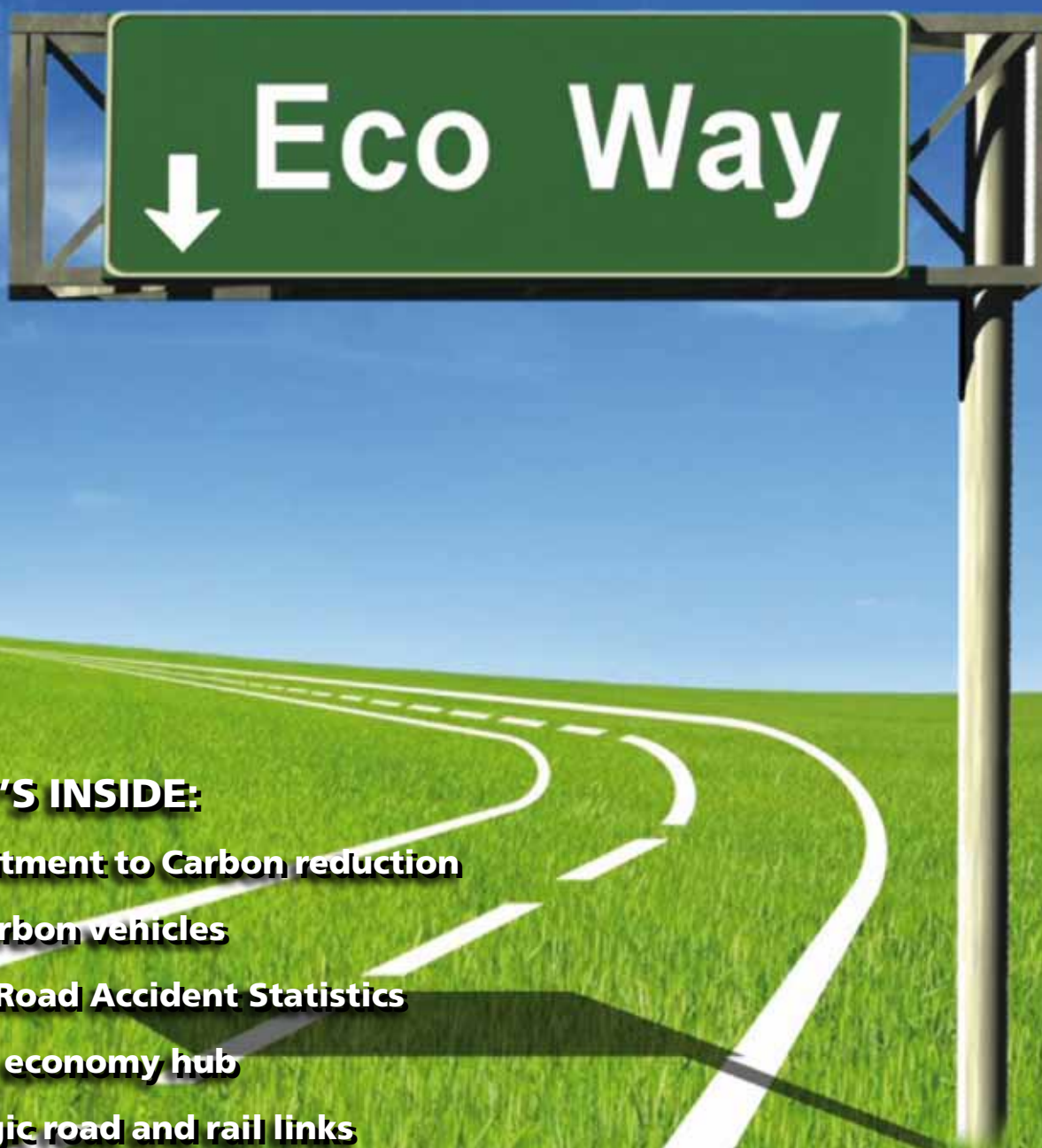


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The Scottish Transport Studies Group (STSG)

STR is the newsletter of the Scottish Transport Studies Group (STSG) and is largely funded from STSG membership subscriptions. STSG was formed in 1984 and now has corporate and individual members from transport operators, industry, national government, local government, universities, and consultants.

The aims of STSG are "to stimulate interest in, and awareness of, the transport function and its importance for the Scottish economy and society: to encourage contacts between operators, public bodies, users, academia and other organisations and individuals with interests in transport in a Scottish context; to issue publications and organise conferences and seminars related to transport policy and research". STSG is a charity registered in Scotland number SCO14720.

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Who decides what goes in STR?

Firstly the members of STSG - We rely on STSG members and others telling us about interesting studies they have completed or knowledge they have. To keep subscriptions low we need members to invest time to share their knowledge. STSG has some funds to commission some analysis and reporting but the editorial work is undertaken voluntarily.

Secondly the Editor Derek Halden, assisted by the STSG Committee tries to fit the contributions into 16 pages and create a readable document.

If you can contribute to STR please e-mail editor@stsg.org

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Finding the Money for Transport Emissions Reductions whilst Growing the Economy

Derek Halden, STR Editor

Einstein commented we cannot always solve a problem with the same toolkit we used to create it. Oil has been the engine of the economy, and 99% of current transport depends on burning oil. As cheap oil runs out, and the climate demands new solutions, are we succeeding in nurturing the new toolkit for transport?

Working towards more sustainable transport has been mainstream within transport policy for nearly 20 years, but these policies are not yet well connected to the engine of transport delivery. There is absolutely no reason why we cannot build a new transport economy that is bigger and better than the oil dependent one. First the transport industry needs to learn how to change. Professionals can identify the type of solutions that might work best for people in the years ahead, but ultimately change depends on what people choose to buy.

The population of Scotland spends more than 15% of all they earn on travel. Perhaps they will buy into new solutions with zero emission shared electric driverless cars and provide the investment to rebuild our towns and cities to accommodate these. However investment on this scale demands a culture change. The recession is a good opportunity to plant the seeds of this change.

Transport professionals have been poor at leading the public debate on transport, preferring to work through the back door of public authorities and let politicians take success or failure on the chin. The "Travel Choices for Scotland" presented in our national transport white paper a decade

ago need to move from debates within the town hall to the public discussions in the coffee bar. Continuing to rely on public funding to tackle the market failures in transport is no longer an option. Transport markets themselves need to become more sustainable through new trading and charging schemes.

Continuing to rely on public funding to tackle the market failures in transport is no longer an option. Transport markets themselves need to become more sustainable through new trading and charging schemes

Even without investment, travel choices are already available. Research shows that people can be pleasantly surprised how much their quality of life improves when they walk to the shops and in doing so, meet their neighbours, keep fit, feel good about reducing their impact on the environment, and save money. But it is the last point that defines the greatest barrier to sustainable transport. It is spending, rather than saving, money that drives the transport economy. This needs to change so that people can invest in sustainability through daily travel choices.

The emerging sustainable transport toolkit includes measures to improve social capital, and invest in local places as well as infrastructure

changes. Some people might want to pay road and bridge tolls in return for lower car and fuel taxes. Others would make the opposite choice. What is clear is that at least as many people are happy to buy into sustainable travel choices as to oppose them. The basic principle that offering choice increases the size of the market, applies to transport as much as any other sector of the economy.

Scottish transport now faces the twin squeeze of implementing the Climate Change Act and declining public budgets. Developing new markets to connect up the economy and society are needed now more than at any time in history. These markets may emerge through road and carbon pricing, or growth in social capital and place making. Scotland's future transport wealth may be as much about creating places for people as moving people about.

The transport sector cannot continue simply to fail on the sustainability agenda as it has done for the last 20 years. Accessibility continues to decline for most people, and the transport sector accounts for the fastest growing emissions. New energy sources will fundamentally change the way that people travel and the design of cars. Just as transport markets have evolved and underpinned the development of Scotland in the past, they are set to make a major contribution to the future of the Scottish economy. To achieve this requires a new type of transport debate with the primary focus being on a new toolkit for improved accessibility, place making and developing social capital.

What policies are effective at reducing carbon emissions from surface passenger transport?

*Edited from a report by the UK Energy Research Centre
by Transport Topic Leader Jillian Anable University of Aberdeen*

This review examines the merits of a range of different policies that offer the prospect of CO2 emissions reduction from road transport. The potential for policies to deliver carbon emissions reduction through encouraging changes to 'behaviour' (changing people's 'travel choices' and reducing car travel) may not be as well understood as policies that target vehicle technologies.

ACTORS, CHOICES AND POLICIES: A FRAMEWORK FOR ANALYSIS

Policymaking in the transport arena is complex because so many actors and choices have the potential to reduce emissions. The relationships between actors, choices and policies are illustrated in Figure 1. This framework is used to consider how policies affect a range of choices

and the key actors making them. The policies affect two categories of choice:

- Travel choices such as how and how far to travel
- Vehicle purchase choices.

