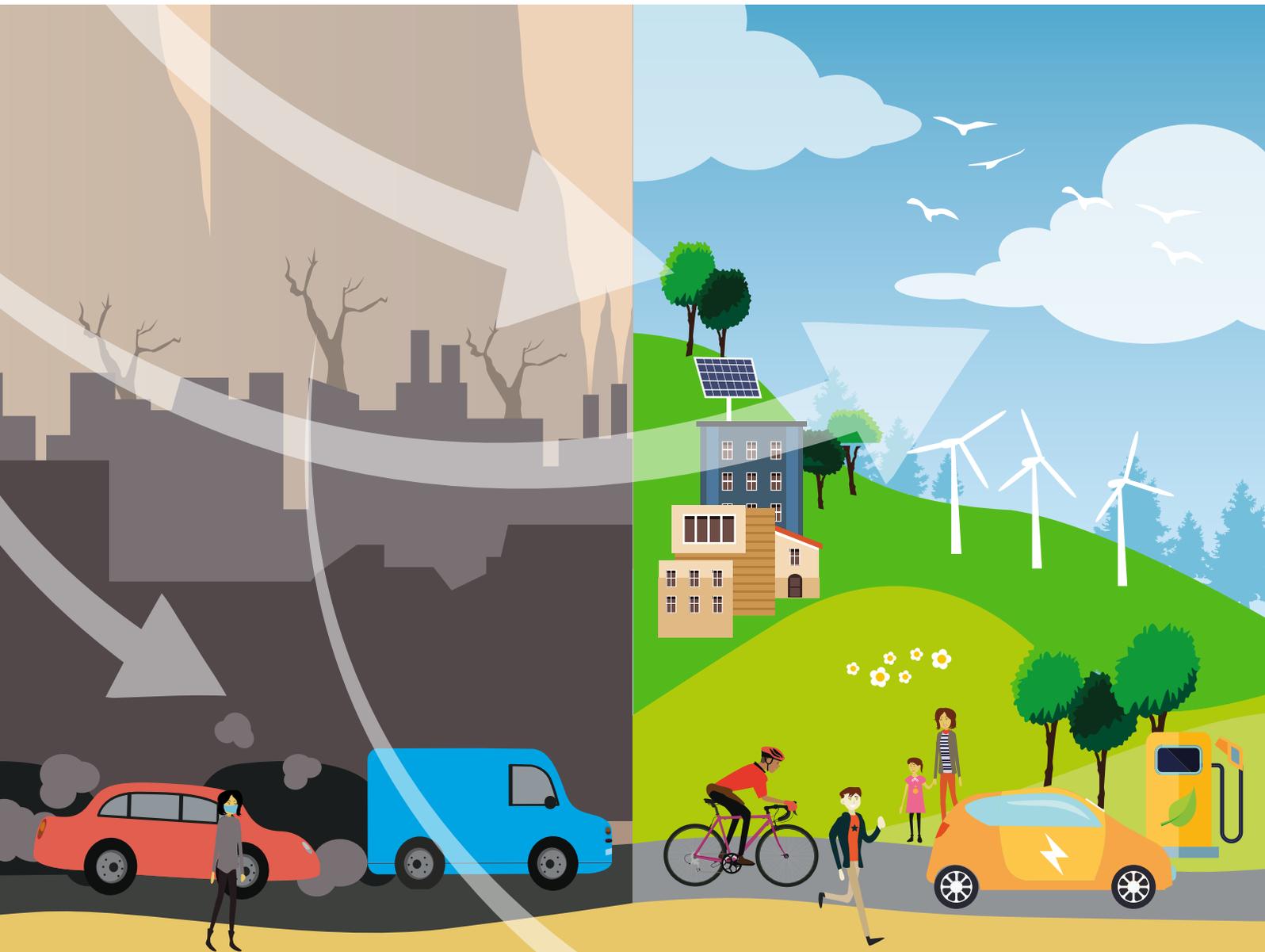


# Scottish transport review

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## A New Look at Making Sustainable Transport Work for Everyone

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**Creating value from social and environmental transport outcomes rather than viewing them as external to transport business models or as a cost to the economy.**

# Summary

Transport policy seeks reduced transport and emissions as essential components of decarbonisation, but needs new business models to help implement these goals. Business models must build in more social and environmental factors to devolve complex transport problems to a simpler and better targeted level than is possible within national policy.

