Fare-Free Travel Policy Analysis

National Transport Authority

Reliance Restricted

19 December 2022 | Final

EY
Building a better working world

DISCLAIMER

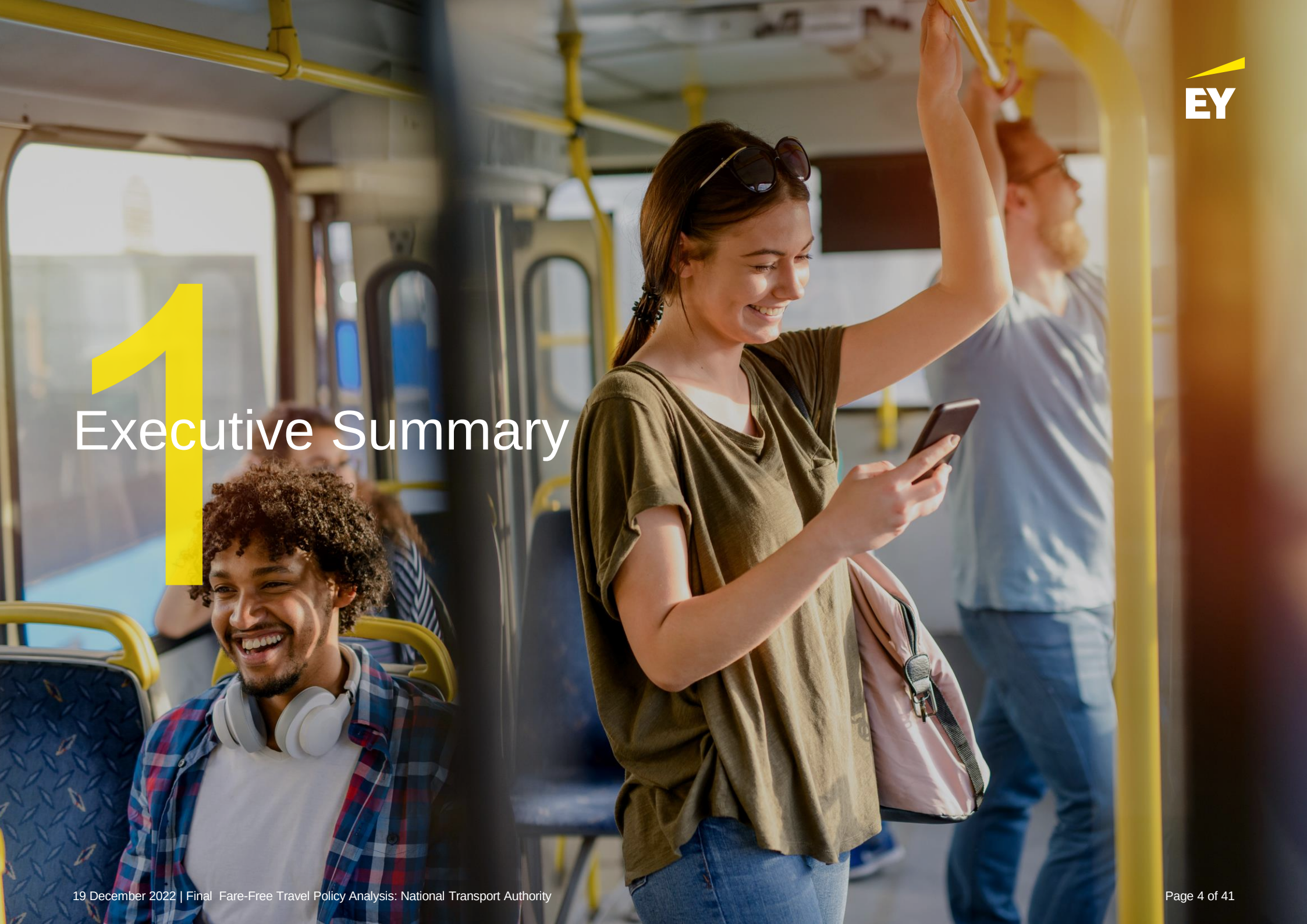
This report has been prepared by Ernst & Young Business Advisory Services ("EY"), in accordance with an engagement agreement for professional services with the National Transport Authority (the "NTA"). EY's obligations to the NTA are governed by that engagement agreement. This disclaimer applies to all other parties (including the NTA's affiliates and advisors).

This report has been prepared for general informational purposes only and is not intended to be relied upon as accounting, tax, or other professional advice. Refer to your advisors for specific advice.

EY accepts no responsibility to update this report in light of subsequent events or for any other reason.

To the fullest extent permitted by law, EY and its members, employees and agents do not accept or assume any responsibility or liability in respect of this report, or decisions based on it, to any reader of the report. Should such readers choose to rely on this report, then they do so at their own risk.

Table of contents



1 Executive Summary

Summary of Findings

Report & Policy Context	► Current Government policy deliberately prioritises active travel and public transport to help achieve Ireland's overall emission reduction goals. The current Climate Action Plan aims to facilitate 500,000 extra walking, cycling and public transport journeys per day by 2030 and reduce the km driven by internal combustion engine (ICE) vehicles by 10%. ► Other Government policies, such as the National Sustainable Mobility Plan and the National Development Plan, align with this goal. Two-thirds of additional capital expenditure has been earmarked for public transport and €360m per annum for active travel. The National Investment Framework for Transport in Ireland (NIFTI) has also introduced a modal hierarchy that prioritises active travel, public transport and car travel in that order. ► The policy alignment of Fare-Free Travel (FFT) is therefore dependent on its ability to drive additional public transport trips through a reduction in car use rather than a reduction in active travel or an increase in the overall level of travel. ► This report analyses the benefits and costs of FFT in this context to determine whether it is a suitable policy tool to meet Ireland's overarching climate and transport policy goals.	Section 2
Evidence Review	► A review of the economics literature suggests that transport subsidies are widely considered to be beneficial given the substantial societal costs of car use. However, these studies do not generally endorse free fares, as it would be overly costly and incentivise excessive travel. ► It has also been demonstrated that when FFT is introduced, a larger share of new passengers often come from active modes such as walking or cycling rather than private cars. The share that does come from car drivers correlates less strongly with fare reductions than with increases in fuel prices, restrictions on parking and road usage, or increases in PT quality in terms of speed, frequency, and coverage. ► Irish transport users have highlighted other issues around public transport availability and reliability as greater barriers to reducing car use than public transport pricing.	Section 2
Case Studies	► The majority of FFT case studies show other public transport enhancements occur at the same time as their introduction of free fares. Therefore, it is difficult to determine if the increase in public transport use came from the free fares or the other enhancements. ► Where FFT has been implemented, as expected, public transport demand increased in all cases. The majority of this additional demand derived from reduced active travel and additional trips made as a result of the elimination of fares. Car use did reduce in most cases but only to a very limited extent.	Section 3

Summary of Findings

Financial Assessment

- The financial assessment in this report considered the following two policy scenarios:
  - **Scenario 1: Local Free Fares:** assumes all public transport is free at a local and city level. However, intercity rail and bus services would still have fares and require booking and ticketing to facilitate demand management.
  - **Scenario 2 - Full Free Fares:** assumes all PSO travel fares are free, including local and intercity bus and rail services. These would become ticketless services and save money associated with revenue collection.
- For both scenarios, it has also considered three components of financial impacts:
  - Reduced fare revenue
  - Cost of increased bus capacity to meet additional demand
  - Reduced costs of revenue collection for transport operators
- Under Scenario 1, FFT would cost the exchequer approximately €340mn per year in lost revenue and approximately €350m per annum if bus service capacity was increased and revenue collection costs were eliminated. The financial assessment has assumed that only buses will be able to increase capacity due to significant constraints in procuring rolling stock.
- Under Scenario 2, FFT would result in €530mn per year in lost revenue and cost €545mn in total if bus capacity was increased to try to accommodate the additional demand and the costs associated with revenue collection were also eliminated. In addition, this scenario would require an additional €140m in total CAPEX to facilitate the purchase of up to 240 new buses.

Section 4

Commercial Bus Operators

- The financial situation of many operators in the aftermath of COVID-19 has weakened. Several operators have recently increased prices due to a substantial rise in input costs.
- FFT could have a detrimental impact on the business viability of commercial bus operators. A large proportion of customers with PSO alternatives could switch to those routes that would be free, and several commercial operators could reduce services in advance of public investment.
- In 2019, Commercial Bus Operators made €186m in fare revenue by facilitating 30.5 million passenger journeys. Should the Government expand FFT to this sector in the same manner as the current Free Travel Scheme, it could cost approximately an additional €150m-€200m per annum.

Section 5

Summary of Findings

Travel Behaviour & Economic Assessment

- The transport model results broadly align with the international case study evidence on FFT. The policy results in an increase in public transport patronage of approximately +22%. This increase is driven by a reduction in walking by 7%, a reduction in cycling by 13% but only a reduction of 1% in car trips, and an increase in total overall trips.
- These transport impacts will lead to a range of economic benefits and disbenefits that have been quantified using a “Marginal External Costs” approach.
- The benefits of the policy include a reduction in congestion and environmental impacts due to the decline in car use. The disbenefits include deteriorating health and increased absenteeism due to reduced active travel.
- Overall, the external benefits of reduced car use only outweigh the disbenefits of reduced active travel by approximately €15.3m per annum in this strategic economic assessment.

Section 6

Practical Impacts of Fare-Free Travel

- The introduction of FFT could make running public transport services more difficult due to a potential loss of data, a sudden increase in demand, and potential unwanted behavioural impacts.
- Should FFT include the abolition of ticketing, it would be more difficult to plan services due to reduced available data. Even if tickets remain, there maybe be a reduction in compliance by passengers due to a perception of futility. Alternative forms of getting data on transport patterns could be pursued, e.g. using mobile phone data, although privacy concerns would need to be carefully considered.
- The increased demand for public transport would likely be sudden upon the implementation of FFT, and capacity could not be expanded quickly enough to absorb it, particularly on the rail network. This would lead to significant overcrowding, as was seen in the case of the German €9 rail tickets this year.
- Should the implementation of FFT be reversed, there could be significant technical difficulties in the reintroduction of fares and ticketing, as well as societal issues due to potential public backlash.
- There may be unwanted behavioural issues associated with FFT. The policy could result in government spending being used to facilitate unnecessary trips. In addition, Austin (USA) experienced a rise in anti-social behaviour (ASB) when it introduced FFT. It is possible that some of the ASB observed on Luas and rail could be seen more frequently on buses if fares are not required while boarding. This could increase the security costs borne by transport operators.
- The introduction of FFT may cause issues with cross-border transport. The Enterprise train service between Dublin and Belfast, as well as cross-border bus transport, may not be able to offer FFT as they traverse two jurisdictions.

Section 7

Financial Assessment Summary

Approach

The report has considered the following two scenarios to understand the potential financial implications of fare-free travel:

- **Local Free Fares:** assumes all public transport is free at a local and city level. However, intercity and commuter rail and bus services would still have fares and require booking and ticketing to facilitate demand management
- **Full Free Fares**: assumes all PSO travel fares are free, including local and intercity bus and rail services. These services would become ticketless services and save money associated with revenue collection.

These scenarios have been assessed against a base case which includes a continuation of the 90-minute fare and the young adult leap card but where the temporary fare reduction is reversed. The following three aspects have been incorporated into the assessment of FFT's financial impact:

- **Reduced fare revenue:** the elimination of PSO fare revenue for all relevant scenarios.
- **Cost of increased capacity:** increases in variable costs for bus operators over the medium term to try and match increased demand.
- **Reduced costs of revenue collection**: the potential cost savings associated with revenue collection over the medium term.

