Rialtas na hÉireann
Government of Ireland

Five Cities Demand Management Study

Executive Summary

Introduction

Addressing the Challenges

The development of the Five Cities Demand Management Study is a result of the urgent requirement to reduce transport-related greenhouse gas emissions and address rising concerns in relation to urban air quality. In addition, the Study reflects the need to manage the impacts of urban congestion and improve the quality of life for people living, visiting, working and studying in our cities.

Taking decisive and rapid action to address these issues will be a major challenge, but the benefits for our cities' residents are huge – cleaner air, a sustainable use of the world's scarce resources, more connected and healthier communities and liveable vibrant cities.

This Study provides a focused and evidence-based approach to addressing the carbon, congestion and air quality challenges facing our cities – using insight from an extensive international best practice review, national and local stakeholder engagement and supported by detailed qualitative and quantitative analysis.

Background

The Study arose from Action 81 of the 2019 Climate Action Plan:

> "Develop a regulatory framework on low emission zones and parking pricing policies and provide local authorities with the power to restrict access to certain part of a city or town to zero-emission vehicles only. Examine the role of demand management measures in Irish cities, including low emission zones and parking pricing policies."

The Dept of Transport appointed SYSTRA Ltd to undertake a study to identify and review the drivers for, and potential management measures of vehicle movements in Dublin, Cork, Galway, Limerick and Waterford.

These measures, known as Transport Demand Management (TDM), aim to influence and change travel demand patterns, and encourage more efficient and sustainable use of transport resources.

The resulting Study also supports the delivery of other desirable outcomes outlined in the Climate Action Plan, including helping to deliver cleaner air, manage congestion, accelerate the uptake of lower emissions vehicles and increase levels of active and sustainable mobility – while minimising any negative impacts on local city economies or exacerbating any transport-related inequalities experienced by vulnerable groups.

The challenges facing our cities

Decarbonisation

- Under the Paris Agreement, Ireland is required to deliver a 30% reduction (relative to 2005 levels) in greenhouse gas emissions by 2030.
- Transport accounts for over 20% of Ireland's greenhouse gas emissions.[1]
- Climate Action Plan 2021 targets a reduction of 42-50% in transport related greenhouse gas emissions by 2030.
- Will require significant modal shift from car to sustainable travel (an additional 500,000 daily sustainable journeys by 2030) and a significant uptake of electric vehicles and increased use of biofuels.
- By 2040, the population of Ireland is expected to grow to 5.7 million people – intensifying our decarbonisation challenge.[2]