Fuel taxes and prices, also affect both travel and vehicle choices.

LOWER CARBON TRAVEL CHOICES

Some interventions offer the potential to reduce carbon dioxide emissions by reducing demand for travel, facilitating the use of non-motorised or public transport and using cars more efficiently. Although planning policies are not discussed in detail in this report, land use planning plays a significant role in reducing (or increasing) demand for travel, affects mode choice and can improve (or undermine) the viability of public transport.

Reducing demand for travel – Key determinants of travel demand include: absolute and relative prices of travel by all modes, land use and choice of destinations, and economic growth. Planning policies can play a significant role in reducing demand for travel. Fuel price increases reduce travel absolutely as well as encouraging mode shifts and more efficient driving. Road pricing may have similar effects. The provision of extra road or public transport capacity can also lead to absolute increases in travel demand. However there are few policies which set out directly to influence the total amount of travel in the system (i.e. to reduce total trips). It is difficult to draw firm conclusions about the potential of tele-activity to reduce emissions, or the policies required to accelerate it. Considerably more work is needed on the potential for tele-activity to influence car dependent lifestyles.

Support for non-motorised modes – A significant fraction of journeys can be made by walking or cycling, since this is the experience

of several European countries. Increasing the share of cycling in Britain to levels closer to those of our Northern European neighbours could yield emissions savings in the UK of around 2 MtC (7.3Mt CO₂) per year (approximately 6% of total transport emissions by source) if like-for-like mode switching was delivered. The savings could be greater if destination switching was also achieved. Inter-country comparisons suggest that effective policies to make cycling safer and more convenient, for example through segregation and prioritisation, correlate closely with levels of cycling. However there is also evidence that policies that penalise car use (congestion charging in particular) and individualised marketing can assist in the uptake of cycling.

policies are able to deliver emission reduction at relatively low cost, provided a well-designed package of policies is put in place.

Support for public transport – The evidence on the potential of public transport to reduce emissions presents a complex and somewhat contradictory picture. On average, emissions per passenger km are much lower than those for private cars. There is a strong

link between the availability of convenient and affordable public transport and patterns of land use that are conducive to lower reliance on private cars. However, the short to medium term potential for public transport to contribute to emissions reductions is relatively limited. The main reasons are that capacity expansion may need to be large in order to absorb a significant proportion of car journeys, that demand may be induced by new routes and lower fares, and users may be attracted from other low carbon modes as well as from cars. It is important to consider the potential to improve occupancy at underutilised times/routes as well as how to provide new capacity.

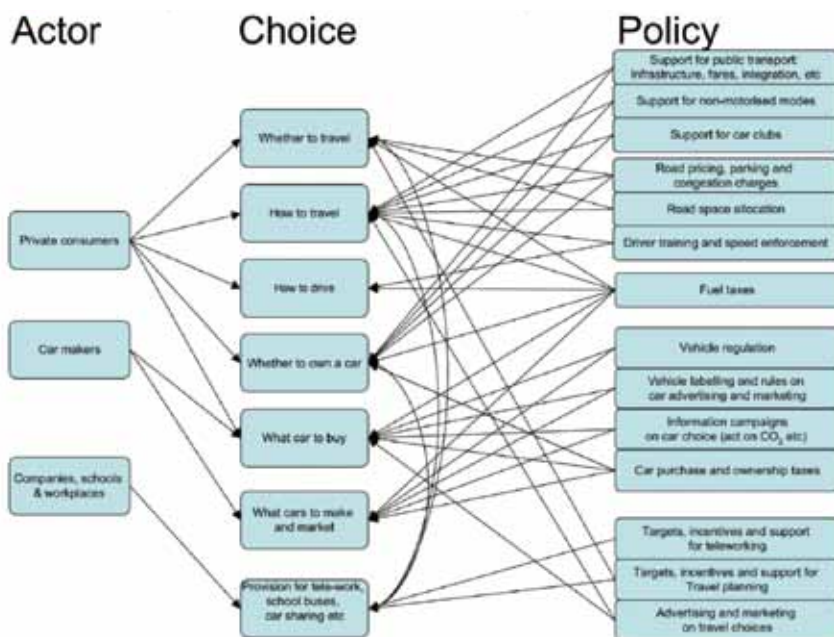
Car clubs – Relative to car ownership, car clubs appear to help reduce total car miles driven, with members who previously owned a car walking, cycling, and using public transport more often, as well as travelling less by car. The research also shows that this reduction of car miles is a direct result of breaking the link between car use and car ownership – exactly the service that clubs provide. More research is needed into the potential rate and scale of growth and how to attract car club membership from a wider section of the population and on cost-effectiveness of carbon saving.

Using vehicles more efficiently – Improving vehicle occupancy offers large potential savings at low cost but it is difficult to deliver in practice. Potential savings from eco-driving campaigns appear to be significant and costs low: reductions in emissions of 10–15% appear feasible at a cost of below £20/tC.

Individualised marketing and travel planning – Travel planning can have a measurable and significant impact on travel choices, typically reducing car usage by between 6% and 30% depending upon context. The most common shifts appear to be to non-motorised modes, though use of public transport and improved car occupancy are also significant. Reported costs fall within a wide range for school and workplace travel planning, from below £30 to over £500 per tC. Cost and accounting for co-benefits requires further research.

Road pricing – Individual congestion charging schemes have led to significant reductions in emissions

within each zone and the evidence suggests that this is offset only to a limited extent by



additional journeys outside the zone. Savings result from both reduced car traffic and more efficient car use, due to reduced congestion. Congestion charging can help promote modal shift and increased vehicle occupancy.

Road space provision and reallocation – The evidence examined supports a clear causal relationship between added road capacity and increased traffic volumes. Short-term emissions reductions from lower congestion and higher/smooth speeds are eroded in the longer term by induced traffic. By contrast, well-designed and well-implemented schemes to reallocate road space away from general

traffic may help to improve conditions for pedestrians, cyclists or public transport users, without significantly increasing congestion or other related problems. There is no clear evidence on costs.

VEHICLE CHOICES

Policies that target car makers, notably voluntary or compulsory emissions standards, may be able to drive the development and availability of lower carbon vehicles. However the vehicles available are only part of the story, since offerings must be attractive to consumers. Emissions per km for the range of cars available today is wide, merely choosing best in class can reduce emissions by at least 50%, sometimes substantially more.

Regulations and Standards – Standards for vehicle emissions can and have improved vehicle efficiency and so can reduce emissions. Until recently however, regulation and voluntary agreements have not been pursued with a level of sustained ambition sufficient to deliver large reductions in emissions from the vehicle fleet. A more ambitious target has now been agreed by the EU (95 g/km in 2020). Net costs to society and individuals are often low or even negative.

Fiscal measures influence consumers – Targets and standards can be complemented by fiscal measures. Evidence from a range of countries suggests that purchase taxes can have a quantifiable impact on sales of lower emission vehicles, particularly when accompanied by subsidies for the lowest emission cars.

Information, labelling and car advertising – The evidence suggests that labelling is an important component of a wider range of policies. Some

analysts argue that the relationship between emissions performance and future running costs needs to be explained more clearly to consumers and that this information should be extended to car advertising in a prominent and consistent way.

Rebound – Both vehicle purchase/circulation taxes and vehicle emission standards can be undermined to some degree by so called rebound effects, whereby the lower fuel costs associated with more efficient cars encourage drivers to drive more. The rebound effect for more efficient vehicles has been studied and estimated to lie in the range 20 to 40%. Whilst this suggests that absolute reductions in emissions can be delivered regardless of rebounds, fiscal and regulatory measures will be most effective when accompanied by policies which mitigate rebounds.

FUEL PRICES AND TAXES

Fuel price increases lead to fuel demand decreases, albeit in a relatively inelastic way. Hence fuel taxes can reduce emissions, or at least slow emissions growth. Unlike some other policies there is no potential for direct rebound effects to undermine savings. Response to fuel prices is complex and depends upon availability of alternatives, income, total cost of motoring and a range of other factors. The strong relationship between income and demand for travel suggests that during conditions of economic growth fuel taxes need to be continually increased if they are to constrain demand growth driven by rising incomes. Response to price is generally inelastic, particularly in the short term, with the implication that large increases in prices/tax levels are needed to deliver significant reductions in demand.