Results

Net annual recurring financial impact – medium-term (2023 prices)

	Scenario 1 – Local FFT	Scenario 2 – National FFT
Lost Revenue	-€337m	-€532m
Increased Capacity Cost	-€41m	-€61m
Avoided Collection Costs	€28m	€54m
Net Financial Impact	**-€350m**	**-€545m**

Source: EY Analysis

Lost revenue

The lost revenue associated with FFT represents the immediate financial impact of the policy. Savings in revenue collection and the increased costs of capacity improvements will take time to be realised. The estimates are based upon forecasted 2023 fare revenue, including Taxsaver tickets but excluding payments associated with the current free travel scheme.

Cost of increased capacity

The cost of increased capacity was taken by increasing the variable costs of bus operators in line with expected levels of increased demand to try and limit the impact of overcrowding on services. Fuel, maintenance, bus hire and direct staff costs have been increased in line with the expected increase in demand based on the case study modelling. It is unlikely that this increase in capacity will happen immediately and should be considered to accrue gradually over the following 3 to 4 years. An additional CAPEX of approximately €140m will be required to facilitate the purchase of up to 240 new buses. It is assumed that it will not be possible to increase rail/Luas capacity beyond what is already envisaged due to restrictions in the procurement of rolling stock and capacity constraints on rail lines.

Savings in revenue collection

Revenue collection costs include the costs of ticket machines, ticket inspectors and third-party fees. These costs could be eliminated over the medium term. The potential savings were estimated by taking NTA research from 2015 that estimated collection costs as a proportion of revenue. These rates ranged from 7% to 13%, depending on the operator. These percentages may be somewhat out of date, given the developments in ticketing in the intervening years. However, they still represent the best evidence available.

Economic Assessment Summary

The Economic Impacts of Fare-Free Travel

EY has conducted a strategic estimate of the benefits of fare-free travel using a marginal external costs approach. This approach estimates the environmental and social costs of mode shift from car travel and active travel to public transport. The benefits that have been considered are listed below:

- **Congestion:** reducing congestion on the road through reduced car use.
- **Carbon Emissions:** reduced emissions from car-use, partially offset from additional public transport trips.
- **Air Quality:** improvement in air quality as a result of lower PM and NOx emissions.
- **Noise:** The benefit of quitter streets due to less car use.
- **Accidents:** reduced road accidents as a result of less driving.
- **Health:** the reduction in health benefits due to lower levels of activity
- **Absenteeism:** The increase in absenteeism as a result of reduced activity levels

Economic Impact of Fare-Free Travel in Ireland

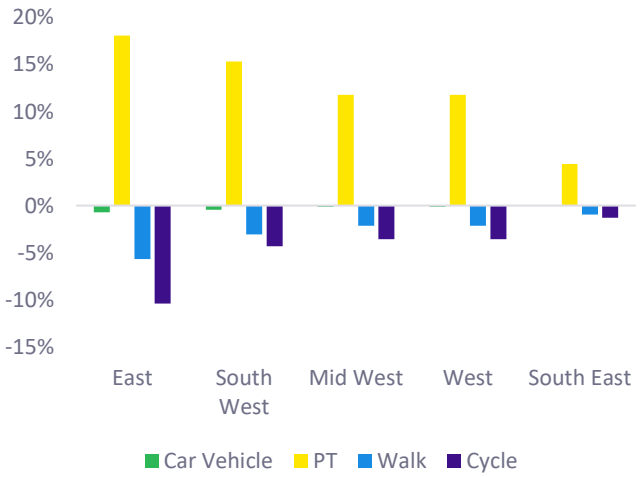
Annual External Benefit

€15.3m

EY used the NTA's Regional Transport Models to estimate the potential modal shift implications of a switch to Fare Free Travel. This model shows a significant increase in public transport demand of up to 10-17%. However, the majority of this mode shift does not come from reduced car use.

Modelled car trips fall by less than 1% as a result of this policy. This reduces congestion, carbon emissions, improves air quality and reduces noise pollution and road accidents. However, the majority of the additional public transport trips are actually driven by reduced active travel. Walking falls by approximately 7%, and cycling by 13%. Active travel users typically benefit from improved health outcomes. Disincentivising active travel reduces life expectancy, increases healthcare costs and increases the level of absenteeism. Therefore, these active travel disbenefits erode most of the external benefits of FFT from reduced car use.

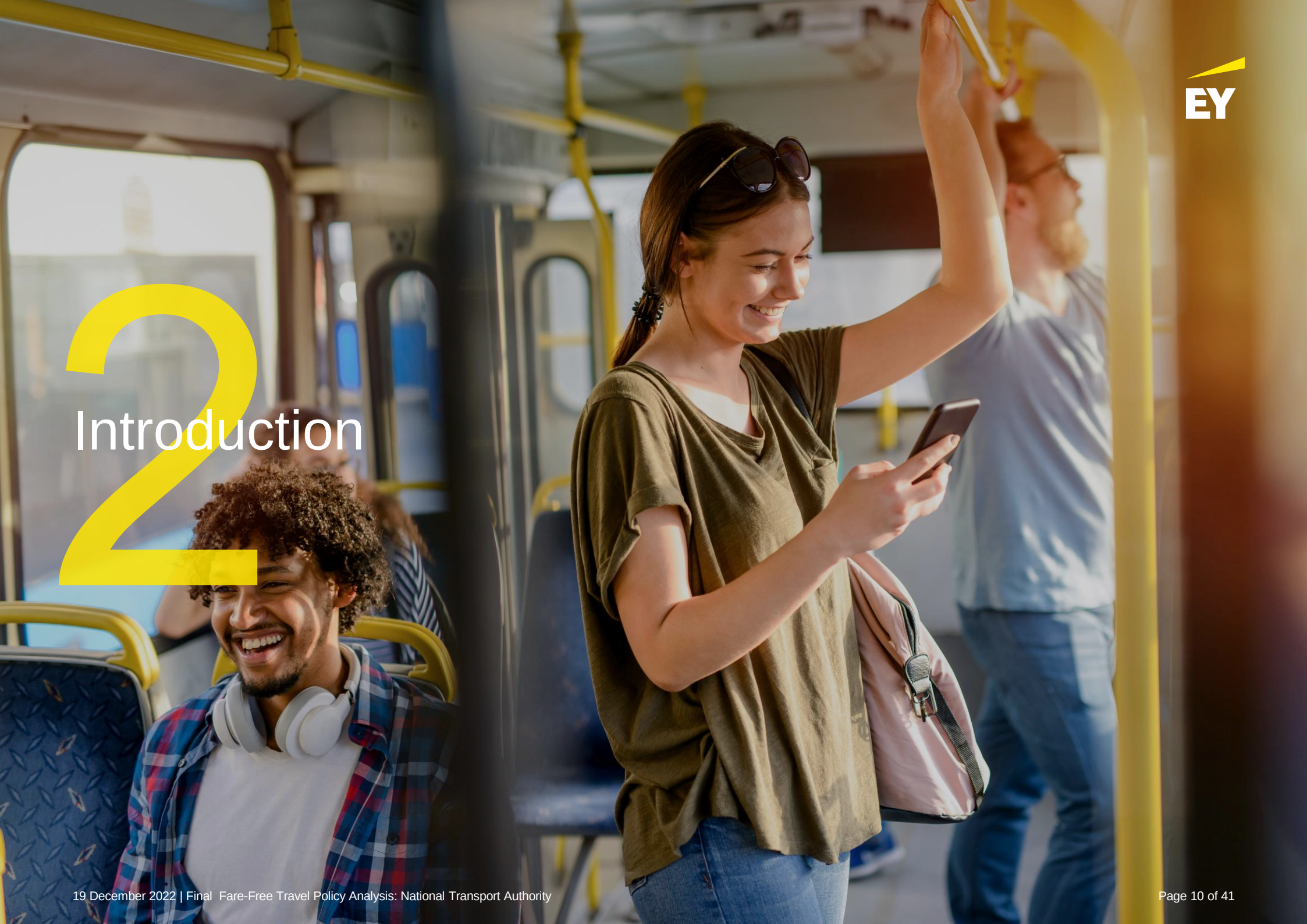
National Fare Free Travel – % change in trips vs. base case



Source: NTA Traffic Modelling

Net External Benefit of Fare Free Travel - €m per annum

Source: EY Analysis



2 Introduction

Overview of the report on Fare-Free Travel

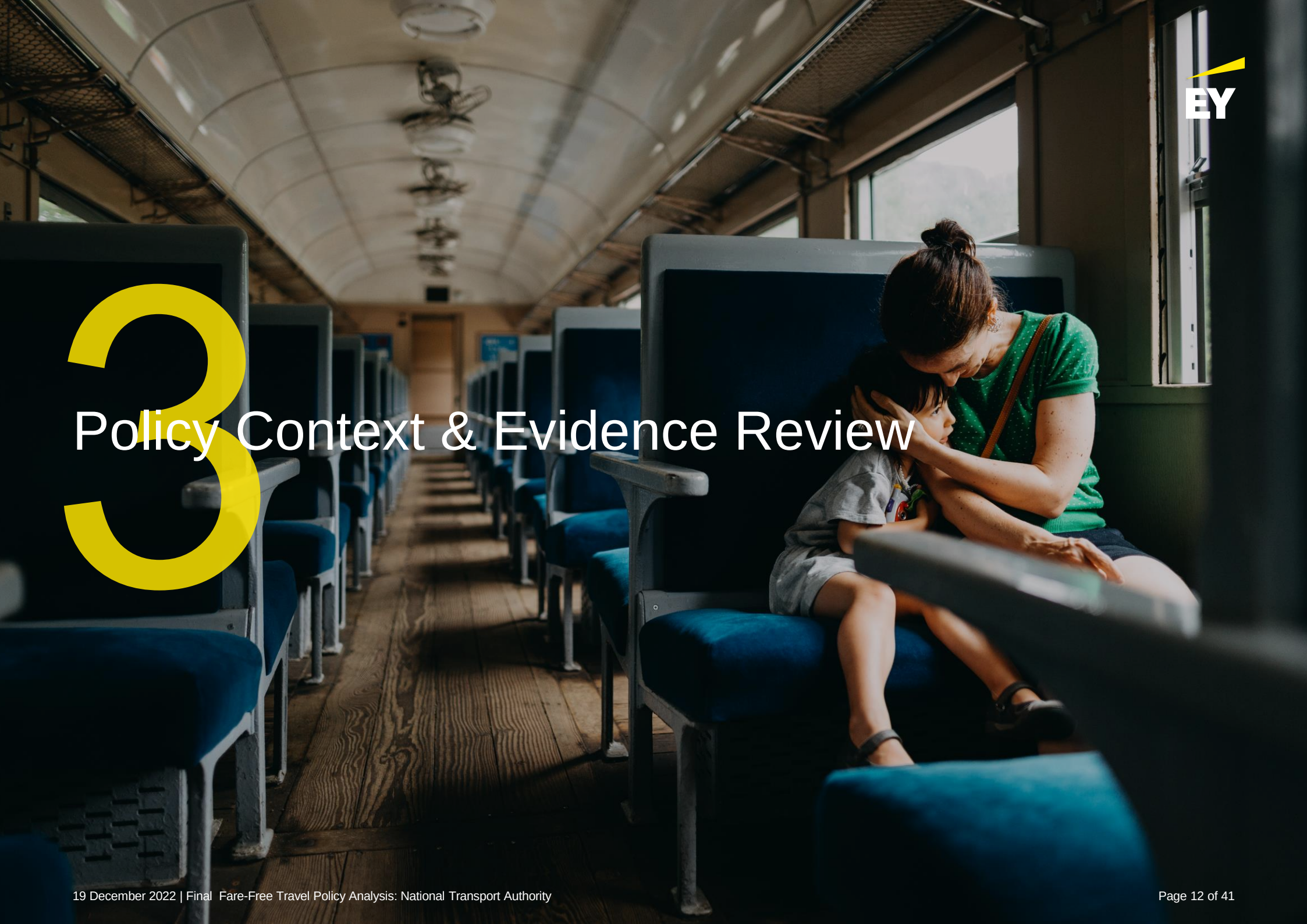
The report investigates the advantages and disadvantages of FFT using a variety of evidence sources and independent assessments

EY has been commissioned to investigate the potential merits of Fare-Free Travel (FFT), a policy that would eliminate ticket fares for all publicly funded public transport in Ireland. This is in the context of the Government putting in place measures to deal with the cost of living crisis and make public transport more attractive to reduce transport emissions. General transport fares have already been cut by 20%, Young Adult fares by 50%, and fares for school transport have been eliminated. Several commentators have advocated for free public transport to help address the cost of living and climate crises.

