



**2030 Rail Network Strategy
Review**

Final Report

October, 2011

Contents

Executive Summary	viii
1 Introduction	
1.1 Background to the Report	1
1.2 Objectives of the Review	1
1.3 Study Methodology	2
1.4 Layout of the Report	3
2 The Policy Context for the Strategic Review	
2.1 Introduction	5
2.2 Government Transport Investment Policies	5
2.3 Policy Factors Underlying Transport Investment	7
2.4 European Transport Policies	11
2.5 Institutional Structures	12
2.6 Overview	13
3 Objectives & Strategic Priorities	
3.1 Introduction	17
3.2 Overriding Strategic Objective of Iarnród Éireann	17
3.3 Economic Development Needs	18
3.4 The Contribution of Rail to Economic Development Needs	21
3.5 Other Objectives for the Railway System	26
3.6 Implications for Development of the Strategy	29

4 Recent Rail Developments

4.1	Introduction	31
4.2	Rehabilitation of Infrastructures & Other Key Investments	31
4.3	Rolling Stock	34
4.4	Service Development	35
4.5	Passenger Demand	37
4.6	Financial Performance	40
4.7	Overview	42

5 Mapping Current Rail Demand

5.1	Introduction	45
5.2	Profile of InterCity Rail Passengers	47
5.3	Development of a National Rail Model	49
5.4	Passenger Demand Across the Network	50
5.5	Inter-Urban Demand	52
5.6	Passenger Boardings	54
5.7	Passenger Kilometres	56
5.8	Financial Performance	58
5.9	Mode Competition	60
5.10	Defining Potential Demand	62
5.11	Conclusions	63

6 Infrastructure & Service Review

6.1	Introduction	65
6.2	Network Classification	65
6.3	Population Catchments	67
6.4	Line Quality	69

7 Passenger Demand Forecasts

7.1	Introduction	81
7.2.	Demographic Environment	81
7.3	Economic Environment	86
7.4	Energy Environment	88
7.5	Competition from Road	90
7.6	Competition from the Bus Mode	91
7.7	Internal Air Transport	95
7.8	Modelling Aggregate Passenger Demand Forecasts	100
7.9	Predicting Future Demand	103
7.10	Prediction of Passenger Demand by Route	104

8 Reinstatement & Closure of Rail Lines

8.1	Introduction	109
8.2	Methodology	109
8.3	Appraisal of Rail Lines	113
8.4	Appraisal of Lightly Used Services	114
8.5.	Overview	116

9 Development of Investment Options

9.1	Introduction	119
9.2	Forms of Investment	119
9.3	Preliminary Screening	122
9.4	Scheme Costs	140
9.5	Demand Modelling	141
9.6	Results of Assessment	143
9.7	Overview	149

10 Appraisal of Options

10.1	Introduction	151
10.2	Cost Benefit Framework	151
10.3	Approach to Valuing Costs & Benefits	152
10.4	Wider Economic Benefits	156
10.5	Results of Cost Benefit Appraisals	160
10.6	Conclusion: Phasing of Investments	169

11 Rail Freight

11.1	Introduction	173
11.2	Policy Background	173
11.3	Trends in Rail Freight Volumes	173
11.4	Rail Freight Finances	177
11.5	Future Potential of Rail Freight in Ireland	179

11.6	Capacity of Iarnród Éireann to Take up New Business	181
11.7	The Case for Public Funding of Rail Freight	185
11.8	Conclusions & Recommendations	186
12 Rail Maintenance & Renewal Needs		
12.1	Introduction	189
12.2	The Railway Safety Programme	189
12.3	Progress Under the Railway Safety Programme	190
12.4	Future Needs: Track Infrastructure & Structures	191
12.5	Future Needs: Signalling & Telecommunications Maintenance & Renewal	193
12.6	Total Infrastructure Maintenance & Renewal Expenditure	196
12.7	Benchmarking Iarnród Éireann’s Expenditure of Maintenance & Renewal of Infrastructure	198
12.8	Future Needs: Rolling Stock Maintenance	200
12.9	Overview	202
13 Fares Policy		
13.1	Introduction	205
13.2	Regulation of Fares	205
13.3	Iarnród Éireann Fares Policy Objectives	206
13.4	Existing Fare Structures	206
13.5	Customer Access to Fare Information	209
13.6	Iarnród Éireann Fares Policies in a Comparative Context	209
13.7	Conclusions & Recommendations	216

14 Conclusions & Recommendations

14.1 Background	219
14.2 Recent Trends & Developments	219
14.3 Performance of the InterCity Network	219
14.4 Service Levels	221
14.5 Future Patronage	222
14.6 Future Role of the ICN	222
14.7 Strategic Priorities	222
14.8 Future Investment Strategy	223
14.9 Route Investment Strategies	224
14.10 Line Service Closures and New Rail Lines	226
14.11 Rail Freight	226
14.12 Fare Structures	226



Executive Summary

Background

The focus of this 2030 Rail Network Strategy Review is on the future development requirements of the Iarnród Éireann InterCity Network (ICN) and the regional services. The potential for rail freight was also considered. The study does not embrace commuter rail services in the Greater Dublin Area as these services are being considered by the National Transport Authority in the context of the Draft Transport Strategy for the Greater Dublin Area (Vision 2030). However, this review pays due regard to the NTA proposals for the greater Dublin area as the InterCity services compete with the Dublin commuter services for access to Dublin city centre and particularly during the peak periods.

The Government's Statement of Common Purpose indicates that it will draw up a new National Development Plan for the period 2012-2019 that reflects Ireland's changed economic circumstances. This Plan is to be based on a comprehensive study of Ireland's public investment priorities over the period. A key element of the Plan will be the requirement to subject major capital projects to thorough cost-benefit analysis and evaluation. This Rail Network Strategy Review is a contribution to the preparation of such a Plan and subsequent strategic development. It may be noted that it adopts an evidence-based approach and identifies investment priorities on the basis of a detailed cost benefit analysis.

Following a review of the major national and regional transport and settlement strategies, a broad strategic goal for the rail network has been identified as follows.

'To provide safe, accessible and integrated rail services that contribute to sustainable economic and regional development in an efficient manner'.

Recent Trends & Developments

In the past decade, infrastructural improvements have been complemented by significant investments in rolling stock. As a result, Iarnród Éireann has the youngest inter city fleet in Europe and service capacity and reliability of the ICN have much improved. Passenger demand has responded, averaging 4 per cent per annum growth over a long period. Demand peaked in 2007 at 45.5m passengers for the railway as a whole, before falling back to 38.2 m in 2010. Passengers on the ICN amounted to 21.4m in 2010 or 56 per cent of all passengers in 2010. Total railway revenue has followed a similar pattern, and is currently 17 per cent below its 2007 peak. Despite cost saving initiatives, amounting to c. €75m over three years, the operating deficit for the railway as a whole amounted to €14.3m in 2010, and declining public subvention has increased the difficulty of keeping operating deficits in check. The recent global economic downturn together with the national property and banking crises have forced the Government to significantly reduce and re-prioritise infrastructural spending in the short to medium term. Funding supports for such services are likely to come under increased pressure in future.

Performance of the InterCity Network

Dublin-Cork

The Dublin-Cork corridor remains the dominant corridor on the rail network, carrying a high level of passenger demand, and a significant level of inter-city movements, particularly by business travellers,

who account for over 35 per cent of total rail passengers. It also competes strongly with car for trips between Dublin and Cork City, accounting for approximately 50 per cent of non-bus trips. Other routes perform less well, with lower market shares.

Dublin-Galway

Although overall patronage on the Galway services is relatively low, the demand on services between Dublin and Athlone/Ballinasloe is quite strong, and is comparable with sections of the Cork and Belfast corridors. In fact, the Galway corridor performs a very strong inter-city function, with only 16 per cent of passenger kilometres accounted for by commuters. Rail competes poorly on journey times with road transport on the Dublin – Galway route, although the train can offer competitive journey times to intermediate destinations such as Tullamore.

Dublin-Belfast

The Dublin to Belfast corridor carries a relatively high level of passenger demand, although much of this is accounted for by outer-commuting services to Drogheda and Dundalk. InterCity services perform extremely poorly in relation to the route's population catchment and trip length. The low level of business travel on this corridor is particularly notable.

Dublin-Limerick

Limerick is provided with the highest number of connections from Dublin compared with any other regional destination. Connections are provided at Limerick Junction to all Dublin – Cork services,

with further direct, albeit stopping, services provided from Dublin (Heuston). The journey time via Limerick Junction is also good. As a result, demand is relatively strong, and the route performs relatively close to its full potential. Nevertheless, the interchange requirement remains a barrier to travel on this route. The interchange also poses additional delay to Dublin – Cork Services.

Dublin-Waterford

Although subject to recent increases in service frequency, the Dublin to Waterford corridor continues to suffer from a number of barriers including the relatively high journey time in comparison to road, the isolation of the mainline rail station in Waterford from the City Centre, and the limited population catchment along the corridor. Journey times are hampered by the arrangement in Kilkenny, and by permanent speed restrictions through difficult terrain, and this all contributes to the route falling significantly short of its full potential demand.

Dublin-Sligo

Patronage on the Sligo route responded well to improvements to frequency and rolling stock quality in recent years. The route carries significant traffic from the commuter areas within the Greater Dublin Area, and demand to/from areas northwest of Longford is somewhat weaker. The route enjoys a moderate train frequency (8 trains/day) for a limited population, using high quality rolling stock and at a journey time that is comparable to that by road. The route also terminates in Connolly Station which boasts good access to the City Centre.

Dublin-Westport/Ballina

The Westport and Ballina service is one of the longer routes from Dublin, and patronage is relatively strong when compared to the catchment population – mainly as a result of the tourism potential on the line. Even so, the high proportion of concessionary travellers on this route has been noted, which make up a significant proportion of leisure travellers. The demand at Castlebar is particularly strong, and confirms the important role of rail in servicing the Castlebar-Ballina linked hub.

The journey time is reasonable in comparison to road journey times, and would become more competitive with any improvements to line speed between Dublin and Athlone. The main deficiency on this route is the low frequency which restricts availability of services, and the requirement to interchange for Ballina services.

Dublin-Tralee

The Tralee routes generate quite strong levels of demand in comparison to the population catchment. As with the Westport/Ballina route, this is due to the high volume of tourism, although a significant level of that demand includes concessionary travellers which comprise in the region of 30 per cent on parts of the Mallow – Tralee corridor.

The long travel times by road from Dublin to Killarney and Tralee supports the use of the railway, and patronage is resilient, despite the need for an interchange at Mallow for the majority of services.

Dublin-Rosslare

The Wexford service is relatively isolated from the core InterCity railway network. The high commuting demand arising from coastal towns in Wicklow and North Wexford dominates the route.

Rolling stock is variable and the InterCity experience can be extremely poor, particularly for peak time departures from Dublin.

The journey time to Wexford is not unreasonable, but demand is restrained by limited service frequency and the variable rolling stock quality. Overcrowding is also prevalent on peak services to and from Dublin.

Other Routes

The Waterford – Limerick Junction, Ballybrophy – Limerick and Manulla Junction – Ballina lines all carry quite low passenger volumes and low levels of passenger kilometres. The existing demand on the Ballybrophy to Limerick line is especially poor. However, this reflects very limited passenger demand into Limerick City. Instead, this line primarily acts as a feeder service from Nenagh and Roscrea onto InterCity services at Ballybrophy.

There is very limited demand for movement between the regional cities. Travel by rail between Cork, Limerick and Galway is extremely low, as is demand between Waterford and Limerick. Analysis confirms that this is also generally the case for road travel, where the volume of city centre to city centre movements is relatively low, other than for:

- Trips between the Regional Cities and Dublin City; and
- Trips between Regional Cities and large towns within their catchment.

This dictates against substantial investment in providing connections between the regional cities, other than in those areas where the catchments of connected cities partially overlap, and InterCity connections allow both catchments to be connected with their relative city centres on a single

service. Whilst this is the case with Galway-Limerick and to a lesser extent Limerick – Waterford, it is not the case with Cork – Limerick.

Service Levels

Service frequency varies considerably across the network to match demand. However, catchment analysis confirms that the Belfast and Galway routes have relatively low service frequencies compared to the population they serve. Line speed is an important attribute of service quality and is dictated by track quality, the number of stops that a service provides, and driver behaviour. The Cork and Limerick routes exhibit the least amount of slow speed running, whilst the Rosslare, Waterford and Sligo services exhibit the highest levels. A high percentage of slow running was also observed on the Belfast and Galway routes, suggesting that there may be scope for improvement in travel times through addressing existing temporary and permanent speed restrictions, and through reducing the requirement for stopping. The high percentage displayed by the Belfast service is of particular concern as there were only four scheduled stops on that particular service. A key issue on that route is the presence of significant speed restrictions north of the border.

Future Patronage

It is anticipated that without further service improvements, passenger numbers will not recover their 2007 peak of 45.5m until after 2015 based on forecast economic and demographic trends. The long term predicted growth rate is 1.9 per cent. The projection is for ICN traffic to increase from 21.3m in 2009 to 31.1m in 2030. This represents an increase of 46 per cent or 1.8 per cent per annum. This may represent a conservative forecast, as there

is potential for rail to win traffic from both car and air modes, as a result of increased energy prices and reduced subvention of air services. Increased competition from the bus mode is likely to arise only if a policy shift to liberalisation of the bus market takes place. The growth rate in passenger demand reflects lower population and GNP growth rates in the post Celtic Tiger period.

Future Role of the ICN

The key role for the ICN over the period to 2030 will be to contribute to the maximum extent possible to value for money, economic productivity and competitiveness, while ensuring safe, sustainable and integrated services. The ICN has a number of key advantages over other modes in this regard:

- It provides direct city centre to city centre links at a time when the service sector has increased in importance and high value-added services continue to be located in city centres;
- The level of service offered by ICN is unaffected by road congestion at the approaches to urban areas, which means that the rail mode offers a degree of reliability, which is becoming more and more valued by trip-makers;
- It contributes to economic productivity by permitting business travellers to work when travelling;
- Where service frequencies are high, it further improves economic productivity by facilitating return journeys between the major urban areas within one day, without driver fatigue and safety issues arising; and

- It has an as yet unexploited role to play in providing transport services for tourists.

- To improve rail links and services to the major airports that act as access points for tourists.

Strategic Priorities

- These considerations point to a number of strategic priorities that should inform the development of a strategy for the ICN. These are:
- The need to ensure that the renewal of the track system is safeguarded and that adequate resources are devoted to maintenance and renewal of track infrastructures and rolling stock;
- The need to build on the infrastructure and rolling stock investments already made to ensure that they make the maximum contribution possible to economic development;
- Within this context, to provide service frequencies and service improvements that will prove attractive to users in general and business users and car available passengers in particular;
- Other things being equal, to concentrate future investments and service improvements on linkages between the major agglomerations. This suggests that the radial routes connecting Dublin to Cork, Belfast, Limerick, Galway and Waterford should be the focus of future rail development;
- To support National Spatial Strategy objectives by improvement of the key non-radial rail links between Cork, Limerick and Galway where transport volumes are of sufficient density; and

In addressing these issues, given that funding resources are likely to be scarce for the foreseeable future, the investment needs and service improvements must be based on a value for money approach and in the context of ensuring that revenues are maximised to the greatest possible extent.

Future Investment Strategy

To increase patronage and enhance the economic role of the railway, a three phase investment strategy is proposed. This strategy recognises the current state of Exchequer finances and is predicated on adequate resources being devoted to infrastructure and rolling stock maintenance and renewal, in order to preserve the gains made in service levels. An estimated spend of €215m per annum on infrastructure maintenance and renewal is required over the period to 2030. This is similar to existing levels of spending. Rolling stock maintenance and renewal spending of €116m per annum will be required.

Phase 1: 2010-2015: Consolidating the Gains through Quick Wins

This Phase has three elements:

Relatively small investments to reduce journey times on rail corridors, with the prime emphasis on the Cork and Galway routes, where there is high existing or potential passenger demand;

- Using existing rolling stock to provide increased frequency on selected routes; and
- Short-term improvements to services to Dublin Airport, through development of a Dublin Parkway station for InterCity customers from the south and west with connecting Airport bus services to the national network. (This is in addition to the separate development of a direct DART spur to the Airport from Clongriffin, which will initially serve passengers from the east coast, the City centre and Northern Ireland.