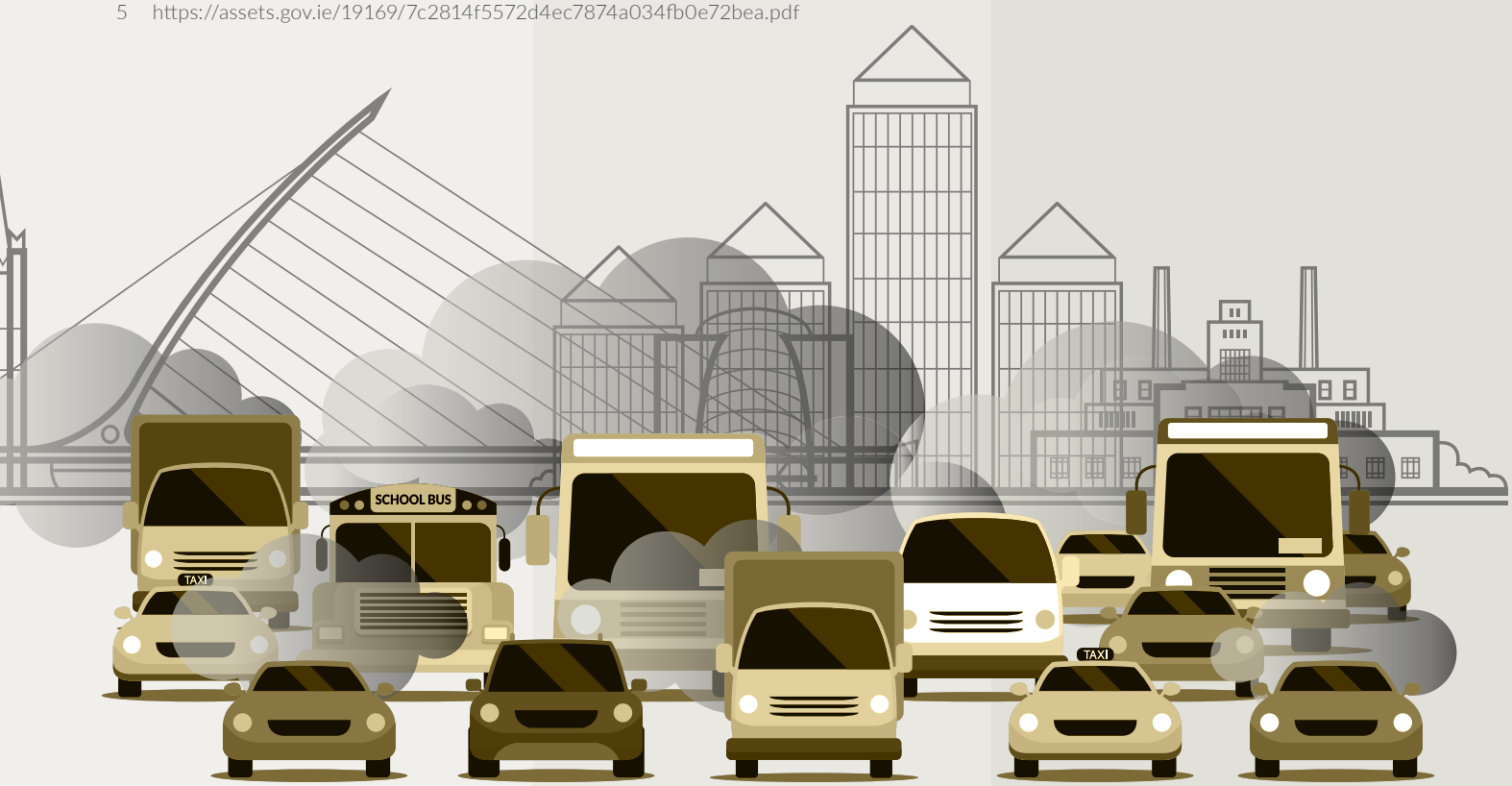
Air Pollution

- Growing concerns in relation to air quality and public health in urban areas.
- Air pollution from transport emissions (particulate matter and nitrogen dioxide (NO_x)) harms people's health – with diesel vehicles of particular concern.
- Environmental Protection Agency (EPA) estimate that the number of premature deaths attributable to pollution in Ireland is around 1,300 per annum[3].
- While current monitoring indicates that air quality in Irish cities is generally good in comparison to other EU member states and cities, there are worrying localised issues.
- If continued monitoring shows breaches of EU limits, local authorities will be required by EU law to prepare Air Quality Action Plans to address the issues.

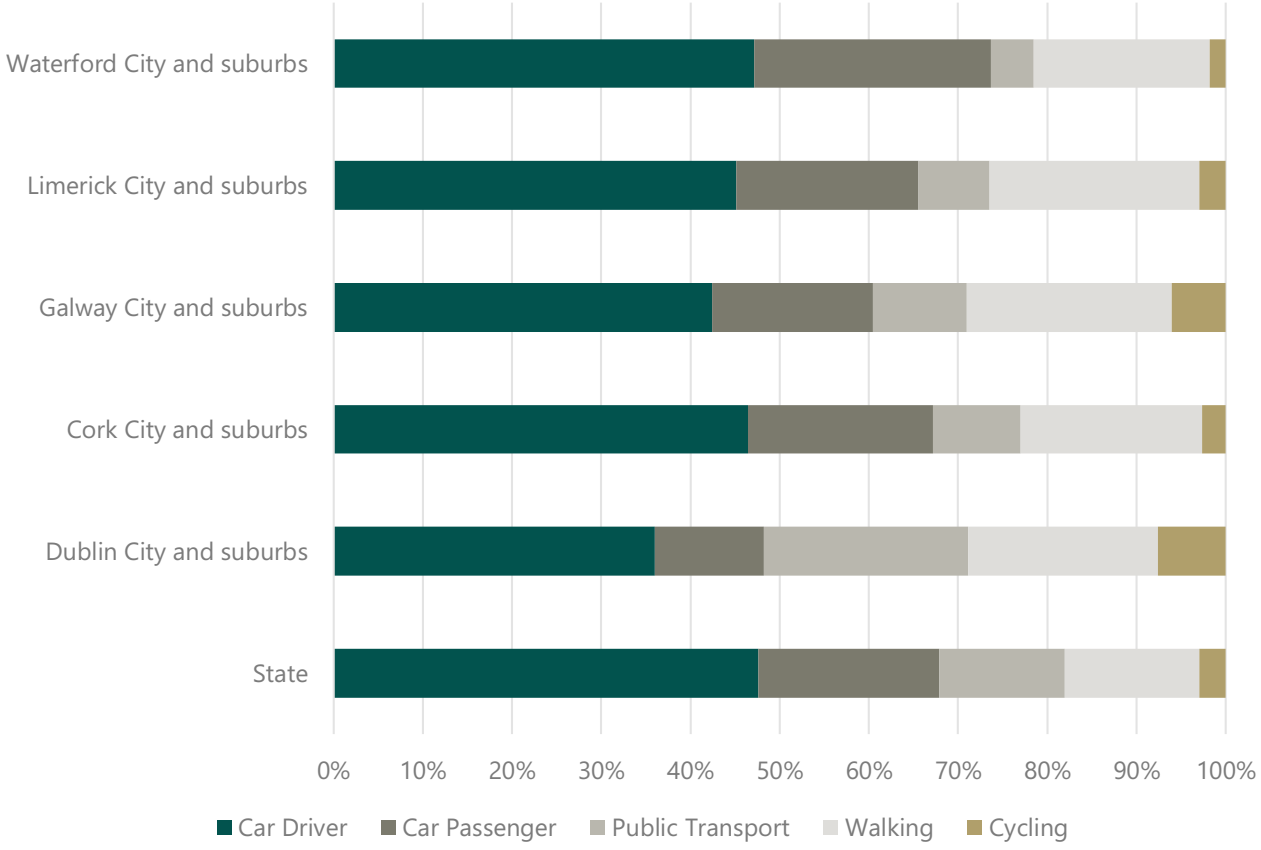
Congestion

- Reliance on the private car has led to increased congestion – particularly in Irish cities.
- 2016 Census shows that private cars still constitute a significant majority of trips to work and education in each of the five major Irish cities.
- Cost of time lost to due to 'aggravated'[4] congestion within the Greater Dublin Area was €358 million in 2012, forecast to rise to €2.08 billion per year in 2033.[5]
- Experience shows that providing additional road infrastructure is unlikely to solve the issue.
- To accommodate the future sustainable growth of our cities, it is vital that congestion is addressed through demand management as well as via increased public transport, walking and cycling.