This report investigates the advantages and disadvantages of this policy by examining a range of evidence sources highlighted below. Essentially the report seeks to determine if FFT is an effective use of Government funds to achieve its overall climate and transport policy goals. To do this, the report reviews the current policy context and the wider evidence base, both theoretical and empirical, to determine if the policy is likely to help the Government cost-effectively meet these goals.

Overview of the report

Policy Context & Evidence Review	► A summary of the relevant Irish transport policies and strategies, and an assessment of what FFT would need to deliver in order to be policy compliant ► An overview of the current landscape of free and discounted fares in Ireland ► An overview of current transport behaviours and preferences in Ireland ► The academic evidence on optimal transport subsidies and the impacts of fare-free travel
Case Studies	► Several case studies into the impact of FFT in places that have implemented the policy ► Case studies into the impact of public transport investments as an alternative use of public funds
Financial Assessment	► An assessment of the financial impact of FFT due to lost fare revenue under two scenarios, a local FFT policy and a national policy. ► An assessment of the additional OPEX and CAPEX costs of providing extra capacity under both ► An assessment of savings in revenue collection costs in the
Economic Assessment	► A summary of the transport modelling results, detailing the expected travel impacts of FFT ► An economic assessment of the external benefits associated with FFT
Commercial Bus Operators	► A summary of the context of the financial position of the commercial transport operators ► A discussion on the potential impacts on the sector of FFT on the sector
Practical Impacts & Conclusions	► An assessment of the operational impacts of FFT ► A summary of the report's conclusions based on the evidence uncovered



3 Policy Context & Evidence Review

Current Irish Transport Policy

Irish transport policy is aimed at improving sustainability, boosting mobility and implementing a modal hierarchy

Sustainability

The Sustainable Mobility Policy and the Climate Action Plan highlight the importance of shifting from private vehicles to more sustainable modes of transport.

The Sustainable Mobility Policy aims to support modal shift from car to sustainable modes (active travel or public transport) through infrastructure and service improvements, as well as demand management and behavioural change measures. The Sustainable Mobility Policy aims to support Ireland's transport GHG emissions reduction target of 50% by 2030. The Climate Action Plan aims to

- Facilitate 500,000 extra walking, cycling and public transport journeys per day by 2030 to help reduce the KM driven by internal combustion engine (ICE) vehicles by 10%
- Deliver 845,000 low-emission cars, 95,000 electric vans and 3,500 low-emission HGVs
- Increase the Biofuel blend rate
- Electrify public transport through 1,500 EV buses and electrified rail

Increased public transport use can help Ireland reach its climate targets, but only through a corresponding reduction in car use. Policies that boost public transport demand through increased rates of travel or a reduction in active travel could even be detrimental to reaching Ireland's overall climate targets.

Mobility

The National Development Plan 2021-2030 sets out a significant increase in transport investment over previous plans. This transport investment will help deliver the National Strategic Outcomes of **:**

- NSO 1: Compact Growth
- NSO 2: Enhanced Regional Accessibility
- NSO 4: Sustainable Mobility

The focus of investment in the NDP is on sustainable modes. Two-thirds of additional capital expenditure has been earmarked for public transport and €360m per annum for active travel. The public transport investments in the plan include:

- Connecting Ireland
- BusConnects (5 cities)
- Metrolink
- Dart+
- Light Rail (Luas Finglas, Cork)

The consideration of FFT does not happen in a vacuum; there are already considerable investments planed that would materially improve the availability, reliability and attractiveness of sustainable modes. As such, it is important to consider whether FFT is the best use of public funds to enable a substantial mode-shift away from private vehicles and the delivery of a more sustainable transport system.

Modal Hierarchy

Modal hierarchy refers to the prioritisation of investment in transport. The National Investment Framework for Transport in Ireland (NTIFTI)'s investment priorities are decarbonisation, protection and renewal, mobility of people and goods in urban areas, and enhanced regional and rural connectivity. This hierarchy shows active transport as the most important, followed by public transport (with a subset of shared transport), and finally, private vehicles.

The National Planning Frameworks Design Manual for Urban Roads and Streets aims to prioritise pedestrians, followed by cyclists, then public transport, then taxi and shared transport, and finally private vehicles, with an aim to divert short car trips to active modes. The Climate Action Plan of 2021 states that active travel is to be encouraged primarily, followed by public transport and underlines the aim to move from vehicle-centred to people-centred neighbourhoods.

The policy alignment of Fare-Free Travel (FFT) is therefore dependent on its ability to drive additional public transport trips through a reduction in car use rather than a reduction in active travel or an increase in the overall level of travel. For example, switching users from active travel to public transport generally increases the carbon emissions of the transport system.

Irish Travel Behaviour and Preferences

Private car is the predominant mode of travel in Ireland and achieving mode-shift will require a step-change in the relative attractiveness of other modes

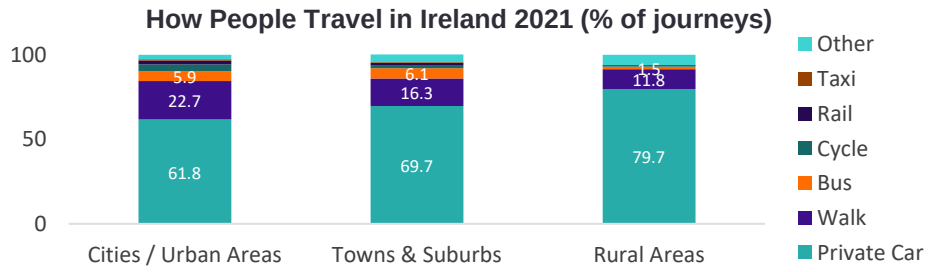
Transport Patterns: private vehicle use predominates

The significant majority of journeys made in Ireland are made by car, either as a driver or a passenger. This varies markedly by whether people live in urban areas, towns and suburbs, or rural areas. City residents are least likely to drive, with just under 62% of journeys made by car compared with almost 70% in towns and suburbs and almost 80% in rural areas. This reflects the patterns of settlements in rural Ireland and the coverage of public transport services.

Nearly two-thirds of car journeys are single occupancy journeys, and the majority of these are less than 15 minutes in duration. 95% of people who are predominantly drivers, and 90% of car passengers do not generally use other forms of transport. Driving is very embedded among a large portion of the public, and achieving a modal shift away from car use would likely require a step-change in the attractiveness of public transport.

Overall almost 50% of people never use public transport. Public transport makes up approximately 8% of journeys in cities, towns and suburbs compared with 1.5% of journeys in rural areas. Buses are the predominant way of travelling by public transport, making up 70-80% of transit trips in urban areas and almost 100% of PT trips in rural areas.

Walking is the second most common form of transport as a proportion of all journeys at 17%. This is more common in cities/urban areas at nearly 23% compared with 16.3% in towns and suburbs and just under 12% in rural areas. Cycling is four times as prevalent in urban areas (4% of journeys) than in rural areas (0.9%) and more than twice as prevalent than in towns & suburbs (1.4%)



Source: National Travel Survey 2019

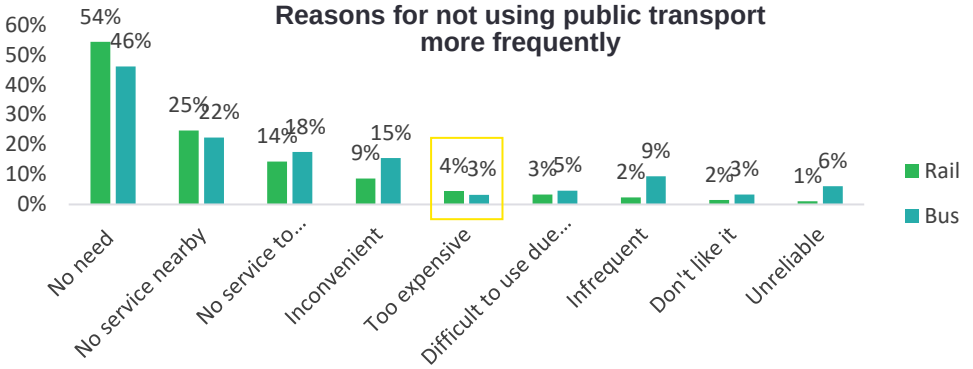
Travel Preferences: availability key to mode choice

When asked, “what factors would encourage you to use public transport more often?”, 7% of respondents said better value PT services. This was outweighed by those who identified improvements in the quality of public transport quality such as more direct routes (9.7%), ease of use (7.8%), greater frequency (6.9%), more reliable timetables (4.9%) and shorter journey times (4.9%) among others.

Similarly, when asked for the reasons why they don’t currently use public transport, only 3-4% said that it was too expensive. A much larger proportion identified that there was no service near to where they lived or their destination or that it was too inconvenient. Bus services were deemed to be too infrequent by 9% of respondents.

One in five respondents said that they would use public transport if they have no alternative method of travel. This tallies with international research that restrictions on car use have a bigger impact than removing fares. The evidence base also suggests that FFT has worked best in conjunction with these types of restrictions on parking and driving.

Overall, the evidence on Irish people’s travel behaviour suggests that it may be difficult to encourage car users to switch modes through FFT alone. Improved public transport services and possibly restrictions or added charges on car use may be required to encourage users to change their travel behaviour.



Source: National Travel Survey 2019

Current Approach to Free and Subsidised Travel

Ireland currently subsidises fares public transport fares across modes and provides free travel for certain target groups

Subsidised Travel

The Public Service Obligation (PSO) funds support socially beneficial but financially unviable services through PSO transport operators such as Dublin Bus, Bus Éireann and Iarnród Éireann. According to a review by the Irish Government Economic and Evaluation Service (IGEES) the PSO is the Department of Transport's single largest item of current expenditure, costing the exchequer €314m in 2019. PSO operators' main sources of revenue are fares, PSO funding, and Free Travel Scheme funding. Fare revenues account for the majority of the operator's revenue; fares accounted for 74% and 60% of Dublin Bus and Iarnród Éireann's revenue, respectively, and just over 50% of Bus Éireann's revenue in 2019.

Fare revenue has increased significantly from 2009 to 2019 due to an increase in fares from 2009-2014 and an increase in passengers from 2014-2019. Pre-COVID PSO funding of €314m was the next largest element of revenue for transport operators in 2019.