These investments would show a large return in both passenger benefits and fare revenue for Iarnród Éireann, if they were carried out immediately. The proposal to invest in the short term to increase journey times was based on relatively modest improvements to line speeds. If further short-term reductions in journey times are possible, then the benefits of this strategy would be enhanced.

Phase 2: 2015-2020: Responding to Long Term Growth

The introduction of more ambitious investments in infrastructure and service frequency improvements,

such as for example double tracking from Portarlinton to Athlone and the early opening of a DART airport link between Clongriffin and the Airport, as well as improvements that are reliant on growth in demand to exhibit a satisfactory economic return, such as upgrades to Limerick Junction and Athlone Stations.

Phase 3: 2020-2025: Electrification of the Core Rail Network

When sufficient growth has occurred and rolling stock replacement is approaching, electrification of Dublin-Galway and Dublin Cork will yield significant returns. This should encompass direct services to Dublin City Centre and Dublin Airport via the DART Underground.

Route Investment Strategies

Analysis indicates that improving InterCity journey time to at least 2:00 hours on the Dublin to Galway, Limerick, Waterford and Belfast routes and at least 2.30 hours on the Cork route would establish rail as a strong option for such connections, and will bring a high level of consistency and transparency to the network. Measures to improve journey times and or improve frequencies on these and other routes were considered. An investment of €50 million per annum on the removal of speed restrictions over the next five years could be expected to deliver even more competitive journey InterCity times than those set out above. Given the focus of transport policy on the promotion of sustainable development, electrification of the more highly trafficked routes is envisaged for the longer term.

The route investment options were subject to cost-benefit analysis to determine their economic return,

priority and phasing. The recommendations on a route by route basis are:

Dublin-Cork: A modest short term investment programme aimed at reducing journey times would yield a large economic return. This is based on achieving a journey time of 2.30 hours or better. Further improvements, identified by Iarnród Éireann to achieve a 2 hour journey also merit consideration in the short term given the central importance of this route for the other InterCity services to and from the south and west.

The economic return to electrification depends on the timing of the investment. If this investment were to take place in the near future when the current fleet of InterCity carriages are all still within their useful life, the relevant costs of electrification would include the full cost of a new electric fleet (EMUs), and the investment would not be justified. However, if electrification is postponed until the current fleet is being replaced, the relevant capital cost of electrification would be limited to the cost of the civil works needed to the line. This would make electrification an attractive investment at that juncture. When the DART Underground is in place, electrification combined with a spur to Dublin airport from Clongriffin will open up large parts of the network to through running to the airport.

Dublin-Galway: Similarly to Dublin-Cork, a short term investment programme aimed at reducing journey times to no more than 2 hours would yield a large economic return. Iarnród Éireann has identified measures that could be introduced in the short term to reduce the journey time to 1hr 30 minutes. These are worthy of further consideration.

An hourly service on this route would be attractive in the short term, if it can be introduced with

the existing fleet and without significant capital investment or negative impacts on existing stopping patterns. This appears to be the case.

Further growth in passenger numbers and increases in the value of these passengers' time will make double tracking from Portarlington to Athlone an attractive investment in the medium term, particularly to improve the reliability of the service.

In the longer term, electrification can be justified on the same basis as Dublin-Cork. In fact, the Dublin-Galway line offers a better return on electrification than the latter.

Dublin-Belfast: If journey times can be reliably reduced to 2 hours with a limited set of investments, then such spending is justified. Additionally, as extra rolling stock is likely to be available in the short term, the introduction of an hourly service should be considered.

Predicted levels of travel between Dublin and Belfast by all modes are not high enough to justify the cost of electrifying the line. This remains true even if electrification is postponed to when rolling stock is being renewed, although this should be kept under review in the context of wider policies.

Dublin-Limerick: Service improvements such as introducing more direct services and upgrading Limerick Junction do not show a high economic return in the short term. However, upgrading these services should be considered in conjunction with the equivalent investments in the Dublin-Cork service, which will generate journey time savings.

Dublin-Waterford: An investment to reduced journey times to two hours is justified if it can be achieved for a relatively modest investment in

civil works. The Waterford services will benefit from time savings generated on the main Dublin – Cork route. Similarly there is clear potential to realise significant net gains by improving access by passengers to Waterford train station.

Dublin-Westport/Ballina: An increase in service frequencies to up to 8 per day would yield an economic return, if rolling stock is available. In the medium term, proposals to upgrade Athlone station and to introduce a shuttle service with existing fleet involving interchange with the Galway service at Athlone should be considered.

Dublin-Rosslare: Upgrading the quality of service to an InterCity level in the short term produces enough extra patronage and is of enough benefit to existing passengers to justify the investment required. However, increasing frequencies to eight per day requires a larger investment that cannot be justified at current levels of demand on this route.

Dublin-Tralee: A relatively modest investment to upgrade Mallow station is appropriate.

Waterford-Limerick Junction: A range of service improvements were considered, but none proved viable, given limited demand along the route.

Limerick-Ballybrophy: If the service from Ballybrophy terminated at Nenagh rather than Limerick it would be possible to run eight services a day with the same rolling stock needed for five services a day between Ballybrophy and Limerick. There is evidence that such a change in the service pattern may be worth considering.

In the context of reduced subvention levels and funding from the automation of level crossings there is a need to carefully consider options to

reduce costs on the Waterford – Limerick Junction and Limerick – Ballybrophy lines. The options range from closure to more targeted services over sections of the routes.

Line Service Closures & New Rail Lines

A number of new rail lines have been proposed by various interests. Of these, a sketch appraisal indicates that only the Athenry-Tuam line merits further consideration, taking account of the performance of Phase 1 of the Western Rail corridor between Ennis and Athenry. None of the others perform sufficiently well to be further considered.

Rail Freight

Recent developments have indicated that opportunities continue to arise for the carriage of bulk materials and unit load traffics, where relatively long distances and port oriented traffics are involved. Carriage of additional traffic by rail could provide an economic if not financial rate of return. As the costs of climate change rise, the economic benefits of using rail freight will grow. For certain traffics, these benefits may then outweigh the costs of providing services, so that the use of the rail mode over road freight haulage should be favoured.

The previous Government commitment to introduce an allowance (subsidy) per tonne for freight transported by rail suffers from the drawback that it is not budget delimited. Given the current Exchequer position and the competition for scarce resources, it is considered that such a policy is no longer justifiable. It is recommended that Government supplant this approach by a grant

facility that would be available to both enterprises and Iarnród Éireann to support projects where a clear economic return exists, as demonstrated by a cost-benefit analysis that encompasses environmental and other economic benefits.

Fare Structures

The single walk-up fare in Ireland is broadly on a par with equivalent fares abroad, with the exception of the UK. Fares in the UK are substantially in excess of the European norm.

The policy of offering basic return fares at a substantial discount to two single fares is very much a UK and Irish phenomenon. For other countries, the return fare is typically double the single. Irish basic return fares are offered at a much more substantial discount to single fares than the UK equivalent. Ireland is unique in offering a discount/saver return fare below the basic single.

While the UK and Ireland were first to make the transition to Advance Purchase, these pricing techniques are quickly becoming more commonplace in Europe. Where they exist, they are varied by time of purchase i.e. they represent a yield management pricing strategy. Despite Ireland being a relatively high price high wage economy, advance purchase fares in Ireland are pitched very low in comparison to the rest of Europe.

The current rail fare structure, which is complex, may be a deterrent to ICN rail use, especially as rail demand is characterised by infrequent users. This complexity also poses challenges for the publication and dissemination of information on fare types and structures. There is a need to simplify and rationalise fare structures, upgrade web-based fare information, and make available an improved train and fare search capability.

A number of key reforms to the fare structure need to be considered:

- Reduce the discount offered for walk-up basic return journeys or alternatively re-balance walk-up single/return fares with a lower single fare than is currently offered;
- Amalgamate the two existing flexible return fares into a single flexible fare and apply across the system;
- Standardise, to the maximum extent possible, the days on which walk-up saver fares are offered;
- Ensure that walk-up saver return fares are always in excess of the basic single walk-up fare;
- Set the walk-up return saver fares above the equivalent single saver fare;
- Raise the lowest advance purchase fare for longer journeys;
- Migrate the existing advance purchase fares to a time-of-purchase related yield management system; and
- In this revised system, consider having advance purchase fares approach the walk-up saver fares as the day of departure approaches.

These and other proposals for changes to fare structures and levels need a more comprehensive appraisal than has been possible in the context of this study. It is recommended that Iarnród Éireann undertake a more comprehensive review of the issues as a matter of urgency.



1 Introduction

1.1 Background to the Report

The Department of Transport commissioned Booz Allen Hamilton (now Booz & Co.) to undertake a Strategic Rail Review. This was completed in February 2003. This in conjunction with the DTO's 'A Platform for Change' formed the basis of the Iarnród Éireann element of the Transport 21 Investment Programme. Transport 21 was launched in November 2005 and major elements of it have already been implemented or committed.

Since then very significant progress has been made in the development of the rail network and this has built on developments that were funded under earlier development plans. These were partially co-financed by the EU's Structural and Cohesion funds.

The NTA is currently updating the transport strategy for the greater Dublin area with a time horizon of 2030. This will build on the Transport 21 programme and will, among other things, review and identify the development requirements of the Dublin commuter rail network.

The focus of this Rail Network Strategy Review is on the future development requirements of the InterCity Network (ICN) and the regional services including commuter rail connections for the four provincial cities. The potential for rail freight was also to be considered. The scope of the study did not embrace commuter rail services in the greater Dublin area as these were being addressed as part of the update of the NTA vision to 2030. However, the wider rail national strategy needed to have a good operational and strategic fit with the emerging GDA strategy.

Iarnród Éireann commissioned Goodbody Economic Consultants and AECOM to undertake the Review.

1.2 Objectives of the Review

The major tasks envisaged for the Review included:

- A passenger demand assessment on a route by route basis for the network;
- An assessment of rail freight potential including the role of freight facility grants;
- Assessment of new business opportunities including the reinstatement of services on disused lines;
- Identification of investment needs;
- Economic justification of investment on a major project basis and / or on a route by route basis;
- Review of wider economic benefits associated with the rail network;
- Financial assessment of emerging proposals including impact on subvention levels;
- Prioritisation of investment, ranked within a range of funding limits and economic return indicators in line with Department of Transport appraisal guidelines;
- Establishment of a development vision for the railway for the year 2030; and
- Production of an appropriate demand assessment model and final report within the agreed timescale.

1.3 Study Methodology

The methodology adopted for the study emphasised an evidence based approach. This involved:

- Interaction with Iarnród Éireann personnel to acquire relevant data;
- Desk studies of international sources;
- A small number of surveys to bridge gaps in the data and validate modelling results;
- Substantial analysis of ticketing and other data to build up a picture of current rail passenger demand;
- A significant modelling exercise to model rail passenger demand at both aggregate and disaggregate levels; and widespread consultations; and
- Development and application of a project appraisal framework to underpin the strategic approach identified by the Review.

With regard to consultations, discussions were held with:

- The Department of Transport;
- The Department of Environment, Heritage and Local Government;
- The National Transport Authority;
- Regional Authorities;

- Cork, Limerick and Galway City Councils;
- National Roads Authority;
- Translink;
- Irish Exporters Association;
- An Bord Pleanála;
- Western Development Commission; and
- West on Track.

1.4 Layout of the Report

The Report is organised as follows. Sections 2, 3 and 4 review the strategic context for the review, set out objectives to inform the development of a Strategy, and review recent rail developments. Sections 5 and 6 map existing demand and the level of service of the rail network. Section 7 makes forecasts of rail passenger demand. Section 8 considers possible changes to the extent of the rail network through the closure of existing rail services and the reinstatement of others. Section 9 develops capacity enhancing investment and service development options. These options are appraised in Section 10. Section 11 considers rail freight issues, while Section 12 discusses fares policies. Rail maintenance needs are set out in Section 13, while Section 14 presents conclusions and recommendations.



Elarnród Éireann

2 The Policy Context for the Strategic Review

2.1 Introduction

This paper sets the policy context within which the 2030 Rail Network Strategy Review is to be carried out by taking account of the various key infrastructural, environmental, and social and economic development policies that are in place at national and local levels.

2.2 Government Transport Investment Policies

2.2.1 Transport Goals and Plans

The Government's Statement of Common Purpose commits to:

- Delivering real commuting choices to people;
- Increasing high capacity commuter services;
- Helping repair damage from severe weather;
- Improving regulation of the transport sector;
- Supporting the rural transport network; and
- Investing in the National Cycle Policy.

The Statement also indicates that the Government will draw up a new National Development Plan for the period 2012-2019 that reflects Ireland's changed economic circumstances. This Plan is to be based on comprehensive study of Ireland's public investment priorities over the period. A key element of the Plan will be the requirement to subject major capital projects to proper cost-benefit analysis and evaluation.

This Rail Network Strategy Review is a contribution to the preparation of such a Plan. It may be noted that it adopts an evidence-based approach and identifies investment priorities on the basis of a detailed cost benefit analysis.

2.2.2 Rail Investment Policies

In light of the extent of the economic downturn, the Department of Finance's policy document, Infrastructure Investment Priorities 2010-2016 highlighted the level of investment made in transport infrastructure and, in light of the near completion of the major inter-urban road routes, states the need to shift the focus of investment from roads towards public transport. The document emphasises that while demand for public transport services in the short to medium term may be falling as a result of factors linked to the current economic situation, such as reduced employment, the focus of any investment decisions should be on medium to long term demand forecasts. This is because of the significant time-lag that exists between a decision being made to invest in a public transport project and the completion of that project when design, planning and construction are taken into account. The document also recognises that this is particularly the case for rail projects.

Rail investment policies are likely to be revised in the context of the new National Development Plan.

2.2.3 Road Investment Policies

The focus of road investment policies over the past decade has been on the completion of the major inter-urban routes connecting Dublin to Belfast, Cork, Galway, Limerick and Waterford. With the completion of the M7 connecting Dublin and Limerick in late 2010, and taking account of the

construction of the M3 and upgrade of the M50, a high capacity inter-urban route system has been put in place. Given the significant progress that has been made in inter-urban roads, further expenditure is likely to be limited, with PPP projects being the focus of investment, where fundable. In this context, further progression of the Atlantic Corridor is likely to arise.

Currently, consideration is being given to extending tolling of the MIUs. This could mean the introduction of significant tolls on existing routes that are currently untolled and the raising of existing toll rates.

It is clear that the major expansion of National Route capacities has already taken place and that further significant improvements of routes competing with the ICN are unlikely. Furthermore, it is probable that road user costs will be raised through additional tolling.

2.2.4 Bus Investment Policies

Significant public investments have already been made to increase the capacities of the Dublin, provincial city and national bus fleets. The level of investment made saw capacity increase by 25 per cent between 2000 and 2007, a period which saw demand grow by just 6 per cent. With passenger numbers now falling, current policy states that service provision by the private sector should be fully explored before any consideration is given to further investing in increasing the capacity of the publicly owned fleet.

Other than the actual fleet, another area of the bus transport system that has seen significant levels of public investment over recent years relates to bus priority schemes in Dublin and the regional

cities. These schemes include the development of Quality Bus Corridors (QBCs) and the provision of technology that allows for the preferential treatment of buses at intersections. Significant achievements have already been made, particularly in the Greater Dublin Area.

2.2.5 Airport Investments and Supports

Ireland has three State airports and six regional airports¹. The State airports are owned by the Government but managed and operated by the Dublin Airport Authority (DAA). The DAA is a fully commercial organisation and receives no state support to fund its operations or capital investments, so although aviation policy encompasses both State and regional airports, the focus of policy in relation to exchequer investment is on the regional airports.

A capital grants scheme of €86 million was launched in 2007 for the regional airports, the primary aims being to enable the airports to comply with the latest aviation safety and security standards, and to support development projects aimed at catering for projected new business. The funding provided under the scheme was for the period to the end of 2010.

The general aim of policy with regard to the regional airports has been to help them to optimise their contribution to achieving regional balance in line with the National Spatial Strategy. With this in mind, the approach taken has tended to be supply-led aiming to achieve regional development goals, as opposed to demand-led, whereby an existing demand for services is met. This has resulted in significant levels of PSO funding for air routes that are not greatly used. In its efforts to cut public spending, the Government has highlighted, in

¹ The three State airports are Dublin Airport, Shannon Airport and Cork Airport. The six regional airports are: Waterford Regional Airport; Kerry International Airport; Galway Airport; Ireland West Airport Knock; Sligo Regional Airport; and, Donegal Regional Airport.