CONCLUSIONS

Short run options with clear potential to reduce carbon emissions in the UK include ecodriving and speed enforcement, expanding the use of non-motorised modes and improving vehicle occupancy. Improving the off-peak utilisation of existing public transport in cities and overall utilisation of buses and trains outside the major metropolitan areas may also be possible. Policies to promote these options include travel planning, fuel and road price increases, dedicated infrastructure or prioritisation for non-motorised modes, and training and education campaigns. Whilst policies to promote lower carbon car choices can have an immediate effect on new car sales it takes time for the vehicle fleet to turnover, so short run impacts on transport emissions are modest. Relatively low elasticity of demand for fuel suggests that the impact of fuel tax increases may be limited in the short run. However despite the political problems that surround fuel taxes in particular, prices can play an important role in determining travel and vehicle choices.

Medium term potential exists in reallocating road space to extend bus and light rail provision. Road pricing and fuel tax rises, competitive fares and service improvements, combined with information provision through travel plans are likely to be effective policy packages. It may also be possible to accelerate a shift to a much more efficient vehicle fleet. Circulation and fuel taxes combined with 'scrappage' subsidies may be able to deliver this goal if combined with information and education.

In the long run both travel and car choices can deliver significant emissions reduction: It is possible to provide an integrated approach to delivering new infrastructure for public transport and non-motorised modes, linked to land use planning such that demand for travel is reduced and significant mode and destination shifting is delivered. This is most likely to be achieved if support for mode shift is accompanied by road use and parking charges, fuel tax increases, road space reallocation and travel planning and other information provision campaigns. Relative prices of different modes play an important role in shaping long-term travel choices. It is also possible over time to facilitate a substantial shift to lower carbon cars. Our review suggests that the most effective policies are emissions regulation, purchase taxes and fuel tax, aided by rules on marketing and labelling. Rebound effects need to be addressed.

Policies can change behaviour, and make a real impact on CO2 emissions. Some policies are able to deliver emission reduction at relatively low cost, provided a well-designed package of policies is put in place.

A Commitment to Mitigating Climate Change

Sam Anson (Scottish Government), and Steven Fraser (Atkins)

A 9-month study carried out for the Scottish Government's Transport Directorate into how transport's climate change impact in Scotland could be mitigated has concluded that a combination of travel demand management, fiscal policy changes and adoption of cleaner technology could reduce CO₂ emissions by up to 12%. The study, carried out by Atkins in partnership with the University of Aberdeen, identified, analysed, and reported on the 22 separate transport policy measures which are devolved to the Scottish Government.

In 2007, Scottish transport, including international aviation and shipping, accounted for 14.7 mega-tonnes of carbon dioxide equivalent (MtCO₂e), or 25.9% of total Scottish greenhouse gas emissions. This figure, both in terms of absolute emissions and the proportion of total emissions, continues to grow on an annual basis.

Reducing emissions from transport is one of the National Transport Strategy's three key strategic outcomes. On 5th December 2008 the Scottish Government published the Climate Change (Scotland) Bill, which includes a commitment to reduce emissions by 50% by 2030, and by 80% by 2050. The

finalised Act also includes an interim target of a 42% reduction by 2020. These targets demonstrate a bold commitment by the Scottish Government. It signifies the importance Scotland places on playing its part in mitigating one of the most serious threats facing our world.

The Scottish Government's Transport Directorate wants to improve its evidence base on how it can contribute to meeting emission reduction targets and appointed Atkins in partnership with the University of Aberdeen to undertake a study to identify, analyse, and report on the policy options available to the Scottish Government.

METHODOLOGY

- The study was carried out using a seven stage methodology:
- Establishment of a preliminary long list of potential policy options;
- Identification of "ownership" of options;
- Finalisation and filtering of the policy option list;
- Comparison of Scottish and UK transport use and requirements;
- Establishment of the baseline 'business as usual' emissions scenario;
- Detailed assessment of policy options; and
- Packing of complimentary policy options into two alternative scenarios;
- Central Scenario - a package of policy options that could feasibly be deployed with a politically or publicly acceptable degree of "forcefulness", and
- Ambitious Scenario - a package of policy options, included all the measures from the Central Scenario which could be applied more forcefully, and also some policy options considered too ambitious for the Central Scenario.

KEY FINDINGS

Policy Options

The study identified a broad range of devolved policy options that are available to the Scottish Government to mitigate transport's climate change impact in Scotland. In total 22 policy options were identified and divided into seven sub-categories, these are summarised in the table opposite.

ABATEMENT POTENTIAL OF INDIVIDUAL POLICY OPTIONS

Annual Abatement

The annual abatement potential of each policy option varies depending on:

The scale of implementation - influenced both by rate of implementation and level of intensity; and

Devolved Policy Options

A) Technology	
53	Electric car technology & network development
109	Procurement of low carbon vehicles
B) Driving Style	
1	Active traffic management
98	National motoring package
143	Speed reduction on trunk roads
C) Car Demand Management (Fiscal/Infrastructure)	
15	Bus/rapid/mass transit infrastructure investment (including bus priority)
37	Cycle infrastructure investment
75	High speed Rail links
97	National network of car clubs
99	National road user charging
103	Introduction or increase in public parking charges
115	Rail investment
125	Introduction/raise in residential/private parking charges
127	Bus /LRT fares reductions
131a	Walking infrastructure investment
172	Workplace parking levy
D) Car Demand Management (Smart Measures)	
18	Bus quality contracts / statutory partnerships
173	Widespread implementation of travel plans
204	Provide community hubs
E) Freight	
63	Freight best practice
F) Land Use Planning	
158	Urban density increases
G) Aviation	
205c	Improve public transport surface access to airports

The year under consideration – influenced by a number of factors;

- increasing levels of implementation through time,
- increasing levels of reference traffic, and
- increasing efficiency of the vehicle fleet.

A number of broad patterns emerged in relation to the relative performance of different types of policy options:

The analysis undertaken as part of this study suggests that the Car Demand Management (Smart Measures) category has the greatest potential to reduce CO2 emissions. In particular the potential for travel planning considerably exceeds that for all other policy options, reflecting the range of approaches covered in the policy option (from workplace travel plans to individual travel marketing) and the associated scale of the target population;

The fiscal policy options in the Car Demand Management (Fiscal/Infrastructure) category also offer significant abatement potential, however, the analysis suggests most of the infrastructure policy options in this category would offer significantly less potential; and

Schemes involving extensive investment in the public transport network generally lie towards the bottom of the list in abatement terms.

Cumulative Abatement

The relative order of abatement potential for the policy options is broadly similar when cumulative abatement and annual abatement in 2022 are considered. However, some minor reordering is evident. This is a consequence of the policy options that are suitable for more rapid implementation performing slightly better and those with a longer build up time performing slightly less well by the cut off date.

Cost Effectiveness and Marginal Abatement Cost Curve (MACC)

Combining the estimated cumulative abatement potential between 2010 and 2030 with the present value of costs incurred over the same interval provides an indicator of cost-effectiveness for each policy option, defined as follows. This can be broadly viewed as the cost in PV terms of each tonne of abatement achieved in total over the 20 year period by each policy option and forms the basis of the Marginal Abatement Cost Curve (MACC). The MACC below illustrates the most cost effective policies.

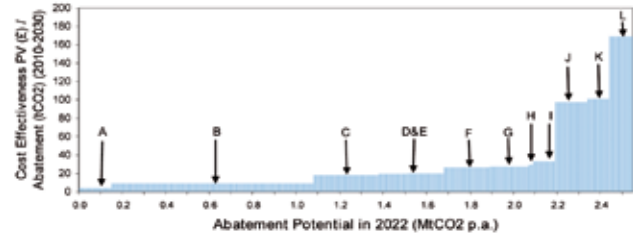
ABATEMENT POTENTIAL BY SCENARIO

The model results suggest that the combined effect of the policy options in the Central Scenario would achieve an annual abatement of around 1.35 MtCO2 p.a. in 2022, whilst the Ambitious Scenario would achieve an additional 0.80 Mt CO2, representing a total of 2.15 Mt CO2 p.a. in 2022.

The estimated abatement potential of the Central Scenario therefore accounts for approximately 15% of the difference between the baseline emissions (including action at the EU/UK level) and the 2022 level of a 44% reduction from 1990 total transport emissions¹. The contribution is nearly 25%, if the comparison is restricted to emissions from the land transport modes targeted by the scenario. The equivalent figures for the Ambitious Scenario are just over 20% of the target difference if all transport emissions are considered and 35% if the focus is on land transport alone.

ABATEMENT BEYOND 2022

The modelling results suggest that the total absolute abatement potential from the Ambitious Scenario will be very similar in 2030, although the balance between the contributions from different policy options will have changed. For instance, those policy options focussing on efficient driving



CODE	MEASURE ID	MEASURE
A	204	Provide community hubs
B	173	Widespread implementation of travel plans
C	143	Speed reduction on trunk roads
D	103	Introduction or increase in public parking charges
E	98	National motoring package
F	172	Workplace parking levy
G	18	Bus quality contracts / statutory partnerships
H	158	Urban density increases
I	63	Freight best practice
J	53	Electric car technology & network development
K	97	National network of car clubs
L	37	Cycle infrastructure investment

will have become less significant (as the vehicle fleet becomes increasingly dominated by electric and hybrid vehicles) and those with longer term effects (such as land use planning) will become gradually relatively more significant.