1 www.epa.ie/ghg/transport
2 https://www.gov.ie/en/press-release/16421-climate-action-plan-2021-securing-our-future/
3 www.epa.ie/our-services/monitoring--assessment/assessment/irelands-environment/
4 Defined in the report as congestion levels above those which would be expected in a properly-functioning busy road.
5 https://assets.gov.ie/19169/7c2814f5572d4ec7874a034fb0e72bea.pdf



2016 WORK & SCHOOL COMMUTING MODAL SHARE BY STATE & CITY IRELAND*



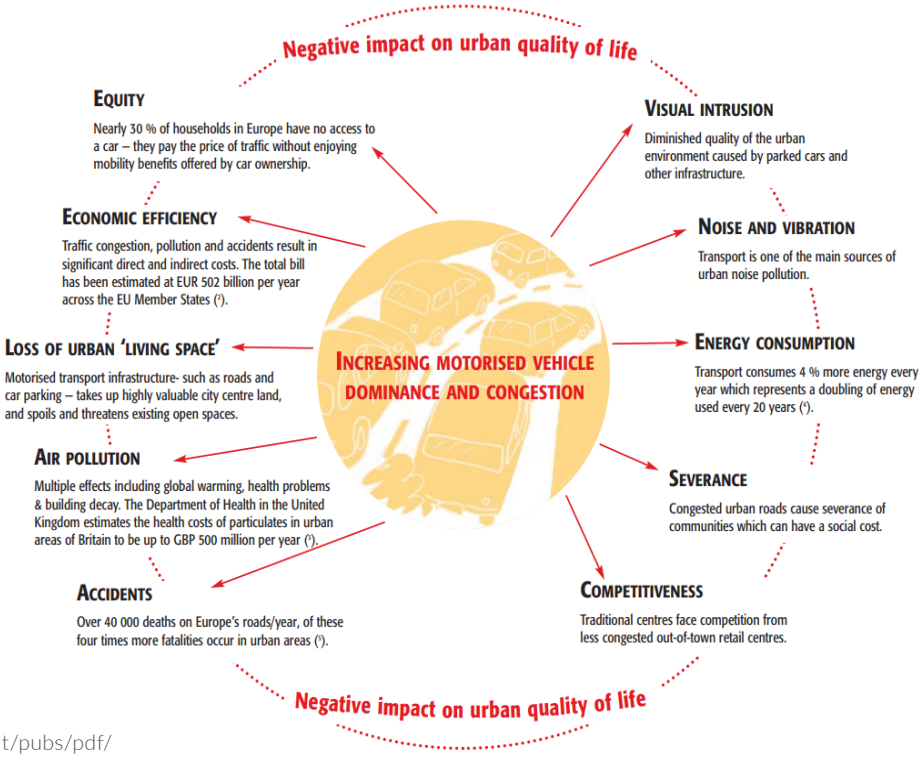
*The above data excludes those answer categorised as Not Stated, Working mainly from Home & Other.

Urban Environment

Traffic, congestion and inconsiderate parking harms the quality of life of residents within urban areas, reducing opportunities for safer and active travel choices. The high rate of car usage in our cities results in many negative impacts including:

- Greater noise pollution
- Severance of urban communities
- Greatest impact on the young, elderly and those with mobility impairments
- Loss of green space & visual intrusion
- Road safety risks
- Poorer quality of the urban realm

THE MAIN PROBLEMS ASSOCIATED WITH INCREASING URBAN TRAFFIC AND CONGESTION[6]