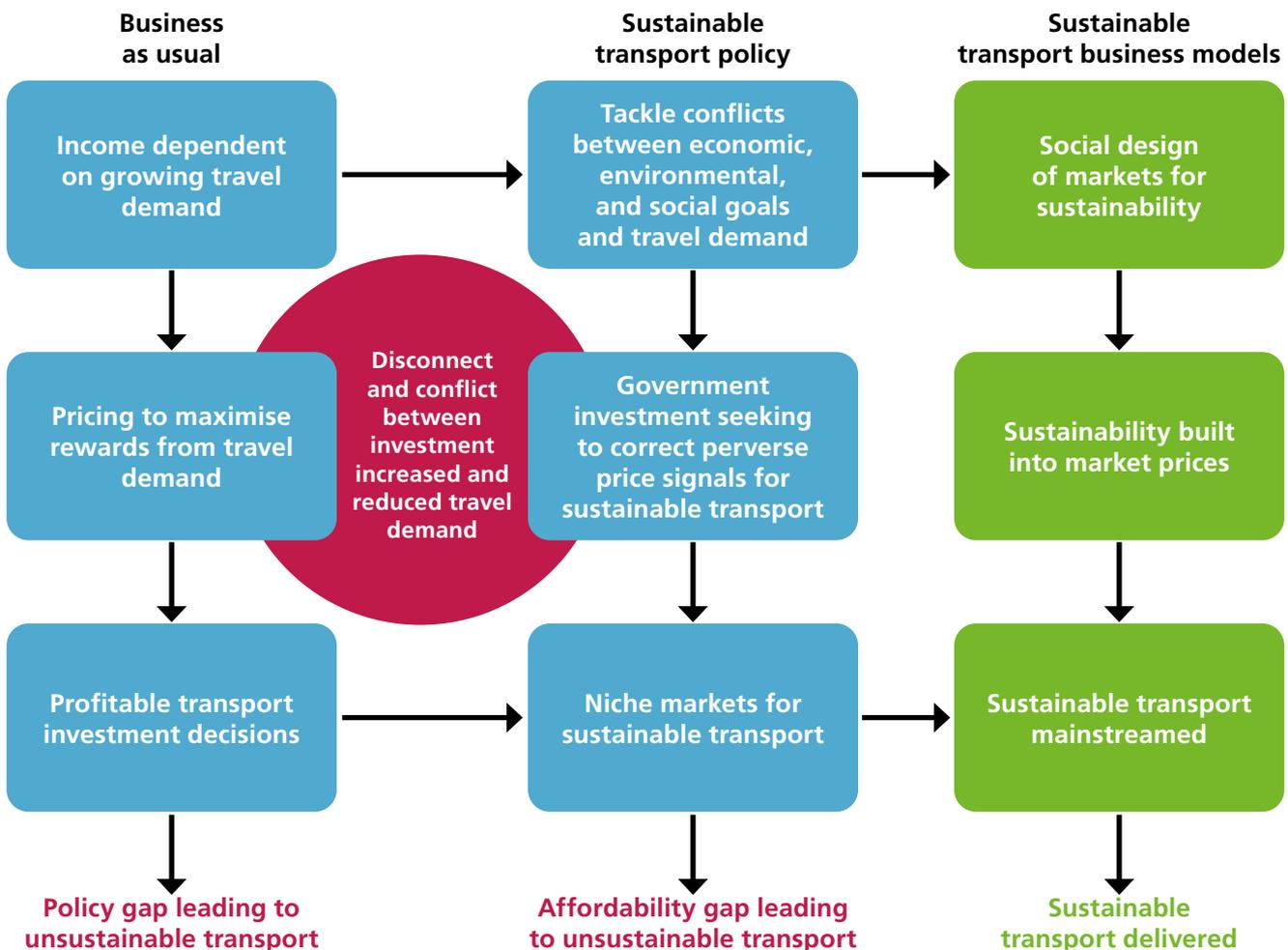
Future Government regulation should focus more on sustainable transport performance to complement the traditional focus on the operation and management of transport.

Performance based approaches could create value from social and environmental transport outcomes, rather than viewing them as external to transport business models or as a cost to the economy. There are also many untapped opportunities for transport to add value to sustainable development by connecting and enabling people and places.

Governance frameworks and business models are now able to use far more sophisticated performance measures, by making better use of new data sources and technology platforms, reflecting social and environmental value within improved ways of working.

Simpler and more achievable solutions to sustainable transport challenges need government to refocus its role, less as a provider than an enabler of good transport, learning from the weaknesses in transitioning to sustainable transport over the last 30 years and building on the new opportunities available in the technology-enabled 21<sup>st</sup> century sustainable transport economy.

The transition to these new business models can be managed incrementally, by building the new broader sustainable transport economy from the bottom up. The new approaches expand social and environmental value through better regulated performance against policy goals, enable transport purchasers and suppliers to interact in more social ways, and organise implementation for target population segments, places and types of organisation.