These subsidies have been rising over the pandemic period. The Young Adult Card has also been introduced, which will enable any person aged between 19 and 23 years old to avail of an average fare discount of 50% across all PSO public transport services. To support this, in Budget 2022, the Department of Transport secured c.€538m of funding for Public Service Obligation (PSO) and Local Link services. A 50% fare reduction for Young Adults and Students has also been introduced across PSO services in recent months. Furthermore, in April and May of 2022, fares on all PSO services were reduced by 20% until the end of the year due to the cost-of-living crisis, which is being enabled by €54m in Exchequer funding.

From April 2022 onwards, the Taxsaver fares on all subsidised public transport services are to be reduced by an average of 20% from the beginning of April. Taxsaver fares are aimed at commuters; the salary spent on the fare is not taxable and can create saving for employees and employers.

Overall, Ireland currently subsidises PSO travel by approximately 50-60% across all modes. This aligns with the academic literature on transport subsidies, detailed in the following pages, which supports significant transit subsidies, especially when the full social cost of car use is not borne by drivers and when additional PT users can help sustain better transit services for existing users.

Free Travel in Ireland

The Free Travel Scheme is an example of partial FFPT. Free travel is provided to those who are 66 years and over and to those receiving a disability allowance from the state. This allows free travel on all Public Service Obligation (PSO) public transport services and several private operators. As of 2021, there were 990,000 customers with direct eligibility, and the cost of the scheme in 2021 was estimated at €95 million.

The Free Travel Scheme is paid directly to operators through the Department of Employment Affairs and Social Protection. Funding has remained relatively static over the period 2010-2019 due to a 2011 freeze on the level of this payment. During this time, the volume of passengers and the volume of passengers who are eligible for free travel has increased, leading to a deficit. The scheme provided around €47 million to PSO operators, but the total expenditure of the scheme was over €93 million in 2019, reflecting the fact that Free Travel Scheme funding is also provided to other commercial operators who do not receive PSO funding.

The Free Travel Scheme accounts for a small share of operator's revenues, at just under 7.5% for Dublin Bus, 8% for Bus Éireann and just over 4% for Iarnród Éireann in 2019.

Academic Literature on Optimal Transport Subsidies

Academic evidence supports transport subsidies, especially when the social costs of car travel are not "internalised" by drivers

Rationale

There are two main arguments for public subsidy of public transport.

- **Scale economies/ Mohring effect:** public transport users can benefit other users by helping to make the public transport system more efficient overall. An increase in public transport demand can lead to more frequent services and reduced travel time for all users. This benefit of public transport use can be incentivised through public transport subsidies.

  It relies on the concept that transport operators have the ability to increase the frequency in response to increased demand. This may not always be the case, e.g. it is unlikely that Ireland's rail system could increase the frequency of its services in many instances without a substantial investment in the rail system.

- **Reduced car use:** lower fares reduce car use, which has significant associated societal costs. These include congestion costs, environmental costs and the costs associated with road vehicle collisions. This argument for subsidies assumes that the social cost of car use is not "internalised" by drivers, e.g. a road pricing and taxation policy do not adequately charge drivers for the social cost of their driving.

The inefficiencies associated with raising taxes to pay for public transport subsidies (shadow cost of public funds) can reduce the optimal level of subsidy. Studies have generally found that there is still a justification for substantial subsidies even when the shadow cost of public funds is accounted for.

Evidence

There is extensive literature that examines optimal transport subsidies stemming back to the 1970s with the establishment of the "Mohring effect" (Mohring, 1972), which implies increasing returns to scale for scheduled urban transport services. Overall the optimal level of public transport (PT) subsidy in these studies differs depending on the methodology, mode, location and time of day. However, the studies generally find that substantial subsidies above 50% of operating costs are welfare-improving but that the optimal level is less than 100%, as would be the case for FFT.

Parry & Small (2009) estimate optimal public transport subsidies in Washington D.C., Los Angeles and London. Their model takes into account the impact of PT demand on congestion, pollution, accident externalities and scale economies in these cities. They found that increased subsidies were welfare-improving in all cases, even when the initial subsidy was 50% of operating costs.

They found that scale economies are more important for off-peak services and car externality reductions are more important at peak times. They found that the optimal subsidy varied between 46% to over 90%. It is important to note that this study did not account for the potential of subsidies being captured by PT workers, capacity constraints on the network or the shadow cost of public funds. These effects would likely reduce the optimal level of subsidies.

Their findings on optimal subsidies for London at 78% to over 90% are somewhat higher than those of Glaister & Lewis (1978) of 50% to 60%. Glaister & Graham (2001) finds that increased subsidies would be welfare improving on buses but not on the underground, most likely because of the increased crowding effects.

Proost & Dender (2008) studied transport subsidies in London and Brussels and found that reducing fares to near-zero produced only limited welfare gains.

While there are some studies that support a near 100% subsidy (Viton (1983), the economics literature does not generally endorse free PT as welfare maximising due to the costs involved and the potential overuse of transport services (Parry & Small, 2009; Proost & Dender, 2008; Jackson, 1975; Brueckner & Kim, 2003; Börjesson et al., 2019 etc.).

It is important to note that a small minority of studies find that PT subsidies are inefficient. For example, Brueckner & Kim (2003) found that when examining the effect of transport subsidies on the spatial expansion of cities, if the transport system exhibits constant returns to scale, then the subsidies are inefficient. Brueckner & Kim find that transport subsidies can lead to urban sprawl and therefore be undesirable.

There is also extensive literature that emphasises the social equity benefits of transport subsidies. Serebrisky et al. (2009) examine the use of demand-side subsidies as a way of making transport more affordable, particularly for poorer communities. Guzman and Oviedo (2018) found this to be the case in Bogota with the implementation of "pro-poor" subsidies.

Academic Literature on Fare-Free Travel

Evidence suggests that FFT boosts public transport demand but fails to materially reduce car use

Benefits of FFT: Volinski (2012) highlights various benefits associated with FFT, including the reduced costs of ticketing and revenue collection and faster boarding due to lack of ticketing. Olsen (2007) argues that, in certain cases, the overall costs of fare collection can exceed the amount of revenue collected. Essentially, by eliminating fares, the revenues collected are reduced to zero, but the costs relating to fare collection can also be eliminated, thus potentially cancelling out the loss of revenue. When reviewing transit systems in Washington State, Hodge et al. (1994) noted that the net cost or income of fare-free transit is an important aspect of a fare-free policy.

However, it is generally agreed that these cost savings are substantially less than the revenue losses from FFT. For example, in a 2008 study conducted by Lane Transit District (LTD) in Eugene, Oregon, staff determined that the cost of fare collection was roughly 2% - 10% of the revenue collected. They found that no employees were dedicated solely to fare collection and had several duties. Therefore, the elimination of hours spent collecting fares may simply transfer to hours spent serving passengers, particularly if ridership increases (Vobora, 2008). Baum (1973) looked at the projected costs associated with fare-free transit for several German cities and noted that, even after accounting for the savings acquired from the elimination of fare collection, the net costs were substantial burdens to local governments. The report doubted that the German government would be willing to fill the revenue gaps that fare-free transit would produce. One of the most significant arguments in favour of eliminating fares is social equity and justice. Larrabure (2016) and Schein (2011) are among those who highlight that FFT can address social exclusion, inequality, and transport poverty by increasing the accessibility of PT to lower-income inhabitants.

Demand for Public Transport: Fare-free public transit has been discussed in the academic literature for decades (Dillon & Bailey, 1970; Goodman & Green, 1977), with an early study establishing the Simpson-Curtin formula (Curtin, 1968). This formula predicts the percentage decrease in ridership as a function of the percentage increase in fares. For years, this formula was the general guideline with an estimate of a 0.3 per cent increase (decrease) in transit ridership for every one per cent decrease (increase) in fares over their previous level. Later studies, however, have concluded that, although the Simpson-Curtin formula is generally correct for overall system analysis and in highlighting the fact that transit ridership demand is price inelastic, there is still a wide variation in transit fare elasticity values. The values reported in the literature for fare elasticity exhibit large variations ranging from -0.009 to -1.32, with a mean value of -0.38 (Holmgren 2007). The literature indicates that the long-term elasticity is generally greater than the short-term elasticity as users are more likely to change their living, working, and travel arrangements over longer periods.

Mode Shift: A core topic debated in FFT is the increase in the utilisation of public transport (Cats, Susilo, & Reimal, 2017). A modal shift from private cars, could reduce emissions and congestion and lead to fewer road accidents. A review of over 20 FFPT programs in the United States by McCollom and Pratt (2004) concluded that most of the reported results were anecdotal, but Hodge et al. (1994) and Volinski (2012) found that the introduction of FFPT could be expected to yield an increase of at least 25–50% in ridership. It is important to note that this increase in ridership does not mean there has been a significant modal shift away from private vehicles to public transport, as motorists' behaviour and mode choice depend very little on PT fares (Fearnley, 2013). Duhamel (2004) discusses how this increase in ridership could be due to a generation of "useless mobility" or non-productive trips.

Generally, public transport demand is more responsive to service improvements than price reductions, especially for car owners. McCollom & Pratt (2004) found that ridership is 1/3 to 2/3s as responsive to a price reduction as it is to an equivalent service improvement.

Keblowski (2020) demonstrates that often a larger share of new passengers come from active modes such as walking or cycling rather than private cars. Storchmann (2003) and Volinski (2012) highlight the issues that can arise from an increase in passenger volumes such as network overcrowding, decreased reliability and punctuality, and association with problem riders. These issues were seen in the case of Austin, Texas, with its 15-month FFT experience (Volinski, 2012).

4 Case Studies

Case Studies: Fare-Free Public Transport

FFT is often implemented at the same time as public transport improvements and restrictions on car usage making it difficult to isolate the impacts

Tallinn, Estonia (NTA & UITP)

Population: 420,000

Introduction of FFTP: 2013 (after a referendum)

Rationale for introduction: Promote a shift from private cars to PT, improving the mobility of unemployed and low-income residents. A 2010 survey showed 59% of Tallinn residents were unhappy with the fares on PT, which were already heavily subsidised (up to 80% of the costs)

Operation: Transport was free for official residents of Tallinn who were registered and paid city tax (average of €1,000 per annum). There was an initial €2 cost for a “green card”.

Outcome: The lost fares amounted to approximately €12m and investments of €11.7m were made to cope with increased demand. Between 2013 and 2019, the city’s population increased by 45,000, an average of almost 6,500 additional registered residents each year, so it is unclear whether these people relocated in response to the offer of free PT or if they were ordinarily resident and had not previously registered.

Prior to the introduction of FFPT, public transport made up 40% of modal share and walking made up 30%. The number of PT trips increased by 14% after the first year (UIT). However, the share of walking trips decreased by 40%, and the share of car users only decreased by 5%, with the average distance travelled by car increasing by 31%. FFPT was also accompanied by parking restrictions and increased fees in the city centre, so it is hard to determine the main influences on driver behaviour.

The National Audit Office (NAO) of Estonia has found that the policy did not meet its goal of reducing car use. In the nine years since the introduction of FFT, the share of cars has risen from 42% of the trips to 48% now. The NAO has instead recommended that the local infrastructure department should investigate ways to improve the bus system by targeting the needs of car users to incentivise mode shift.

Dunkirk, France (NTA & UITP)

Population: 202,332

Introduction of FFT: September 2018

Rationale: FFT was part of the DK'Plus de mobilité regeneration project which began in 2014 with the aim of rebalancing transport modes, combating social exclusion and isolation, and bring about social redistribution of purchasing power.

