discourage traffic in the most congested, most polluted areas of the city. Munich's system is one of the most refined, but most cities have some sort of parking management program (IHK München, 2004 and IHK Berlin, 2004). But these positive messages need to be set against the use of tax breaks for the journey to work. Germany allows per km tax deductions from the income tax for work commuters regardless of mode of travel. Thus, even pedestrians and cyclists, and of course, public transport riders, are entitled to this tax break. Prior to

the current coalition government (Social Democrats and Greens), only car users got this tax deduction (German Federal Ministry for Finance, 2001).

3.4 Individual Marketing – Much of conventional choice theory assumes that each individual has complete knowledge of the alternatives and can make a rational choice – this is the basis of consumer choice modelling. More recent empirical research (e.g. Brög et al., 2004) suggests that a much more proactive approach is required that not only informs individuals about the alternatives that are available, but also helps them decide which is most suitable for them. Information has to be taken to the customer, rather than assuming that they will find it themselves. Individualised marketing is the best example of this dialogue-based technique for promoting the use of public transport, cycling and walking as alternatives to the car. It has been developed and applied in many European and Australian cities with positive outcomes (reductions in car use of around 10 %), and more importantly, it seems that changes in travel behaviour are maintained over time.

This is not an idea that has much currency in North America, but the 10% order of magnitude is interesting as it echoes the average level of voluntary reduction car-use in 1984 and 1988 surveys of likely behaviour in a fuel shortage in Canada. These surveys observed hypothetical shifts in actual recent behaviour using gaming-simulations, rather than asking motorists to predict their responses in a future shortage (Lee-Gosselin, 1990).

Public acceptability seems to be high provided that social norms can be changed and the policy measures are presented as a package that can effectively be implemented. The process needs to build up trust and respect between the different actors over time, so communication and active involvement is essential. It also seems that legitimacy must be based on a participatory and inclusive approach that involves “selling” the message of sustainable transport to individuals, groups and localities through explaining the need for changes in behaviour and convincing them of the importance of their contribution. This responds to the Schade and Schlag (2003) goals of importance and fairness in urban transport pricing strategies, and the need to both guide and force change (Vlek, 2000). In many situations, there are strong positive measures (reducing global warming and healthy transport) that can be promoted, but underlying success is the need for a high level commitment to sustainable transport and strong leadership. In both the USA and the EU, this leadership has primarily been found in the cities, rather than at the national or international levels.

4. Principles of Acceptability

Sustainable transport can best be achieved with a strong combination of four separate sets of policy measures

- a) Technology, including investment in technology in transport modes, information systems and in the transport system itself, and in giving industry clear directions on priorities (e.g. on hybrid and fuel efficient vehicles and alternative fuels);
- b) User regulation, including driver and vehicle licensing, taxation and pricing, standards and traffic regulations;
- c) Land use development, including planning and regulation;

- d) Information, including social pressure, awareness raising, demonstration, persuasion, and individual marketing.

In all situations, it is important to use the best available technology, and this means that clear signals can be given to industry to produce more efficient vehicles, making the best use of renewal energy sources and hybrid engines. For the general public, these options are not controversial as it enables them to carry out their activities with minimal change. It also seems to be accepted in the EU and Canada that the external costs of transport should be reflected in the actual costs of travel through higher fuel prices or through some form of road user charging. Demand management both reduces congestion and improves environmental quality, but it does require public support to work effectively. Similarly, physical restraint measures and development patterns that support shorter travel distances are seen as desirable in terms of improving levels of accessibility. These first three sets of policies are not the focus here, but they are still important as they interface with public acceptability through establishing particular patterns of travel behaviour through the use of particular modes, and the possibility of technological and institutional lock in. Our focus is on the last set of policy measures.

Acceptability is an essential (yet often neglected) element of sustainable transport. Seven key principles emerge from the previous discussion. The first four are uncontroversial, but the second three require more careful investigation, as they begin to tackle some of the more fundamental questions.