# 1.0 Introduction

- 1.1 Sustainable transport is challenging to achieve. Despite the emergence of sustainable transport policies over the last 30 years, transport emissions continue to rise<sup>1</sup>, and inequity grows between those that benefit most from the growing demand for transport, and those who do not. This paper looks at how to make sustainable transport easier to implement and more equitable. By changing the business models that influence the way things happen, transport business aims can become better aligned with sustainability aims.
- 1.2 There are few incentives for less travel in current transport business models and new approaches are needed that reward reduced travel demand as a transport performance goal. Transport policy seeks reduced transport as one of the essential components of decarbonisation and needs new business models to help implement incentives for better utilisation of resources, and shorter trips. .
- 1.3 This report draws from the workshops and discussions held in the six years since STSG started its publications on new transport business models with the publication “Connecting Scotland – New Ways to Fund Better Transport”<sup>2</sup>. The 2014 report was followed up in 2016 with “Towards a More Collaborative Transport Economy”<sup>3</sup>. These reports considered transport market failures such as poor transparency of transport information, perverse price signals, and the dominance of legacy business models aligned to 20<sup>th</sup> century policy goals rather than 21<sup>st</sup> century goals.
- 1.4 This new report builds on the themes of funding and collaboration to consider the emergence of new business models for fair net-zero transport. COVID-19 has disrupted transport, overcoming inertia, so structural change currently appears more achievable than for many years. The time is right for new business models to manage the transition to sustainable transport.
- 1.5 This report: describes the current market failures in sustainable transport in Chapter 2 and reviews the scope for new approaches to deliver sustainable transport including needs for change in Chapter 3.



Transport business aims can become better aligned with sustainability aims.



Structural change currently appears more achievable than for many years. The time is right for new business models to manage the transition to sustainable transport.

1 In 1990 there were 14.83 million tonnes of carbon dioxide equivalent (MtCO<sub>2</sub>e) from transport with the equivalent provisional figure reported in June 2020 for 2019 being 14.8 and the confirmed figure for 2018 being 14.9  
<https://www.transport.gov.scot/publication/scottish-transport-statistics-no-38-2019-edition/chapter-13-environment-and-emissions/>

2 <https://stsg.org/connecting-scotland-new-ways-to-fund-better-transport>

3 <https://stsg.org/towards-a-more-collaborative-transport-economy-report>

# 2.0 Business Models and Market Failures

## The gap between policy goals and implementation

2.1 For sustainable transport markets to function effectively: the buyers and sellers must have equal access to information about what is being traded; there must be transparency about the terms of the transaction; and the buyer and seller must participate within a shared set of rules governing the trade. Current transport market design is increasingly failing all these tests.

- Many economic, social and environmental costs of transport are not reflected in current transport business models with price signals often being inconsistent with policy. In particular, despite long held aspirations for carbon reduction, carbon prices are not yet built consistently into most transport prices, so the business of transport is poorly aligned with policies to reduce carbon emissions.
- The way that people and businesses buy and sell transport has been changing, with most journeys now being tracked, generating large revenues from the use of travel data. However, there is unequal access to the travel data distorting value in transport markets with a recognised need for new trusted, transparent, and accountable frameworks for the reuse of privately held data for social purposes<sup>4</sup>.
- Transport costs are increasingly bundled with other services, weakening transparency about the terms on which transport is being purchased. Whilst these gaps are often greatest for personal travel, freight transport also often offers little transparency for purchasers about transport prices (e.g. 'free' delivery).

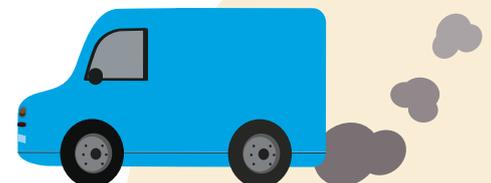
2.2 It is the role of government to address market failure, but tackling the compound failures within transport markets has proved to be too challenging to resolve within the political economy. Transport affects every part of people's lives and business competitiveness, so greater government intervention to tackle market failure has been associated with an unacceptable level of intrusion in individual travel choices and logistical decisions of companies.

2.3 For individual transport choices to be aligned with transport policy goals, without undermining the capabilities of people and organisations, change is needed. A systematic rewiring of business models and regulatory structures could make the scope of the government interventions more manageable. (Figure 2.1).



Greater government intervention to tackle market failure has been associated with an unacceptable level of intrusion in individual travel choices and logistical decisions of companies.

<sup>4</sup> <https://theodi.org/article/mobility-data-sharing-during-the-covid-19-pandemic-research-from-cuebiq-and-govlab/>



- 2.4 The value of transport is only partly related to the cost of transport itself. To build a sustainable transport economy, the gap needs to be closed between the purpose of transport, and the incentive structures that influence day-to-day transport provision. For transport prices to reflect sustainability goals, wider economic, cultural, and lifestyle choices need to be factored into transport choices.
- 2.5 The mechanisms used to determine these transport prices define more sustainable approaches to transport business model design.