Operation: FFT was combined with a major improvement in bus services. The number of lines was increased from 10 to 17, and the fleet expanded from 100 to 140 buses, including greener vehicles powered by natural gas and offering Wi-Fi. The loss of revenue from fares was €4.5m, and additional operating costs were about €10.5m. In Dunkirk, the payroll tax was increased from 1.05% to 1.55% in 2011. This financed the development work necessary for the reorganisation of the network and now contributes to the additional operating costs, bringing in about €9m annually.

Outcome: 50% of users surveyed said they used PT instead of a car since the introduction of FFPT. 10% of passengers no longer have a car or decided not to buy a new or second car. FFT does not explain the increase in passengers alone, as the policy was accompanied by improvements to the service. Almost 40% of those surveyed mentioned the increased efficiency and reliability of the network as the reason for using public transport more often.

Case Studies: Fare-Free Transport

The most successful case studies of FFT have combined FFT with improved public transport and restrictions on car travel

Frýdek-Místek, Czechia (UITP)

Population: 57,000 (2020)

Rationale: Response to the decline of PT ridership and revenues and to growing traffic in the city centre.

Operation: FFPT for residents of the city registered in the FFPT zone (which covers 19 municipalities), who must buy an annual free-fare bus pass (cost 0.04euro) to prove they benefit from the scheme. Combined with an increase in fleet capacity and modernisation of the service.

Outcome: FFPT implementation was followed by an increase in ridership from 3.8 million passengers in 2010 (the year before the FFPT was introduced) to 6.9 mil passengers in 2017. However, many trips are for only three stops which previously would have been made walking. Of the new PT passengers/journeys, previous public transport users account for 58%, followed by drivers (20%) and others (21%, cyclists, pedestrians, train, and co-driver).

Hasselt, Belgium (UITP)

Population: 73,000 (2010)

Introduction of FFPT: 1997, discontinued in 2014

Rationale: The policy was introduced to alleviate congestion instead of implementing a new ring road.

Operation: FFPT was introduced along with radical improvement of PT offerings which included an increase in the number of bus lines and the frequency of services. Restrictions on car use were also implemented, such as traffic capacity and parking restrictions.

Outcome: Bus ridership increased by 700% when the scheme was first introduced. 63% of additional trips were made by former bus users, 16% from car users, 12% from bicycle users and 9% from former walkers. The scheme was dropped in 2014 after a change in political leadership and issues with rising costs. However, it retained 75% of former travellers on weekdays and 67% on weekends. Occupancy rates dropped on short-distance routes, where trips had been made by former pedestrians (UITP, 2020). It is important to note that before the implementation of FFT, public transport provision radically improved, along with parking restrictions and policies for cyclists and pedestrians being introduced. In the first year, 16% of car users moved to public transport.

Case Studies: Fare-Free Public Transport

Lyon demonstrates that improvements in public transport can lead to a substantial boost in public transport demand

Luxembourg (NTA & UITP)

Population: 614,000

Introduction of FFPT: March 2020

Rationale: In 2019, it was recorded that Luxembourg had the highest number of cars per person in the EU; more than 60% of commuters travelled by private car (19% on PT), and every day more than 200,000 people cross the border by car, causing congestion. FFPT aims to reduce the problem of congestion and increase PT ridership and increase the purchasing power of low-income users. (NTA Case Studies).

Operation: Annual revenue from ticket sales in Luxembourg was €41m, which was around 8% of the annual costs, which were then over €500m – the shortfall was made up for in general taxes. FFPT is to be accompanied by an improvement in PT services, which previously had a poor reputation (Carr & Hesse, 2019)

Outcomes: There have been suggestions that the use of trams is increasing, but the recent date of implementation and the impact of the Covid-19 pandemic make it difficult to analyse in depth. Initial evidence suggests that the policy has failed to curb congestion. In May 2022, congestion on the roads was at the same levels or higher than it was for the same month in 2019.

Lyon, France (UITP)

Population: 1.7m (2020)

Rationale: Lyon considered implementing FFT but decided not to. A study on the viability of the scheme showed that while it could lead to a ridership increase of 15-30%, the majority of new trips would stem from cyclists and pedestrians rather than car users. Lyon has instead followed a “virtuous cycle approach” of funding and cost management on its transport network.

Operation: Between 2001-2018, ridership in Lyon has grown steadily up to a 58% increase from 303 million to 480 million passengers per year. During the same period, the network’s offer increased by 42%, with the operator investing €3.6 billion. Ticket prices have followed the evolution of operating costs, increasing by 1.7% in 2017. Nevertheless, 98% of subscribed passengers pay less than €1/day, thanks to social tariffs based on the age and income level of passengers. “Passengers currently take an average of 330 trips per inhabitant per year, a significant contrast with the average 30 trips per year per inhabitant in the medium-sized cities which have implemented FFPT schemes.” (UITP, 2020)

Case Studies: Fare-Free Public Transport

Aubagne & Etoile, France is one of the most successful implementations of FFT. It combined FFT with the modernisation of the public transport network

Aubagne & Etoile, France

Population: 48,725

Introduction of FFPT: May 2009

Rationale: The policy aimed to increase the use of public transport, reduce the use of cars in urban areas, promote the reallocation of public spaces, increase families' purchasing power, and reduce greenhouse gas emissions. (UCLG, 2010)

Operation: Fare revenue only comprised 8.6% of the total bus budget before the implementation of the policy. The transport operator operates 11 regular bus lines, 13 school bus lines, and a single tram line. The estimated cost was €710,000 of lost revenue from fares and €860,000 for costs related to increased demand for PT. This was paid for by an increase in tax from 0.6% to 1.% for companies with more than 11 employees. The tax generated €5.7m in revenue, which enabled the modernisation of the network.

Outcomes: Ridership increased by 138% from 2008 to 2011. 50% of these passengers previously used cars, 20% cycled, and 10% walked. 63% of trips generated by fare abolition otherwise would have been taken by a motorised vehicle (Giovanangelli and Sagot-Duvauroux, 2012) (CAPAE, 2013).

Salt Lake City, Utah

Population: 200,478

Introduction of FFPT: February 2022

Operation: Salt Lake City introduced FFT for February to commemorate the anniversary of hosting the Winter Olympics. The state needed to raise between $2-2.4m to cover lost farebox revenue costs. This was done through Sponsored Funding ($1.13m) and Pass Partner Funding ($1.4m), where partners that usually subsidise fares for their users continued to pay their monthly subsidy.

Outcomes: Demand for the public transport system increased by 16.2% on weekdays, 58.1% on Saturdays, and 32.5% on Sundays compared to January 2022. The transport authority surveyed users to ascertain the impact of the policy. Over half of the respondents indicated they were riding because it was free. Most trips were for work or entertainment reasons.

75.1% of users indicated they were very likely to ride the service more if it was free. More than one-fifth of respondents indicated they were new PT users. The majority of these new users were making trips for entertainment purposes. (Utah Transit Authority, 2022)

The transit authority did not measure how many of these additional trips were displaced car trips compared to displaced active trips or additional trips which makes it difficult to determine the climate and congestion impacts of the policy.

Case Studies: Recent capacity enhancements in Ireland

Investments alternative to FFT have yielded success in increasing patronage already in various projects across Ireland

Irish Town Services

In December 2020, under the Government stimulus programme, a range of service enhancements was introduced in Drogheda and Navan towns.

Drogheda Town

This included the introduction of 2 new cross-town services building on the success of the D1 and D2, seven days a week. The 168 route was merged with the 189 to provide an enhanced Monday to Saturday and a new Sunday service offering a continuous service between Drogheda and Dundalk via the coastal alignment and better connections with rail and intercity bus services.

By period 4, 2022, patronage on the enhanced Drogheda services was more than double pre-pandemic patronage and significantly bucked the national trend of suppressed demand wrought by the pandemic.

Navan Town

The new service provided two new cross-town routes (N1 and N2) operating at a 30-minute frequency, seven days a week. This service replaced the existing 110A, B and C services which were no longer fit for purpose.

Since its introduction and despite movement restrictions, patronage on the Navan town service has grown significantly, with the service now carrying almost 20,000 passenger trips per period as compared to c. 4,000 per period pre-pandemic.

Inter-urban Services

East Clare, Tipperary and Limerick

In January 2021, under the Government stimulus programme, the NTA reconfigured and improved the level of service on the 323 and 345 services to provide enhanced connectivity between east Clare and Tipperary towns into Limerick City and UL.

Unlike the vast majority of inter-urban services, in particular, patronage on these services has grown significantly since the introduction and is now in excess of pre-pandemic levels and expected to grow further once travel patterns at UL re-establish post-pandemic.

Kildare Rail Line

In 2016, the NTA approved the introduction of new rail services between stations on the Kildare corridor and Grand Canal Dock via the refurbished Phoenix Park Tunnel and calling at Connolly, Tara Street and Pearse Street stations. On 20 November 2016, new morning and evening peak services were introduced. In December 2018, additional off-peak and evening services were added to the corridor.

Since service improvements on the corridor, daily boarding more than doubled between 2015 and 2019. This rate of growth was significantly higher than that on comparable GDA commuter lines over the same period of time and across the wider network.

Increased Investment in Irish Public Transport

Investments alternative to FFT have yielded success in increasing patronage already in various projects across Ireland

Local Services

Westport & Achill Local Services

In November 2020, under the Government stimulus programme, the NTA reconfigured and rationalised the 450 and 440a routes serving Westport, Achill, and Louisburgh in County Mayo. The level of service was enhanced, including the introduction of weekend and off-peak services. Patronage has increased 5-fold on these routes since their introduction.

Dingle Peninsula Services

TFI Local Link and Bus Éireann services on the Dingle peninsula were re-organised and enhanced in April 2021. Passenger numbers for these services continue to increase, with 941 passenger journeys on the Local link service in the first week of June 2022 compared to the peak in 2021 of 738 passenger journeys which occurred in late August. Joint promotional activity has taken place between TFI Local Link and Bus Éireann to highlight the increased frequency and connectivity for passengers between these services.

Leitrim Local Link

The NTA and the Donegal Sligo Leitrim Transport Coordination Unit developed a new revised TFI Local Link scheme for Co. Leitrim. The improvements included the provision of an enhanced number of services over an expanded schedule with an increase in Regular Rural Services (RRS) routes. Since the introduction of the enhanced network, passenger numbers have continued to increase, with the service now carrying almost 10,000 passenger trips per period, more than double the pre-pandemic patronage levels.

City Services

Limerick City

In January 2021, under the Government stimulus programme, the NTA reconfigured and increased the level of service on route 303 and provided an enhanced off-peak and evening level of service on the 306 serving Limerick City.

Despite suppressed demand for office-based commuting trips in metropolitan areas, in particular, patronage on the improved routes remained at 20 – 25% above the national trend throughout the pandemic and had returned to pre-pandemic levels by October 2021

5 Financial Assessment

Financial Assessment Context

Fare revenue fell significantly during COVID-19 pandemic but has largely returned to pre-pandemic levels

Impact of COVID-19

Passenger numbers declined significantly across public transport providers in 2020 and 2021 as pandemic restrictions limited the movement of people and the levels of economic activity. This creates challenges for estimating the financial impact of FFT, especially as some behaviours have changed in relation to remote working.

