
Business Models for Net-Zero Transport

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1 Introduction

Circular transport business models require supply chain management approaches to recover or recycle all of the natural resources used when transporting people and goods. Decarbonisation aims for transport are widely stated, but sustainable approaches require complex trade-offs between economic, environmental and social factors. This paper proposes a new approach to construct business models making better use of the capabilities of organisations. Who has the untapped capability to close the gap between transport policy aims and practice? How can the business of transport must be better designed for implementing social and environmental policies?

In the absence of well-regulated net-zero business models, net-zero transport is becoming increasingly confusing hampering prospects for global decarbonisation efforts. The world's largest airline by revenue and value, Delta, already claims to be net-zero. In contrast, the decarbonisation plans of the government suggests that net-zero rail transport will not be achieved until nearer 2050. Vehicles described as being manufactured net-zero now dominate electric vehicles car sales, but most bus and rail operators suggest dates between 2030 and 2050 for completing the decarbonisation of their fleets. Many transport authorities have made commitments to reach net-zero by 2045 or later, recognising that some transport, particularly HGVs, will take longer to decarbonise than others. Greater consistency and clarity are needed in the way these net-zero processes are regulated to manage the transition process.

New performance-based approaches to transport regulation 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. 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.

Business model design has been a growing part of Scottish transport innovation for over 20 years, but smarter approaches continue to be framed as pilot programmes to allow business as usual to continue alongside. In addition to demonstrating the new business models, incentives are needed to encourage a shift towards them from traditional ways of working. This paper considers how to overcome the weak progress transitioning mainstream transport business to more circular business models. It identifies how the traditional focus on the operation and management of transport can be supplemented with stronger regulation of sustainable transport performance to add value to transport.

To achieve these changes government must refocus its role on more new enabling roles in the sustainable transport economy. New socially designed business models all require some form of regulation, ranging from additional environmental criteria in vehicle insurance requirements, to more widespread pricing of carbon emissions. The largest Scottish Government transport business model development programme currently underway seeks to support 'mobility as a service' (MaaS) as a way of joining up different modes of travel, but the value created through MaaS is not easy to reconcile with sustainable transport. The paper reviews how 'as a service' business models could have greater value beyond mobility, with potential for 'net-zero as a service' being one promising approach to future sustainable transport business models.

2 Business Models and Sustainable Transport Market Failure

2.1 The gap between policy goals and implementation

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 markets are increasingly failing all these tests with:

- Many economic, social and environmental costs of transport not reflected in current transport business models and price signals often being inconsistent with policy - 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 changing - Most journeys are tracked, generating large revenues from the travel data. However, there is unequal access to this data distorting value in transport markets and creating need for new trusted, transparent, and accountable framework for the reuse of privately held data for social purposes.
- Transport costs increasingly bundled with other services – This weakens 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).

It is the role of government to address market failure. However, 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.

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).

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. The mechanisms used to determine these transport prices define more sustainable approaches to transport business model design.