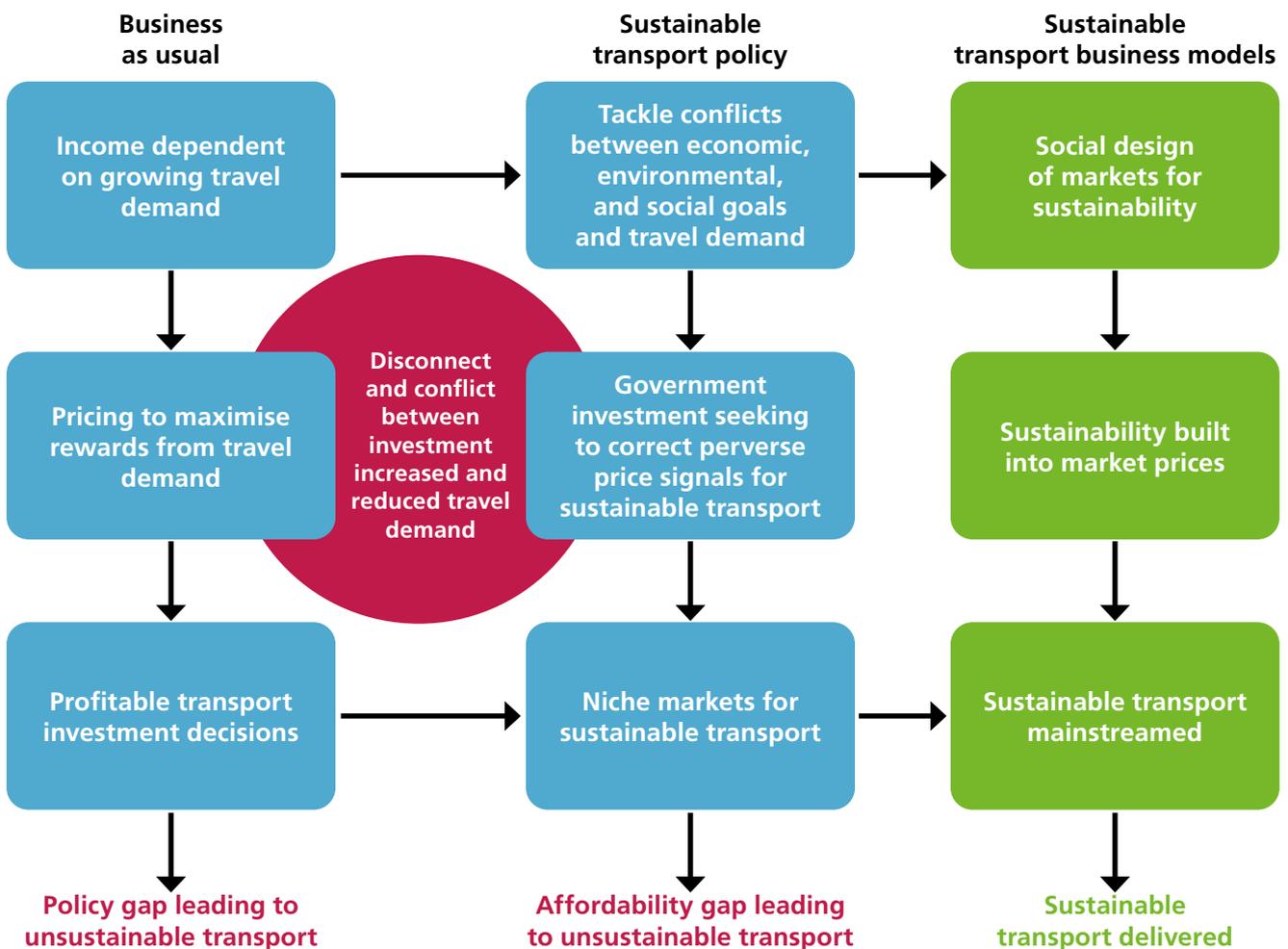


To reflect sustainability goals, wider economic, cultural, and lifestyle choices need to be factored into transport choices.

## Sustainable transport prices

- 2.6 Successive governments have sought to correct the price signals through mechanisms such as road fuel tax, applied nationally to reflect the distance travelled, and road pricing, where legislation prescribes that solutions are designed locally to be relevant to local needs. The use of the funds raised through these mechanisms has been highly controversial, particularly the inequity issues highlighted by opponents about who pays and who benefits. Given the

Figure 2.1 – Transport supply, demand and policy conflicts



complex tariffs that would be needed to ensure fairer approaches, across diverse populations and businesses, publicly acceptable price signals to achieve fair, efficient and sustainable choices have proved to be difficult to achieve<sup>5</sup>.

- 2.7 Successful approaches have been strongly associated with targeted pricing, where the costs incurred by people, places and businesses are planned and managed to secure intended outcomes. Geographical targeting such as bridge tolls and city centre road pricing have secured well-defined aims, but less well targeted schemes have failed to gain wide public acceptance, with equity concerns being particularly important.
- 2.8 Equitable market design requires that, as far as practicable, transport prices for each journey reflect the travel purpose and needs of people making the journey or purchasing the transport. To achieve this, transport prices must be determined by the supply and demand for sustainable transport goals, rather than only the supply of more transport. Achieving this requires clear metrics for sustainable transport performance<sup>6</sup>.