Forecasts of emissions levels and the impact of abatement policy options over the longer term to 2050 inevitably have to be less detailed than those for shorter timescales due to the uncertainties involved in attempting to forecast travel patterns, behaviour and technology in 40 years time.

However it is possible to anticipate likely important future trends. The key influence is likely to be the anticipated increasing use of electricity to power the vehicle fleet either directly or through the production of hydrogen. Sources such as the Committee on Climate Change report and the King Review suggest that such vehicles could feasibly be the standard by 2050.

In this case, emphasis will increasingly be on energy policy and technology and the nature and viability of the electricity network and vehicles rather than the direct reduction in emissions from vehicle exhausts. Suitable vehicle technology and the provision of very low carbon electricity (generated for instance by renewable energy) could potentially result in very low transport carbon emissions levels. However, the role of supporting transport policy options will remain important. Although some of the policy options assessed above will become less relevant as they are related to current technology (particularly those encouraging more efficient driving), the emphasis on improving efficiency and reducing demand will continue to be important. This will potentially be aimed less at reducing carbon emissions directly and more at ensuring demand remains at a level and in a form that could be viably served by the electricity network.

The outputs from the study will help to inform transport’s contribution to the Scottish Government’s statutory Report on Policies and Proposals, to be published in Summer 2010.

¹ The Climate Change (Scotland) Act includes an interim target of a 42% reduction by 2020 on the path to achieving an 80% reduction by 2050. The adoption here of a 44% reduction by 2022 is intended to act as a proxy for this target.

Towards Low Carbon Vehicles in Scotland

Views from CILT Scottish Region Policy Group

The Scottish Government invited comments on the development of low carbon vehicles (LCVs). In doing so, Government note that the market is likely to deliver low carbon vehicles over time but this may be too slow in the absence of some level of intervention from Government. The consultation recognises that there will be a number of barriers as well as opportunities in implementing ambitious targets for LCVs, including costs, the ability of technologies to deliver, and consumer behaviour. In addition, there may be classes of vehicles where it is not practical to aspire to significant emission reductions.

CILT recognises that the transition to low carbon vehicles will require Scotland to take a lead in some areas, and work with organisations across the UK and EU on others. There has to be a combination of increased energy efficiency (less fuel = less emissions) combined with alternative fuel sources (cleaner fuel = cleaner emissions) to make an impact.

FUELS

In the freight sector, research and prototypes of improved efficiency engines has continued over the last 20 years; as a result of increased fuel efficiency in conjunction with increased load capability, there has been a decrease in fuel consumption of over 50% since 1975, with Euro 5 engines having significantly less GHG emissions than Euro 0 (89% less CO₂, 87% less HCs, 89% less NO_x and 98% less particulates than Euro 0 engines (source: Volvo Trucks)). More over, improved aerodynamics in trailer technology is increasing, along with potential to increase payloads for the less emissions – for example the European Modular System for 25.25 m long vehicles, which would reduce HGV traffic by 1/3 compared to current EU standards and reduce fuel per 1000/tonne km by 10 – 15%.

The industry needs to ensure that total emissions are reduced (i.e. over the life cycle of the technology from 'well to wheel'), not just at 'tail pipe'. Fuel research in road freight has focussed on a range of alternatives including biofuels, synthetic diesel, gas and dimethyl ether (DME). There needs to be a broad range of criteria considered in the true sustainability of alternative fuels which includes climate impact, land use, energy efficiency, availability of fuel production and distribution, cost, safety and adaptability of the existing vehicle fleets.

There needs to be an emphasis on a balance between all these criteria to establish the true impact of alternative views, not just the climate impact, otherwise there is a danger of diverting the issue from the tailpipe to elsewhere in the supply-chain. Currently the largest impact can be delivered by synthetic diesel, bio-DME and biogas but there would need to be significant investment in infrastructure for any fuels other than bio / synthetic diesel.

There are excellent commercial examples of companies, like TNT, converting their local delivery fleets to electric ones

Vehicles using full or partial electric propulsion are likely to have the greatest impact because they can use renewable sources of energy. Furthermore, Battery vehicles were relatively common 40 or more years ago on local delivery duties. Battery technology has moved on significantly in the intervening period so such vehicles today should have significantly greater performance than their predecessors.

Battery technology will make a significant impact on emissions if the efficiency and range can be improved. There are excellent commercial examples of companies, like TNT, converting their local delivery fleets to electric ones; these companies should be engaged and encouraged by Government to share experiences and supported to extend their pioneering approach further.

TIMESCALE AND BARRIERS

Given the possible financial penalty in first cost for low carbon vehicles, some incentives may be required to persuade users to look at life time costs at least in the early years until a critical mass of operators/vehicles is reached. Whilst subsidies or lower taxation on more efficient and lower emitting fuels should be encouraged to allow faster conversion of new and existing fleets, care should be used in ascertaining true LCA costs (including environmental impact), which might vary across technologies and fuels.

Given that some of the technologies are already available such as improved efficiency engines, stop/start technologies in cars, bio-fuels, hybrid vehicles and battery development, there is no reason why there should not be increasing use within 5 years. Provision of the necessary infrastructure, whether for bio-fuels or their derivative, or battery charging, will be a critical factor affecting the take up: and this is particularly important for private vehicle users that live in homes without individual or communal access to charging points (e.g. in a garage). Important milestones would also include the ability to 'smart meter' electricity use and off-grid capability to re-charge vehicles.

Specific issues are that:

- Alternative logistics infrastructure to reduce emissions and increase effectiveness (such as consolidation centres) will need local government support.
- Distribution to remote areas may be a problem and resistance to renewable energy generating plants must not impact on food production.
- Grid reinforcement should not present too many challenges, but phase control for a multitude of micro generators may be difficult.
- The electricity generators have an interest in selling their power and surely must have an interest in funding the means of delivering it to the consumer. They would be expected to fund it and recover the costs from the additional electricity sold.
- Remoter areas may well be those with the greatest potential for renewable generation by means of wind wave tide or micro hydro schemes. Suitable combinations of these may allow them to be self-sufficient in power and even generate a surplus.
- HGVs and long distance coaches may have such a high energy requirement that technology will not give them sufficient range in true LCV form. However, in hybrid form, with further refinements to engine technology and other developments such as regenerative braking, their emissions should reduce. It would, therefore, be sensible to keep them within the target.

PUBLIC SECTOR LEADERSHIP

Over the longer term, by 2020, there should be the same approach to both the public and private sector. However, in the shorter term,

it is appropriate for the public sector to take the lead in creating the demand which should lead to costs coming down. Additional costs to the public sector and the resulting tax implications have to be recognised but also the additional benefits and impacts in terms of safety, efficiency, health, economy etc need to be assessed to establish how uptake of new technologies will actually affect public finances.

A progressive target based on a percentage reduction in the government fleet vehicle emissions may be helpful. This avoids the possibility of a significant number of relatively low emission vehicles being replaced without a commensurate percentage reduction in total emissions.

Planning regulations must not erect barriers to LCV development. The same organisations will also have an interest in a suitable distribution network so complementary effects should be identified between public infrastructure and private market development.

SCOTTISH INDUSTRY AND SKILLS

The UK has not had a good record in recent decades in converting new ideas into new products due to low research and development spend. Pump priming may be required to overcome this problem. Major barriers would include workforce technological experience and capability, and the provision of the right skills to mass produce low carbon vehicles. In addition, any Scottish industry would rely on the ability to export many more vehicles than it would sell on the local market, so excellent access to world class infrastructure in roads and ports would be critical for both inbound component parts and outbound finish product.

There continues to be seems to be a lack of people taking up careers in engineering but rebuilding transport around LCVs is a large employment opportunity. Appropriate training at all levels may have to be stepped up to ensure that adequate resources are available to service a new technology.

The proposed approach whereby public bodies would take a lead is strongly supported since this helps to build skills, capabilities and markets throughout the LCV economy. This should extend throughout the policies and practices of the public sector. For example:

- Car allowances for employees should be more generous for those using LCVs
- Car loans could be restricted to LCVs
- There should also be emphasis on use of

smaller, less powerful vehicles with these provisions also applying to MSPs to give a lead.

- Government should actively engage with market leaders to seek opportunities for partnership.

Partnership opportunities should be used to influence change by others. Bus and freight quality partnerships, operator grants, and tendered services are all areas where the public sector can extend the use of LCVs.