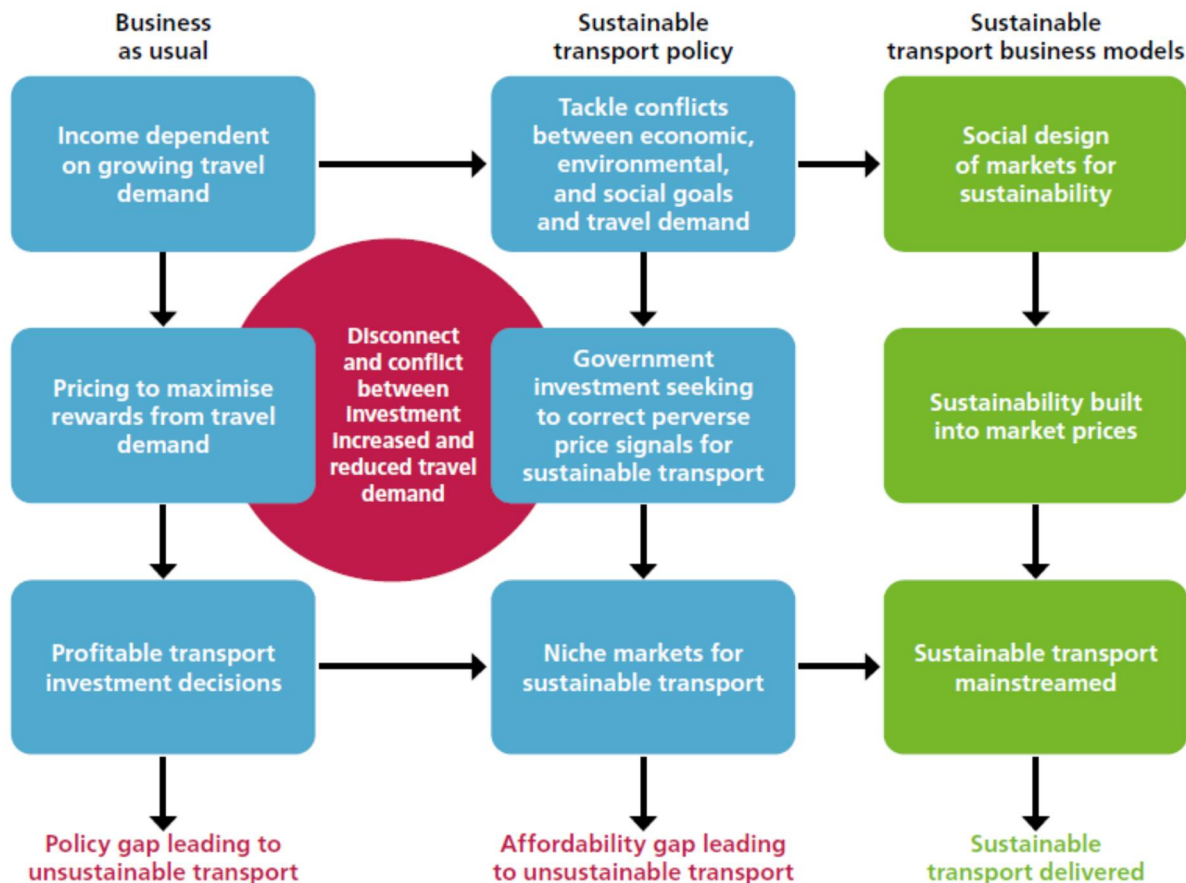


Figure 2.1 – Transport supply, demand and policy conflicts

2.2 Measuring and accounting for what is valued

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.

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. 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.

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.

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 Steps Towards new Business Models

3.1 A typology of new approaches

New business models are possible by making better use of data and technology and reflecting social and environmental goals within improved ways of working. 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. 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.

The new business models mark a shift from current transport valuation with a stronger focus on:

- Performance against 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 .
- People, businesses and places - Travel and accessibility plans for organisations that generate or attract transport such as the sustainable travel plans public authorities require of large employers for staff, visitors and freight. Within places there are also opportunities for empowering local people and communities to design lead on sustainable transport delivery.

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. 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 self-regulation by industry itself.

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 such as reduced emissions	Pay as you drive insurance with cheaper premiums for those who drive less Investment in carbon reduction within the supply chain such as renewable energy generation and storage	The value of emission reduction needs 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	Digital travel information on platforms such as Google and marketplaces for freight transport supply	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

One of the greatest current transport market failures results from the inconsistent and partial coverage of emissions taxes and trading schemes. Climate change policy observes a broad consensus that, all carbon emissions should be either taxed or traded but there is currently no consensus about how the currently regulatory frameworks can be revised to achieve this. 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.

3.1.1 Performance criteria on environmental markets

Partly to support net-zero claims by business, voluntary carbon markets are growing rapidly. With the voluntary carbon offsetting approach, a polluter with no easy choice of a zero-carbon option pays others to increase natural carbon absorption. Until recently there was little way to confirm that any voluntary offsetting scheme was actually making a meaningful contribution to cutting emissions, but this looks set to change as UK companies such as Sylvera and BeZero rate carbon offsets to improve transparency about the carbon reduction being achieved. The cash generated from carbon offset purchases provides vital financial support for many projects delivering climate action.

Sometimes the most polluting sectors need to take action faster, so the world's largest airlines have typically stated far shorter timescales for achieving net-zero than less polluting transport modes. If net-zero is realistic for the world's largest airline, and the offset purchases are generating essential revenue for environmental action, what other parts of the transport system could move faster with net-zero commitments?

Progress has been glacial expanding nationally and internationally regulated carbon markets, and increasing taxes on emissions. Until the political obstacles to national schemes can be overcome it makes sense to grow more local and voluntary approaches so that paying for carbon emissions becomes increasingly normal business. We often think of market design as being exclusively the responsibility of national and international governments, but local market design for sustainable transport can be progressed far faster and more equitably.

For example, it is already within the power of any local authority to introduce a road pricing scheme charging travellers at a rate equivalent to the full cost of the carbon emissions. Within business, 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 elements climate risk relating to emissions and equity. 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 by deterring walking to school magnifying 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.