**Transport prices must be determined by the supply and demand for sustainable transport policy implementation, rather than only the supply and demand for transport.**

## Measuring and accounting for what is valued

- 2.9 Social and environmental outcomes can be hard to simplify into comprehensive performance indicators, but markets designed using less than perfect alignment with policy goals are still far better than markets with weak or no alignment with policy aims.
- 2.10 For this reason, it has been convenient to regard some modes of transport as more sustainable than others, but this level of simplification misses many of the sustainable transport opportunities achievable which do not fit with modal stereotypes<sup>7</sup>. Particularly when considering sustainable transport performance by people, rather than freight, more accurate performance metrics are needed. Trips by walking and cycling offer mainly local travel opportunities, and the sustainability of all other modes in the immediate years ahead will depend more on which modes decarbonise first in each location, than what emissions for that mode looked like in previous years. The gap between ambitious policy goals for sustainable transport, and the weak performance in promoting modal shift demonstrates the need for better ways to measure performance<sup>8</sup>.



**The gap between ambitious policy goals for sustainable transport, and the weak performance in promoting modal shift demonstrates the need for better ways to measure performance.**

5 Some road pricing schemes have been delivered covering city centres in London, Cambridge and Durham but not in Scotland. This partly reflects spatial cohesion in city centres relative to the diverse spatial context elsewhere.

6 <https://stsg.org/connecting-scotland-new-ways-to-fund-better-transport>

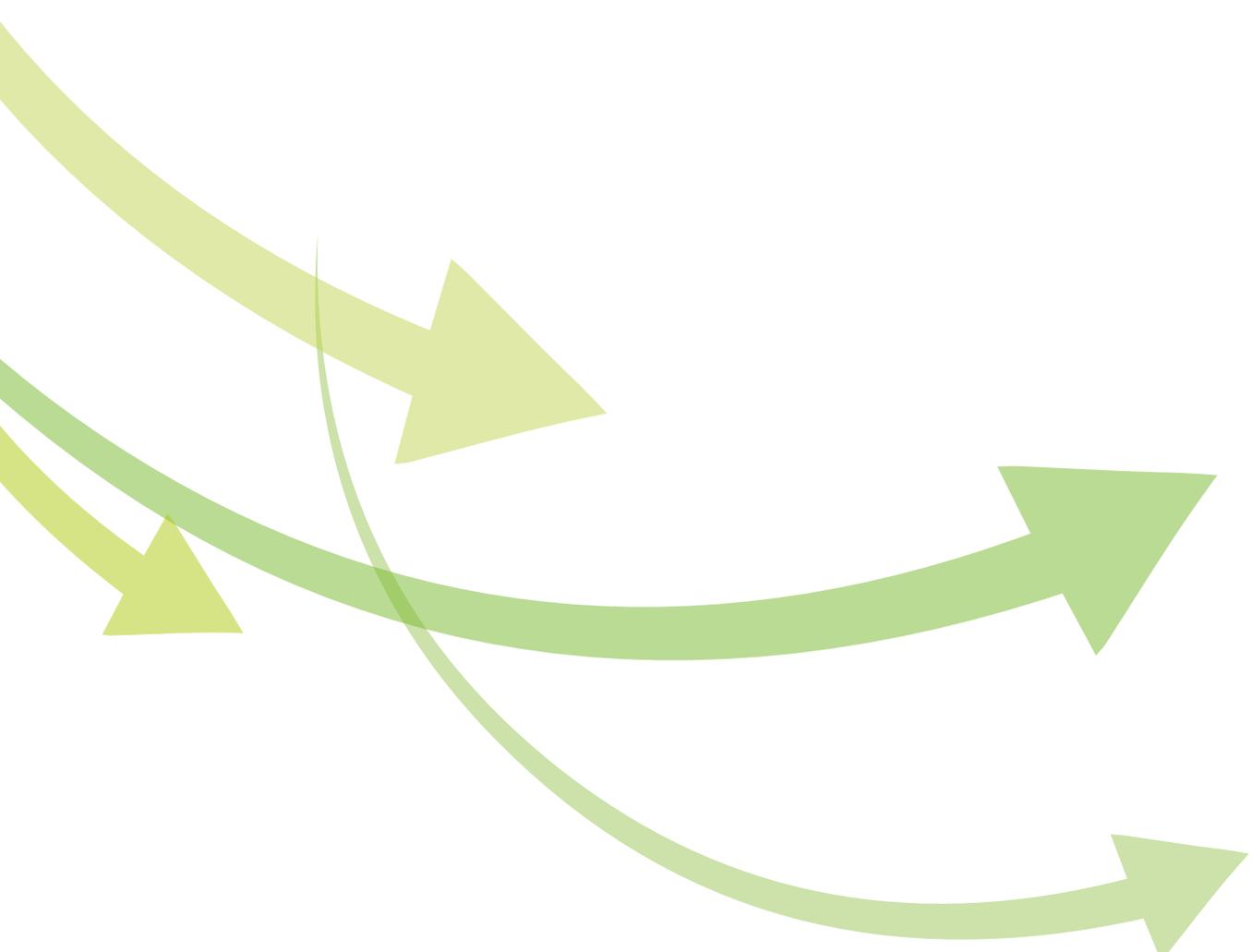
7 E.g. switching from road to air to reduce emission costs to Scottish islands Schönberger, Ferguson, Halden, Young 2019 Sustainable Transport for Remote Island Communities. STAR Conference