Infrastructure Investment Priorities 2010-2016, the need to reconsider policy in this area, particularly in light of the much improved rail and road links to the major regional centres. It expects that the enhancements to these other transport links, combined with the contraction in economic activity, will in fact serve to further diminish any existing demand for regional air links.

2.2.6 Ports

Although they remain State-owned, current policy with regard to the ten Irish port companies is for them to operate commercially without exchequer support². As a result, operations and infrastructural requirements tend to be funded using existing resources, user charges, revenue streams developed by the port companies, disposal of non-core assets, borrowing or private sector investment. The port companies are also expected to operate in competition with one another.

The only current commitment to exchequer capital investment in ports relates to the outstanding regional harbours that are due to be transferred to local authority ownership or, where this is not possible, sold to the private sector. This low level investment is for the completion of a number of remedial works in advance of the transfers of ownership.

2.3 Policy Factors Underlying Transport Investment

2.3.1 Land Use and Regional Development

A key focus of national development policy in Ireland over the last decade has been on the need for a more spatially balanced approach

that enables greater regional development. Central to this approach is the National Spatial Strategy (NSS) which sets out how Ireland can be spatially structured and developed in a way that is internationally competitive, socially cohesive and environmentally sustainable. It establishes the type of planning framework necessary to coordinate the investment that is required to achieve more balanced regional development. All other development policies, be they at regional or local levels, stem from the NSS, taking account as they do of the strategies and priorities set out therein.

At a high level, the NSS identifies nine Gateway³ cities and towns that are strategically located around the country to form the key points of the overall planning framework. These Gateways link into the wider rural areas through nine identified Hub⁴ towns. The NSS identified a number of key investment requirements in relation to the transport infrastructure. One of these requirements is the need to build on Ireland's radial transport system of main roads and rail lines that connect Dublin to other regions, by developing an improved mesh or network of roads and public transport services. Another is the need for internal transport networks to enhance international access to all parts of the country, by facilitating effective interchange possibilities between the national transport network and international airports and sea ports.

With regard to the rail network specifically, the NSS highlights the need to ensure that rail continues to offer realistic alternatives to road travel on the key InterCity routes, which are identified as being: Dublin-Belfast; Dublin-Cork; Dublin-Galway; Dublin-Limerick; and Dublin-Waterford. It also suggests that better interconnection between Cork and Galway (via Limerick) would facilitate ease of interaction and enhancement of critical mass, and

² The ten commercial State port companies are: Port of Cork Company; Drogheda Port Company; Dublin Port Company; Dundalk Port Company; Dun Laoghaire Harbour Company; Galway Harbour Company; New Ross Port Company; Shannon Foynes Port Company; Port of Waterford Company; and Wicklow Port Company. Rosslare Europort is owned and operated by Iarnród Éireann.

³ The nine Gateways are: the Greater Dublin Area; Cork; Limerick/Shannon; Galway; Waterford; Dundalk; Sligo; Letterkenny (Derry); and, Athlone/Tullamore/Mullingar.

⁴ The nine Hub towns are: Cavan; Ennis; Kilkenny; Mallow; Monaghan; Tuam; Wexford; Ballina/Castlebar; and, Tralee/Killarney.

calls for services to other Gateways and Hubs to be enhanced.

2.3.2 Energy, the Environment and Sustainable Development

Current environmental policy requires that the focus of transport planning should be on the development of 'sustainable transport'. Sustainable transport helps to preserve the natural environment by minimising emissions of pollutants, reducing and managing transport waste, and by careful land use planning to address the impact of transport infrastructure on the local environment.

The NSS identified the further development of Ireland's public transport network, both in terms of its capacity and its effectiveness, as a way of ensuring that increases in energy demand and emissions of CO₂ arising from increases in demand for movement as a result of economic growth are minimised. Transport has made the greatest contribution to Ireland's rise in carbon emissions in the last decade, which is hardly surprising given the pivotal role that it plays in supporting economic development. The Government's National Climate Change Strategy, developed in 2007, set out the various measures required to enable Ireland to reduce its emissions levels, and highlighted the need to separate transport emissions growth from economic growth.

Key to this separation is the need for a significant modal shift by commuters from private cars to public transport (including bus and rail), walking and cycling. Commuters will consider a shift from private to public transport only if efficient alternatives are available. Transport 21 has enabled significant levels of investment to radically improve the level, accessibility and quality of public

transport services, including bus, light rail, suburban rail and metro. This kind of investment is essential if the Government is to achieve the ambitious target that it sets in Smarter Travel to reduce work-related commuting by car from its current modal share of 65 per cent of all commuting, to 45 per cent by 2020.

Significant achievements have been made in developing Bus Rapid Transit systems and Light Rail Transit systems for commuters within the Greater Dublin Area and these continue to be built on. Smarter Travel makes a commitment not only to complete studies into the feasibility of similar systems in Cork, Galway, Limerick and Waterford, but also to act on the results of these studies.

2.3.3 Integration of Transport Modes

Another key feature of current transport policy is the physical integration of transport modes. This can be achieved at two levels:

- The development of key interchanges between the national transport network and international ports and airports; and
- The development of services and infrastructure at local level that will enhance commuter services and drive modal shift from private cars.

With regard to the development of interchange possibilities, the development of an underground DART line that will link the Northern rail line to the Kildare line is being considered. With underground stops at the Docklands, Pearse Street, St. Stephen's Green, Christchurch and Heuston, this Interconnector tunnel would also allow rail commuters to link up with the Luas and Dublin Bus.

Another significant development in is the proposed Metro North line that would enable the provision of an efficient underground rail service linking Dublin City (St. Stephen's Green) to Dublin Airport. These projects have potential to link up the various transport services that run into and throughout the Greater Dublin Area.

At a more local level, the various city and county development plans all take account of the need to develop services and infrastructure that will enhance commuter services and drive modal shift from private cars. Examples of the kind of infrastructural facilities that allow commuters to switch travel modes with ease, and that are included in the various local development plans, include the provision of 'park and ride' or 'kiss and ride' drop-off facilities at rail stations along key commuter routes. Other enhancements to local transport services that are also incorporated into many of the development plans include the addition of more feeder bus services that will link local areas to key points on the rail network. The need for the further development of such services and infrastructure is reinforced in national transport policy in Smarter Travel.

Another feature of an integrated public transport system is integrated ticketing, which allows commuters to complete a journey using more than one transport mode, but only one ticket. Integrated ticketing has been a vision of transport policy for a number of years now and there are a number of integrated ticket arrangements in place that are based on magnetic strip technology. These tickets allow for the combined use of bus, commuter rail and DART services. More recent advances in ticket technology have seen the introduction of stored value smart cards which allow commuters to 'top-up' their travel card as required. This includes the Iarnród Éireann interim smart card scheme with an

ePurse (electronic purse) facility, which has now been fully rolled-out to the public. This interim scheme, together with the Dublin Bus and Luas smart card schemes, will migrate to the single smart card scheme after its launch.

It is an objective of Smarter Travel to transform any integrated tickets that are based on magnetic strip technology to stored value smart technology. This will enable the full integration of ticketing in the Greater Dublin Area as smart card technology is already in place on Luas and Dublin Bus services.

These objectives are being implemented via a project that is being funded under Transport 21. The 'Integrated Smart Card Ticketing' system for the Greater Dublin Area, which is being implemented by the National Transport Authority, is being rolled out on a phased basis with annual and monthly tickets now available for use on the Luas and the Dublin Bus network. A more recent development has been the introduction of an annual smart card that can be used on the Dublin Bus network, the suburban rail network and the DART. The ultimate aim of Smarter Travel is that these systems will eventually be rolled out on a national basis and encompass all forms of public transport.

2.3.4 Accessibility

There are specific obligations with respect to accessibility set out under the Disability Act 2005 and reflected in the Department of Transport document, Transport Access for All. Essentially, the high level policy goal is for the provision, in the shortest possible time, of a public transport service that is accessible to the greatest number of people with mobility, sensory and cognitive impairments, having regard to resource, technical and other constraints.

With regard to rail services, there are three causes for consideration:

- Infrastructure (rail stations);
- Carriage fleet; and
- The interface between the train and the platform.

Iarnród Éireann has already incorporated accessibility as a standard feature in the design of all new and refurbished rail stations, which takes account of:

- Station access, including car parking for passengers;
- Facilities to aid step-free passenger movement throughout the station and its environs, including the installation of ramps, automatic doors, facilities for transferring platforms, tactile surfaces, improved lighting, and improved colour contrasting schemes;
- Ticket offices with split-level counters, non-reflective glass, significant colour contrasting, induction loops, improved lighting, and security;
- Customer information and public address systems with associated improved lighting, induction loops and improved signage; and
- Customer facilities, which include accessible toilets and improved waiting areas.

Furthermore, following a comprehensive accessibility audit of all stations on the rail network in 2003, Iarnród Éireann has been carrying out

improvement works on a line-by-line basis, prioritising the lines with the highest passenger numbers.

Iarnród Éireann has also recognised the need for the carriage fleet to be accessible and all carriages purchased since 1995 are wheelchair accessible. More recent investments have been in carriages that are designed to comply with the UK Rail Vehicle Accessibility Regulations.

In addition to this, Iarnród Éireann has been addressing the problems that mobility or sensory impaired passengers can encounter accessing the train from the platform and vice versa, by way of an extensive platform lengthening and renewal programme.

These various projects and investments that have already been undertaken by Iarnród Éireann are a clear indication that any future investment strategy will also take full account of the need for services and infrastructure to be accessible to all.

2.3.5 Safety

Current Irish policy on railway safety has its roots in the Railway Safety Investment Programme that was developed in 1999 following an in-depth Safety Review that had been carried out the previous year. A high level Railway Safety Task Force, which was created to address the issues raised by the review, recommended the implementation of this fifteen year programme of investment. Examples of projects funded under the programme include the renewal of certain stretches of rail, the building of fences, the replacement or renewal of bridges, and the closure or upgrading of level crossings. Under the second programme of funding (2004-2008), the focus widened to include the various systems

of safety management that are in place in Iarnród Éireann. Expenditure under this tranche amounted to €512 million, with €68 million of that being used to improve the safety management systems, procedures and practices that were in place, and to promote a culture of safety at all levels in Iarnród Éireann.

A significant amount of rail investment to date has been specifically targeted at improving railway safety, thereby illustrating the existing commitment of Iarnród Éireann to make it an operational priority. Any future investment strategy will not only need to address the issue of safety in the same way, but will also need to give regard to the specific obligations that Iarnród Éireann needs to fulfil as set out in the Railway Safety Act.

2.4 European Transport Policies

In many instances, the various aspects of Irish Transport policy discussed above are a reflection of European policy, which highlights the need for modern transport systems to be sustainable, not only environmentally, but economically and socially as well. European policy recognises the need to improve links between central markets and the outlying regions. The ultimate aim is to reduce both congestion in the central markets and isolation in the regions, thereby increasing competitiveness.

European policy also aims to break the link between economic growth and transport growth which inevitably results in increases in energy demand and emissions of CO₂, both of which have negative connotations. The approach taken has been the development of a series of measures that include, among other things, the revitalising of alternative modes of transport to road. A revitalisation of rail transport is considered key to ensuring a modal

shift to the extent required is achieved.

A running theme at European level is the development of a trans-European transport network, something that Ireland, as an island, is largely precluded from. Specifically in relation to rail, the aim is to strengthen the position of railways vis-à-vis other transport modes, by focusing on three key areas:

- The opening of the rail transport market to competition;
- Improving interoperability and safety; and
- Developing infrastructure.

With regard to the opening up of the rail transport market to competition, the foundation stone was laid in 1991 with a Directive⁵ requiring that the management of railway infrastructure and the provision of railway transport services operate on a separate and commercial basis. The Directive also allows railway companies from all member states to run passenger and/or freight services on any other member state's rail infrastructure although this does not necessarily include urban, suburban or regional services. The legislation does not specifically require a privatisation of the railways, more a liberalisation to allow for increased competitiveness. Generally speaking, the majority of member states continue to have a state-owned infrastructure company but, unlike Ireland, many have privatised part or all of their service providers, or are in the process of doing so.

In terms of improving interoperability and safety, both are considered to be essential and intertwined elements of a successful trans-European rail network. Technical standards for each

⁵ Directive 91/440/EEC on the development of the Community's railways.

component of the railway system (track, rolling stock, signalling systems, operating procedures, etc.) that aim to enhance safety are set out in two European Directives on interoperability. Duties and responsibilities for all stakeholders at administrative level are set out in a separate Directive on safety on the Community's railways⁷. This Directive requires, among other things, the establishment in each Member State of an authority responsible for supervising safety. On foot of this requirement, the Railway Safety Commission was established in Ireland in 2005.

With regard to developing infrastructure, the focus at European level is again on the development of a trans-European rail network with priority given to the need for investment in infrastructure that will eliminate bottlenecks, particularly at country borders, and to modernise the rail network as necessary in some of the accession member states.

2.5 Institutional Structures

The Transport Act of 1958 required CIE, the railway operator at the time, to provide reasonable, efficient and economical transport services with due regard to safety of operation, the encouragement of national economic development and the maintenance of reasonable conditions of employment for its employees.

In 1986, CIE was reorganised and three separate organisations were established: Iarnród Éireann; Bus Éireann (Irish Bus); and Bus Átha Cliath (Dublin Bus). The Transport (Re-Organisation of Córas Iompair Éireann) Act 1986 set the principle objective of Iarnród Éireann as being the provision of a railway service and a road freight service both within the State and between the State and other jurisdictions.

On foot of EU Directive 2004/18⁸ which made it a requirement for public service contracts to be put in place for the provision of public passenger transport services, the National Transport Authority (NTA) was established under the 2008 Act.⁹ The NTA is responsible for securing the provision of public transport services nationally, and for developing an integrated transport system within the Greater Dublin Area. With regard to the national transport network, the NTA has contracts in place with Iarnród Éireann to provide public transport rail services. It also provides funding for specified passenger rail services that are considered necessary for social reasons but that are not economically viable.

The public service contract that is in place between Iarnród Éireann and the NTA sets out the service requirements and the various conditions of contract. These are largely based on the provision of specified passenger services and passenger capacity.

The public service obligation (PSO) element of the contract does not relate to individual routes or services, but encompasses the wider characteristics of the rail network. As such Iarnród Éireann is also expected to:

- Conduct its operations with due regard to safety, including the safety of the public, passengers and staff, and in compliance with applicable laws and standards;
- Integrate all services with other public transport services;
- Participate in the development and operation of the Integrated Ticketing Scheme;

⁶ Directive 96/48/EC on the interoperability of the trans-European high-speed rail system; and Directive 2001/16/EC on the interoperability of the trans-European conventional rail system.

⁷ Directive 2004/49/EC on safety on the Community's railways.

⁸ EU Directive 2004/18 on the Coordination of Procedures for the Award of Public Works Contracts, Public Supply Contracts and Public Service Contracts

⁹ The Dublin Transport Authority Act 2008 was amended by the Public Transport Regulation Act 2009, which changed the name and functions of the Dublin Transport Authority to encompass the whole country.

- Cease the existing Smartcard;
- Cooperate in the development and implementation of a single public transport brand; and
- Comply with accessibility standards.

In terms of strategic development, the contract allows Iarnród Éireann to propose changes to services, which can include the introduction of new lines, new rolling stock and new services. The contract also requires Iarnród Éireann to give due consideration to the environmental impacts of railway operations. In this regard, Iarnród Éireann is required to prepare a plan which sets out how the company will:

- Minimise fuel consumption;
- Minimise greenhouse gas and other transport emissions;
- Outline proposals for fleet replacement based on the most sustainable rolling stock and fuel type; and
- Continuously monitor and improve environmental performance.

2.6 Overview

At the time of writing, the Government has announced its intention to draw up a new National Development Plan for the period 2012-2019 that reflects Ireland's changed economic circumstances. This Plan is to be based on comprehensive study of Ireland's public investment priorities over the period. A key element of the Plan will be the requirement to subject major capital projects to proper cost-benefit analysis and evaluation.

This Rail Network Strategy Review is a contribution to the preparation of such a Plan. It may be noted that it adopts an evidence-based approach and identifies investment priorities on the basis of a detailed cost benefit analysis.