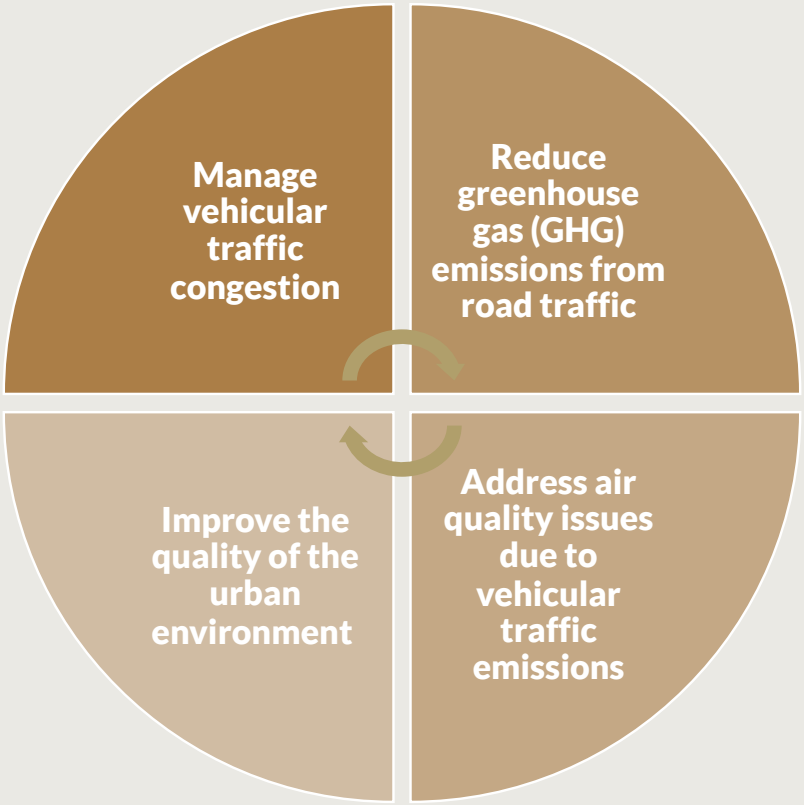


6 Source: https://ec.europa.eu/environment/pubs/pdf/streets_people.pdf

Study Objectives

The measures recommended in this Demand Management Study have been developed in order to deliver the following key Study Objectives within each of the five cities:

STUDY OBJECTIVES



Recommended Transport Demand Management measures are a result of....

.... extensive and detailed international best practice research and stakeholder engagement, initial refinement and screening of potential TDM measures for each city followed by thorough qualitative assessment utilising a multi-criteria analysis and quantitative fleet modelling assessment.

This informed Phase One of the Study, with detailed quantitative assessment then undertaken using the National Transport Authority's Regional Modelling System in order to refine and further prioritise the final Recommendations and Delivery Roadmap.

STUDY METHODOLOGY

A. CAP Action 81

- Provides the overall context for this Study

B. Study Objectives

- Objectives identified to achieve the Climate Action Plan (CAP) Action 81

C. Identify solutions

- Identification of potential measures through:
- Best Practice review
- Baseline conditions in each city
- Stakeholder consultation - national and cities x 5

D. Refine solutions

- Review and analysis of potential solutions against Study Objectives - initial screening
- Refinement of potential measures

E. Test solutions

- Potential measures identified and tested
- Emerging recommendations - stakeholder consultation
- Quantitative fleet modelling and qualitative assessment
- Regional Modelling System (RMS) quantitative modelling

F. Recommendations

- Recommendations Report
- Delivery Roadmap

Introduction to the Tiered TDM Measures

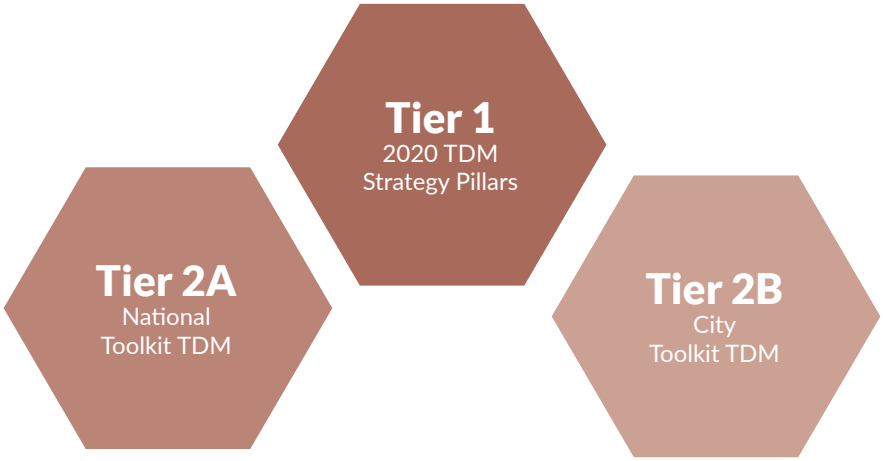
Tier 1 TDM Strategy Pillars

As the study progressed, it became apparent that some measures would lead to such a scale of impact or change that they would benefit from more detailed qualitative and quantitative analysis to identify the most appropriate strategy. All of these measures would have far reaching impacts both geographically and beyond. These measures were grouped in Tier 1 as the as the Transport Demand Management (TDM) Strategy Pillars.

Tier 2 TDM Toolkit

The remaining measures were assessed in terms of their effectiveness in delivering the key Study Objectives. Utilising a Toolkit approach, the recommended Tier 2 TDM measures can be applied in different ways and intensities, recognising the different circumstances of each of the five cities and their current and planned application of TDM measures. The Toolkit offers flexibility and additional options for both local and national interventions. For ease of reference and in recognition of the nature of their application, the Tier 2 measures are split into two toolkits, 2A National and 2B City.

ALL THREE TIERS IN COMBINATION FORM THE STRATEGIC DIRECTION OF TDM IN THE FIVE CITIES.



Tier 1 measures – informing the Delivery Roadmap

Given the scale and nature of the Tier 1 measures, it is unlikely all would be implemented and indeed some would be considered mutually exclusive. In other cases, the benefit of a measure would be diminished if certain alternative measures were implemented, therefore making them unsuitable for recommendation. In addition, some Tier 1 measures are better suited to particular cities more than others.

These factors were considered in the preparation of the TDM Delivery Roadmap. To help in the Delivery Roadmap development, the detailed quantitative analysis for Tier 1 measures was used to provide an overall and city-by-city ranking. The ranking is not intended as a means of excluding measures, rather as a guide when decisions need to be made between potentially competing measures.