Bus

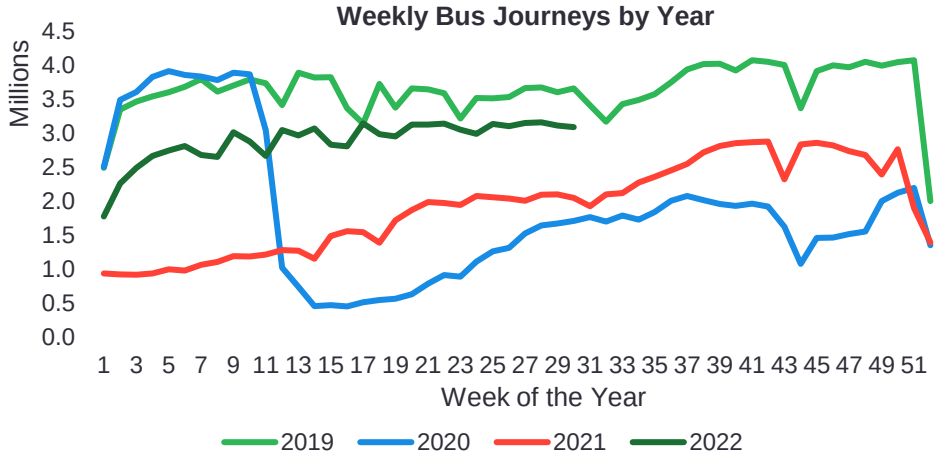
Fare revenue and passenger demand on buses were approximately 50% lower in 2020 and 2021 than in 2019 levels. These falls were higher in Dublin than in the rest of the country.

Rail

Rail revenue fell by 57% in 2020 compared to the previous year and remained at that level throughout 2021.

Luas

Luas was the most affected mode of transport during the pandemic; revenues fell by approximately two-thirds in 2020 over the previous year and were still 60% lower than pre-pandemic figures in 2021.



Post Pandemic Recovery

During 2022 passenger numbers and revenues have significantly recovered as pandemic restrictions have lifted. Demand for PSO services surpassed pre-pandemic levels in October 2022.

Bus

There have been significant improvements in the demand for bus services but a reduction in average fares. Demand for buses has largely recovered to 2019 levels by late summer 2022. Average fares are also about 25% below levels due to the increased proliferation of leap cards, the 20% reduction in fares and young adult fares.

Rail

Irish rail has experienced strong growth in demand since the introduction of fare discounts. By 2023, passenger numbers are forecasted to reach 2019 levels at 34 million passengers.

Luas

Luas passengers have also increased significantly this year, above 2020 and 2021 levels. By August 2022, Luas revenue had already surpassed the total revenue in 2020. However, Luas demand is perhaps most impacted by changes to commuting patterns and the recent increases in remote working. Revenue for July 2022 was 36% lower than the same period in 2019, and passenger demand is expected to reach 2019 levels next year. However, this also reflects price changes in the intervening years, such as the 20% reduction in fares, the 90-minute fare and a shift to leap cards.

Financial Assessment Methodology

We have assessed four potential financial impacts over two policy scenarios against a base case where the current 20% discount is eliminated

Categories of Impacts assessed

The financial assessment has assessed several potential impacts of FFT to understand the overall cost of the policy.

1. **Reduced Fare Revenue:** As fares are eliminated, the revenue associated with them no longer accrues to the transport bodies and needs to be covered by Government. This impact has been estimated by looking at trends in fare revenues across operators and budgets for 2023 and applying an elasticity in the base case to understand the impact of eliminating the current 20% discount.
2. **OPEX Cost of Increased Capacity:** We have considered the potential impact of operators increasing services to try and address the increased demand and potential overcrowding of services. This is assumed to only happen on bus services as there are infrastructural restrictions to increasing capacity for rail services. The cost was estimated by identifying the components of OPEX that are variable in relation to service delivery (fuel costs, maintenance costs, driver costs etc.) and increasing them proportionately to expected increases in demand from buses based on transport modelling from the NTA.
3. **Revenue Collection Savings:** Revenue collection costs include the costs of ticket machines, ticket inspectors and third-party fees. These costs could be eliminated over the medium term. The potential savings were estimated by taking NTA research from 2015 that estimated collection costs as a proportion of revenue. These rates ranged from 7% to 13%, depending on the operator. These percentages may be somewhat out of date, given the developments in ticketing in the intervening years. However, they still represent the best evidence available.
4. **CAPEX Cost of Increased Capacity:** In addition to the OPEX impacts of increased capacity, additional buses would need to be procured. The costs of these were estimated based on the most recent bus purchases from Bus Eireann and Dublin Bus. They assume a less-than-proportionate increase in fleet size compared with the expected increase in overall demand. This is because peak bus demand has a lower price elasticity than off-peak demand and fleet size is highly correlated with peak demand.

Scenarios Considered

To model the financial impact of FFT, the scope of the policy needed to be determined. Fare Free Travel could apply to all trips, modes etc. or could be applied to a subset of those trips. We have assessed the impact of two scenarios for the purposes of the financial assessment.

1. **Local Fare Free Travel:** This scenario assumes that all “local” PSO public transport services are free and do not require tickets. Local in this context means all urban bus services, local link, DART and Luas services. It does not include inter-urban rail, commuter rail or the equivalent inter-urban and commuter bus services.
2. **National Fare Free Travel:** National FFT assumes that all state-funded services are free and do not require ticketing. This includes all Irish Rail, Luas, Bus Eireann and Local link services, as well as all other services that avail of PSO funding.

Both scenarios are assessed against a base case whereby the 20% fare discount is phased out by the end of 2022, but permanent changes such as the young adult leap card are included. This means that the cost of fare-free travel is more than the revenue for 2022, as revenues are assumed to increase in the absence of FFT. Revenue is not expected to increase by 25% due to the reductions in demand as a result of increased fares. A price elasticity of demand of -0.4 has been used to estimate the demand impact of fare increases.

Financial Assessment Results

The annual financial impact of FFT is estimated to be in the region of €350-€550m. The capital cost of additional bus capacity would be approximately €140m

The below table sets out the estimated annual net financial impact of the FFT policy under the two scenarios considered by this report. These results are considered to be the "medium term" net impacts, as the increased capacity costs and avoided collection costs will take several years to be realised. The lost revenue should be considered to be the financial impact of the policy in the initial 1-2 years.

Net annual recurring financial impact – medium-term (2023 prices)

	Scenario 1 – Local FFT	Scenario 2 – National FFT	Timing
Lost Revenue	-€337m	-€532m	Immediate
Increased Capacity Cost	-€41m	-€61m	Medium Term
Avoided Collection Costs	€28m	€54m	Short-Medium
Net Financial Impact	**-€350m**	**-€545m**	**-**

Source: NTA, Operator Data, EY Analysis

Lost revenue

The lost revenue associated with FFT represents the immediate financial impact of the policy. Savings in revenue collection and the increased costs of capacity improvements will take time to be realised. The estimates are based upon forecasted 2023 fare revenue, including Taxsaver tickets but excluding payments associated with the current free travel scheme. The lost revenue may increase in future years as passenger numbers increase in the base case.

Cost of increased capacity

The cost of increased capacity was calculated by increasing the variable costs of bus operators in line with expected levels of increased demand to limit the impact of overcrowding on services. Fuel, maintenance, bus hire and direct staff costs have been increased in line with the expected increase in demand based on the case study modelling. It is unlikely that this increase in capacity will happen immediately and should be considered to accrue gradually over the following 3 to 4 years.

An additional CAPEX of approximately €140m will be required to facilitate the purchase of up to 240 new buses. It is assumed that it will not be possible to increase rail/Luas capacity beyond what is already envisaged due to restrictions in the procurement of rolling stock and capacity constraints on rail lines.

Avoided collection costs

Revenue collection costs include the costs of ticket machines, ticket inspectors and third-party fees. These costs could be eliminated over the medium term. The potential savings were estimated by taking NTA research from 2015 that estimated collection costs as a proportion of revenue. These rates ranged from 7% to 13%, depending on the operator. These percentages may be somewhat out of date, given the developments in ticketing in the intervening years. However, they still represent the best evidence available.

The above assessment does not apply to commercial bus operators as they are outside of the scope of the policy. As discussed in section 6, commercial operators provide a valuable public service, and there may be a need to expand the scheme to these routes. If the scheme were expanded to these operators, it could significantly add to the cost of the policy.

6 Economic Assessment

Transport Modelling Overview

NTA's Regional transport models show that FFT would increase public transport demand but not reduce car use significantly

Fare-Free Travel Scenarios

In conjunction with the NTA, EY developed several scenarios to be tested in NTA's regional transport models. These scenarios investigate the impact of both national and local FFT policies with differing capacity responses to the policy in terms of bus capacity.

1. **National FFT:** Free travel is applied to all PSO services across the country. Bus services do not increase in capacity.
2. **National FFT – Unconstrained:** As per scenario 1, but crowding effects on bus services are removed to simulate a proportionate increase in bus capacity.
3. **Local FFT:** Fare travel is applied to local bus services, DART and Luas routes. It is not applied to inter-urban or commuter services.
4. **Local FFT – Unconstrained:** As per scenario 2, but crowding effects on bus services are removed to simulate a proportionate increase in bus capacity.

These scenarios have been run in each of the five regional models used by the NTA.

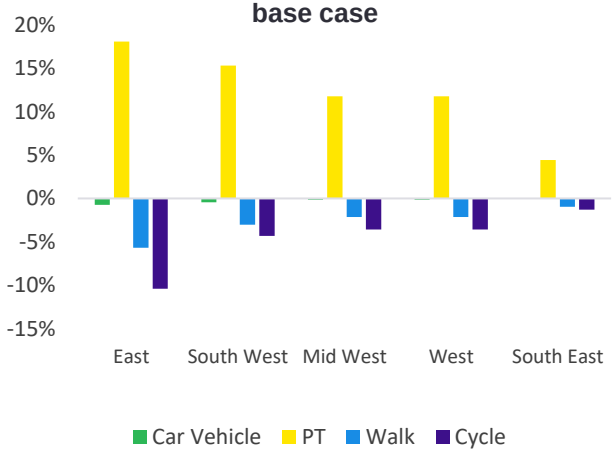
1. **Eastern:** Leinster excl. Carlow, Kilkenny & Wexford, Monaghan & Donegal
2. **South Western:** Cork & Kerry
3. **Mid-Western:** Limerick, Clare, North Tipperary
4. **Western:** Connacht & Donegal
5. **South Eastern:** Carlow, Kilkenny, Waterford, Wexford, South Tipperary

Modelling Results

Unsurprisingly, FFT leads to an increase in demand for public transport across all model runs. However, the extent of this increase varies by region and scenario. FFT has the largest impact in the East of Ireland as the public transport network is more extensive, particularly in Dublin. This means that public transport is more competitive with private car trips and the implementation of FFT leads to a higher marginal impact. In other regions where the public transport system is less developed, public transport trips would take much longer relative to car travel for many users. This means that public transport remains unattractive despite the introduction of FFT, and the modal shift is lower. Importantly, across all scenarios and all regions, the increase in public transport trips is driven more by a reduction in walking and cycling than by a reduction in car use.