8 E.g. Scottish Government 2013. Smarter Choices Smarter Places. Programme Evaluation.

2.11 Sustainable transport performance can usefully be measured in terms of:

- The effectiveness of the connection being offered – the journey times and the journey cost being achieved when connecting people, places, organisations and opportunities.
- The value of emissions and resource use – with maximum value being achieved with a circular economy where there are no net emissions or resource use.
- The value of a fair and inclusive society – valuing diversity and comprehensiveness in transport coverage.

2.12 The value of change to each of these measures can be defined in various ways. As new business models develop there will be a need for ongoing improvements to performance metrics, but the remainder of this paper discusses opportunities for first steps towards the redesign of transport business models.



# 3.0 Steps Towards New Approaches

- 3.1 New business models are possible by making better use of data and technology and reflecting social and environmental goals within improved ways of working.
- 3.2 Potentially, these new business models could be managed within private, public or voluntary sectors. Each of these sectors has different strengths for assembling resources, managing accountability, and delivering ongoing innovation<sup>9</sup>. If these different strengths can be pooled within collaborative cross-sector business models, the scope for adding value compared with current transport business models is greater.
- 3.3 The new business models mark a shift from current transport valuation with a stronger focus on:
- Desired outcomes – The starting point for all interventions should be defining and incorporating transport policy outcomes into collaborative delivery models within which all partners are incentivised to deliver the defined outcomes.
  - Connections – With platforms to link purchasers and suppliers, including for insurance, enabling transport purchasers and providers to interact in new and more social ways<sup>10</sup>.
  - Transport and accessibility plans for organisations that generate significant volumes of personal and/or freight movement. These can include sustainable travel plans for employees or green freight plans for companies aiming to reduce the environmental impact of their distribution operations. Within places there are also opportunities for empowering local people and communities to design lead on sustainable transport delivery.
- 3.4 In principle, any area of sustainable transport implementation could be refreshed with new business models that better match available skills and capabilities to implementation of the challenging agenda ahead. However, these three examples are a good starting point to illustrate why improved business model design is becoming more important for overcoming current challenges to sustainable transport implementation.
- 3.5 Table 3.1 identifies key characteristics of these new business models which can be constructed in many different ways, largely by national government and local authorities but perhaps also through regulation by industry itself.

 Delivery models within which all partners are incentivised to deliver the defined outcomes.

<sup>9</sup> <https://www.gov.uk/government/publications/transforming-infrastructure-performance-roadmap-to-2030/transforming-infrastructure-performance-roadmap-to-2030>

<sup>10</sup> Such as including social design for platforms delivering transport as a service e.g. see Pangbourne, K. Mladenovi b, M., Stead, D., and Milakis, D. (2020) Questioning Mobility as a Service: Unanticipated Implications for Society and Governance. Transportation Research Part A: Policy and Practice, Volume 131, pages 35-49



**Table 3.1 – Key Attributes of the New Business Models**

Enabler	Value creation	Current examples	What needs to change
Clear performance metrics for outcomes	the outcomes where value can be created	Pay as you drive insurance	Social value scored when insurers sell pay as you drive policies with social benefits
Organising new connections such as using online platforms	Customer relationship between transport suppliers and users	Google provides over 90% of the digital travel information in the UK	Data collaboration agreements between government and big data companies
Targeting at places and population segments to manage complexity	Adding value to the wider economy of land, labour, and services	Employee travel plans Local road pricing – e.g. Durham City Centre	Incentive and reward structure is needed to reflect the social value of managing travel demand

- 3.6 One of the greatest current transport market failures results from the inconsistent and partial coverage of emissions taxes and trading schemes<sup>11</sup>. There is broad consensus that at some time in the near future all carbon emissions should be either taxed or traded but less consensus about how this can be achieved.
- 3.7 New business models such as those in Table 3.1 could help to turn the broad consensus on the principle into consensus for change in sustainable transport policy implementation.