Key Recommendations

Top three priority TDM measures

The three priority TDM measures for implementation across the five cities are as follows:

Rank	Measure Reference	TDM Measure	Measure Description
1st	PP08	15 Minute Neighbourhoods	Develop and embed the concept of 15-minute neighbourhoods through national and local plans and strategies, providing resourcing to incentivise the implementation of 15-minute neighbourhoods through national funding/grants schemes
2nd	PP04	National Planning Framework Delivery Management	Enhance Delivery of the National Planning Framework
4th*	PTM04	Public Parking Controls	Development/refresh of city centre Parking Controls & Pricing strategy to strengthen parking as a TDM measure, including EV parking pricing strategies and targeted removal of on-street parking.

**The 3rd ranking measure (PP01 Healthy Streets) was not included in the final Delivery Roadmap due to its overlap with a higher ranking measure (PPO8 15 Minute Neighbourhoods).*

Other Tier 1 TDM measures

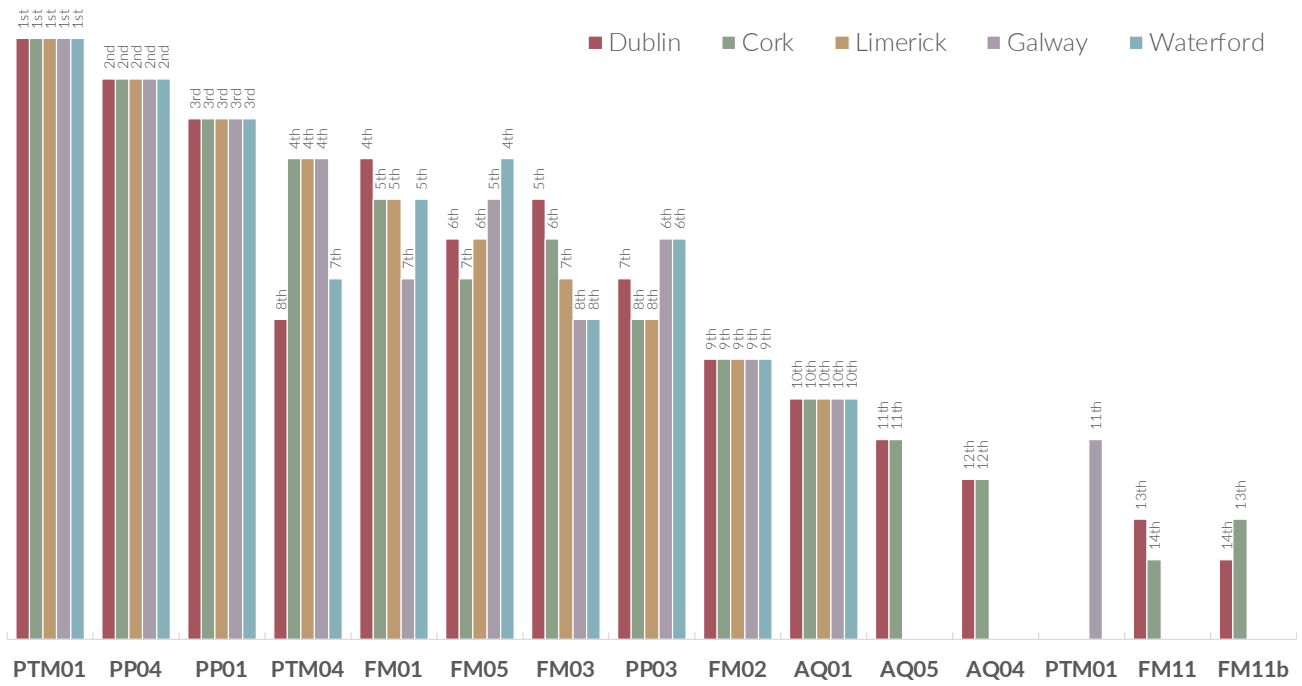
Following the quantitative RMS modelling, the other Tier 1 measures have also been ranked and refined. This outcome utilises an average across applicable cities for each measure.

Rank	Measure Reference	TDM Measure	Measure Description
5th	FM01	Progressive Vehicle Taxation	Progressive taxation measures towards cleaner, safer fleets
6th	FMO5	Alternative Fuelled Vehicle Support	The continuation, enhancement or phasing out of financial supports or requirements for the purchase of alternative fuelled vehicles and/or supporting infrastructure.
7th	FM03	Time/Location Based Vehicle Taxation per km	Mileage based vehicle taxation varied by time and/or location (e.g. between urban and rural areas)
8th	PP03	Transport Appraisal Enhancements	Appraisal of 'softer benefits' of transport schemes within the appraisal process – review of appraisal approach to transport projects with potentially greater consideration of non-economic impacts such as environment, policy integration and human impact & communities.
9th*	FM02*	Vehicle Taxation per km	Mileage based vehicle taxation per km
10th	AQ01	Clean Air Enabling Legislation	Clean Air Enabling Legislation, including taxi & bus licensing impacts
11th	FM11	Congestion Charge (Dublin & Cork)	Congestion Charging
12th	PTM01	Workplace Parking Levy (Galway)	Undertake additional examination and research as to potential application of a Workplace Parking Levy within a pilot city (Galway)
13th	AQ05	Clean Air Zone via National Vehicle Sticker System	Clean Air Zone (CAZ) via National Vehicle Sticker Scheme (where significant Air Quality concerns arise in individual cities)
14th	AQ04	Clean Air Zone via ANPR	Clean Air Zone (CAZ) via ANPR (where significant Air Quality concerns arise in individual cities)

**Not included in Roadmap due to higher ranking alternative (FM03)*

Tier 1 TDM measures – ranking by City

The outcome of the Tier 1 Assessment on a city-by-city basis is also shown below.