Whatever the priority to be attached to rail in the National Development Plan, it is recognised that there are lengthy timeframes involved in the planning, design and construction of capital rail projects. There is a recognised need, therefore, to plan for potential future investment so that when the Irish economy has regained some strength, the overall process will already be in train. Such planning should not be concerned with the current economy and resultant falls in passenger numbers, but should have recourse to longer-term demand forecasts.

The National Spatial Strategy highlighted the need to ensure that rail continues to offer realistic alternatives to road travel on the key InterCity routes, which are identified as being: Dublin-Belfast; Dublin-Cork; Dublin-Galway; Dublin-Limerick; and Dublin-Waterford. It also suggested that better interconnection between Cork and Galway (via Limerick) would facilitate ease of interaction and enhancement of critical mass, and calls for services to other Gateways and Hubs to be enhanced.

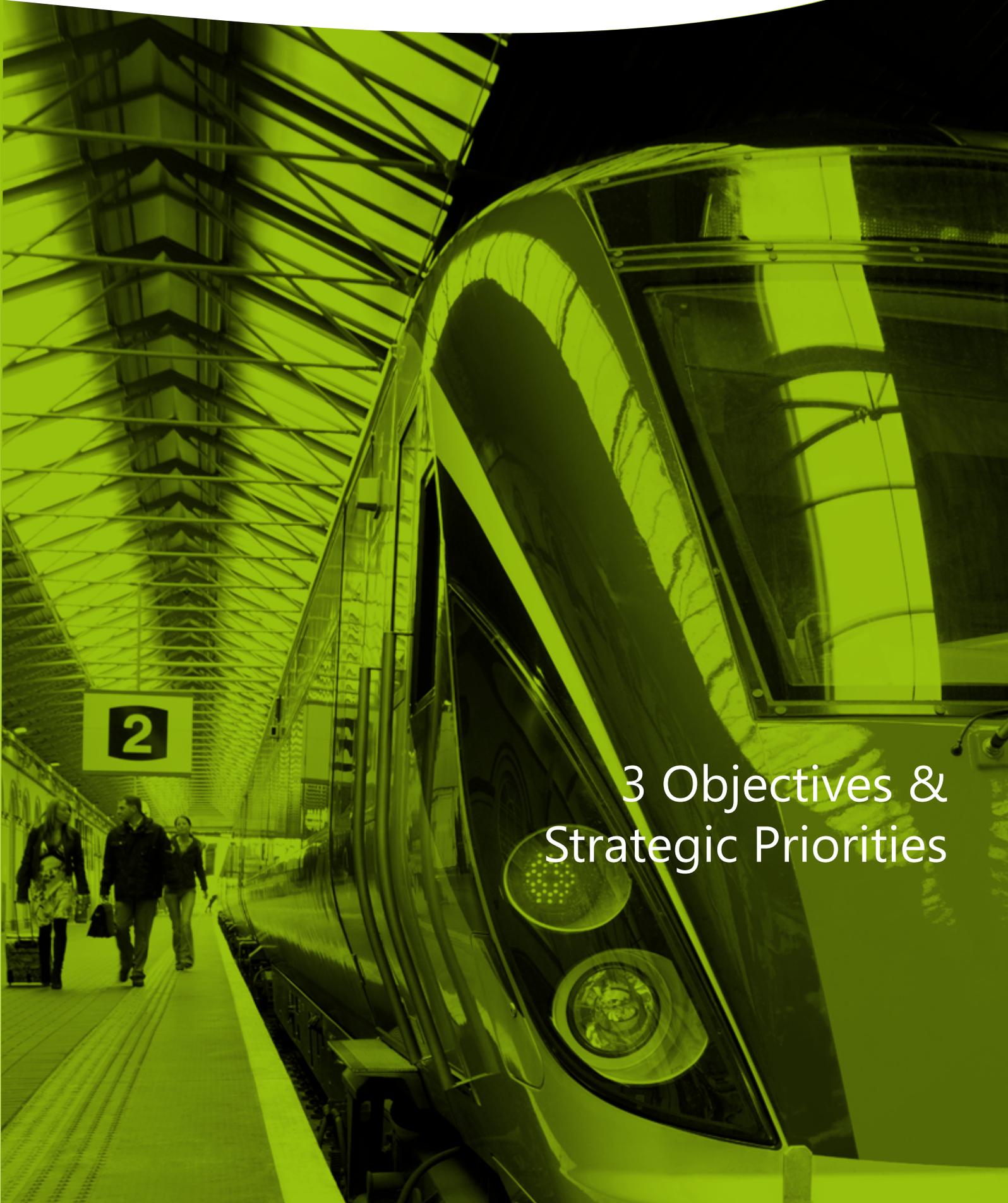
Crucial to an effective transport system is the extent to which it is sustainable, not only in terms of the environment, but economically and socially as well. One way of driving sustainable transport is through modal shift, whereby commuters are encouraged to use alternative modes to the private car, thereby reducing congestion and pollution. This should be a focus of rail investment policy.

Another important element of a sustainable transport system is the integration of different transport modes at key interchange points allowing commuters to seamlessly complete a journey using more than one type of transport. Opportunities to improve the integration of the rail InterCity Network (ICN) with other modes need to be examined.

The extent to which existing and planned services are accessible to people with a disability has defined a significant part of recent and ongoing investment in the rail network, as has the issue of safety. The level of investment and progress already made in developing both infrastructure and services, and the extent to which this investment has taken account of such matters as the environment, accessibility and safety, is a clear indication of the Government's continued commitment to implementing policy in this area.

Finally, partly on foot of EU developments, the institutional structures governing transport in Ireland have changed, with the advent of the National Transport Authority. The NTA is responsible for securing the provision of public transport services nationally. In this context, it provides funding for rail services that are uneconomic but socially desirable. Given the constraints on the Exchequer, funding supports for such services are likely to come under increased pressure over the short to medium term.





3 Objectives & Strategic Priorities

3.1 Introduction

This Section is aimed at elaborating the context in which the future strategy for the ICN may be established. It commences by suggesting a set of objectives for the rail system as a whole that could be used as the focus for elaboration of a detailed strategy. It then proceeds to identify potential elements of a rail strategy that would be supportive of these objectives.

This contribution must be set against the current state of development of the rail system. In this regard, it is noteworthy that the past ten years has seen a renewal of the rail infrastructure and substantial investment in modern rolling stock, as well as substantial investment in new lines and stations. Thus, a key question is how the contribution of this high level investment to the objectives set for the rail system can be maximised, through further investments and service innovations.

3.2 Overriding Strategic Objective of Iarnród Éireann

In many spheres of economic activity, Government, either through legislation, white papers or other media, promulgates a set of objectives for public bodies that are charged with policy implementation. This is not the case for Iarnród Éireann. In the absence of such objectives, the previous rail review undertaken by Booz Allen Hamilton developed its own vision statement for the future railway.¹⁰

This lack of explicit objectives for rail has been the subject of comment in the past, most notably in the report of the 2001 review group, which commented in respect of Iarnród Éireann: " the absence of

a transparent Shareholder mandate to the Board and the management, with clear objectives and targets, makes it very difficult to formulate business strategies and plans with any great confidence."¹¹

While Government has not set explicit objectives for the ICN, it has been more explicit in identifying objectives for the transport system as a whole. Table 3.1 identifies aspects of economic and social development that are identified in various documents as areas to which transport is expected to make a contribution. While economic development, regional development and safety are long standing concerns of government policy, there is a new emphasis on sustainability and the environment in particular.

The relevance of these aspects of economic and social development is reinforced by the extent to which Government procedures take cognisance of them in developing a number of transport policies and procedures.

For example, the Department of Transport's Common Appraisal Framework (CAF)¹² contains a project appraisal system that emphasises the goals of economy, safety, environment, accessibility and social inclusion and integration. Economy covers both congestion and economic development effects. The transport agencies are mandated to follow the CAF procedure when presenting business cases for investment proposals.

This discussion of policy imperatives suggests that the overriding strategic goal of Iarnród Éireann could be stated as follows:

"To provide safe, accessible and integrated rail services that contribute to sustainable economic and regional development in an efficient manner"

¹⁰ See: Booz Allen Hamilton. Strategic Rail Review. Report to the Department of Transport. 2003.

¹¹ Iarnród Éireann: The Way Forward. A Report to the Minister for Public Enterprise. 2001

¹² Department of Transport. Guidelines of a Common Appraisal Framework for Transport Projects and Programmes. June 2009.

This strategic goal needs to be resolved into a number of sub-objectives that could inform the Strategy. In order to identify these sub-objectives, there is a need to determine how rail services can contribute to each of the above aspects of economic and social development. Of these, the most important are economic development needs. There is a need to elaborate on what these needs are and this is done in the next section.

3.3 Economic Development Needs

Up until the end of the 1990s, economic growth in Ireland was driven by a strong export performance. These exports comprised high technology manufactured products such as information and communications technology and pharmaceuticals, and internationally traded business services principally financial services. Much of this export activity was driven by inward investment with foreign-owned firms bringing additional capital and know-how to the Irish economy. While an expansion of domestic construction activity occurred during this period, it was in response to a real need to provide housing and commercial space to serve a rising indigenous population and increasing industrial and commercial output.

In contrast, Ireland's economic expansion from approximately 2001 onwards was largely driven by domestic consumption and investment, with investment spending was largely concentrated in property and construction. This phase of expansion did not reflect natural population growth or domestic and commercial demand. As domestic consumption and construction activity must ultimately be related to the size of the national population and its current level of wealth, these aggregates cannot be expanded in a limitless fashion.

Because of the small size of Ireland's economy from the point of view of the worldwide economic markets, the capacity for export-led growth is relatively limitless. Moreover, consumption or investment by Irish firms cannot drive a recovery. Consumer and business confidence are low, households and firms are highly indebted and it is difficult for households or firms to borrow money in the current banking crisis. In these circumstances, neither consumption nor investment by domestic firms can grow by enough to drive renewed economic growth. This leaves exports and foreign direct investment as the sources of stimulus to drive an economic recovery and to sustain long term growth. The key role of exports and foreign direct investment has been endorsed by Government in The National Recovery Plan, 2011-2014. The plan identified a number of key economic policy considerations that informed the Plan:

- The need to boost competitiveness; and
- The need to enhance the economy's productive capacity.

The Plan also emphasised the need to take a long term view.

The National Competitiveness Council has stated that "future employment and economic growth is dependent on growing the trading sectors of the economy and increasing internationally trading activity in sectors that are currently reliant on the domestic economy". This means increasing Ireland's exports of high value added exports of manufactured goods and internationally traded services. Tourism deserves particular mention in this regard. Ireland has successfully promoted itself as an international tourism destination for many years. Although world tourism markets are currently

in a cyclical decline, there is clear scope to grow this sector of the Irish economy by increasing Ireland's share of this global market.

The National Competitiveness Council has concluded that restoring cost competitiveness and improving productivity growth across all sectors of the economy are the key requirements for export-led growth. Transport has a contribution to make in respect of both of these issues

Table 3.1: Review of National Objectives

Policy Document	Aspect of Economic and Social Development						
	Economic Development	Regional and Local Development	Sustainability/ Energy/ Environment	Safety/ Security	Congestion Alleviation	Accessibility for Disadvantaged Groups	Integration of Transport Modes
National Development Plan	✓	✓	✓		✓	✓	
NSS	✓	✓	✓		✓		
Smarter Travel Policy			✓		✓		✓
Transport Access for All						✓	
Department of Transport Statement of Strategy	✓	✓	✓	✓	✓	✓	✓

3.4 The Contribution of Rail to Economic Development Needs

3.4.1 Introduction

The rail network is part of the transport infrastructure of Ireland, and if the rail service is to play its part in promoting economic recovery and growth it must serve the needs of firms that export goods and services. This will promote these exports and will help make Ireland an attractive location for foreign investors considering Ireland as a location for the production and export of goods and services.

It is important that future opportunities to expand freight services are taken, so that the potential for rail freight to contribute to economic development and sustainability is maximised.¹³ However, the Iarnród Éireann system is now largely a passenger service, with the importance of freight much diminished. It is in the area of passenger rail services that the contribution of Iarnród Éireann to economic development must be found.

3.4.2 Cost Efficiency

The ICN has the potential to contribute to a reduction in the cost of doing business to the extent that it offers reduced journey times for business travellers. More generally, where roads are congested, moving travellers from road to rail travel has benefits not only for the travellers who switch to rail but also for the travellers who continue to use the roads. All road travellers will enjoy reduced journey times as a result of reduced congestion on the roads.

With regard to business travellers, these constitute a maximum of 22 per cent of all mainline rail users (See Section 5). However, this figure includes commuters, so that those travelling in the course of work are likely to fall short of 20 per cent of all rail users. Thus, increasing benefits to the business sector will require a change in the profile of rail users to promote increased business use. With regard to congestion alleviation, this is predicated on attracting car owners. At present at least 60 per cent of rail users are car-owning. This means that the rail system has the potential to contributing significantly to congestion alleviation, where these car owners would have otherwise travelled on congested networks.

With the advent of motorway links between Dublin and Belfast, Cork, Galway, Limerick and Waterford, the congestion alleviation benefits of the rail system are likely to be focused, in the short term, on the environs of these cities where networks are more congested. Congestion alleviation potential on other routes is likely to be greater, as these are largely served by two lane low capacity roads.

3.4.3 Economic Productivity

Rail offers a significant advantage to the business user in terms of the capacity to undertake work on a rail journey and to travel directly between central business districts. Studies of high speed rail systems show that the white collar business users in high-value service industries form the bulk of users and that these value the opportunity to work and conduct meetings on trains and to access centrally located urban stations. Rail is a naturally competitive mode for journeys between city centres.

¹³ See Section 9 for a further discussion

Studies of the values put on travel time show that the disutility associated with rail travel is low by comparison with other modes. The low disutility derives from the additional comfort afforded by rail travel and the opportunity to be productive. This explains why the rail mode attracts users even when it does not offer better journey times.

Bus travel offers much less opportunity in this regard. While there is no information available with which to profile inter city bus travel, it is evident that Irish inter-urban bus services attract very few business users. Relative to air travel, high quality rail services on the continent have proved very competitive for journeys of up to three hours duration.

Thus, to the extent that the rail system attracts increased use for business trips, there are significant productivity gains to be won. This will be enhanced to the extent high income service sector workers can be attracted to rail.

3.4.4 Tourism

As indicated above, tourism is an export industry and as such is an exogenous source of aggregate demand in the Irish economy. There is currently very little use of the rail network by foreign tourists in Ireland. According to Fáilte Ireland only 4 per cent of foreign visitors to Ireland in 2009 used the railways at any point in their visit. This represents some 260,000 visitors who used the rail network one or more times during their visit to Ireland. (This figure excludes persons visiting from Northern Ireland.) The total number of passenger inter-city rail journeys made in Ireland in 2009 was 21.3 million. While tourist visitors to Ireland can conceivably make any number of rail passenger trips during their stay in the country, it is likely that

tourists using inter-city rail make an average of no more than 4 passenger trips each, representing approximately 1 million inter-city rail journeys. As such, we can deduce that tourist visitor trips account for less than 5 per cent of overall passenger trips made on the inter-city network

The potential to develop the rail network as a resource, and even an attraction, for foreign tourists needs to be considered. The network covers many of the most important centres for visitors to the country: i.e. all of the largest cities and a range of smaller centres which either are, or could be, visitor attractions including Sligo, Ballina, Castlebar, Westport, Tralee and Killarney.

The contribution of mainline rail to the tourism product will be enhanced if rail services are made easily accessible to tourists. At present, 87 per cent of overseas tourists arrive by air, with Dublin Airport being by far the major access point. Currently, the mainline rail network is not linked directly to Dublin Airport, so the option for visitors to connect directly with other parts of the country is not available. An airport link would facilitate both leisure and business tourists in this regard.

There is also a need to consider how fares policy could be used to make mainline rail attractive to tourists.

3.4.5 Economic Spillover Benefits

The benefits outlined above accrue to users. It is worth explaining that economic theory supports the view that the provision of quality transport links has the potential to improve competitiveness and to attract inward investment in a way that is not wholly accounted for in the benefits to rail users.

These benefits are centred on:

- Agglomeration benefits;
- Labour market benefits; and
- Increased competition between firms.

Agglomeration Benefits

This is one of the wider economic benefits from transport investments currently receiving more attention. It is well established that firms in agglomerations (cities), which are thus close to many other firms and to a deep pool of labour, perform better than firms that are relatively isolated. This is one reason for the superior economic performance of cities.