1. *Information*, including education, awareness campaigns, and prompting through media and social pressure. Here, the purpose is to explain the need for sustainable transport policies, emphasising the positive benefits to the individual and businesses. It may be appropriate to concentrate on the health benefits to the individual and society as a whole.
2. *Involvement* and communication between all stakeholders, so that the process is seen to be inclusive and both its aims and means are clear to those on whom the strategy will impact. This part of the acceptance process is designed to gain support and understanding, so that the public can buy into what is being proposed, which in turn means that there is likely to be a high level of consistency between expectations and outcomes. Solutions to difficult policy decisions cannot be imposed on people without their understanding (and acceptance) of the motivations and benefits to them and to society more generally. Failure to gain public acceptance means that avoidance strategies will be found to continue with “business as usual”, and if this outcome is widespread, then the achievement of sustainable transport is not a realistic policy goal.
3. *Packaging* of push and pull policies are necessary, as all sustainable transport actions will involve combinations of measures. For example, policies restricting car use or raising its costs should be accompanied by well publicised programmes to improve the availability and attractiveness of alternatives to driving alone, including car pooling, public transport, cycling and walking, financed by dedicated revenues from all car pricing measures.

4. *Selling the Benefits* - While many sustainable transport measures entail some form of costs, inconvenience, and sacrifice, they also provide substantial benefits, even in the short-term, and it is necessary to widely publicize these benefits. Thus, car drivers will support funding of alternative modes to reduce congestion on the roads they drive on. Overweight or obese individuals would directly benefit from better walking and cycling conditions that would provide them with more daily exercise. Everyone benefits from cleaner air and safer traffic conditions. More walking, cycling, and public transport use would help relieve parking shortages. These are not theoretical, long-run benefits, but important, direct impacts that even the most “self centred” person can support. The individual benefits of sustainable transport and development policies must also be emphasised, since the longer-term, societal benefits may not be convincing.

These four principles of acceptability are widely used, as many cities are already actively involved in debating sustainable transport strategies. For example in the USA, the Surgeon General’s Office, the Centers for Disease Prevention and Control, the American Medical Association, the Robert Wood Johnson Foundation, the American Public Health Association, and many other non-profit groups have been widely publicizing the severe health impacts of car-dependent lifestyles and promoting more walking and cycling for daily travel (Pucher and Dijkstra, 2003). Given the direct benefits it would provide to so many people, this is a message that should provide an effective source of public and political support for sustainable transport policies.

But the scale of change required to really begin to make an impact on the global and local environment means that a deeper understanding of acceptability is needed. Rather than trying to encourage automatic responses and continuous evaluation in terms of the benefits to individuals, the debate must also embrace reasoned actions that examine the whole process in terms of societal benefits, where all options and implications are considered. Behavioural change must be seen as part of the solution. It seems that virtually none of the prerequisites are met in the USA, as most Americans are not willing to change their travel behaviour for overall societal reasons unless they are forced to, such as under shortage or emergency conditions. In addition, there are three other principles that are more controversial.

5. *Adopt controversial policies in stages* so that support can be built up in terms of positive outcomes and measurable improvements in the quality of life. Politics is about reflecting prevailing preferences and also forming opinions. As noted above, acceptability requires the involvement of all actors including residents, businesses, and interest groups, so that each of them can take on responsibilities and give a commitment to change through actions. It is only with the support of a substantial majority of stakeholders and clear leadership that effective action will take place.

Simple decisions can act as triggers and generate new forms of activities. For example, telecentres can encourage more local patterns of activities as the journey to work is replaced by local movements. If sufficient uptake happens, it would be worthwhile to open local services such as cafes and shops creating self contained local centres. Alternatively, controversial policies such as road

pricing could be introduced in progressive stages, rather than in one action. Initially, road space could be reallocated to public transport services and parking charges in the city raised substantially, with new park and ride services being provided to give the motorist a choice. In stage two, cars would be allowed in the bus lanes if they paid, and gradually more of the road space would be allocated to the paying motorist and public transport. As public transport is now more reliable, patronage would rise and further investments would be initiated to again increase capacity and frequency. Such a dynamic facilitates implementation, gains public acceptability and gradually familiarises users with road pricing, whilst at the same time provides choice through high quality public transport.

6. *Consistency and Longer Term Perspectives* – When thinking about measures to achieve sustainable transport, there are some (like pricing) that are common to all futures. Such measures need to be implemented now, even though their impacts might be slow in the initial stages. For example, the UK government has increased the costs of driving through raising fuel duty by at least 5 % in real terms each year. In the transport sector, this has been the main policy being pursued to meet the Kyoto reduction targets for CO₂ emissions. Over a six year period, this increased the price of a litre of fuel from about 45 pence to 85 pence (1994-2000), of which 70 pence is tax and duty. The escalator was removed (2000) after pressure from industry and other interests, particularly those in rural areas.