## Social Value in Vehicle Insurance

- 3.8 Climate change is sometimes described as the world’s greatest insurance market failure. To tackle this market failure one option might be to require insurance companies to cover risks resulting from climate change including a requirement for them to hold sufficient financial reserves to ensure that they can pay for whatever damage occurs. The logic of this approach is that the reserves the insurance companies would need to hold would be huge and unmanageable, so in practice it would be far cheaper for these companies to work to prevent the climate change costs in the first place.
- 3.9 Whether or not it becomes practical in the long term for insurance markets to cover all climate risks, a more manageable shorter-term proposition would be for transport vehicle insurance to include a wider range of social and environmental risks than are commonly covered under current policies<sup>12</sup>. The scope of vehicle insurance could be expanded so that the rules under which insurers were able to offer policies were framed more broadly to include certain

 These new business models could help to turn the broad consensus on the principle that all carbon emissions should be either taxed or traded into consensus for change in implementation.

11 The EU ETS currently covers the emissions of large stationary installations and aviation emissions from intra-European Economic Area/European Free Trade Association flights  
European Parliament 2021 – 2030 climate target plan: extension of European Emission Trading System (ETS) to transport emissions

12 Halden 2008. Citizens Consumers and the Acceptability of Road Pricing. Proceedings of the Institution of civil Engineers <https://doi.org/10.1680/tran.2008.161.3.149>

elements of climate risk relating to emissions and equity<sup>13</sup>. Provided these new rules were manageable for insurers, they could help to support behaviour change towards sustainable travel choices with:

- A risk premium on the value of the transport emissions which all people and organisations creating emissions must pay to insure against the climate change risks.
- A geographical risk element that reflects the higher climate risk associated with travel in certain places at certain times. For example, driving a car outside a school at opening and closing time has social impacts on the travel behaviour of other travellers that magnify the climate risk of the car use. The premium could also depend on the type of vehicle and specific noise or emissions for the vehicle could be included in the premium to reflect the travel behaviour responses to different types of vehicle.

- 3.10 The value of the risk premium would be determined within competitive insurance markets under similar oversight and regulation, including voluntary industry protocols as for other insurance products<sup>14</sup>.
- 3.11 Regulators would need to satisfy themselves that the insurers had set the risk premium for customers at a level sufficient to be able to demonstrate a shift to sustainable travel behaviour by customers, whilst ensuring that the burden of increased cost was distributed fairly.
- 3.12 In designing these new regulatory frameworks, equity issues will be critical. For example, shift workers have less choice about where and when to travel so would be unable to benefit from the lower cost insurance that those with flexible working schedules could purchase. To ensure equitable designs for the new schemes credit schemes would be needed<sup>15</sup>.

13 For example the Scottish Government currently has a policy to reduce emissions from cars and could potentially (via the Bank of England Prudential Regulation Authority) introduce new rules to ensure that insurers met targets for average emissions reduction across the vehicles they insure with a structure of penalties for not meeting these targets, or an obligation to purchase credits from companies that exceed the targets.

14 How insurance is regulated. <https://www.abi.org.uk/data-and-resources/tools-and-resources/regulation/>

15 For example enabling employers to register certain people as essential car users with a defined level of credit being applied to their account relative to the normal pay as you go tariff. Any credit scheme must ensure clear regulation to ensure any value received by insurers are ring fenced for investing in carbon reduction



Set the risk premium for customers at a level sufficient to be able to demonstrate a shift to sustainable travel behaviour.



## Organising new Connections

- 3.13 Sustainability is also about sharing and collaboration and making more of the untapped potential of resources. The global platforms such as Amazon and Google have unlocked value by helping suppliers and users of goods and services to interact in ways that were not possible without these platforms.
- 3.14 Transport platforms derive much of their value from managing customer relationships. By understanding the needs and preferences of individual users they can match available opportunities with user needs.
- 3.15 Potential benefits from wider use of platforms in transport come from greater shared use of assets such as cars and vans. This can build on the opportunities increasingly available through the digitalisation of logistics using online platforms to match loads to available freight transport capacity, thereby cutting the distance vehicles travel, energy use and emissions through more efficient operation.
- 3.16 If the embedded carbon costs in vehicles were included in the tariffs offered through car clubs and vehicle rental providers these shared transport providers could potentially offer much more attractive costs to customers. Adding value from reduced emissions, improved access to services and social inclusion benefits to the transport provision would be additional to the operational cost savings currently offered by shared transport.

 Transport platforms derive much of their value from managing customer relationships.

## Transport and Accessibility Plans for Organisations

- 3.17 Travel plans seek to manage staff and customer travel, at the level of individual sites and/or organisations, and plans for freight transport for supplies and deliveries are managed within supply chains. The process of preparing a plan requires organisations to think about how they can manage their travel more sustainably. Travel plans have the potential to resolve more complex trade-offs in sustainable transport since the organisational capability is often best matched to the implementation requirements. Some highly successful travel plans have been used to manage access for staff, customers and goods to achieve consistency with wider sustainable development of organisations and places but most successful approaches have a strong local champion for the plan such as a senior manager or owner of a business<sup>16</sup>.
- 3.18 To frame policy goals within these travel plans, transport authorities can define their policy goals in terms of quantifiable and measurable factors that can be linked to a system of incentives and penalties. For new development this is sometimes managed through planning agreements, but similar approaches could be applied to all organisations generating travel demand. Establishing new business models to help to make travel plans more effective requires policy goals to be specified in terms of measurable benefits. Prices can be set using various mechanisms for:

 This is sometimes managed through planning agreements but could potentially be applied to all organisations generating travel demand.