A CROSS SECTORAL APPROACH

Other mechanisms to encourage the conversion of fleets and private vehicles should be

rebuilding transport around LCVs is a large employment opportunity

considered including road pricing for non LCVs, provision of consolidation centres to enable non-polluting vehicles to supply retailers and services within city centre boundaries, workplace parking charging, and other regulatory and pricing initiatives.

Taxation policies should also encourage change. Sensitivity will be needed in the application of these to heavy and light goods vehicles and PCVs as well as cars.

Even with the most optimistic assumptions it is clear that by 2020 and for many years thereafter there will be continued use of fossil fuelled power stations for part of the electricity supply. Any increased use of electricity at periods of peak demand will require additional use of such power stations. The emphasis for electrically driven vehicles should therefore be on electrical charging at off peak demand times. A pricing structure to encourage this is essential with provision for charging at peak demand times, whilst necessary to permit flexibility subject to a significant surcharge.

A common and consistent charging mechanism is necessary throughout Scotland, the UK and EU. Initially off peak trickle, charging through the household 240v supply should be facilitated but as soon as a sufficient base load of demand is established a higher voltage direct charging system is required. Common attributes should permit direct use by all vehicles as well as easy interchange of run down and newly charged batteries. As referred to above interchange points could be located similarly to existing filling stations. During the transition period parts of filling stations might be converted for such use.

CONCLUSION

Implementing the necessary changes will be difficult since the scale of change is large and there are many existing competing public and private sector interests. A realistic action plan is required to build support for the changes.

Critical issues for government will be planning policies and taxation.



Scottish Transport in the News

What the papers are saying about Scottish Transport – A review by Tom Hart.

GENERAL POLICY AND FINANCE

Passenger Focus is due to add buses to its remit from spring 2010 and, in a review of airport regulation, government is proposing that Passenger Focus should gain a role in relation to customer standards at major airports.

The House of Commons Transport Committee has produced its report on Taxes and Charges on Road Users (HC 103 Session 2008/09 – published 14 July). This report calls for greater clarification in relation to road taxes, charges and attributable road costs with much improved linkage between the Treasury and transport policies sending clear signals to UK motorists on carbon emissions while encouraging walking, cycling and greater use of public transport. The Committee proposes greater government support for voluntary road pricing but also concludes that taxation based on car usage – through fuel duty – remains fairer than taxes on car ownership, and would do more to encourage fuel efficiency and reduced emissions. In the absence of any plans for road pricing for cars, the Committee urges government to resurrect proposals for a low-cost pay per mile lorry charge for UK and foreign registered vehicles to prevent unfair competition from foreign vehicles able to take advantage of cheaper diesel.

The RAC Foundation has suggested possible privatisation of strategic roads. This would provide an immediate boost to government funds while the transfer to the new body of an appropriate proportion of fuel duty plus freedom to expand road charging and more efficient private management could ensure the road network which UK road users deserved.

The Calman Commission has completed its review of whether there is a need for further change in devolution arrangements. It saw no need for substantial change in the present transport position apart from the introduction of a longer-term borrowing power, under Treasury supervision, for the Scottish Government plus a devolution of powers to set road speed limits and drink drive standards. The suggestion is also made that the Scottish Government should gain the powers to set levels of air passenger duty on flights in, and to and from Scotland.

AVIATION

A £40m expansion of Edinburgh Airport completed by early 2011 will provide a security search area and a new-look departure lounge with more shops, bars and restaurants.

Ryanair is seeking an immediate enforced sale of Edinburgh Airport but BAA wants to delay sales of Glasgow or Edinburgh until 2012.

Edinburgh lost the Delta Airlines service to New York in September.

Ryanair is cutting some winter flights from the airport but expanding total winter services from 19 routes to 29 – including ski destinations.

easyJet will also introduce a ski-related service from Edinburgh to Lyons in December.

Ryanair is expanding winter flights from Prestwick to Spain and the Canaries but reducing services to Belfast and Paris Beauvais and ending flights to Bournemouth, Frankfurt and Stockholm.

New Irish taxes on air travel of 2euros on trips under 300km and 10euros on longer trips will penalise trips to Edinburgh relative to the lower tax on Dublin-Glasgow trips.

PORTS & SHIPPING

CalMac has introduced the first Sunday ferries from Ullapool to Stornoway.

Discounted fares and charges on Western Isles ferries are producing strong growth in traffic, including campervans.

The 113,000 tonne Crown Princess has broken the record for the largest cruise vessel to visit Greenock. The visit coincided with opening of the new £100,000 cruise terminal.

Scotland's coast and waterways are now second to golf as Scottish tourist earners. Bookings for sailing and boating are up 30%.

Following a rise in deaths on inland waters, the Scottish Government has launched a major review of rescue services.

RAIL

A Network Rail report on high-speed rail options favours a £32bn new 200mph route from central London to Glasgow and Edinburgh via Lancashire with associated spurs improving services from London to Birmingham, Manchester, Warrington, Liverpool and Preston. Glasgow-London times would fall to 2hours 16 ms and Edinburgh-London to 2 hours 9ms. High-speed proposals have secured cross-party support though the issue of funding has been raised, objections have come from cities omitted from the network and Scottish interests have called for construction to be started from both ends. By December, DfT expects to have details of a preferred route from London to Birmingham settled.

DfT has announced the initial phases of a major electrification programme for England and a cancellation of orders for additional diesel trains. The priority for Liverpool-Manchester electrification by 2012/14 will allow Scotland - Manchester services to be electric rather than diesel.

A deal between the Treasury, Network Rail and the Scottish Government will allow Network Rail to borrow £1.1bn to finance planned Glasgow-Edinburgh electrification, including related lines to Dunblane and Alloa by 2016/17.

The Glasgow Airport rail link has been cancelled as part of a Scottish Government spending review.

Outline plans for the tram/rail interchange at Gogar (west Edinburgh) have been issued for public comment with the aim of completion of Phase 1 by 2011/12 and addition of the Dalmeny south curve west to the Falkirk line by 2016/17.

Edinburgh-Dunbar and Glasgow-Kilmarnock will gain improved services from December.

The Stirling-Alloa line has been modified to ensure that specified bridge clearances for electrification are available.

Passenger complaints on West Coast Main Line services are 52% up despite a £9bn modernisation.

89% of passengers are satisfied with ScotRail services but failure to fully meet specified standards – especially in relation to toilets and customer information – have led Transport

Scotland to impose a £1m fine, three times higher than in 2008.

Noise from coal trains has led to substantial complaints on the Longannet line and in Ayrshire but it is claimed that night operation is unavoidable in order to maintain supplies.

BUS, TRAM & TAXI

Tram rails are now in place on most of Princes St but Edinburgh City Council has taken the tram contract with Bilfinger Berger to legal adjudication. Further delays are expected with opening of an initial section of route unlikely before May 2012. Work is in progress on further assessment of optimum bus route reshaping once trams are operating.

MVA consultancy has identified bus rapid transit and tram routes from west Edinburgh to the Forth crossing. Both would run close to the A8000.

New rules from April 2010 will require bus firms on eight main routes across Glasgow city centre to operate at least 90% of trips with low floor and low emission buses. The aim is to improve the quality of the city centre by reducing the present average of 230 buses an hour down Union St (300 at peaks)

SPT has appointed Glasgow bus wardens in an effort to clamp down on rogue operators.

SESTRAN is to fund the extension of real time displays in the borders following the decision of Scottish Borders Council to pull out of financing this project.

Horsburgh 64 has started an hourly serve from Edinburgh Airport via Edinburgh Park train station through north-west suburbs to Western General Hospital. 25% of air passengers now use bus services for access.

Moffat and Williamson, with bases at Newport and Glenrothes, has gained extra bank finance to extend operations in Fife in competition with Stagecoach.

One-day strikes have disrupted First Bus services in Aberdeen.

Scottish bus builder Alexander Dennis is seeking a bus scrappage scheme to accelerate the introduction of low emission buses.

First Bus has announced it is installing new

technology to cut the carbon footprint of its 9000 UK buses.

Glasgow City Council is proposing a new scale of taxi fares with a maximum fare of £2.20 for 931 yards or 3 minutes 13 seconds.

Civil liberties groups are concerned at plans to install CCTV on Glasgow's fleet of 1000+ taxis. Operators feel the scheme will improve staff and passenger security.

ROADS & PARKING

Expressions of interest in constructing a new Forth road crossing and related works have been invited and 2 expressions have been submitted.

A9 improvements at Bankfoot and Carrbridge, each costing £2.7m, have been completed – as has the £8m 3.3km A7 deviation at Auchenvick south of Langholm.

Argyll and Bute Council is preparing plans for an Oban eastern bypass and distributor relieving the town and linking with new housing. Project approval is being sought in 2011. Plans for an improved ferry/road/rail interchange at Oban Pier have been delayed by Network Rail objections.