The petrol tax in Germany was indexed to increase regularly, just as in the UK, but only between 1999 and 2003. The tax rose by 6Pfg (or about 3 Eurocents) per litre every year. The ruling coalition of Social Democrats and Greens adopted this, but the automatic annual increase was suspended in 2004 due to political pressure (German Federal Ministry for Finance, 2003b). So the long-term commitment was terminated, and it seems that only through concerted action at the EU level will a European escalator be introduced. Regulations, standards, subsidies and tax incentives should all be used to encourage manufacturers and other transport suppliers to develop and adopt the most energy efficient and environmentally friendly technology possible.

A second element here is that even though some details of the science remain to be finalised, the precautionary principle should be followed, particularly on the global warming effects of transport emissions. Some measures may have unexpected results, and these need to be accommodated. For example, a major change in the built form has an enormous potential to influence travel patterns and mobility, but it will take time to actually impact on travel patterns. Location decisions made now on where to build new houses, schools, hospitals and shops will substantially influence future travel patterns. Many of the problems created for the transport system do not emanate from the transport sector, but from other sectors. So a more holistic perspective is needed that integrates decision-making across sectors and widens the public discourse.

7. *Adaptability* - Decisions today should not unnecessarily restrict the scope for future decisions. When the impact of strong measures is hard to predict, a

good strategy may be to make piece-meal changes and to test several solutions in small-scale experiments, so that the adaptive behaviour of individuals and agencies can be assessed. As with all of these conditions, there is no prescription or blueprint for the correct procedures to follow. Each situation requires separate analysis and implementation, including flexibility to change policy measures if intentions and outcomes do not match up. Assessment of risk and reversibility are both strong components of environmentally sustainable transport. The central goal of sustainable mobility must remain with support from all political, business and public decision makers. But adaptability is not an excuse for inaction or weak action. It is an argument for clear decision making, leadership, supported by analysis and monitoring to check on the effectiveness of policy action.

The messages are clear. There is strong support for enlarging the scope of public discourse and empowering all the key stakeholders through an interactive and participatory process. The open and active involvement of all parties would be far more effective than the conventional passive means of persuasion. Thus, broad coalitions should be formed to include specialists, researchers, academics, practitioners, policy makers and activists in the related areas of transport, land use, urban affairs, environment, public health, ecology, engineering, green modes and public transport. It is only when such coalitions form that a real debate about sustainable transport can take place. There must be a willingness to change and an acceptance of collective responsibility. To achieve environmentally sustainable transport, the arguments must be sufficiently powerful to overcome the dependence on the car and the fact that the costs of delay and congestion have already been internalised by drivers.

There are hopeful signs even in the USA. Although over 90% of trips in American cities are by car, voters are increasingly supporting tax-financed funding for alternative transport modes. For example, in state and local referenda in the November 2004 election, public transport issues won almost everywhere. At least 23 of the 31 ballot measures to launch or expand bus and light rail lines in 11 states were approved, with a total price tag of over \$40 billion. For example, in Colorado, 57 percent of Denver area voters approved a sales tax increase to finance a \$4.7 billion expansion of light rail to the suburbs and the city's airport. In Arizona, 57 percent of Maricopa county voters agreed to extend a half-cent sales tax to fund the Phoenix light rail system. In Sonoma County, California, two-thirds of voters approved a sales tax hike to ease traffic congestion by building a rail line and pedestrian paths. Although many of these initiatives may seem small in terms of addressing sustainable accessibility, they mark a significant move in a positive direction, especially in a country such as the USA that has so long favoured the private car in all its policies.