<sup>16</sup> Rye T. 2002 Travel Plans: Do They Work? Transport Policy 9:4, pp 287-298. Also "DHC 2000. Evaluation of the Cycle Challenge Initiative. Final Report for Scottish Executive" reported that travel plans for many major employers had been triggered through very low cost programmes by working through campaign groups such as the Lothian Cycle campaign in Edinburgh and the Highland Cycle Campaign in Inverness.

- CO2 and other emissions
- Access to opportunities such as the cost and time of travel to key services such as grocers, leisure facilities, and health services<sup>17</sup>.
- Equitable allocation public space, particularly for parking versus better ways of sharing road space.



3.19 Setting prices to ensure the business models are financially viable requires that the revenue received under the scheme is equivalent to the expenditure requirements for organisations delivering benefits through their travel plans. For sharing public space that might mean parking charges to fund shared transport services.

3.20 Using these approaches, travel plans could be applied in any local area for:

- Workplaces – Managing employee commuting to and from a location and during work with all emissions and use of road space and local; services being measured. Visitor, freight and delivery movements can also be important for some workplaces requiring similar management approaches.
- Residential locations – Managing transport supply to residential locations using defined measures of travel time and cost to identify who should pay more and who should receive the benefits..
- Service providers – Managing the travel associated with healthcare, education and other travel to facilities where the traveller has limited choice of destination. Travel plans for these locations recognise that competitive non-car solutions are generally better known to the service providers than the travellers themselves, making information, particularly personalised information, relatively important as an influence on travel behaviour. Service providers have chosen the destination location for most service users, so are also well placed to invest in the infrastructure and services to serve these locations to ensure sustainable choices are available.
- Other trip generations and attractors – Managing the transport generated by, or attracted to, locations where the traveller usually has a choice of destination available when making the trip such as retail, leisure, sports, entertainment and other similar locations.

3.21 For new developments planning obligations are typically used to define the charges residents pay to fund implementation mechanisms required for improvements to be made. For other sites other existing transport authority powers such as for road pricing and parking could be used to frame the new business models. Alternatively new powers could be given to local authorities to reflect the many opportunities to develop new travel planning business models. These could potentially enable transport authorities to enter into a legally binding partnership agreements for travel demand management with occupiers of land, including the arrangements for ongoing monitoring and enforcement.

 That might mean parking charges to fund shared transport services.

17 Halden D 2021. Co-ordinating and Integrating Transport by Valuing Accessibility to Opportunities. Accessibility for Transportation in the Big Data Era Journal of Advanced Transportation (forthcoming).

# 4.0 Conclusions

- 4.1 Transport markets are not sustainable due to multiple failures in the way business models are designed. Sustainable approaches require complex trade-offs between economic, environmental and social factors that have proved to be too complex to resolve through national fiscal and regulatory mechanisms.
- 4.2 A new approach is needed which frames transport markets differently so that the most complex issues can be resolved by devolving them to a simpler level than national policy.
- 4.3 Reducing complex policy to simplistic implementation, such as some modal shift programmes, has not succeeded in reducing transport emissions, so new and better targeted approaches are needed. In the future Government should focus more on transport performance, complementing the traditional focus on travel demand operation and management.
- 4.4 Performance based approaches could create value from social and environmental transport outcomes, rather than viewing them as external to transport business models or as a cost to the economy.
- 4.5 There are many untapped opportunities for transport to add value to sustainable development by connecting and enabling people and places.
- 4.6 Governance frameworks and business models are now able to use far more sophisticated performance measures, by making better use of new data sources and technology platforms, reflecting social and environmental value within improved ways of working.
- 4.7 The transition to these new business models can be managed incrementally, by building the new sustainable transport economy from the bottom up, complementing established systems.
- 4.8 Simpler and more achievable solutions to sustainable transport challenges need government to refocus its role, less as a provider than an enabler of good transport, learning from the weaknesses in transitioning to sustainable transport over the last 30 years and building on the new opportunities available in the sustainable transport economy.



Making better use of new data sources and technology platforms, reflecting social and environmental value within improved ways of working.



Learning from the weaknesses in transitioning to sustainable transport over the last 30 years and building on the new opportunities available.



# STSG Occasional Paper 2021/1

The aims of the Scottish Transport Studies Group are to raise awareness of the importance of transport for the Scottish economy and society. STSG is a charity registered in Scotland SCO14720. This paper seeks to promote debate and represents the views of the authors in October 2021. It should not be taken to represent the views of STSG subscribers or supporters.

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