In Edinburgh, the Seafield roundabout at Portobello has been replaced by traffic lights. £800,000 is to be spent on improving safety at the Crewe Toll roundabout. Developer contributions may cover more than half the cost.

In his second annual report, John Gooday, Scottish Roadworks Commissioner, has found a lack of proper repairs on one-third of utility roadworks with Scottish Water the worst performer.

NHS Lothian is planning further cuts in parking spaces as part of hospital development. This will require more attention to parking management.

Health Secretary Nicola Sturgeon has launched a new advice line to help patients get to hospital by public transport. This follows on from problems arising from the abolition of parking charges at most hospitals. The advice scheme has been developed by NHS Greater Glasgow and SPT.

The Edinburgh Car Club has secured £1m to facilitate expansion. Operating vehicles should rise from 90 to 150.

Edinburgh City Council has extended the consultation period on proposals for higher parking fee permits for cars with poor fuel

consumption.

The Scottish Government has announced new targets for a 40% fall in road deaths and a 55% cut in serious injuries by 2020.

As part of Climate Change Delivery Plans, it is proposed to cut maximum motorway speeds to 60mph.

In a new report, the Institute of Advanced Motorists points out that Scotland still has a higher road death rate per head than England. They advocate that more attention should be paid to the specific problems of rural roads and young drivers.

The Health Commission Report on Glasgow has called for a major extension of 20mph zones before the Commonwealth Games.

20mph zones around primary schools in Edinburgh have cut accidents by almost one-third.

The Scottish Government is to develop automatic speed-limiters for cars as part of the new road safety framework.

WALKING & CYCLING

Research at the University of Glasgow has found that the linkage between poor health and low income is less pronounced in communities able to walk or cycle to attractive green space.

Comments on the consultation on Designing Streets have stressed the importance of layout and maintenance for encouraging walking and cycling.

The Scottish Government is consulting on a Cycling Action Plan. Outline proposals include a change in accident liability to put the onus on car drivers involved in collisions with cyclists and a new target of 10% of Scottish trips to be by cycle by 2020. Suggestions have been made for a possible tax on cyclists.

Edinburgh City Council aims to raise cycling from 4% to 15% of trips by 2020.

SPOKES measurements show 14.4% of vehicles on Lothian Rd in the morning peak hour are now cycles.

Visitor numbers at the 2009 mountain bike event in Fort William were 25% above 2008. Attendance reached 18,000, generating an estimated £2.5m for the local economy.

Main Transport Trends 2008

This note presents collates a range of data sources to present the main transport trends in Scotland, including some comparisons with Great Britain (or the UK).

MOTOR VEHICLES, TRAFFIC AND ROAD CASUALTIES

Motor vehicles

The number of motor vehicles licensed in Scotland in 2007 was 2.6 million, 2 per cent more than the previous year, 31 per cent higher than the number in 1997 and the highest figure ever recorded. Over the longer-term, the number of vehicles licensed has increased from an estimated 0.8 million in 1962.

In 2007 there were around 251,000 new vehicle registrations in Scotland, an increase of 3 per cent on 2006. It was the fourth highest figure ever recorded, 22 per cent more than in 1997 and almost three times the number (86,000) in 1962.

In 2007, there were 51 vehicles per 100 population in Scotland compared with 58 in Great Britain.

The Scottish Household Survey (SHS) shows that, in 2007, 70 per cent of households had at least one car available for private use - up from 63 per cent in 1999. 25 per cent of households had two or more cars in 2007, compared with 18 per cent in 1999. As the SHS is a sample survey, its results are subject to year-on-year fluctuations.

In 2005 (the latest data available for comparisons), around 69 per cent of households in Scotland had regular use of a car compared to 75 per cent in Great Britain as a whole.

The road network

There were almost 55,000 kilometres of public road in Scotland in 2007 with the trunk road network accounting for 6 per cent of this. Relative to the size of the population, the length of the road network is greater in Scotland than in Great Britain: in 2007, Scotland had 10.7 kilometres of road per 1,000 population; GB had only 6.8 kilometres per 1,000 population.

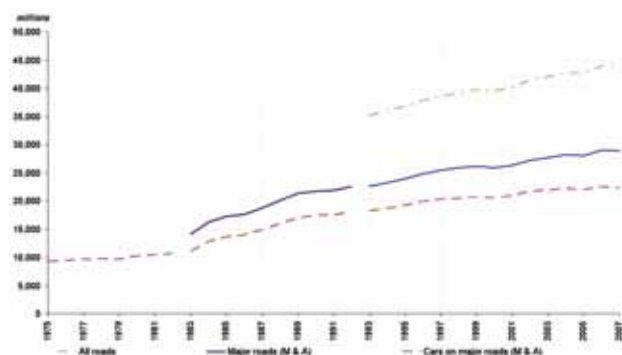


Figure 1: Traffic (vehicle kilometres). * figures for 2007 are provisional

Road traffic

The estimated total volume of traffic on Scotland's roads in 2007 was over 44 billion (thousand million) vehicle kilometres - 1 per cent more than the 2006 and 15 per cent more than 1997. The total volume of traffic is at its highest ever level: the estimates show increases in every one of the past ten years except from 2000, which was affected by the fuel protests.

The pattern in Scotland was similar to that for Great Britain as a whole. The total volume of traffic for Great Britain rose by 1 per cent between 2006 and 2007, and was 14 per cent higher than ten years earlier, with increases in every year (including a very slight rise in 2000).

Per head of population, there is less traffic on Motorways, more traffic on A roads, and less traffic on all roads taken together (including B, C and unclassified roads) in Scotland than in Great Britain.

Road casualties

The number of road deaths in Scotland in 2007 (282) was 10 per cent less than in 2006, and the lowest figure since current records began more than 50 years ago. 2,316 people were provisionally recorded as seriously injured in road accidents in 2007, 12 per cent fewer than in 2006, and the lowest figure since records of serious injuries began in 1950. Over the past ten years, the number of people reported injured in road accidents has fallen by 29 per cent to 16,056 in 2007, the lowest number for more than 50 years.

Since 1997, the fall in the number of people killed or seriously injured in road accidents in Scotland (41 per cent) has been greater than Great Britain (34 per cent lower). The number of people killed or seriously injured per thousand population was almost the same in Scotland and Great Britain in 2007 (about 0.5 per thousand population).

PUBLIC TRANSPORT: BUS, RAIL AND AIR AND FERRY

Local bus services

In the 2006-07 financial year there were 482 million passenger journeys on local bus services in Scotland, an increase of 1 per cent over the previous year and 1 per cent more than in 1996-97.

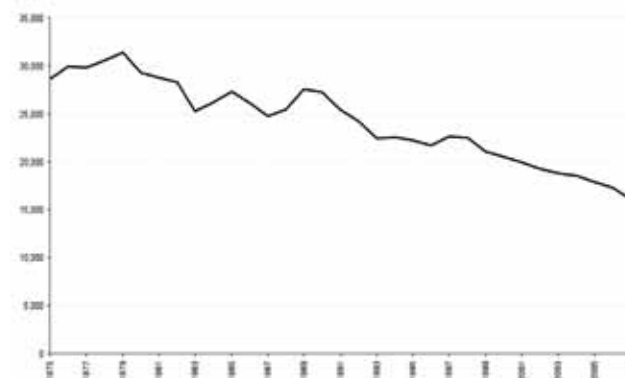


Figure 2: Road accident casualties. * figures for 2007 are provisional

However, over the longer-term, there have been large falls. There were almost 1,700 million passenger journeys on local bus services in 1960. The number had almost halved by 1975. Since then, it has roughly halved again, from 891 million in 1975 to 482 million in 2006-07. There were falls in every year between 1960 and 1999 except 1985, 1987 and 1988.

Since 1996-97, the number of passenger journeys on local bus services has increased by 1 per cent in Scotland compared with an increase of 12 per cent for Great Britain over the same period (due to an increase in London).

Rail passenger services

The total number of ScotRail passenger journeys in the 2007-08 financial year was 81.3 million, 4.0 million (5 per cent) more than in the previous year, and 45 per cent more than 10 years earlier. Over the longer-term, the number of rail passenger journeys originating in Scotland (including cross-border journeys) fell from a peak of 73 million in 1964 to a low of 50 million in 1982.

The 5 per cent increase in ScotRail passenger numbers between 2006-07 and 2007-08 was lower than the 7 per cent rise in rail passengers for Great Britain. Over the last ten years, Scotrail passenger numbers have increased slightly less than GB as a whole. However, the rise in the number of rail passenger journeys originating in Scotland (including those on other operators' services) had not been as rapid, at least up to 2005-06 (the latest data available).