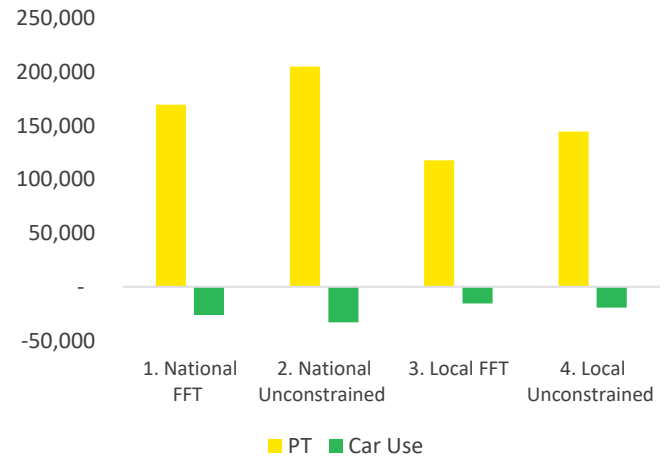
Local FFT leads to a smaller increase in public transport demand than a national policy. When the crowding effects on buses are removed to simulate a proportionate increase in bus capacity, public transport demand increases as fewer users are put off by overcrowded buses. However, this does not significantly change the impact on car use. For many car users, the current public transport system does not provide sufficiently timely services to compete with cars even when fares are eliminated. The local scenarios generate an even higher proportion of their increased public transport demand from active travel. This is because local public transport is a closer substitute to active travel than inter-urban and commuter transport services would be.

National Fare Free Travel – % change in trips vs. base case



Source: NTA Modelling

Change in daily trips relative to the base case



Source: NTA Modelling

Economic Assessment

The net external benefits of the policy are very limited compared to the overall costs of the policy

Method

EY estimated the benefits of fare-free travel using a marginal external costs approach. This approach estimates the environmental and social costs of modal shift from car and active travel to public transport. The benefits that have been considered are listed below:

- **Congestion**: reducing congestion on the road through reduced car use
- **Carbon Emissions**: reduced emissions from car use
- **Air Quality:** improvement in air quality as a result of lower PM and NOx emissions
- **Noise:** The benefit of quitter streets due to less car use
- **Accidents:** reduced road accidents as a result of less driving
- **Health:** the reduction in health benefits due to lower levels of activity
- **Absenteeism:** The increase in absenteeism as a result of reduced activity levels

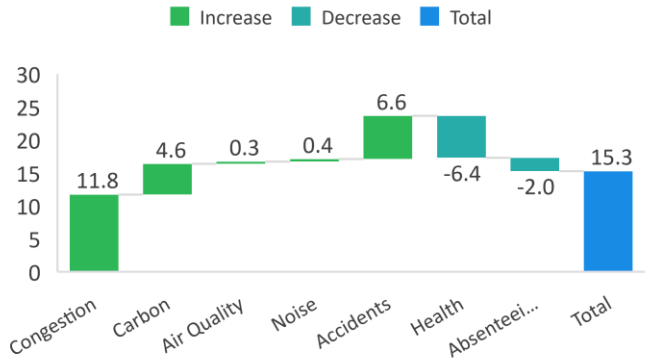
These estimations use Irish values from the Common Appraisal Framework and the TII Project Appraisal Guidance where possible. Other values have been translated from the UK's Transport Analysis Guidance. The assessment only looks at the external benefits of the policy. The internalised benefits would not cover the shadow cost of public funds without a considerable increase in public transport demand. Therefore, significant external benefits are needed to justify the policy.

Results

National FFT: The national FFT policy has been found to generate marginal external benefits of €15m per annum. This is driven by the reduction in car use and the associated fall in congestion, carbon emissions, pollution, noise and road traffic accidents. These benefits are offset by the reduction in health and absenteeism benefits associated with reduced active travel.

When buses are unconstrained, the net benefit falls to €2.8m due to the extra external cost of the increased bus supply. This is because extra buses do cause additional congestion, carbon emissions and air pollution, just proportionately less so than car users.

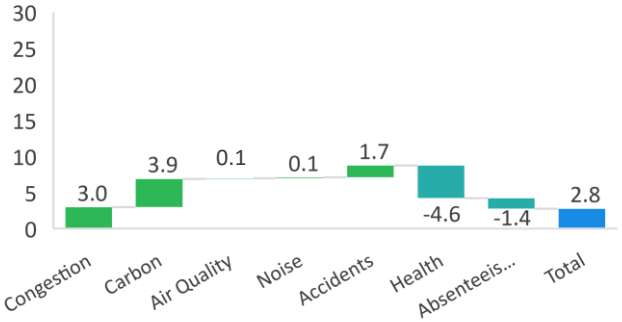
Annual Net External Benefit of National FFT - €m



Local FFT: The local FFT policy generates less external benefit per annum (€2.8m) due to the size of the scheme and the nature of mode shift that the policy attracts. The overall benefits of reduced car use are lower than the national scenario. The benefits are more substantially offset by the reduction in health and absenteeism benefits associated with reduced active travel.

For all scenarios, the overall level of external benefits is low compared to the cost of the policy of over €500m. This strategic analysis has only considered external benefits and does not constitute a full CBA. However, it is possible to infer, due to the limited external benefits and the level of increased PT demand, that it would be unlikely that a BCR would exceed 1.

Annual Net External Benefit of Local FFT - €m



Source: NTA, EY Analysis

Key Takeaway: The external benefits of the policy are very limited compared to the overall costs. This is because most of the benefits of reducing car use are offset by the disbenefits of reduced active travel and financial losses from fare revenue.

7 Commercial Bus Operators

Context on Commercial Bus Operators

The commercial bus operators are recovering from the impact of COVID-19 and are often in competition with increasingly subsidised PSO services

Commercial Bus Operators

Commercial bus passenger services operating within Ireland are licensed by the NTA under the Public Transport Regulation Act 2009. These licenced services are operated without any subsidy from the NTA. Some do, however, take part in the Department of Social Protection's Free Travel Scheme and receive payments for the fare forgone for carrying passengers entitled to free travel. The two state-owned bus companies also provide commercial services under licence.

In 2019, there were 30.5 million journeys taken on commercial bus services, representing almost 10% of all public transport journeys in Ireland. In 2020, COVID-19 had a massive impact on commercial bus services, with the number of passenger journeys dropping by 69% compared to 2019.

As commercial services are traditionally operated without any public subsidy, the level of revenue they generate is critical to their ability to provide services. Therefore, the impact of COVID-19 was significant, and in July 2020, the Government announced that temporary financial support would be provided via several mechanisms, including grant agreements and direct-award public contracts. The scheme was initially intended to run for a period of 6 months. However, in response to ongoing restrictions, the scheme was extended until 30 June 2022.

The commercial bus fleet has grown in recent years, reaching 1,400 vehicles in 2020, 1,243 of which were used on a full-time basis. The sector does not have an even geographic spread. In 2019, 71% of passenger journeys on commercial routes operated at least part of their journey within the Greater Dublin Area. These routes often target commuter trips to Dublin, e.g., Swords Express & Wexford Bus.

Elsewhere in Ireland, areas with a less extensive Bus Éireann network tend to have a greater proliferation of commercial bus operators, e.g., Carlow, Kilkenny, and Tipperary.

Current Financial Position

With the wind-down of COVID-19 government supports (e.g. EWSS and CBO Support Scheme) and considering other factors – such as increasing costs, availability of discounts of PSO services and cost of living challenges facing customers – the financial situation of many operators has weakened.

Several operators have recently increased fares to combat a substantial rise in input costs, including fuel and staff costs (as a result of a shortage of drivers). One of the largest commercial bus operators has increased fares by c.20% on some of its routes while closing others due to low patronage relative to pre-COVID levels.

In 2019, Commercial Bus Operators made €186m in fare revenue by facilitating 30.5 million passenger journeys. In 2022, a 20% fare reduction was introduced across various public transport bus services, including Dublin Bus, Go-Ahead Ireland, Bus Eireann, and Transport for Ireland local services. In addition, a 50% fare reduction for Young Adults and Students has been introduced across PSO services in recent months. These reductions have been met with criticism from The Coach Tourism and Transport Council of Ireland (CTTC), which asserted that these schemes are anti-competitive and could lead to a long-term demand shift from commercial to public services.

The CCTC contended that given that most private bus companies operate on low margins, individual operators are not in a position to match discounts without subsidisation. With high fuel prices and increases in operational costs, the CTTC fears a combination of these challenges, including a loss of patronage, poses a significant and unique risk to the long-term viability of the sector and could cause significant financial struggles to 100+ family-owned private transport companies.

The CTTC asked that the Government include commercial bus services as part of the Young Adult Card scheme. Following discussions with representatives from the sector, the Government announced that half-price young adult fares have been available on commercial routes since September 2022. This will help to address competitiveness concerns for this segment of the market. However, many operators have stated that they are struggling to compete with PSO routes in the aftermath of COVID and the PSO fare reductions.

Impact of FFT on Commercial Bus Operators

The impact of FFT on commercial operators could be severe and may necessitate costly Government intervention

Consequences for the sector

The impact of FFT on the sector could be detrimental. In many cases, commercial bus operators would be in direct competition with free PSO public transport. Users may change their transport behaviour to switch to PSO bus services and rail options which were previously more expensive or less convenient.

There are sections of the country where commercial bus operators have a higher market share, and the impact of FFT may be less significant as there are fewer alternatives. For example, large sections of Donegal, Kilkenny, Carlow and Tipperary have relatively few PSO bus services but have an extensive commercial bus network.

In the event of FFT, these regions could lobby for more PSO routes as there would be a significant price difference between PSO and non-PSO bus services. This raises equity issues for regions that have limited public transport networks versus regions which have extensive networks.

Even in the case that PSO services were not expanded, a small reduction in demand for some commercial routes could make these unviable. As discussed on the previous page, some commercial operators are financially weaker post-COVID-19 and are already reducing services and increasing prices on many routes, with evidence from the COVID-19 support scheme showing that revenue continues to lag behind costs across a significant number of commercial operators.

In these circumstances, the Government may need to intervene in the commercial sector to avoid capacity reductions and a loss of critical services throughout the country. The potential cost of this is beyond the scope of this report, but commercial bus operators made €186m in fare revenue in 2019. This could be considered a high-level estimate of the subsidy that would be required should an FFT policy be enacted and further assistance is extended to the commercial sector.

In the event of FFT, there could also be legal challenges to the policy by commercial operators. Government subsidies for public transport are already well established through the PSO system. However, FFT could significantly alter the commercial prospects of these operators. This report does not assess the potential merits of such a case, but the likelihood of it being taken should not be discounted.

Potential remedies to address impact on commercial sector

There are several ways that the Government could intervene in the market to ensure that public transport services are maintained throughout the country.

Extend FFT to Commercial Operators

The most obvious solution would also be to extend FFT to commercial operators. This could be done in the same manner as the current Department of Social Protection's Free Travel Scheme, whereby participating operators receive payments of fares forgone for travellers over the age of 66.

Currently, the sector receives about 15% of its revenue and 20% of its passengers from the free travel scheme.

Under this scenario, the scheme would need to be carefully regulated to ensure that the Government retains value for money. For example, there would no longer be a "market price" to determine the level of "fares forgone". Careful consideration would need to be given to determine the appropriate remuneration for these operators. As per most sectors that are under economic regulation (power, utilities, airports etc..), measures may need to be taken to ensure that costs in the sector are not inefficiently incurred to overstate the cost of delivery.

Given the available revenue statistics, the cost of engaging in this policy may be in the order of €150m-€225m per annum on top of those identified in the financial assessment. This could rise significantly in the future, the sector grew by over 50% between 2013 and 2019, and that growth is likely in the post-Covid era. The other likely cost to the Exchequer is if NTA were to step in to provide PSO services, as often happens when CBOs withdraw.

Alternative Measures

Other measures would not have the same level of precedent and would be difficult to implement. An overall subsidy based on lost revenue from FFT, similar to that implemented over the COVID-19 period, would be difficult to estimate, especially as the industry is still recovering post-COVID. This difficulty could increase over time as the impact of FFT becomes more difficult to determine.