Tier 2 TDM Toolkit Measures

The Tier 2 TDM measures have been compiled into two Toolkits, one containing national measures and one containing measures which could be implemented at a city level. The Toolkits are intended to be a resource for stakeholders to identify appropriate measures for given situations.

Tier 2a National Toolkit

Measure Type		Ref	Tier 2a National Toolkit – TDM Measure	Measure Description
Fiscal Management (FM)	Alternative Fuels	FM06	Hydrogen Vehicle Trials	Continue measures to support innovation trials in relation to Hydrogen vehicles
	Scrappage Schemes	FM09	Vehicle to Mobility Credit Scrappage Scheme	Vehicle Scrappage Schemes which provide mobility credits for sustainable mobility in exchange for high polluting vehicles being scrapped (further examination/evidence as regards the potential for a Pilot Study in larger cities, with smaller cities pending outcomes)
	Incentivising Sustainable Mobility	FM10	Sustainable Mobility Incentives	Progressive tax subsidies to incentivise sustainable travel (e.g. Tax Saver; Cycle to Work scheme; Business related EV & cycle mileage eligibility & incentive improvements)
Air Quality (AQ)	Clean Air Zones/Low Emissions Zones	AQ02	Air Quality Monitoring	Continue EPA roll out of AQ monitoring stations building capacity and capability for AQ modelling
		AQ03	Air Quality Citizen Engagement	Continue EPA roll out of AQ citizen engagement programmes (e.g. Globe Schools, Curious Noses/Clean Air Ireland) to enhance awareness of air quality and support behavioural change.
Planning Policy (PP)	Transport & Public Health	PP02	Public Health & Transport	Improve integration between Public Health & Transport, including focused resources to embed physical activity and improve air quality outcomes through the health system, land use planning & behavioural change programmes.
Parking & Traffic Management (PTM)	EV Parking Strategies	PTM03	Electric Vehicle Charging Management	Technology to support efficient booking and use of public EV charging facilities
Behavioural Change (BC)	ISO 50001 Energy Management Certification	BC01	ISO50001 Energy Management Standard – Public Sector	Mandatory implementation of ISO50001 Energy Management Standard (or similar Energy Management standards) for all public sector bodies
		BC02	ISO50001 Energy Management Standard – Private Sector	Resources to support and encourage private sector to implement ISO50001 Energy Management Standard (or similar Energy Management standards) (e.g. via SEAI's EXCEED scheme)
	Eco-Driving	BC09	Eco-Driving	Strategy to encourage and support increased levels of eco-driving for freight, public transport operators, grey fleet and private cars.
	Behavioural Change Campaigns	BC10	Behavioural Change Campaign – Cleaner Fleets	Behavioural Change Campaign to support switch to cleaner, lower emission fleets for next vehicle purchases (including private cars & taxis)
Technology & Communications (TC)	Integrated Ticketing and Mobility as a Service	TC01	Next Generation Ticketing	Roll out of next generation ticketing systems across all modes including PT, cycle hire and parking
		TC02	Mobility as a Service Pilot	Mobility as a Service – further examination and evidence review to identify potential to undertake a pilot, including trialling demand responsive services
	Connected Vehicles	TC09	Connected Vehicles	Development and use of connected vehicles, leading to more efficient driving and use of road space