The value of the risk premium could be determined within competitive insurance markets under similar oversight by voluntary industry protocols and regulation and as for other insurance products. 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. 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.

3.1.2 Organising new Connections

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. 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 is 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.

If the embedded carbon costs in vehicles were included in the tariffs offered through car clubs and vehicle rental providers these organisations could potentially offer much more attractive costs if reduced emissions, improved access to services and social inclusion benefits were added to the operational cost savings currently included

3.1.3 Transport and Accessibility Plans for Organisations

Travel plans seek to manage staff and customer travel, and freight transport for supplies and deliveries at the level of individual sites and/or organisations. The process of preparing a travel 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.

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:

- 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 .
- Equitable allocation public space, particularly for parking versus better ways of sharing road space.

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.

3.2 Managing transport as a system

As new business models emerge to include more social and environmental factors within transport there will be growing intersection and overlap between transport and other sectors. Transport providers will need to deliver not just seamless, omni-channel and customised experiences, but managed approaches to manage the creation of social and environmental value.

For example, the bus industry has marketed its services as 'social inclusion projects on wheels' providing networking between travellers and helping people to interact with opportunities to access employment, goods and services. However, these traditional transport business models have not captured the value of the social inclusion within the business model. System level providers specialising in data and customer relationships have been able to capture much of the value that the bus operators have chosen not to exploit. The value of the network effects exploited through customer relationships from tracking travel patterns is often many times greater than the resource costs of providing the transport but operators who do not capture this value run the risk of losing their market.

This shifts the balance of value in transport from providing mobility to enabling accessibility. These mechanisms have long been demonstrated, such as the free shopper bus provided by retailers to enable retail sales. However new revenue-generating approaches have become possible through analysis of customer data and targeted promotion and marketing.

Transport business models based on offering the cheapest travel option between two places are increasingly being replaced with 'as a service' business models where the value of transport is increasingly generated through the enabled access to opportunity. Sustainable transport business models are now as much about using data to assist understanding, as provide options for physical movement.

Within the new system level business models, the skills to succeed may be very different from established transport sector skills. Traditional transport economics will give way to technologies that deliver access, status and convenience. Successful business model development will draw skills from many partners, optimise subtle behavioural preferences and manage progress towards healthier more sustainable lifestyles.

3.3 Achieving a viable transition

Implementing net-zero goals too early in the decarbonisation process would add at least a £trillion to transport costs overseen by local authorities alone. In the latest BEIS (Department for Business, Energy and Industrial Strategy) data, transport emissions per capita range from less than 1.5 tonnes per person in some Council areas to over 5 tonnes per person in other areas. These averages also mask wide variations within each local area with some people, often the least wealthy, having very low emissions associated with their travel whilst others emitting well over 10 tonnes per year.

To manage the transition the UK Climate Change Committee has recommended a much clearer net zero delivery framework where the relative roles and responsibilities of local and central government are far better defined. The local authority role will be particularly important in securing a just transition that benefits all communities recognising the diversity of needs and capabilities across the country.

Local authorities have been queuing up to declare climate emergencies, but these declarations have been used more for political capital than any practical emissions reduction benefit. When transitioning to net-zero business models one possible short term step might be to purchase carbon offsets within the supply chain to help fund the decarbonisation of related services where decarbonisation can move faster than for the transport vehicles themselves. Viewing emissions within each transport supply chain in terms of hard cash as soon as possible will also help to focus attention on the rapid growth of zero-emission technologies.

Enabling transport purchasers and providers to interact in new and more social ways, could facilitate rapid change, shifting the mindset for the transport sector from business models based predominantly on the supply and demand for travel, to business models based on investing in people and places to reduce travel demand and emissions. Some transport emissions will need to be offset within the supply chain for at least the next few decades and creating new revenue streams for good projects should pave the way towards better and more sustainable regulation and taxation. The decarbonisation of all transport emissions will take time, but net-zero business models should be something everyone can aim for in the short term. The new business models can be developed incrementally alongside current transport business models allowing the transport economy to change as it grows away from its dependence on increased travel demand.

4 Conclusions

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. It is the role of government to address market failure, but the compound failures within transport markets have proved to be too challenging to resolve within the political economy.

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.

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 to implement sustainable transport policies. In the future Government should focus more on transport performance alongside the traditional focus on travel demand operation and management.

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 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.

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.

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.

5 References

For further details of the projects summarised in this paper and the references on which they are based see <https://stsg.org/a-new-look-at-making-sustainable-transport-work-for-everyone>.

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