5. Conclusions

Individuals' behaviour changes continuously in response to policy measures, but also to changing personal circumstances (e.g. the acquisition of a car), location and life cycle changes. Analysis needs to explore change, as both the net effects (average) and the individual effects (variance) are important to understanding overall behavioural change. The economic rationality arguments seem to be weak with

respect to this volatility in individual behaviour. There is a need to engage with people through debate, and discussion is crucial to convincing them of the legitimacy and fairness of behavioural change. Short-term action is possible through the variety of means outlined in this chapter. This means a gradual change through the reassessment of whether particular activities are essential, and whether they can be undertaken with others, or more locally, or by public transport, or with no travel through the use of telecommunications. Over the longer term, there are other decisions that have an important impact on sustainable transport, such as moving home, changing job, or new family commitment, as well as car acquisition questions. It is here that economic rationality has a more important role to play, but sustainability should be pushed higher up the agenda. Political leadership has a key role here in establishing broader social and distributional objectives, and a clearer perspective on how sustainable transport and improvements in the quality of life can be achieved.

Even though there is an acceptance that transport is contributing increasingly to global warming and the lowering of environmental quality in cities (and elsewhere), that is not sufficient to encourage effective action. Nor has the increased recent linking of transport emissions to a range of health impacts, together with the concern over obesity, provided a sufficient impetus to change. The scientific evidence of the links and a potential causality between transport and public health is now emerging (TRB, 2002), in particular as it relates to accident associated trauma, the effects of air pollutants on respiratory health (in particular particulates from diesel), increasing levels of driver stress, and the community costs of noise. But the links between health, global warming and transport are not entirely clear, and even if specific causal links could be established, the question remains whether it would be sufficient to permit dramatic changes in public policies and travel behaviour. Perhaps there is a case here for a high level education programme that explains and widely publicizes the links between transport, the environment and health, and the necessity to adopt healthier lifestyles, including more walking and cycling for daily travel.

There is considerable difference in approach between the EU and North America, with many countries in Europe deferring to the EU itself for leadership on difficult environmental issues, including sustainable transport. This is a “top down” approach on promoting EU-wide pricing strategies, complemented by regulations and standards, through Directives that give national governments three years to implement change in their own legislation. In the USA, there is a greater variability in approach with clear directions from the federal government through standards (e.g. CAFE), but there is more of a “bottom up” approach as some of the States are pushing hard on promoting clean transport. At the city level, there are also many initiatives being introduced in the EU, Canada and US cities, which are designed to allocate space to priority users through regulation and pricing. It is here that many of the best examples of sustainable transport are evident, and it is also here that both sides of the Atlantic have much to learn from each other.

The overriding conclusion is that there is too much complacency with the current situation in the EU, the USA and Canada. In particular, there is an exaggerated hope that technological solutions will soon be available. That is particularly true in the USA. But technological solutions alone will not suffice, and even in this respect, governments should do more to encourage more sustainable technologies, for

example, by establishing stricter energy and environmental standards. Postponement of action on this front ignores the time it takes for the technology to work its way through into the vehicle stock. Initially, it is likely that hydrogen will be produced from ethanol and biomass, which still produce substantial quantities of carbon, so this is not “solving” the problem of carbon dioxide emissions, only reducing it. There are also substantial costs associated with the difficulty of storing the hydrogen and in filling vehicles (i.e. safety and the time taken), and in the design of the onboard reformer (Science, 2004).

There are clear trans-Atlantic differences, as there is a greater willingness to accept government intervention in the EU than there is in the USA or Canada, where there is a strong ideological resistance to many forms of government intervention. In the USA there is also a concern over the loss of competitiveness in the economy resulting from increased regulation and control. In the EU the possibilities for sustainable transport are seen as more of an opportunity to open new markets for products and environmentally based policies in transport. Canada lies in between these two positions as it has a sparse but heavily urbanised population. This uncertainty is reinforced by the essentially short-term view of all politicians (to the next election), and this is where the longer-term perspective of the EU provides some optimism that there will be commitment and continuity of change over time. This is perhaps reflected in the greater social concerns in the EU, whilst in the USA there is a stronger culture of individualism. The need for more sustainable transport is similarly crucial in the USA, Canada and the EU, because of both local and global impacts. Nevertheless, the relative political importance of environmental issues varies considerably, both among and within countries, and the acceptable measures to improve sustainability are very different in the USA, Canada and the EU.

The good news is that there are many effective ways to increase the public and political acceptability of sustainable transport before reaching a crisis situation. Many cities and countries throughout the world have already demonstrated that it is possible. Now is the crucial time to employ every possible strategy to increase the public and political acceptability of the necessary policies to improve the sustainability of our transport systems.

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