Tier 2b City Toolkit

Measure Type		Ref	Tier 2b City Toolkit – TDM Measure	Measure Description
Fiscal Management (FM)	Tolling	FM12	M50 Multi-Point Tolling	Further examination/evidence required in relation to multi-point tolling on the M50
Parking & Traffic Management (PTM)	EV Charging Infrastructure Strategies	PTM02	Electric Vehicle Charging Strategy	Development & implementation of an EV charging strategy for each city for private cars and taxis, including: County Development Plan Parking Standards; on-street; Park & Ride; Rail Stations; Mobility Hubs; Multi-Storey parking and e-Taxi charging infrastructure
	On-Street Parking Controls & Pricing	PTM07	Car Clubs/Car Sharing	Foster partnership between National and Local Authorities and private car-share operators with an emphasis on allocation of on-street Car Club/car Share spaces within City Parking Strategies.
	Residential & Workplace Parking Standards	PTM08	Residential Parking Standards	Reduced Residential Parking Standards for new developments in appropriate locations
		PTM09	Workplace Parking Standards	Reduced Workplace Parking Standards for new developments
		PTM10	Residential Parking Standards – EVs & Car Clubs	Continue to require EV & Car Club spaces within new Residential developments
	Freight/Goods Delivery Management	PTM12	HGV Management Strategy	Development & implementation of a HGV Management Strategy for each city
		PTM13	Active Kerbside Management	Active Kerbside Management, cargo bikes/last mile distribution hubs
	Traffic Management	PTM14	Slow Zones	Expansion of Slow Zones in residential areas
		PTM16	Park & Ride	Improve interchange opportunities via Park & Ride provision on outskirts of cities, focused on reducing longer distance car commuting
		PTM17	Car Free Zones & Streets	Identify areas within cities where Car Free Zones & Streets could have a positive impact on Air Quality and quality of the Public Realm
Behavioural Change (BC)	Mobility Management Plans	BC03	School Mobility Management Plans (MMPs)	School Mobility Management Plans (MMPs) – resources to support Local Authorities and An Taisce with local school MMP implementation e.g. site specific support
		BC14	School Streets & Safe Routes to School	Resources to support local School Streets & Safe Routes to School initiatives including consultation, implementation and monitoring
		BC04	Workplace Mobility Management Plans (MMPs)	Workplace Mobility Management Plans (MMPs) – resources to support Local Authorities and the NTA Smarter Travel Team with local workplace & campus MMP implementation e.g. planning compliance, site specific support
		BC05	Flexible Working	Programme of support for employers to encourage flexible working/home working/remote hub working
		BC06	Staggering School and Workplace Start and Finish Times	Staggering school and workplace start and finish times
		BC07	Residential Mobility Management Plans	Residential Mobility Management Plans (RMMPs) – resources to support planning compliance monitoring and site-specific support
		BC08	Area Mobility Management Plans	An area based approach to Mobility Management Planning
	Behavioural Change Campaigns	BC11	Reward Schemes	Incentive-based applications to reward sustainable travel and off-peak travel behaviour
		BC12	Marketing New Schemes	Resources to lock in benefits of active & sustainable travel infrastructure investment through focused social marketing and behavioural change campaigns
		BC13	Disruption & Resilience	Resources to reduce demand, build transport resilience and/or embed sustainable habits during times of disruption through focused social marketing and behavioural change campaigns

Measure Type		Ref	Tier 2b City Toolkit – TDM Measure	Measure Description
Technology & Communications (TC)	Intelligent Transport Systems	TC03	Real Time Passenger Information	Continue the NTA roll out of multi-modal Real Time Passenger Information (RTPI) across all cities
	Variable Speed Limits	TC05	M50 Variable Speed Limits	Review impact of current TII plans for implementation of variable speed limits along the M50 (as part of eMOS project)
	Urban Traffic Management Centres	TC06	Public Transport Control Centres	Continue NTA investment in control centre for all public transport modes, including interactions with Luas
		TC07	Urban Traffic Management Centres	Proactive Urban Traffic Management including SCATS system development & resources and implementation of other initiatives e.g. bus gates
	Parking – Wayfinding & Variable Message Systems	TC08	Smart Parking Wayfinding & VMS	Continued development & resources for Smart Parking wayfinding & Variable Messaging Systems (VMS) to support proactive traffic management

Recommended Tier 1 TDM Measures

The Tier 1 measures have been examined at both the national and individual city level and combined to form the recommended strategic pillars for the future development of TDM in Dublin, Cork, Limerick, Galway and Waterford. Where appropriate, these Tier 1 measures have been further assessed utilising the NTA's Regional Modelling System – which has in turn informed the refinement of the Delivery Roadmap.

Recommended Tier 2 TDM Measures

The recommended Tier 2 measures have been compiled into two toolkits, one containing national measures and one containing measures which could be implemented at a city level. The TDM Tier 2 Delivery Roadmap is intended to be a resource for stakeholders to identify measures for a given situation.

Delivering the Roadmap – Funding and Organisation

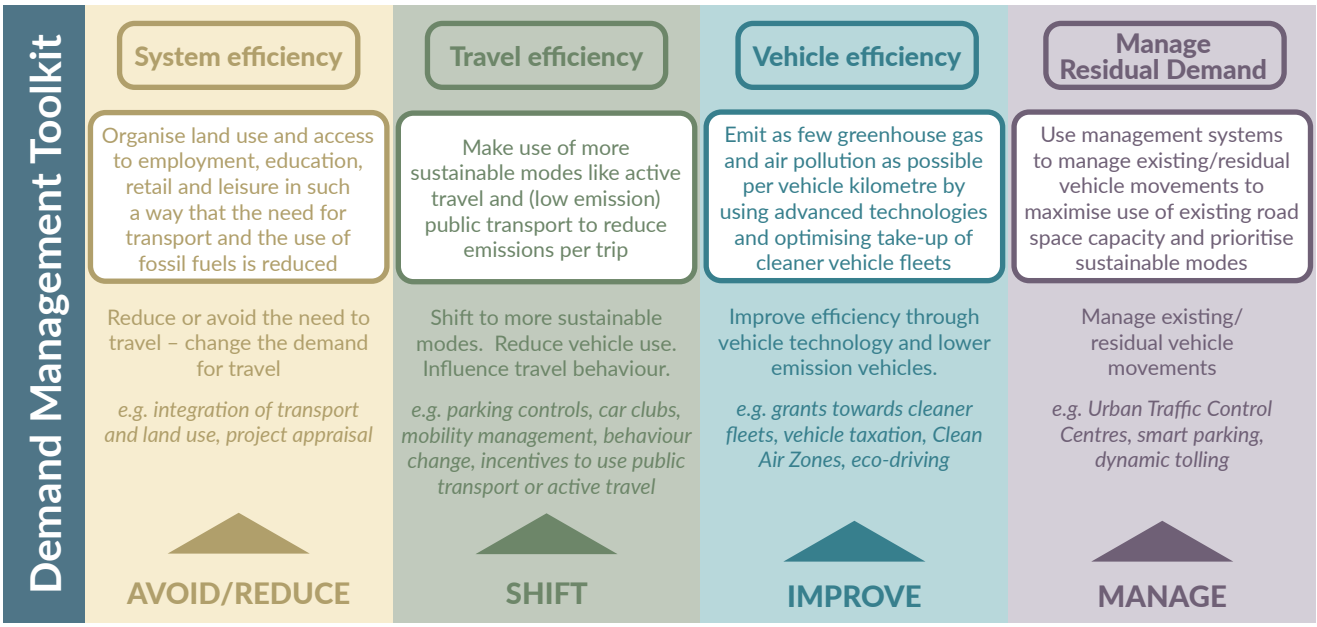
Consideration of this Tier 1 Roadmap and the recommended Tier 2 Toolkits would be beneficial in informing the future investment, planning and ongoing funding of demand management. The management of funding of TDM is complex given the diverse measures and many interactions with wider issues. Whilst a central or dedicated funding stream for TDM would ringfence investment, it may not be the most efficient use of resources, particularly if there is duplication with other publicly funded interventions.