Transport investments reduce travel times, and so reduce the effective distances between firms, and between firms and labour markets. Transport investments can, therefore, increase these agglomeration effects. A transport investment that reduces travel times in a city agglomeration, such as DART Underground, increases the effective size and density of the agglomeration and will improve its economic performance. The business case for DART Underground estimated the value of this effect for the Greater Dublin Area, using the methodology currently being proposed for consideration by the UK Department for Transport. Rail investments in the Greater Dublin Area are outside the scope of this review. However, similar effects may arise from rail investments outside the GDA:

- Improvements in the intercity network linking Dublin and the other major cities might have an agglomeration effect on the country as a whole; and

- Investments that create high quality links between cities could link these cities together to form effective agglomerations. For example, if travel between each of Cork, Limerick and Galway became sufficiently quick and convenient, agglomeration effects could arise for firms in each of these cities.

The ICN is well placed to support agglomeration benefits. Work carried out by Goodbody indicates that the network either serves, or soon will serve, the vast majority of the centres of economic activity in the country. Figure 3.1 below presents a job density map. This sets out the number of jobs per hectare in each Electoral District¹⁴ in Ireland in 2006 using Census of Ireland POWCAR (Place of Work Census of Anonymised Records) data. As the map highlights, in almost all cases, areas with higher job densities are served by the InterCity rail network. For instance, (outside the larger cities) Drogheda and Dundalk on the Dublin-Belfast line; Mullingar, Longford and Sligo on the Dublin-Sligo line; and Kildare, Tullamore, Athlone, Ballinasloe and Athenry on the Dublin-Galway line represent the areas with the highest job densities and they are all served by the inter-city rail network. The situation further south is similar with Carlow, Gorey, Enniscorthy, Clonmel, Cahir, Charleville, Ennis, Mallow, Killarney and Tralee all being serviced by inter-city rail services. There are a small number of cases where areas with higher job densities are not located in proximity to the rail network, these include Navan Town, Kells, Cavan Town, Monaghan Town, Tuam, New Ross, Listowel as well as Letterkenny. When the Navan Rail Line is completed, Navan Town will be removed from this list. Phase Two of the Western Rail Corridor would connect Tuam to the rail network.

¹⁴ Electoral Districts are the smallest unit of territory for which Census data is available

This work indicates that increasing the level of service to business travellers may not require extending the rail network to new destinations, although other improvements in services will be needed to increase the utility of the rail network to business travellers.

Labour Force Effects

Making commuting easier and cheaper may encourage people into the labour force. It will also widen the labour force available to individual firms, ensuring that appropriate skills are available. This will increase overall economic output and the Exchequer benefits will represent a net social benefit. Again, this type of effect will arise where there is a significant improvement in commuting services into a large city. This effect may not be particularly significant for the investments being considered as part of this review.

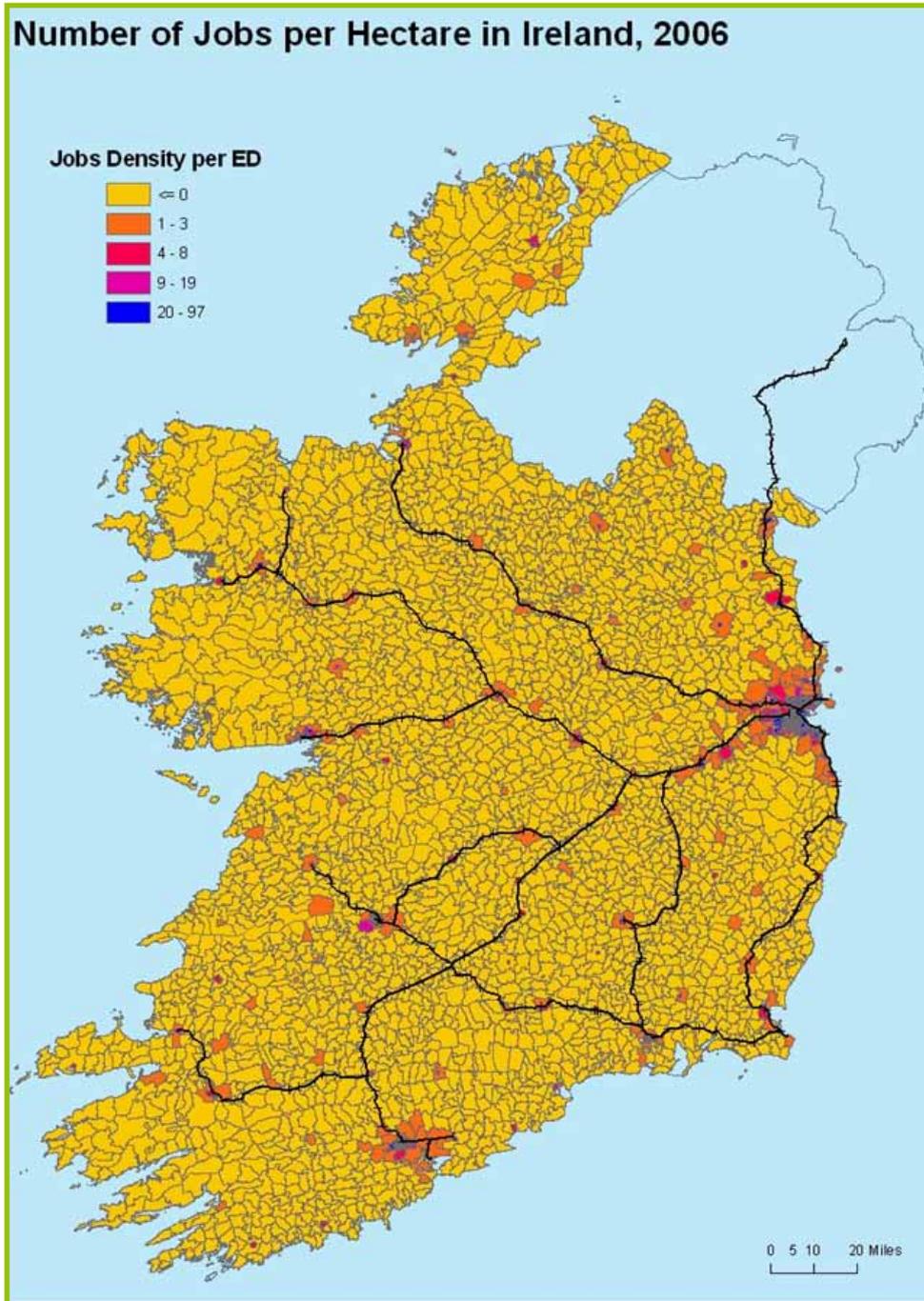
Improving transport links can encourage people to travel further to work, and so allow them to take higher paid, more productive jobs, so increasing economic output. The Exchequer benefit of this represents a net gain to the economy as a whole. This type of effect is most likely to arise where a transport investment improves commuting services in and out of a large city. It may not arise to a great extent as a result of the investments being considered as part of this review

Competition Effects

Improvements in transport reduce the effective distance between firms and so increase the size of geographic markets. A consumer looking for a good or service might consider all potential suppliers within a given journey time. The area defined by this journey time defines the geographic market for

the good or service in question. Firms providing this good or service will only face effective competition from firms in the same geographic market as them. Where there are few firms in a geographic market competition may be "imperfect". In this situation prices will be higher and output lower than if there was a fully competitive market. If a transport investment increases the size of a geographic market (i.e. consumers can now look further afield when sourcing the good or service in question) the number of firms, and hence the intensity of competition, in the market will increase. This should reduce prices and increase output. However, unless a completely new transport link is being created this effect is unlikely to be significant in practice

Figure 3.1: Location of Economic Activity and the Rail Network



Source: AECOM

3.4.6 Overview

The ICN has a role to play in promoting economic development through:

- Contributing to cost efficient services in the economy;
- Enhancing productivity in industry and services;
- Supporting overseas tourism; and
- Facilitating agglomeration benefits.

Given the lack of opportunities for rail freight, the extent to which Iarnród Éireann can attract the business traveller will be crucial. The ICN can be characterised at present as a “leisure railway”. The challenge is to make it more substantially a “business railway”.

Based on the above, economic development objectives for the mainline rail system could be couched as follows:

“To contribute to a reduction in the cost of doing business in Ireland by providing an efficient, work friendly, transport service for business people that connects firms to their suppliers, customers and partners and in so doing to help secure the economic benefits of agglomeration/ urbanisation without the costs”

“To contribute to the tourism potential of Ireland by improving rail connections from the main points of entry for foreign tourists to the main current and potential tourism areas in the country”

3.5 Other Objectives for the Railway System

3.5.1 Introduction

In addition to supporting economic development, mainline rail has a role to play in promoting:

- Safety;
- Regional development;
- Sustainability;
- Accessibility; and
- Integration.

3.5.2 Safety

The safety of rail passengers, rail personnel and the general public is a priority for Iarnród Éireann. A significant amount of rail investment to date has been specifically targeted at improving railway safety, thereby illustrating the existing commitment of Iarnród Éireann to make it an operational priority. Any future investment strategy will have to encompass an ongoing Railway Safety Programme.

A suitable safety objective for the ICN would be along the following lines:

“To continue to improve all aspects of safety on the ICN through investment in infrastructure maintenance and renewal and safety management systems.”

3.5.3 Regional Development

At a high level, the NSS identifies nine Gateway cities and towns. With one exception – Letterkenny/Derry - these are located on the mainline rail system.¹⁵ The NSS adverts to the need for transport services to:

- Build on Ireland’s radial transport system of main roads and rail lines that connect Dublin to other regions, by developing an improved mesh or network of roads and public transport services; and to
- Facilitate effective interchange possibilities between the national transport network and international airports and sea ports.

Given the focus of the railway on passenger services, its contribution to regional development must focus on improving radial services between Dublin and other gateways and non radial services between the principal Gateways. Such a policy would have to be selective and focus on developing linkages between urban centres where a minimum threshold level of economic activity and interconnectedness is reached.

In the latter context, the Galway-Limerick-Cork corridor and the Athlone-Mullingar link present opportunities for the ICN network to contribute to regional development.

A suitable regional development objective for ICN would be:

“To contribute to regional development through the improvement of infrastructure and services between Dublin and the major regional gateways and between these gateways where transport volumes are of sufficient density.”

3.5.4 Sustainability

Rail freight can contribute to sustainable development through the transfer of environmentally damaging traffics to rail.

With regard to passenger travel, the modernisation of rolling stock will result in a fleet that has better energy and emissions characteristics. The future strategic emphasis in respect of sustainability needs to be focused on attracting car users to rail through:

- Service improvements aimed at changing the modal split of interurban travel; it is only by attracting car users that beneficial global warming effects will be achieved; and
- Ensuring that peak road users can be attracted by preserving peak hour rail capacity to accommodate car available passengers and other priority users.

A suitable sustainability objective for the ICN rail network would be:

“To focus service improvements on measures to improve the ICN rail modal split through attracting increasing numbers of car-available passengers to the system”

3.5.5 Accessibility and Social Inclusion

Iarnród Éireann has already incorporated accessibility as a standard feature in the design of all new and refurbished rail stations. Furthermore, following a comprehensive accessibility audit of all stations on the rail network in 2003, Iarnród Éireann has been carrying out improvement works on a line-by-line basis, prioritising the lines with the highest passenger numbers.

¹⁵ Derry is of course on the Northern Ireland Railways network.

Iarnród Éireann has also recognised the need for the carriage fleet to be accessible and all carriages purchased since 1995 are wheelchair accessible. More recent investments have been in carriages that are designed to comply with the UK Rail Vehicle Accessibility Regulations.

In addition to this, Iarnród Éireann has been addressing the problems that mobility or sensory impaired passengers can encounter accessing the train from the platform and vice versa, by way of an extensive platform lengthening and renewal programme.

Given that the rolling stock requirements are met for the foreseeable future, the emphasis on accessibility in future will centre of station refurbishment and renewal, as well as soft measures to aid persons with visual and aural disabilities.

A possible accessibility objective would be:

“To continue to make more of the mainline rail system and its operations accessible and user friendly to people with disabilities.”

Rail also provides transport services to people in lower socio-economic groups, who are non-car owning. Rail systems share this role with bus services. This aspect of rail is especially important where bus alternatives provide a substantially inferior service than rail. This would generally be true of urban areas, where congestion impacts on the quality of bus services to a greater extent than rail. With regard to the ICN, the key requirement must be to ensure that, where rail services are withdrawn, adequate alternative bus services are put in place. The NTA has in place a methodology whereby the social impact of changes to public transport services may be assessed.¹⁶

3.5.6 Integration

The other key aspect of integration is the physical integration of transport modes. Integration of rail infrastructure with land use development priorities is also important. There is need for action at a number of levels:

- The development of key interchanges between the national transport network and international ports and airports. As Iarnród Éireann is essentially a passenger system, this reinforces the need to consider rail links to the main access points for overseas tourism;
- The development of services and infrastructure at local level that will enhance interchange and drive modal shift from private cars. Two aspects present themselves: the increased use of park and ride facilities, particularly parkway stations on the outskirts of the major urban areas and the need to improve feeder bus services to rail stations; and
- Contributing to high density land use at station environs and in rail catchments.

A possible objective for integration is:

“To promote integration of transport modes by encouraging the development of bus feeder services, the development of new park and ride, including parkway stations and through the promotion of high density land uses in rail catchment areas.”

¹⁶ National Transport Authority. Social Impact Estimation Methodology, 2010.

3.6 Implications for Development of the Strategy

Based on the above considerations the key role for the ICN over the period to 2030 will be to contribute to the maximum extent possible to value for money, economic productivity and competitiveness, while ensuring safe, sustainable and integrated services. The ICN has a number of key advantages over other modes in this regard:

- It provides direct city centre to city centre links at a time when the service sector has increased in importance and high value-added services continue to be located in city centres;
- The level of service offered by ICN is unaffected by road congestion at the approaches to urban areas, which means that rail offers a degree of reliability, which is becoming more and more valued by trip-makers;
- It contributes to economic productivity by permitting business travellers to work when travelling;
- Where service frequencies are high, it further improves economic productivity by facilitating return journeys between the major urban areas within one day, without driver fatigue and safety issues arising; and
- It has an as yet unexploited role to play in providing transport services for tourists.

These considerations point to a number of strategic priorities that should inform the development of a strategy for the ICN. These are:

- The need to build on the infrastructure and rolling stock investments already made to ensure that they make the maximum contribution possible to economic development;
- Within this context, to provide service frequencies and service improvements that will prove attractive to users in general and business users and car available passengers in particular;
- Other things being equal, to concentrate future investments and service improvements on linkages between the major agglomerations. This suggests that the radial routes connecting Dublin to Cork, Belfast, Galway, Limerick and Waterford should be the focus of future rail development;
- To support National Spatial Strategy objectives by improvement of the key non-radial rail links between Cork, Limerick and Galway where transport volumes are of sufficient density; and
- To improve rail links and services to the major airports that act as access points for tourists.

In addressing these issues, given that funding resources are likely to be scarce for the foreseeable future, the investment needs and service improvements must be based on a value for money approach and in the context of ensuring that revenues are maximised to the greatest possible extent. This implies that individual projects conceived with these strategic priorities in mind should be subject to evaluation of their costs and benefits before incorporation into a strategy.



4 Recent Rail Developments

4.1 Introduction

This Section of the Report sets out recent developments that have occurred across the rail network in terms of infrastructure, services and passenger demand. A synopsis of Iarnród Éireann's financial performance is also given.

4.2 Rehabilitation of Infrastructures & Other Key Investments

Major rehabilitation works have been carried out on the railway network over recent years under the Railway Safety Programme. The Programme was established in 1999 following an in-depth safety

review that had been carried out the previous year. Covering a fifteen-year period, the programme is being implemented by way of three tranches of investment, each covering a five-year period. Typical projects funded under the programme include the renewal of certain stretches of rail, the building of fences, the replacement or renewal of bridges, the closure or upgrading of level crossings, embankment stabilisation, and coastal defence works. Table 4.1 below gives an indication of the level of investment made in the programme, which is effectively a rehabilitation of the railway network. As the table indicates, over the fifteen years of the programme, investments in excess of €1.5 billion have been put into rehabilitating and upgrading the existing railway infrastructure in Ireland.