Air passengers

There were around 25.1 million air terminal passengers at airports in Scotland in 2007, the largest number ever recorded: 3 per cent more than in the previous year, and 75 per cent more than in 1997. Figure 6 shows the rise since 1975. Over the longer-term, terminal passenger numbers grew from 1.2 million in 1960 to 25.1 million in 2007.

Between 1997 and 2007, the number of air terminal passengers increased by 75 per cent for Scotland and 64 per cent for the UK as a whole. Over the past ten years, the number of passengers per head of population has been higher for Scotland than for the UK.

Ferry services

In 2007, over 6 million passengers were carried on those shipping services within Scotland for which figures are available back to 1973 (i.e. Caledonian MacBrayne, P&OScotish Ferries / NorthLink Orkney and Shetland, and Orkney Ferries). This was 0.1 per cent less than in the previous year. Figure 6 shows the long-term trends, which were affected by the reduction in traffic that followed the opening of the Skye Bridge in 1995.

PERSONAL TRAVEL (E.G. DRIVING, WALKING AND CYCLING; TRAVEL TO WORK AND SCHOOL)

Possession of driving licences, and frequency of driving

68 per cent of people aged 17 or over had a full driving licence in 2007: 78 per cent of men and 60 per cent of women. Since 1999, the proportion of men who have a driving licence has remained steady at almost three-quarters, whereas the percentage of women aged 17+ who have a full driving licence has increased eight percentage points since 1999. As a sample survey, the SHS's results are subject sampling variability.

In 2007, 45 per cent of people aged 17+ said that they drove every day. The percentages who said that they drove at least 3 times a week (but not every day) rose from 8 per cent in 1999 to 10 per cent in 2007.

Frequency of walking and cycling

Respondents are asked on how many of the previous seven days they walked more than a quarter of a mile (a) in order to go somewhere (i.e. used walking as a means of transport), and (b) for pleasure or to keep fit, including walking a dog. In 2007, 51 per cent of individuals reported walking to go somewhere on at least one of the previous seven days. This figure has fluctuated from year to year, presumably due to sampling variability. However, the percentage who said that they had walked for pleasure or to keep fit had increased 7 percentage points since 1999.

Respondents are asked similar questions about cycling. In 2007, about 3 per cent said that they had cycled as a means of transport, and around 4 per cent said that they had cycled for pleasure or to keep fit. These percentages are similar to those found in 1999.

Travel to work and travel to school

In 2007, about two-thirds of commuters said that they travelled to work by car or van (63 per cent as a driver and 6 per cent as a passenger), 12 per cent walked, 12 per cent went by bus, 4 per cent took a train and 2 per cent cycled. While there have been year-to-year fluctuations in the SHS's results, the percentage driving to work has risen 8 percentage points and the percentage getting a lift has fallen 6 percentage points.

The Labour Force Survey (LFS) shows that the percentage of people travelling to work by car has tended to be slightly lower in Scotland than in Great Britain as a whole, and the percentage using public transport has tended to be slightly higher in Scotland than in Great Britain. According to the LFS, in Autumn 2007, 69 per cent of people travelling to work in Scotland and Great Britain did so by car and 16 per cent used public transport. The year-to-year fluctuations, and any differences from the results of the SHS, are likely to be due to sampling variability.

Around 53 per cent of pupils walked to school in 2007, 21 per cent went by bus, 22 per cent by car, 1 per cent cycled, and 1 per cent went by rail. While there have been year-to-year fluctuations in the results, it appears that, since the SHS started in 1999, the percentage going by car has risen from around 18 per cent.

FREIGHT

The volume of rail freight traffic lifted in Scotland fell from 29.8 million tonnes in 1960 to 5.4 million tonnes in 1994-95. Figure 11 shows that since then it has increased in most years, and stood at 13 million tonnes in 2006-07.

Coastwise freight traffic lifted in Scotland rose from 24 million tonnes in 1987 to 40 million tonnes in 1998. Since then, the total has fallen to 20 million tonnes in 2003. However, the figures from 2000 are on a different basis from those for earlier years (see Chapter 10 of Scottish Transport Statistics). The annual amount of freight lifted for inland waterways has remained between about 9 and 12 million tonnes since 1982.

The amount of oil carried in Scottish pipelines rose rapidly to 23 million tonnes in 1977, and has fluctuated since then between 21 million tonnes and 30 million tonnes per year.

In terms of tonnes lifted, much more freight is carried by road than by any other mode of transport. However, a different picture can be seen when account is taken of the distance that freight is carried.

Power to Connect

Edited from the summary of the June 2009 report by think tank Reform Scotland

Authors Ben Thomson, Geoff Mawdsley and Nefertali Deeb

This aim of Power to Connect is to set out how we could make a generational transformation of the transport network in Scotland by implementing strategic national projects which will benefit most of Scotland rather than projects which benefit particular parts of Scotland. Clearly this has major cost implications at a time when our economy is in recession and budgets are coming under increasing strain. However, we need to do this if we are not to be left behind in economic terms by other countries and there are advantages to starting at this time as construction costs will be low while such capital spending will provide a much-needed boost to the economy. In addition, the costs would be spread out over time. It is far more likely that a clear national strategy to improve the transport system will deliver long term benefits to the Scottish economy rather than various piecemeal developments.

A transport system that maximises our potential for faster economic growth is an essential part of any successful economic strategy. It will not come cheap, but it is a genuine investment in the future prosperity of Scotland and everyone living in the country. It is essential that all the possible funding options are examined that would turn this vision into reality. This would include the additional borrowing powers that the Calman Commission proposed should be given to the Scottish Government as well as innovative examples from around the world as to how infrastructure projects can be funded which Reform Scotland will look at in a future report.

Based on our analysis of the current situation in Scotland and evidence from overseas on measures that have improved transport systems, Reform Scotland makes some recommendations as to the projects that would make the most difference to our economic growth potential. At the same time, the report examines whether, in the longer term, road pricing offers the potential to improve the efficiency of the transport network in Scotland.

FINDINGS

The significant investment in the transport system in Scotland over recent years has led

to improvements to transport infrastructure in Scotland. Scottish Enterprise's survey of industry opinion from June 2008 recognised the improvements made to the transport network with over 70 per cent of respondents thinking that trunk road, rail and air services were very or fairly good in Scotland. However, less than a quarter thought services were 'very good' which shows there is still plenty of room for improvement.

The evidence from other countries, such as Singapore and Norway, is that road pricing schemes of different types can lead to better management of demand for road space

The importance of cities and city regions to economic growth has been recognised by the Scottish Government and its agencies since by concentrating economic activities cities and city regions enable greater economic specialisation and integration which promotes greater productivity. Reducing the journey times between the key cities in Scotland would increase the scale and reach of city regions and bring companies, their suppliers and their potential employees closer together. This would increase the potential for economic growth and that is why a number of other countries have made significant strategic investments in high speed links which have brought tangible economic benefits.

The evidence from other countries, such as Singapore and Norway, is that road pricing schemes of different types can lead to better management of demand for road space, so reducing journey times and congestion on roads, increasing reliability and contributing to a more effective overall transport system.

POLICY RECOMMENDATIONS

Central transport hub: We recommend that a central transport hub is created in Scotland around the airport at Ingliston which would be renamed Grand Central Airport to recognise its role in serving Scotland as a whole. The main railway station in Scotland would also be located here, called Grand Central Station, and, in addition, the trunk road network would be linked to this central hub. This would create the focal point within the central belt of Scotland for a properly integrated network of road, rail and air transportation which would aid the economy of Scotland as a whole.

In a perfect world, a completely new hub would be established equi-distant from Glasgow, Edinburgh and Stirling. However, because there is already an airport at Ingliston with the potential for growth and development our proposal is a more practical option. If journey times to this hub were no more than 20 minutes from Glasgow, Stirling and Edinburgh, it could perform the role as a national transport hub. Glasgow airport could not perform this role as it is sited on the west of the city, the wrong side for easy access to most of the rest of the country.

High speed rail links: We recommend that high speed rail links are created from Grand Central Station south to England and west, east and north to link Scotland's main cities of Glasgow, Edinburgh, Stirling, Perth, Dundee, Aberdeen and Inverness. Such an investment in new infrastructure, which would be done in stages, would dramatically reduce journey times and create the potential for a substantial increase in Scotland's trend rate of economic growth through greater integration of the economy. It is essential that high speed rail in Scotland links into the new high speed rail links proposed in England as this would increase access to key markets in other parts of the United Kingdom.