8 Practical Implications & Conclusions

Practical Issues with FFT

The implementation of Fare-Free Travel could lead to overcrowding and make service management more challenging

Overcrowding

The increased demand for public transport would likely be sudden upon the implementation of FFT, and capacity would not be able to increase quickly enough, particularly on the rail network.

This has been seen after the introduction of free school travel. Demand for the service has increased substantially, and many users who were previously reliant on the service have been unable to secure tickets. It is likely that those who previously used the service are more in need of it than those who have displaced them, who used alternative means in previous years.

The recent introduction of €9 tickets on the German rail network led to over 700 reports of disruptions per day on the initial weekend of the scheme due to overcrowding. This was much greater than other comparable weekends.

As per the evidence on modal shift, the majority of this additional crowding does not come from those shifting from car travel.

The evidence is clear that transport users dislike crowded services, and this is especially true for potential users that are not used to travelling on public transport. Overcrowded services may therefore discourage car drivers from switching to public transport.

Data & Service Management

The introduction of FFT could make the running of public transport services more difficult due to a potential loss of data, a sudden increase in demand and potential unwanted behavioural impacts.

Should FFT include the abolition of ticketing, it could be more difficult to plan services due to a reduction in the data available. Even if tickets remain, there maybe be a reduction in compliance by passengers due to a perception of futility.

Without the data, it will be difficult to determine which routes and at what times services are overcrowded, and when additional capacity is needed.

Alternative forms of getting data on transport patterns could be pursued, e.g. using mobile phone data from mobile phone operators to understand passenger movements. This could be an additional cost of FFT that has not been considered in this report.

In addition, the privacy concerns of users would need to be carefully considered. The data would need to be appropriately anonymised and specifically restricted to users' public transport use. All GDPR obligations would need to be met in full. Moreover, there may be public concern about collecting this kind of user information in the context of wider concerns around data and how it is used by the private sector.

Behavioural Issues

Once public transport has been deemed to be free, it may be difficult to reverse the policy decision. Companies, governments and other organisations have faced difficulties in charging for services and products that had previously been free. Users may determine a change from "free" to charging for a product to be a "categorical" change rather than a change in price and could be resistant to this type of change. This is reflected in the case studies presented in this report, where FFT was often only partially unwound to former fare structures.

Other behavioural issues are related to how people will use services. Evidence shows that free public transport encourages additional "low-value" trips. These trips range from people making trips to amenities slightly further away from where they live to people loitering and engaging in anti-social behaviour. The former involves using public funds to enable trips that are not of high value to the user. The latter makes public transport itself less attractive to users who would otherwise drive.

FFT increases the risk that the public transport system is overcrowded, poorly managed and has higher rates of anti-social behaviour that could deter car owners from using public transport. Ticketing provides valuable information to help plan transport services, and fares help to deter low-value trips that could otherwise be completed via active modes. Fares and ticketing can also be used to investigate and deter antisocial behaviour on public transport.

Conclusions

Several evidence sources have shown that FFT would boost public transport demand at the expense of active travel with a limited reduction in car use, undermining the strategic merit of the policy

Overview

The report has considered the strategic, economic, financial and operational implications of FFT.

Benefits of FFT

- A reduction in car use and carbon emissions
- Reduced transport poverty
- Savings in revenue collection costs
- Improved boarding times on buses

Limitations of FFT

- A very limited reduction in car use and carbon emissions
- A failure to meaningfully deliver on overall transport strategy
- A reduction in walking and cycling and a worsening of health outcomes
- A substantial financial outlay that could otherwise be spent on improving public transport services
- Overcrowding of transport services in the initial years of the policy, before public transport capacity can be increased
- Potential increases in anti-social behaviour on bus services
- Increased difficulty in operating public transport services due to a lack of data

Conclusions

EY has examined the potential impact of FFT from several perspectives using several evidence sources. These sources include transport strategies, statistics, case studies, academic literature, surveys and transport modelling. A relatively consistent picture has emerged as to the likely impacts of the policy in Ireland. Fare-free travel would increase public transport demand and provide a financial benefit to users, but this would not be achieved through a substantial reduction in car use, according to multiple sources of evidence. The increase in public transport demand would instead largely be achieved by reductions in active travel and increased levels of overall trips.

This undermines the strategic merit of the policy as it would not substantially boost the sustainability of the Irish transport system compared with alternative policies of a similar cost that aim to improve public transport service provision. Surveys of Irish car users suggest that price is not a major determinant in their decision not to use public transport. The lack of a reliable public transport service near to where they live is a much more salient factor in their travel decisions. This aligns with international evidence, which suggests that public transport demand is much more sensitive to the levels of public transport service provision than it is to pricing.

Therefore, the economic benefits of FFT could be limited. There are substantial societal benefits to be gained in directly reducing private car use. These include the benefits of reducing congestion, carbon emissions and the number of traffic collisions on Irish roads. However, given that the reduction in car use is limited in the FFT scenarios modelled for this project, these benefits are largely mitigated by the health disbenefits associated with reduced walking and cycling.

The net financial cost of removing fares would be in the region of €350-€550m per annum. Additional capital expenditure of €140m would be required to prevent overcrowding on buses. This extra capacity could take years to implement, and considerable overcrowding would be unavoidable in the initial years of the policy. The commercial bus sector could also be negatively impacted, competing with a free service, and additional public investment may be required to sustain commercial services.

Nonetheless, the benefits of FFT are present in isolation. Bus users, in particular, tend to belong to lower-income groups, and FFT would reduce transport poverty. It would also improve bus boarding times, although this benefit is substantially reduced by the onset of leap cards and next-generation ticketing. Overall, these benefits would likely be more than offset by the costs and disbenefits of the FFT policy. The academic evidence is clear that public transport should receive substantial subsidies to encourage its use over and above car travel. However, FFT may reduce active travel and incentivise unnecessary trips rather than reducing car trips. Therefore, the policy may not be an effective use of public resources in the long term to achieve national policy goals.

9 References

References

1. Baum, H.J., 1973. Free public transport. *Journal of Transport Economics and Policy*, pp.3-19.
2. Börjesson, M., Fung, C.M., Proost, S. and Yan, Z., 2019. Do small cities need more public transport subsidies than big cities?. *Journal of Transport Economics and Policy (JTEP)*, *53*(4), pp.275-298.
3. Brueckner, J.K., Kim, HA. Urban Sprawl and the Property Tax. International Tax and Public Finance 10, 5–23 (2003).
4. Cats, O., Susilo, Y.O. and Reimal, T., 2017. The prospects of fare-free public transport: evidence from Tallinn. *Transportation*, *44*(5), pp.1083-1104.
5. Central Statistics Office 2019, *'National Travel Survey 2019'*
6. Curtin, J.F., 1968. Effect of fares on transit riding. *Highway Research Record*, *213*(1).
7. Department of Public Expenditure and Reform 2021, *'National Development Plan 2021-2030'*
8. Department of the Environment, Climate and Communications 2021, *'Climate Action Plan 2021'*
9. Department of Transport 2021, *'National Investment Framework for Transport in Ireland'*
10. Department of Transport 2022, *'National Sustainable Mobility Policy'*
11. Department of Transport, Tourism and Sport and the Department of Housing, Planning and Local Government (updated 2019), *'Design Manual for Urban Roads and Streets'*
12. Dillon, R.W. and Bailey, J.A., 1970. Legal and political aspects of free transit in major metropolitan areas.
13. Duhamel, Y., 2004. Gratuité des transports publics urbains et répartition modale. Retour sur rapport fnal. Axiales/Programme de recherche et d'innovation dans les transports terrestres (PREDIT), Agence de l'environnement et de la maîtrise de l'énergie.
14. Fearnley, N., 2013. Free fares policies: impact on public transport mode share and other transport policy goals.
15. Giovanangelli, M. and Sagot-Duvauroux, J.L., 2012. Voyageurs sans ticket-Liberté, égalité, gratuité: une expérience sociale à Aubagne. *Au Diable Vauvert, Vauvert*.
16. Glaister, S. and Lewis, D., 1978. An integrated fares policy for transport in London. *Journal of Public Economics*, *9*(3), pp.341-355.
17. Glaister, S. and Graham, D., 2001. Transport pricing and investment in Britain. *A scoping study. London: Imperial Colleage. Dostępne w Internecie: http://www. theitc. org. uk/docs/16. pdf (dostęp: 14.12. 2016).*
18. Goodman, K.M. and Green, M.A., 1977. *Low Fare and Fare-Free Transit; Some Recent Applications by US Transit Systems* (No. UMTA-DC-52-0002-77-1).
19. Guzman, L.A. and Oviedo, D., 2018. Accessibility, affordability and equity: Assessing 'pro-poor'public transport subsidies in Bogotá. *Transport Policy*, *68*, pp.37-51.

References

20. Hodge, D.C., Orrell, J.D. and Strauss, T.R., 1994. *Fare-free policy: costs, impacts on transit service, and attainment of transit system goals*. Washington State Department of Transportation.

21. Holmgren, J., 2007. Meta-analysis of public transport demand. *Transportation Research Part A: Policy and Practice*, *41*(10), pp.1021-1035.

22. Jackson, R., 1975. Optimal subsidies for public transit. *Journal of Transport Economics and Policy*, pp.3-15.

23. Kębłowski, W., 2020. Why (not) abolish fares? Exploring the global geography of fare-free public transport. *Transportation*, *47*(6), pp.2807-2835.

24. Lane Transit District., 2008. *Fare-Free Service at Lane Transit District: An Overview of Financial and Operational Impacts*.

25. Larrabure, M., 2016. The struggle for the new commons in the Brazilian free transit movement. *Studies in political economy*, *97*(2), pp.175-194.

26. McCollom, B.E. and Pratt, R.H., 2004. *Traveler response to transportation system changes. Chapter 12-transit pricing and fares* (No. Project B-12A FY'99).

27. Mohring, H., 1972. Optimization and scale economies in urban bus transportation. *The American Economic Review*, *62*(4), pp.591-604.

28. National Transport Authority 2021 *'Fare-free Travel – Review of other schemes'*

29. Olsen, D., 2007. Why Community and Public Transportation Should Be Fare-Free. *Community Transportation*, *25*(4).

30. Parry, I.W. and Small, K.A., 2009. Should urban transit subsidies be reduced?. *American Economic Review*, *99*(3), pp.700-724.

31. Proost, S. and Van Dender, K., 2008. Optimal urban transport pricing in the presence of congestion, economies of density and costly public funds. *Transportation Research Part A: Policy and Practice*, *42*(9), pp.1220-1230.

32. Schein, R., 2011. Free Transit and Social Movement Infrastructure: Assessing the Political Potential of Toronto. *Alternate Routes: A Journal of Critical Social Research*, *22*.

33. Serebrisky, T., Gómez-Lobo, A., Estupiñán, N. and Muñoz-Raskin, R., 2009. Affordability and subsidies in public urban transport: what do we mean, what can be done?. *Transport reviews*, *29*(6), pp.715-739.

34. Storchmann, K., 2003. Externalities by automobiles and fare-free transit in Germany—a paradigm shift?. *Journal of Public Transportation*, *6*(4), p.5.

35. UITP (International Association of Public Transport) 2020 *'Full Free Fare Public Transport: Objectives and Alternatives'*.

36. Utah Transit Authority, 2022. Free Fare February Final Report,

37. Viton, P.A., 1983. Pareto-optimal urban transportation equilibria. *Research in transportation economics*.

38. Vobora, A., 2008. Fare-Free Service at Lane Transit District: An Overview of Financial and Operational Impacts.

39. Volinski, J., 2012. *Implementation and outcomes of fare-free transit systems* (No. 101). Transportation Research Board.


Building a better
working world