Table 4.1: Railway Safety Programme – Level of Expenditure

	Infrastructural Safety (€m)	Systems of Safety Management (€m)	Total (€m)
Programme 1 (1999-2003)	661	-	661
Programme 2 (2004-2008)	444	68	512
Programme 3 (2009-2013)	443	70	513
Total Investment	1,548	138	1,686

Source: Transport 21

Over the eleven-year period between 1999 and 2009, this Programme has enabled Iarnród Éireann to:

- Renew in excess of 500 miles of track;
- Erect approximately 500 miles of new fencing;
- Replace and/or renew over 250 bridges; and
- Close or upgrade over 1,000 level crossings.

Other works have included ballast cleaning, the replacement of point ends, the renewal of glue joints, embankment stabilisation, and signalling works. Besides improving safety, this investment has also facilitated improved journey times, additional services and passenger comfort throughout the network, by providing for example a platform for further investment in rolling stock, which is discussed further in Section 4.3 below.

A number of significant infrastructural investments have also been made by Iarnród Éireann over recent years, which will make a significant contribution to enhanced rail services. The most notable of these include:

- The Kildare Rail Project;
- The Dunboyne Rail Line;
- The Cork Commuter Rail;
- The Western Rail Corridor;
- DART Upgrade Project;
- The Portlaoise Traincare Depot;

- The Redevelopment of Heuston Station; and
- The Resignalling of InterCity Lines.

The Kildare Rail Project has involved the development of a four-track railway between Cherry Orchard and Hazelhatch on the Heuston-Kildare line to allow for the separation of long distance and commuter services. This improves the speed and capacity of all services. In addition to the two new rail tracks, this project has included a number of associated ancillary works including signalling works and bridge development, as well as the construction of four new stations on the line (Hazelhatch & Celbridge; Adamstown; Parkwest/Cherry Orchard; and, Clondalkin/Fonthill). The geographic areas served by the Heuston-Kildare line have grown rapidly over recent years exerting pressure on existing services. This project facilitates increased operational flexibility, allowing Iarnród Éireann to run more frequent services for each of the three market segments operating on the line: commuter, regional and InterCity. The four-track railway is now fully operational, with current services operating temporarily on the two new tracks while the original tracks are being renewed.

The first phase of the Navan Rail Line project saw the construction and reopening of 7.5 kilometres of railway line that branches off the Maynooth line at Clonsilla, terminating at the M3 interchange at Pace, north of Dunboyne. The project also includes the development of three new stations on the route at Hansfield, Dunboyne and Pace. The station at Pace on the M3 has a 1,200-space car park which is the largest park and ride facility in the country. There are also 300 park and ride spaces at Dunboyne. It should be mentioned that although the line is now fully operational, the station at Hansfield remains closed because of incomplete road access. Phase 2

of this project will see the extension of this railway line to Navan by 2015, under the framework of Transport 21.

The first phase of the Cork Commuter Rail project involved the re-opening of the railway line between Glounthaune and Midleton, enabling Iarnród Éireann to provide a commuter service between Cork and Midleton. This phase of the project involved the provision of an upgraded single track, with a passing loop at Carrigtwohill, and the development of two new stations at Midleton and Carrigtwohill, both of which offer extensive park and ride facilities. Other ancillary works included a new signalling system, the replacement of a number of level crossings with bridges, as well as boundary and drainage works. This new service came into operation in July 2009, providing connections to the Cork-Dublin InterCity service in addition to the underlying new commuter service. Phase two of the project, which would see the opening of three new stations at Blarney, Kilbarry and Dunkettle, has been postponed pending revised allocations of capital funding available under Transport 21.

The Western Rail Corridor project comprises three phases, which when fully complete will provide for an intercity rail link between Limerick and Galway, with an onward connection to Claremorris on the Dublin-Westport line. The first phase of the project saw the reinstatement of the line from Ennis to Athenry, which involved the relaying of 36 miles of track. Associated ancillary works included the decommissioning of a number of level crossings, the construction and renewal of a number of bridges, and signalling development, as well as the construction of four new stations at Sixmilebridge, Gort, Ardrahan and Craughwell. The line was officially opened in March 2010, with a fifth new station due to open at Oranmore in early 2012.

The Portlaoise Train Care Depot was completed in February 2008 and came into operation on a phased basis the following month. The high specification InterCity and regional railcars that Iarnród Éireann has invested in (described in Section 4.3 below) require a high standard maintenance facility to ensure safety, reliability and availability of the fleet. The depot provides maintenance and servicing to 234 InterCity railcars and a number of outer suburban railcars serving the Kildare route.

Another significant infrastructural project that has been completed since the previous Strategic Rail Review was carried out is the redevelopment of Heuston Station, which is the busiest station on the rail network for InterCity services. The redevelopment included the construction of four new platforms, bringing the total number to nine, as well as a lengthening of all platforms to facilitate longer trains and a greater number of services. New computerised signalling combined with a remodelling of the track work, both in the station and on approach, also enable more flexible operations. The construction of a second concourse to serve the new platforms and improve customer facilities was another key element of the development. Customer support was further enhanced throughout the station with new train information displays, an automated PA system, and 'help points' at which customers can receive assistance. As well as providing for increased capacity and flexibility of services, the completion of the project saw journey times on nearly all InterCity services into Dublin from Cork, Galway, Limerick and Waterford, reduced by up to 30 minutes.

The DART Upgrade project involved platform extensions to facilitate the operation of 8-carriage DART and commuter trains through the entire DART area, increased from the then 6-carriage maximum;

the upgrade of all stations previously without accessibility or with limited accessibility; and the resignalling of the city centre to increase the maximum number of DART and commuter services through the central area from the current twelve trains per hour in each direction to seventeen trains per hour which is currently underway, and will be completed in 2013.

4.3 Rolling Stock

In addition to the infrastructural investment in the rail network as described above, Iarnród Éireann, with the support of the Exchequer, has also invested significantly over recent years in updating the rolling stock. This investment has also taken place under the framework of Transport 21.

Excluding DART, Iarnród Éireann currently operates five classes of rolling stock, each of which provides a unique passenger experience:

- De-Dietrich InterCity;
- Mark IV InterCity;
- 29000 Class DMU;
- 22000 Class DMU; and
- 2600-2800 Class DMU.

The De-Dietrich InterCity rolling stock came into service in 1996 following a significant investment in the Dublin-Belfast route. The 29000 Class DMU entered service between 2002 and 2005. Although classed as commuter railcars, they do play a role on the Inter-city network, replacing some of the older rolling stock on the lesser used Inter-city lines, such as Limerick Junction to Waterford or Limerick to

Galway. They also operate on a number of branch routes such as Limerick Junction to Limerick or Manulla Junction to Ballina. However, the majority of the 116 Class 29000 DMU railcars currently operated by Iarnród Éireann are used to provide outer-commuter services in the Greater Dublin Area (Dundalk, Mullingar, Enniscorthy and Kildare).

The Mark IV InterCity trains, which came into service between 2005 and 2006, are formed into 8-car sets, pushed or pulled by a Mark IV DVT class locomotive. They represented a significant change in the programme of rolling stock upgrade as the push-pull operation omits the requirement that used to exist for a repositioning of locomotives at the end of each service. A total of eight sets are currently in operation, all on the Dublin to Cork line, providing hourly services. The onboard experience for passengers is good. Services include information displays, PA announcements, catering facilities and a first class area. Seat reservations are encouraged and passenger names are displayed automatically at each seat. First Class accommodation has tilting seats, audio entertainment and power-points at each seat.

The 22000 Class DMUs, which came into service between 2006 and 2011, brought the push-pull operation to all remaining InterCity Routes. These trains have fully replaced older rolling stock on four key routes: Dublin to Waterford; Dublin to Sligo; Dublin to Westport; and, Dublin to Galway. They are also used for some services on the Dublin to Wexford/Rosslare Europort route. Despite having no first class accommodation, the on-board experience for passengers is also good. Onboard information is similar in quality to that onboard the Mark IV, and passenger comfort is also of high quality. Unlike the Mark IV, power supply is available at every seat in Standard Class. A total of forty-two sets are currently in operation: twelve are 6-car sets with

the remaining twenty-nine being 3-car sets. When multiple sets are connected (to make 6-car sets), it is not possible to pass through the full train, which creates difficulties for the provision of catering throughout the train. However, the 6-car sets are currently being reconfigured to include a first class carriage and a dining car, thereby providing a full quality service on key inter-city routes. An order for an additional 51 Mitsui railcars was placed in December 2008 for the provision of services over the Kildare and Dunboyne commuter routes. It is anticipated that these railcars will be delivered in 2011 and in service by early 2012.

The Class 29000 units replaced the older Mark 3 (and older) rolling stock initially on the Sligo and Rosslare lines, although the class 22000 units now provide for much of the intercity demand on these routes.

The Class 29000 units are not easily distinguished from the older Class 2600, Class 2700, and Class 2800 units, which entered service between 1994 and 2000 and supplement services on the commuter and branch lines.

The on-board experience is based on the needs of commuters, with limited space for seating, no provision for on-board catering or seat reservation, and poor climate control with multiple doors opening into each car at stops. This can lead to an extremely poor passenger experience for longer trips.

The reliability of the rolling stock fleets have improved significantly since these various investments came into operation, with the number of incidents causing delay halving between 2007 and 2009. This improved reliability of the rolling stock has directly supported the improved reliability of services.

4.4 Service Development

The network and rolling stock investments described above have resulted in much improved service capacity and reliability. Table 4.2 indicates the number of daily services (round trips) operating on each of the various inter-city and commuter routes in 2000 and 2010. An annual total is given for each route for each year, giving rise to the percentage change in services that has occurred on each route over the eleven-year period.

Table 4.2: Service Improvements on the Inter-City & Commuter Network, 2000-2010

Route	2000			2010			% Change 2000-2010
	Mon-Sat	Sun	Annual Total	Mon-Sat	Sun	Annual Total	
Cork	6	8	2,288	14	10	4,888	114%
Limerick	10	12	3,744	17	16	6,136	+64%
Galway	5	5	1,820	9	7	3,172	74%
Tralee Direct	2	2	728	1	2	416	-43%
Tralee via Mallow	3	2	884	7	6	2,496	182%
Waterford	4	4	1,430	8	4	2,704	89%
Westport	3	3	1,092	4	4	1,456	33%
Sligo	3	3	1,092	8	6	2,808	157%
Rosslare EP	3	3	1,092	3	3	1,092	0%
Drogheda	19	5	6,188	26	9	8,580	39%
Balbriggan	2	1	676	3	0	936	38%
Kildare	13	0	4,056	17	5	5,564	37%
Portlaoise	3	0	936	6	0	1,872	100%
Maynooth	11	0	3,432	32	12	10,608	209%
Longford	1	1	364	3	0	936	157%
Docklands	0	0	0	9	0	2,808	n/a
Cobh	16	7	5,356	25	12	8,424	57%
Limerick-Rosslare EP	2	0	624	4	0	1,248	100%
Limerick-Ballybrophy	2	1	676	2	1	676	0%
Cork-Midleton	0	0	0	21	8	6,968	n/a
Limerick-Galway	0	0	0	5	4	1,768	n/a

Source: Iarnród Éireann
 Note: Total is not sum of individual series

Overall services increased by 107 per cent between 2000 and 2010. Of the eighteen routes that had services in operation in 2000, fourteen saw an increase in services over the decade, with seven of these routes experiencing an increase of 100 per cent or more.

The most significant increase in services occurred on the Maynooth commuter route, which saw total annual round-trips rising from 3,432 in 2000 to 10,608 in 2010, an increase of 209 per cent. The Dublin to Sligo inter-city route saw services rise from 1,092 total round trips in 2000 to 2,808 total round trips in 2010, an increase of 157 per cent. The Dublin to Longford route also experienced an increase in services of 157 per cent over the period with total round trips of 936 in 2010 compared to just 364 in 2000.

Just two routes saw a fall in services over the decade. Total annual round-trips on the direct Dublin-Limerick route fell from 1,456 in 2000 to 1,248 in 2010, a decrease of 14 per cent. However, it should be noted that services on the Dublin to Cork route increased by 114 per cent over the same period, and the majority of the time it is possible to use this service and change at Limerick Junction, going on to Limerick that way. The other route that

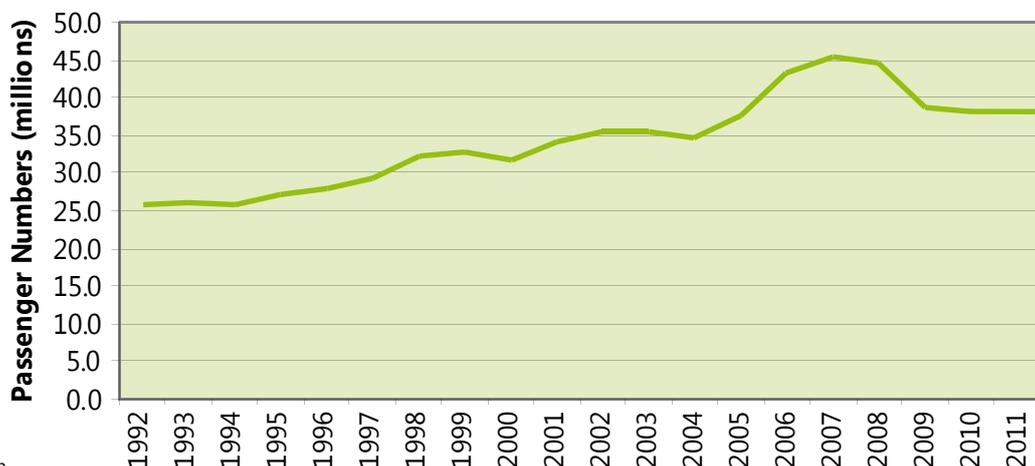
experienced a decrease in services was the direct Dublin to Tralee route which saw services fall from 728 round trips in 2000 to 416 round trips in 2010, a drop of 43 per cent. However, services on the Tralee via Mallow route (whereby passengers use the Dublin-Cork service changing at Mallow to go on to Tralee), increased by 182 per cent over the same period, from 884 round trips in 2000 to 2,496 round trips in 2010.

4.5 Passenger Demand

Passenger demand for rail services is recorded at an aggregate level by Iarnród Éireann through the collation of ticket sales information for defined periods.

Figure 4.1 below illustrates the overall trend in passenger numbers across the entire Iarnród Éireann network between 1992 and 2010. As the Figure indicates, passenger demand increased from 25.8 million passengers in 1992 to a peak of 45.5 million passengers in 2007, an increase of 76.1 per cent or 3.9 per cent per annum. With the onset of the economic recession, demand declined to 37.4m passengers in 2011 or by 18 per cent from the peak.

Figure 4.1: Iarnród Éireann Passengers, 1992-2011



Source: Iarnród Éireann

Table 4.3: Number of Passengers using DART and other Iarnród Éireann services, 2005 - 2009

	DART Passengers (m)	Other Rail Passengers (m)	Total Rail Passengers (m)	Other Rail as % of Total
2005	16.3	21.4	37.7	56.8
2006	19.7	23.7	43.4	54.6
2007	20.2	25.3	45.5	55.6
2008	19.9	24.8	44.6	55.6
2009	17.5	21.3	38.8	54.9
2010	16.8	21.4	38.2	56.0
2011	15.9	21.5	37.4	57.5

Source: Iarnród Éireann

Table 4.4 breaks down the total number of passengers using inter-city and outer-suburban rail services each year across the various routes.