Improved trunk road network: We recommend that certain parts of the trunk road network in Scotland are improved to ensure that it links into the central transport hub that we propose and to reduce journey times by road between the main Scottish cities. This recognises the importance of good road

LINKS TO THE ECONOMY IN SCOTLAND

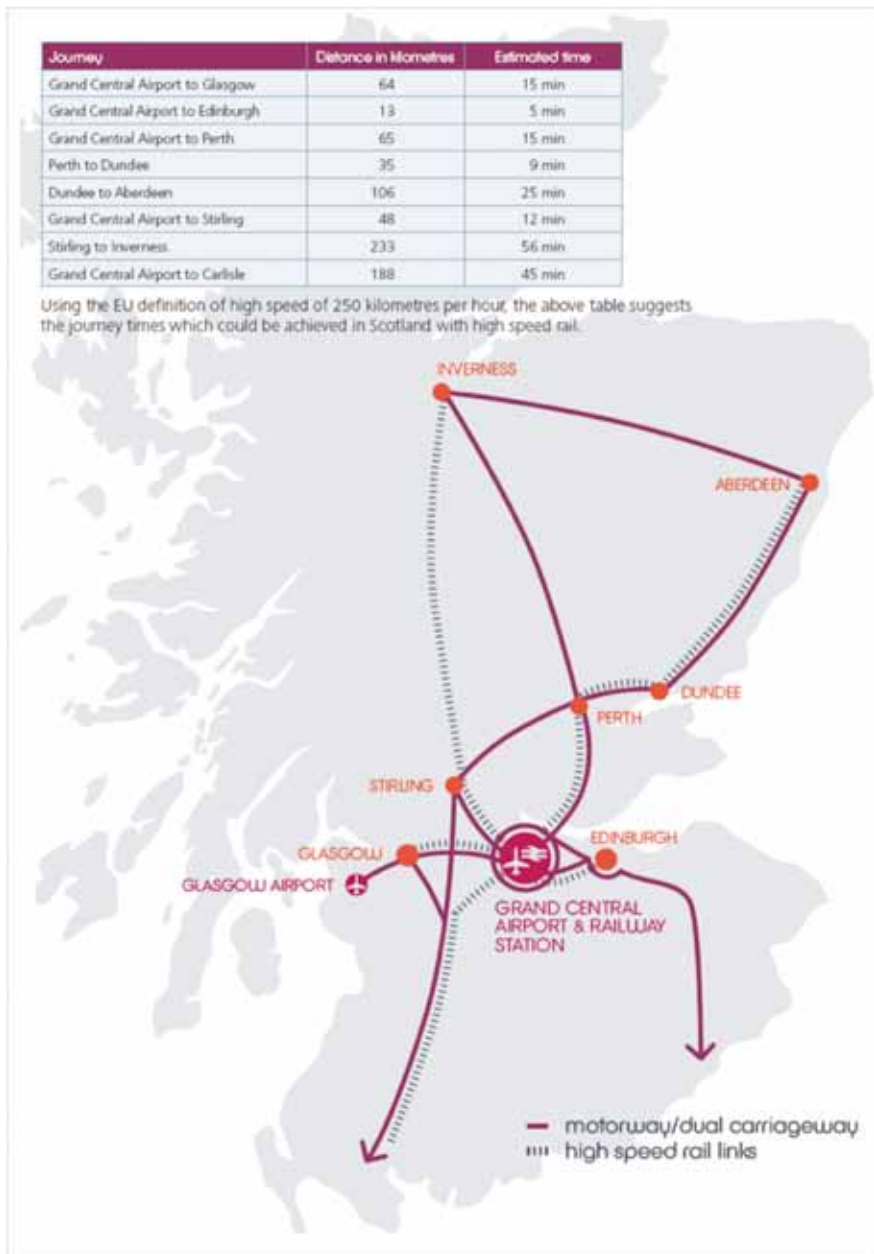
Specifically, a ring road should be built around the central transport hub at Ingliston linking into the M8, M9 and Forth Road Bridge. In addition, there are currently plans to turn parts of the A9 between Perth and Inverness into a dual carriageway and the A96 from Aberdeen to Inverness is going to be upgraded with bypasses and overtaking opportunities. We would recommend that the A96 and A9 are upgraded to complete dual carriageways along their entire lengths as soon as possible.

Road pricing: We recommend further investigation of how road pricing schemes might be implemented in Scotland. Evidence from other countries such as Singapore and Norway shows the part that road pricing systems can play in reducing journey times and congestion while improving reliability and having a positive impact on the environment. This justifies further investigation. By charging users directly for the use of road space and the costs they impose on others, road pricing has the potential to provide a more efficient and fair way of allocating road space and addressing the problem of congestion on our roads. Road pricing schemes should not be seen as a way of paying for the strategic transport projects set out in this report. They are an entirely separate way of improving Scotland's future transportation system. It is also important to note that any Scotland-wide scheme would have to be an alternative to the existing methods of paying for roads through fuel and vehicle excise duties and not an additional means of raising revenue. To bring this about in Scotland, it would be necessary for the Scottish Parliament to have greater tax raising powers as recommended in Reform Scotland's earlier report, 'Fiscal Powers'.

CONCLUSION

The central insight of Reform Scotland's first report, 'Powers for Growth', was that governments did not have the necessary information and knowledge to control and direct an economy and that where such an approach had been tried it led to a misallocation of resources. However, governments have an essential role to play in creating the right framework within which people can create prosperity.

As is widely recognised, an efficient transport network is an essential component of the right framework for economic growth. This is because it integrates an economy and so creates the potential for faster growth.



It is Reform Scotland's view that we need to aim high in Scotland. The transport system in Scotland has improved, however we have not made the revolutionary changes seen in some other countries. The key as far as our transport system is concerned is to think far more strategically about how we improve the system in this country just as other countries have done. In achieving this national transport plan, we will need to review projects or potential projects to see how they fit into the national strategy and take out or delay those that do not contribute to the overall objectives.

The projects outlined in this report – a central transport hub connected through the airport to other countries and combined with faster rail and road links between our key cities and south to England – would have an enormous impact on the economic growth potential of Scotland as a whole and help to achieve the goal of sustainable economic development. In addition, both high speed rail and road pricing have the potential over time to reduce congestion on our roads helping business by reducing journey times and reliability as well as improving our environment.

Digital Evolution

Aberdeen University is to host one of three Digital Economy Research Hubs. Project Director Professor John Farrington and Technical Director Peter Edwards describe their plans

Imagine a rural Britain where village economies thrive and which meets the needs and aspirations of old and young alike. Yet today it can be tough just to get a bus or find reception for a mobile phone. To tackle these kinds of issues a £12.4 million digital economy research hub has been established at the University of Aberdeen providing some 60 jobs and studentships.

The project is a cornerstone of the Research Councils UK Digital Economy Programme. There was intense competition among universities, but Aberdeen University's strong track record and user led approach succeeded in attracting the hub particularly since it is geared to delivering practical results.

There are many significant challenges for rural areas which are clearly not achieving their social and economic potential. The Hub provides a large interdisciplinary centre of excellence with sufficient critical mass to deliver large projects that can make a real difference to people's lives and prospects.

The Hub's ambition is to become a permanent feature of the University. It makes a major contribution to the aim of engaging with business and the community. The NHS and Firstgroup are already active in the Hub's work. Both see huge potential for providing cost effective means to offer better services.

For healthcare it promises a way forward in its efforts to reshape services to provide more home-based care, rather than expecting patients to travel to hospitals and clinics. With public finance cuts looming in the years ahead, community based care had the double advantage of being preferred by patients and being cheaper to deliver. The capacity to gather and share

information using digital technology also fits with today's multi-disciplinary approach. However the sharing of information can be fraught with difficulties of confidentiality and presentation. Information must be filtered and tailored to the needs of users. It should not be a black box with all of the information just disappearing inside. The presentation and language might be very different for an adult than for a child, or for a GP, social worker or bus driver.

The Hub is working with a company that uses remote sensors that could mean that an elderly person in a remote community could be monitored over a period of time allowing a tailored package of care to be designed precisely for their lifestyle.

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difficulties of confidentiality
and presentation*

There are opportunities to enhance tourism potential by allowing visitors to download information and maps about heritage attractions and leisure facilities to their mobiles. In zones where mobile reception is poor, the latest Wi-Fi developments may provide an alternative.

One ambition is to develop a virtual marketplace in which anyone needing transport, whether it is for shopping, work, or a hospital appointment, can go online and choose from a variety of options. It will also enhance the ability of companies to provide flexible services, for example with buses using flexible routes according to demand.

Public transport is a vital issue in rural areas. Young people often cannot get to work or training course since they cannot afford a car. Without jobs and training they cannot then afford housing and move elsewhere. Digital technology can provide solutions that cut through this vicious circle allowing young people to stay in the communities where they grew up rather than drifting away.

The digital economy can help release the untapped economic potential of the rural economy which is estimated to be nearly £400bn across the UK.

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