It is recommended that a signposting resource is developed to aid delivery of TDM under the Tier 2 Toolkits. This is envisaged as an online 'live' database that would identify potential alignment between the implementation of desirable TDM measures and available national and EU funding sources.

Given the complexity and interdependency of the range of recommended TDM measures, embedding a TDM approach into national, regional and local planning, policies and delivery mechanisms will be critical to provide an integrated framework to achieve the Study Objectives, both nationally and within each of the five Study cities.

Development of the Roadmap

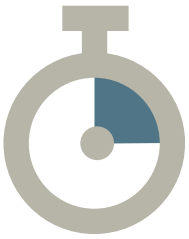
In developing this emerging roadmap, the influence of the measure has been considered using an approach, known as A-S-I (Avoid/Reduce; Shift; Improve). The A-S-I approach entails three categories which we have expanded for the purposes of this Study by adding a fourth pillar 'Manage':



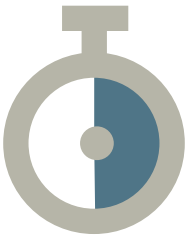
Delivery Roadmap – Timescales

The proposed delivery of the Demand Management Roadmap has been segmented into different timeframes as follows:

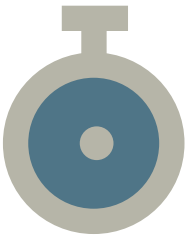
Short term By 2025



Medium term By 2030



Long term By 2040



SUMMARY OF TIER 1 IMPLEMENTATION TIMESCALES

	A-S-I-M			Short Term	Medium Term	Longer Term
Avoid to:	Decarbonise Address air pollution Manage congestion Improve the urban environment	PP08	15 Minute Neighbourhoods	→	→	→
		PP04 PTM04	National Planning Framework Delivery Management	→	→	
Shift to:	Decarbonise Address air pollution Manage congestion Improve the urban environment	PP03	Public Parking Controls	→	→	→
			Transport Appraisal Enhancements		→	→
		FM03	Time/Location Based Vehicle Taxation Per Km			→
		PTM01	PTM01 Workplace Parking Levy (Galway)	→	→	
Improve to:	Decarbonise Address air pollution	FM05	Alternative Fuelled Vehicle Support	→		
		FM01	Progressive Vehicle Taxation	→	→	
Manage to:	Address air pollution Manage congestion	AQ01	Clean Air Enabling Legislation	→		
		AQ04 & AQ05	Clean Air Zones	→	→	
		FM11	Congestion Charging (Dublin & Cork)	→		

Conclusion

The Five Cities Demand Management Study has identified a suite of TDM options to address the pressing climate change, air quality and congestion challenges facing our cities.

The quantified modelling undertaken indicates that implementation of the identified TDM measures will support the delivery of the key Study Objectives. These range from additional reductions in carbon from individual measures of between 4% in Galway to over 6% in Cork, building on planned infrastructure investment in sustainable travel and underlying changes in vehicle technology within the Irish fleet.

The analysis demonstrates potential reductions in harmful air quality emissions identified across all our cities. Individual measures will support reductions in congestion, with modelling results indicating reductions in travel time ranging from 8% in Dublin to over 13% in Galway. The quality of our urban environment is also shown to improve, with indicated reductions in car trips in our urban cores of up to nearly 14% – making for a more pleasant and safer environment for those travelling by public transport, bike or by foot.

What has also emerged clearly from this Study is that there is no silver bullet or one single solution to tackling the challenges facing our cities. Utilising an integrated Travel Demand Management approach to policy development, planning and delivery of our land use and transport systems will be fundamental to addressing these challenges.

As outlined in the 2021 Climate Action Plan, promoting cleaner, safer and more sustainable mobility is critical for climate policy. It also represents an opportunity to improve our health, boost the quality of our lives and meet the needs of our growing urban centres.

This TDM Study sets outs a roadmap for a better future for all those visiting, living, working and studying in our cities.

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