Table 4.4: Number and Distribution of Passengers using Inter-City and Outer-Suburban Rail Services by Route, 2006-2010

Route	2006		2007		2008		2009		2010		2011	
	'000s	%										
Dublin Drogheda	6,614	28.0	6,742	26.7	6,581	26.6	5,469	25.7	5,572	26.0	5,768	26.9
Dublin Maynooth	4,166	17.6	4,672	18.5	4,639	18.7	4,186	19.7	4,125	19.2	4,147	19.3
Dublin Cork	2,571	10.9	2,909	11.5	2,885	11.6	2,433	11.4	2,404	11.2	2,333	10.9
Dublin Kildare	2,125	9.0	2,170	8.6	2,135	8.6	1,859	8.7	1,743	8.1	1,759	8.2
Dublin Galway	1,475	6.2	1,584	6.3	1,521	6.1	1,219	5.7	1,055	4.9	975	4.5
Dublin Sligo	1,134	4.8	1,242	4.9	1,343	5.4	1,207	5.7	1,245	5.8	1,226	5.7
Dublin Waterford	1,267	5.4	1,377	5.5	1,293	5.2	1,120	5.3	1,124	5.2	1,097	5.1
Dublin Belfast	1,178	5.0	1,215	4.8	1,172	4.7	818	3.8	875	4.1	889	4.1
Dublin Limerick	728	3.1	823	3.3	827	3.3	741	3.5	750	3.5	660	3.1
Cork Cobh & Middleton	643	2.7	691	2.7	594	2.4	671	3.2	808	3.8	860	4.0
Dublin Tralee	550	2.3	573	2.3	540	2.2	499	2.3	507	2.4	529	2.5
Dublin Westport Ballina	481	2.0	478	1.9	470	1.9	417	2.0	442	2.1	425	2.0
Dublin Rosslare EP	404	1.7	427	1.7	402	1.6	323	1.5	384	1.8	349	1.6
Dublin Wicklow	247	1.0	279	1.1	290	1.2	254	1.2	260	1.2	256	1.2
Limerick Jct Rosslare EP	40	0.2	44	0.2	54	0.2	48	0.2	35	0.2	44	0.2
Limerick Ballybrophy	38	0.2	36	0.1	36	0.1	29	0.1	24	0.1	19	0.1
Dublin Navan									34	0.2	98	0.5
Limerick Galway									44	0.2	35	0.2
Total	23,661	100.0	25,262	100.0	24,782	100.0	21,292	100.0	21,433	100.0	21,469	100.0

In a similar vein to trends in overall passenger demand, the majority of routes experienced a general increase in passenger numbers between 2006 and 2007, followed by a slight decline in 2008 and a more substantial decline in 2009, reflecting the economic situation in Ireland. A further reduction in passenger numbers was witnessed in 2010 on approximately half of the routes. The Cork commuter route by contrast, which saw the completion of the Midleton line, experienced an increase in passenger numbers between 2008 and 2010. There has been a slight increase in demand on Inter-City and Outer-Suburban Rail services between 2010 and 2011, although this has occurred against the background of a further decline in DART passengers.

In terms of the distribution of passenger demand across the various routes, the Drogheda commuter route accounted for the highest proportion (26.9 per cent) of passenger numbers in 2011. This was followed by the Maynooth commuter route (19.3 per cent), the Cork inter-city route (10.9 per cent), and the Kildare commuter route (8.2 per cent).

The distribution of passenger demand across the various routes has remained fairly constant over recent years.

4.6 Financial Performance

Table 4.5 summarises financial performance of both Iarnród Éireann and its Mainline Rail Division from 2004 to 2010. Taking Iarnród Éireann first, its total revenue (passenger and freight) was €190.2m in 2010, representing a 3.7 per cent decline on 2009 and a 17.4 per cent decline from the 2007 peak. Its total operating costs, before exceptional items, amounted to €370.1m in 2010. This is a reduction of €52.4m on the 2008 peak of €422.5m and is primarily explained by a reduction in the cost of materials and services. Despite State PSO and rail safety grants of €167.5m, Iarnród Éireann had an operating deficit excluding exceptional items of €14.3m in 2010.

Table 4.5: Summary Profit and Loss Account - 2004 to 2010

	2004	2005	2006	2007	2008	2009	2010
	€000's						
Iarnród Éireann							
Revenue	215,481	222,284	227,696	230,250	221,476	197,575	190,184
Operating Costs before Exceptionals	389,063	396,009	403,266	419,566	422,492	382,328	370,055
Interest, Disposals & Exceptionals	25,140	12,075	31,907	19,163	21,663	30,646	24,141
Grants Charged to P&L							
State Grants - Public Sector Obligation	171,420	179,990	188,716	189,910	181,152	170,624	155,137
State Grants - Railway Safety Grant	10,557	13,337	13,661	13,580	12,466	12,772	12,378
Other Subventions charged to P&L	0	0	1,000	18,397	10,000	0	-
Surplus / (Deficit) for the year	-16,745	7,527	-4,100	13,408	-19,061	-32,003	-36,497
Accumulated Deficit at end of year	-102,584	-95,057	-99,157	-85,749	-104,810	-136,813	-173,310
Mainline Rail Division							
Revenue: Passenger services		122,032	127,270	132,952	135,320	123,397	118,375
Freight services		17,809	13,014	10,079	15,479	9,001	8,650
Total	126,119	139,841	140,284	143,031	150,799	132,398	127,025
Expenditure: Total	180,537	195,745	199,026	209,342	221,590	198,401	195,599
Operating Deficit before Interest and PSO	-54,418	-55,904	-58,742	-66,311	-70,791	-66,003	-68,574

Source: Iarnród Éireann Annual Reports, AECOM

Revenue from Mainline Rail passenger services was €118.4m in 2010, equivalent to a decline of 12.5 per cent from the 2008 high. When revenue from freight services is factored in, the Division's total revenue amounted to €127.0m. Total Mainline Rail expenditure was €196.6m in 2010. This represents a fall of 11.7 per cent from the 2008 high of €221.6m. The main expenditure sub-heads (maintenance of rolling stock, fuel and operating & other expenses) all contributed to the cost reduction. The Division therefore had an operating deficit (before interest and PSO) of €68.6m in 2010 compared to 2008's operating deficit of €70.8m.

4.7 Overview

Since 1999, the railway infrastructure has been rehabilitated through a fifteen year Railway Safety Programme. In addition a number of key capacity enhancing investments have been made including four tracking of sections of the Kildare line, the first phase of the extension to Navan, the development of Cork commuter services to Midleton, and the first phase of the Western Rail Corridor. These infrastructural improvements have been

complemented by significant investments in rolling stock. As a result, service capacity and reliability have much improved. Between 2000 and 2010, service levels on the ICCN and commuter network have more than doubled. On the ICCN, services levels have particularly increased on the Cork and Sligo routes. Passenger demand has responded, averaging 4 per cent per annum over a long period. Demand peaked in 2007 at 45.5m passengers before falling back to 38.2m in 2010. Passengers on the ICCN amounted to 21.4m in 2010 or 56 per cent of all passengers in 2010. Revenue has followed a similar pattern, and is currently 17.4 per cent below its 2007 peak. Despite cost saving initiatives, amounting to c. €75m over 3 years the operating deficit as a whole has increased to €14.3m in 2010. A declining public subvention has increased the difficulty of keeping operating deficits in check.





5 Mapping Current
Rail Demand

5.1 Introduction

Rail demand is recorded at an aggregate level by Iarnród Éireann through collation of ticket sales information, with all ticket sales allocated to defined routing groups. These data provide the main basis for tracking changes in passenger demand

on the rail network at an aggregate and at route level. Aggregate totals by route (million passengers per annum) for the period from 2005 to 2011 are outlined in Table 5.1. The data highlight the high level of rail demand on DART and Dublin commuter services, which together account for some 75 per cent of rail patronage in 2011.

Table 5.1: Aggregate Demand (Million Passengers Per Annum)

Route	2006	2007	2008	2009	2010	2011
Dublin Rosslare EP	0.404	0.427	0.402	0.324	0.384	0.349
Dublin Sligo	1.134	1.242	1.343	1.207	1.245	1.226
Dublin Waterford	1.267	1.377	1.293	1.121	1.124	1.097
Dublin Belfast	1.178	1.215	1.172	0.818	0.875	0.889
Dublin Wicklow	0.247	0.279	0.290	0.251	0.260	0.256
Dublin Maynooth	4.166	4.672	4.639	4.184	4.125	4.147
Dublin Drogheda	6.614	6.742	6.581	5.463	5.572	5.768
Dublin Cork	2.571	2.909	2.885	2.434	2.404	2.333
Dublin Tralee	0.550	0.573	0.540	0.499	0.507	0.529
Dublin Limerick	0.728	0.823	0.827	0.741	0.750	0.660
Dublin Galway	1.475	1.584	1.521	1.219	1.055	0.975
Dublin Westport Ballina	0.481	0.478	0.470	0.417	0.442	0.425
Dublin Kildare	2.125	2.170	2.135	1.853	1.743	1.759
Limerick Jct Rosslare EP	0.040	0.044	0.054	0.048	0.035	0.044
Limerick Ballybrophy	0.038	0.036	0.036	0.029	0.024	0.019
Cork Cobh & Midleton	0.643	0.691	0.594	0.671	0.808	0.860
Dublin Navan					0.034	0.098
Limerick Galway					0.044	0.035
DART	19.689	20.254	19.865	17.520	16.793	15.909
Overall Total	43.351	45.515	44.646	38.798	38.226	37.378

This information highlights a broad growth in demand through 2005 to 2007, followed by a slight decline in 2008 and a substantial decline in 2009, with passenger levels reverting back to those seen during 2005.

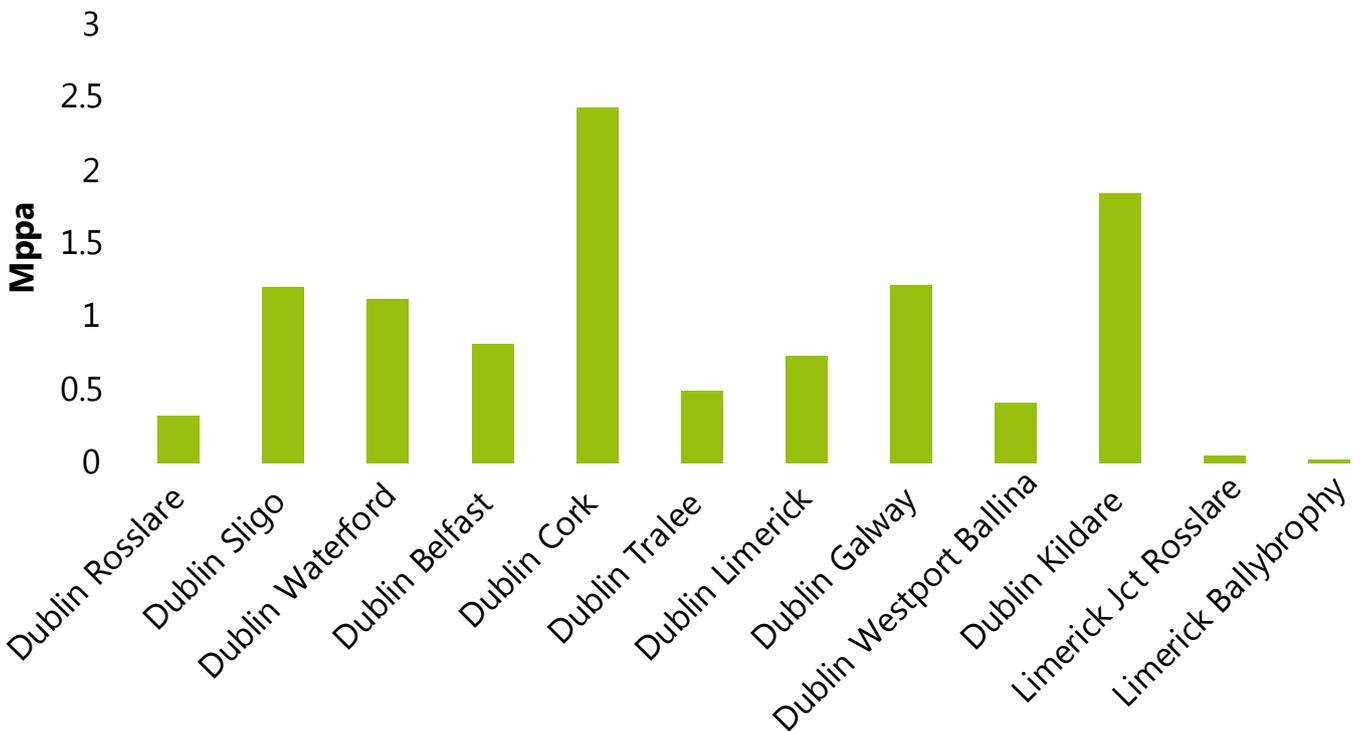
Focusing on the Inter-City route network, Cork remains the most dominant route in attracting patronage, with in the region of 2.5m passengers per annum. Sligo, Waterford and Galway each carry slightly above 1m passengers per annum, with Limerick and Belfast both carrying less than 1m passengers per annum.

Although this information provides a reasonable picture of passenger demand, it is accepted that

the allocation of passengers to 'routes' presents some challenges, and may not always present an accurate picture of usage. This is most evident on those corridors which are served by multiple routes (e.g. Dublin to Limerick Junction or Portarlinton to Athlone). Expression of demands on a route by route basis will remain challenging in any network where a choice of services exists to any rail user.

Furthermore, this means of presenting data does not distinguish between a high level of short distance trips (such as will become evident on the Dublin to Galway Route) or a small number of Long distance trips (as is the case with Limerick). An alternative means of mapping rail demand is therefore proposed.

Figure 5.1: Passengers on Key Routes 2011 (Million passengers per annum)



Source: Iarnród Éireann

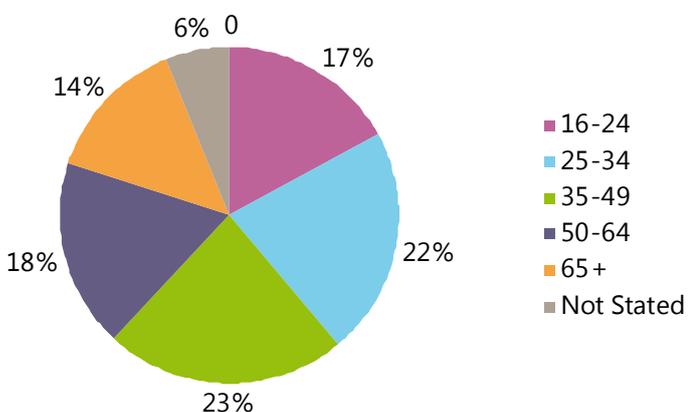
5.2 Profile of InterCity Rail Passengers

A survey of InterCity rail passengers was undertaken by Iarnród Éireann between June and November of 2009 in the form of face to face interviews with rail passengers. The survey data was compiled through approximately 9,000 interviews, with the exception of the Dublin – Belfast line. Findings are outlined below. The data was intended to provide a high level overview of passenger profiles, and was not intended at the time to form the basis for any detailed analysis or modelling of passenger classification. Some key results of this research are outlined here

5.2.1 Gender and Age

The survey suggests a female/male split of 40 per cent/53per cent with 7per cent providing no response. Approximately 63 per cent of passengers are of working age (assumed between 24 – 65 years), with 14 per cent of passengers being over 65. A total of 17 per cent of passengers are recorded in the 16-24 age category. Overall, the age of passengers is quite evenly spread across all categories.

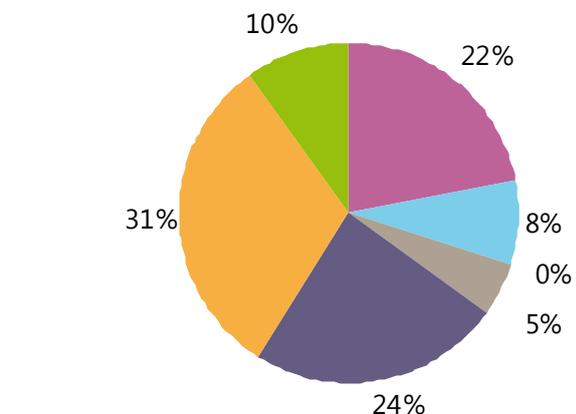
Figure 5.2: InterCity Passenger Age Groups



5.2.2 Trip Purpose

The most dominant trip purpose observed among Iarnród Éireann passengers is for 'Visiting' (31 per cent) and 'Other Leisure' (24per cent). The third most common purpose is for 'Business' (22 per cent), although it is noted that during the survey commuting trips have been included in this category, and hence it is not possible to understand the level of real business travel. These results highlight that passenger demand is heavily reliant on leisure trips, which tend to be relatively infrequent users of the network.

Figure 5.3: InterCity Trip Purposes

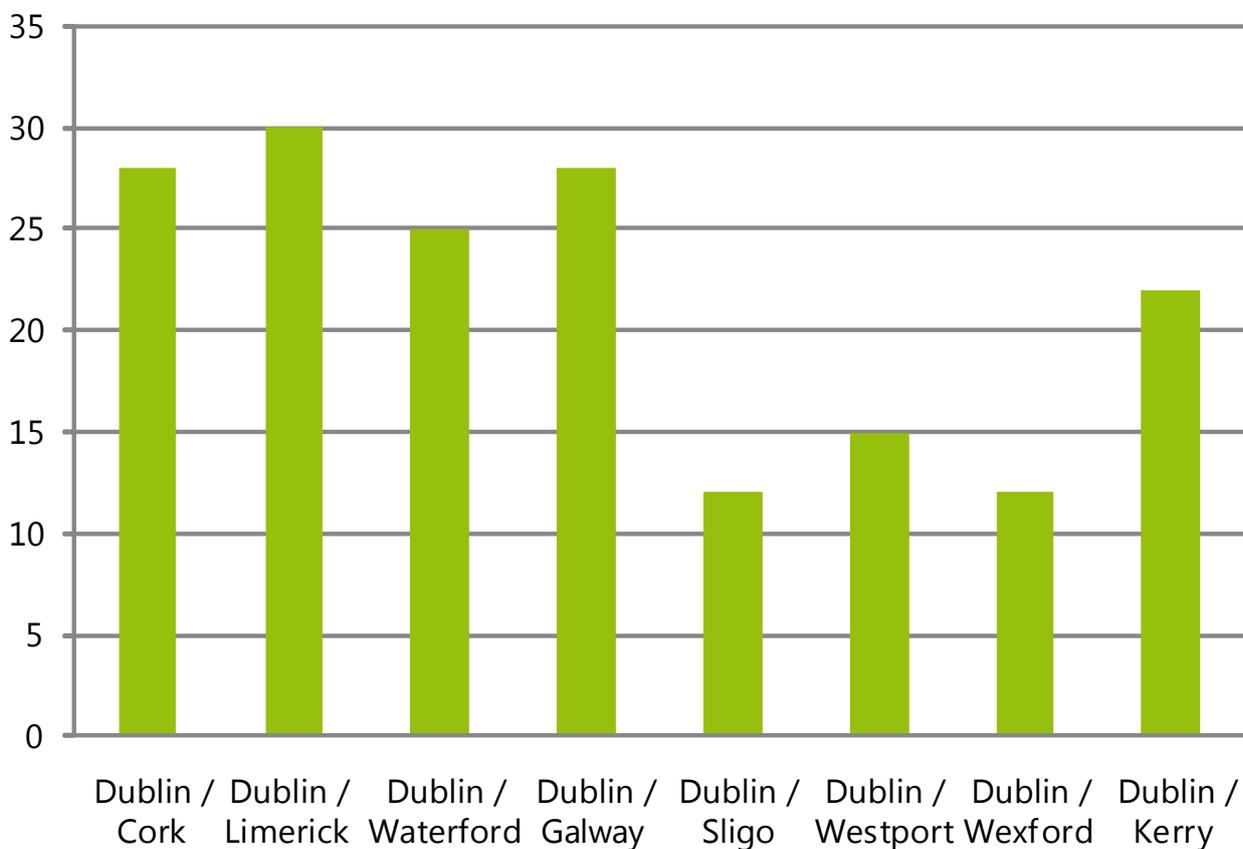


- Business
- Shopping
- Education (secondary school)
- Education (college/university)
- Other leisure
- Visiting friends/relatives
- Other

The level of business travel has been reported for a range of inter-city corridors as shown in figure 5.4. Again, note that commuting has been included in these numbers, which is likely to significantly distort

the results for Wexford and Sligo where there are high levels of commuters travelling longer distances using inter-city services.

Figure 5.4: Proportion of InterCity ‘Business’ Passengers by Route

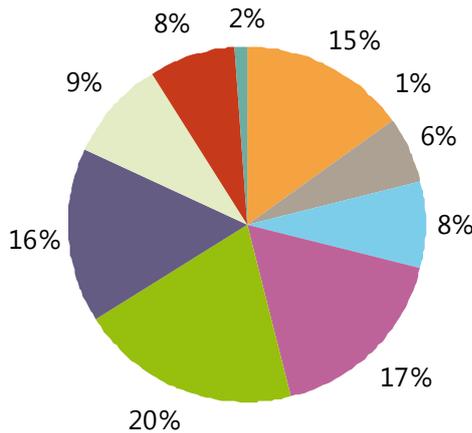


5.2.3 Frequency of Use

As demonstrated in figure 5.5, a very low percentage of passengers use Inter City services on a regular basis. Only 6 per cent use services more than once a week whilst 8 per cent use services at least once a week. Seventeen percent use rail

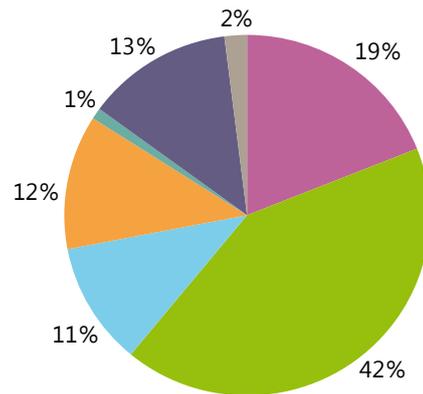
services once a month while the remaining 69 per cent of passengers use the service less frequently. As many as 15 per cent of passengers were using the train service for the first time, this presents significant opportunity for securing repeat custom, but does require a high level of satisfaction.

Figure 5.5: Frequency of InterCity Train Use



- First time travelling on this route
- More often than once a week
- At least once a week
- At least once a month
- Once every 2-3 months
- Once every 4-6 months
- Once a year
- Less often than once a year
- Don't know

Figure 5.6: Mode of Travel to Train Station



- By car as driver
- By car as passenger
- By bus
- By Luas
- By bike
- Walk
- Other

5.2.4: Car Ownership & Mode of Travel

The majority (60 per cent) of Iarnród Éireann passengers are currently car owners, with 29 per cent of passengers not owning a car. Despite the high car ownership, just 19 per cent of passengers drove to the station, whilst 42 per cent of passengers were dropped off at the station. This again reflects the dominance of infrequent leisure trips within the existing passenger profile.

5.3 Development of a National Rail Model

This study has been supported by the development of a fixed demand rail assignment model. Assignment models are constructed through the development of a demand matrix which represents the origin and destination of each passenger using the rail network, with appropriate segregation of demand to represent user groups, trip purposes, time periods and fare type. This demand matrix is then assigned on to a defined network, and allows resulting trip patterns to be measured directly from the model. It provides a tool for more efficient monitoring and measurement of network performance.

The National Rail Model has been constructed to represent rail demand in a 2009 Base Year, and a future year of 2025. It represents passenger demand during a 15-hour weekday period (07:00 to 22:00), and includes all heavy rail trips (ie no trips by Light Rail). The model has been constructed to be fully compatible with the National Traffic Model which is held and maintained by the National Roads Authority.

In developing the National Rail Model, the objectives were to develop a model which would:

- Simplify reporting of existing and future passenger demands across the network;
- Provide a tool for financial reporting and forecasting of fare revenue;
- Provide key indicators on rolling stock usage, including train kilometres, train running hours etc;
- Allow the impact of network enhancements to be assessed on the range of routes using that part of the network; and
- Provide clear and detailed information for economic appraisal of investment measures.

The National Rail Model therefore brings together the various functions associated with strategic planning, rolling stock management and financial analysis into a single tool which can support all these functions.

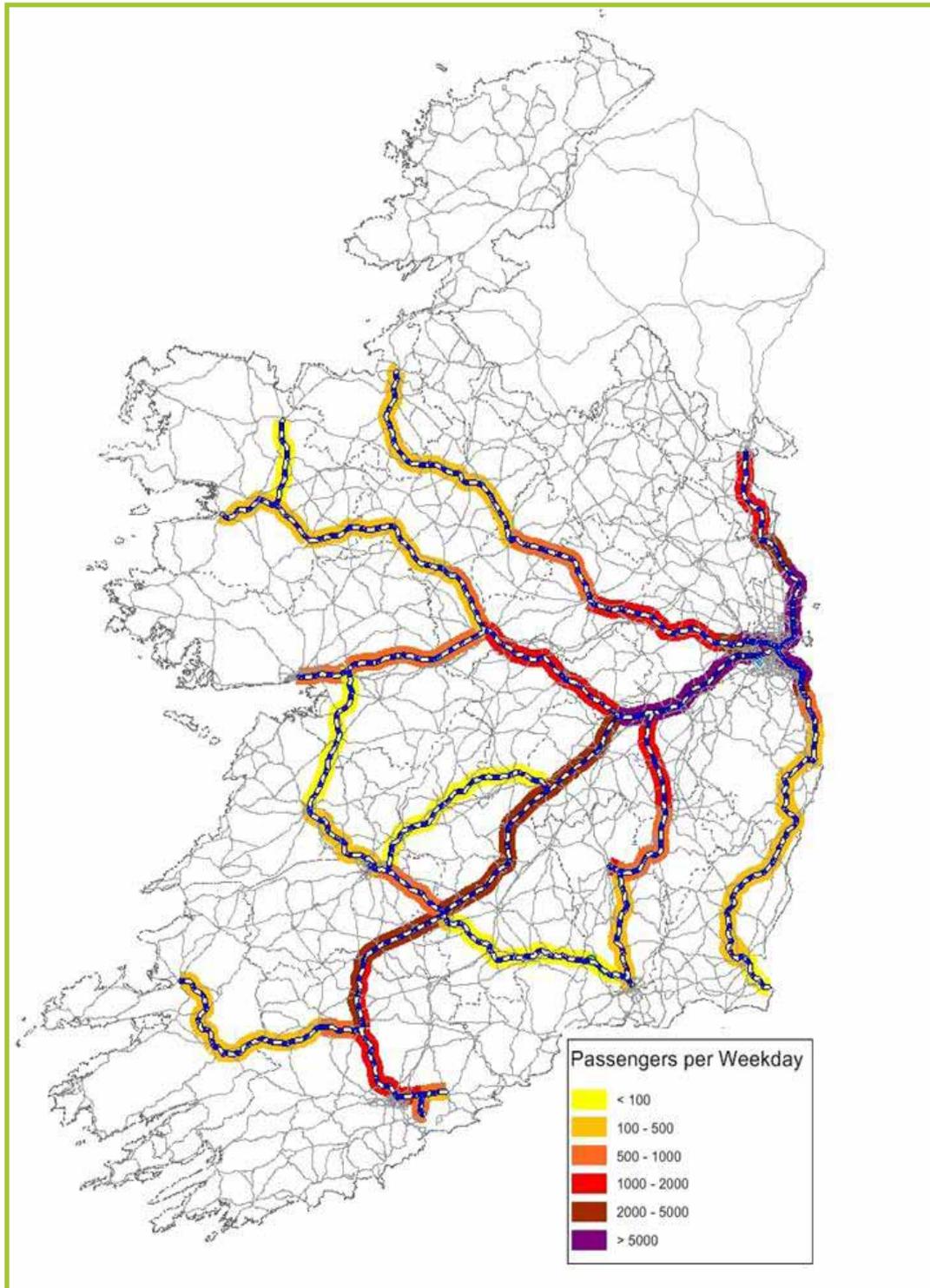
5.4 Passenger Demand Across the Network

Figure 5.7 uses output from the National Rail Model to summarise current weekday passenger volumes on each link within the rail network. The data demonstrates that the highest levels of demand exist on mainline routes from Dublin to Cork, Athlone, Mullingar, Carlow and Dundalk, with substantially lower levels of demand on those corridors which connect the regional cities.

Limerick and Galway attract similar volumes of patronage along the corridor from Dublin, with the lowest levels of demand on those corridors terminating in Sligo, Westport, Tralee, Waterford and Rosslare Europort.

The data suggests some differences between the patterns of demand on different routes. Demand on the Dublin to Cork route appears strong along the full length of the corridor, with limited reductions in occupancy at higher distances from Dublin. On other corridors such as Westport, Sligo and Tralee, patronage falls sharply as the distance from Dublin increases.

Figure 5.7: Aggregate Passenger Demand (Average Weekday 2010)

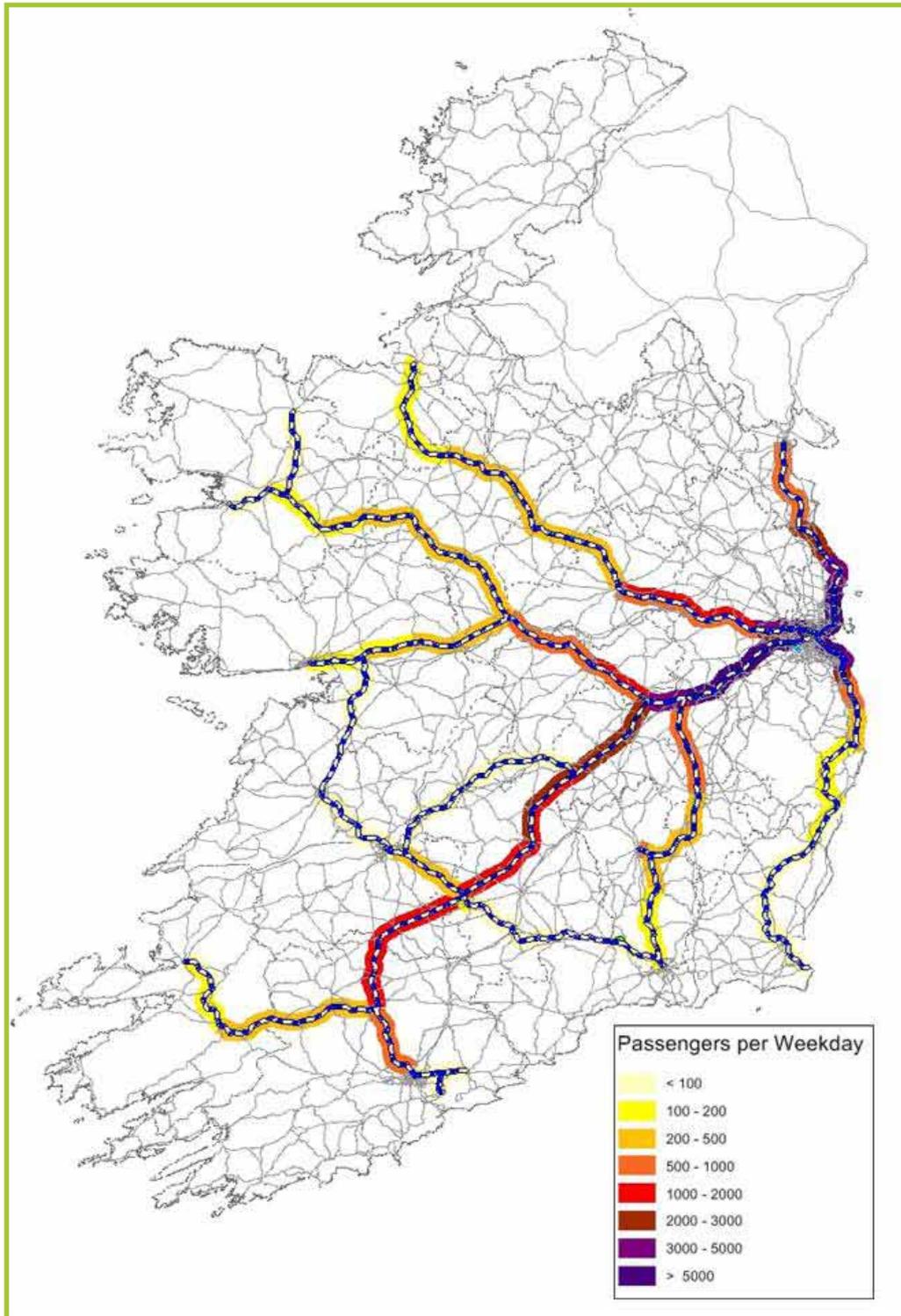


5.5 Inter-Urban Demand

For much of the InterCity network, the frequency of stops on services is influenced by the requirement to serve intermediate towns whilst ensuring that the end to end journey time is not unduly impacted. Much of the InterCity network is single track, and hence the requirement to stop is an operational one in addition to a demand-driven decision.

Nevertheless, intermediate stops do account for a proportion of intercity demand, although this does vary from corridor to corridor. The analysis below outlines existing passenger movement to/from the Dublin terminals, as extracted from the National Rail Model. This shows the dominance of the Cork Route in attracting longer distance movements, with significant reductions in demand on the other routes as one travels away from the capital city. For example, the information suggests that less than 200 passengers travel between Dublin and Galway, Sligo or Waterford each weekday, with Limerick and Cork capturing the greatest level of passenger demand from Dublin.

Figure 5.8: Trips to/from Dublin (Average Weekday 2010)



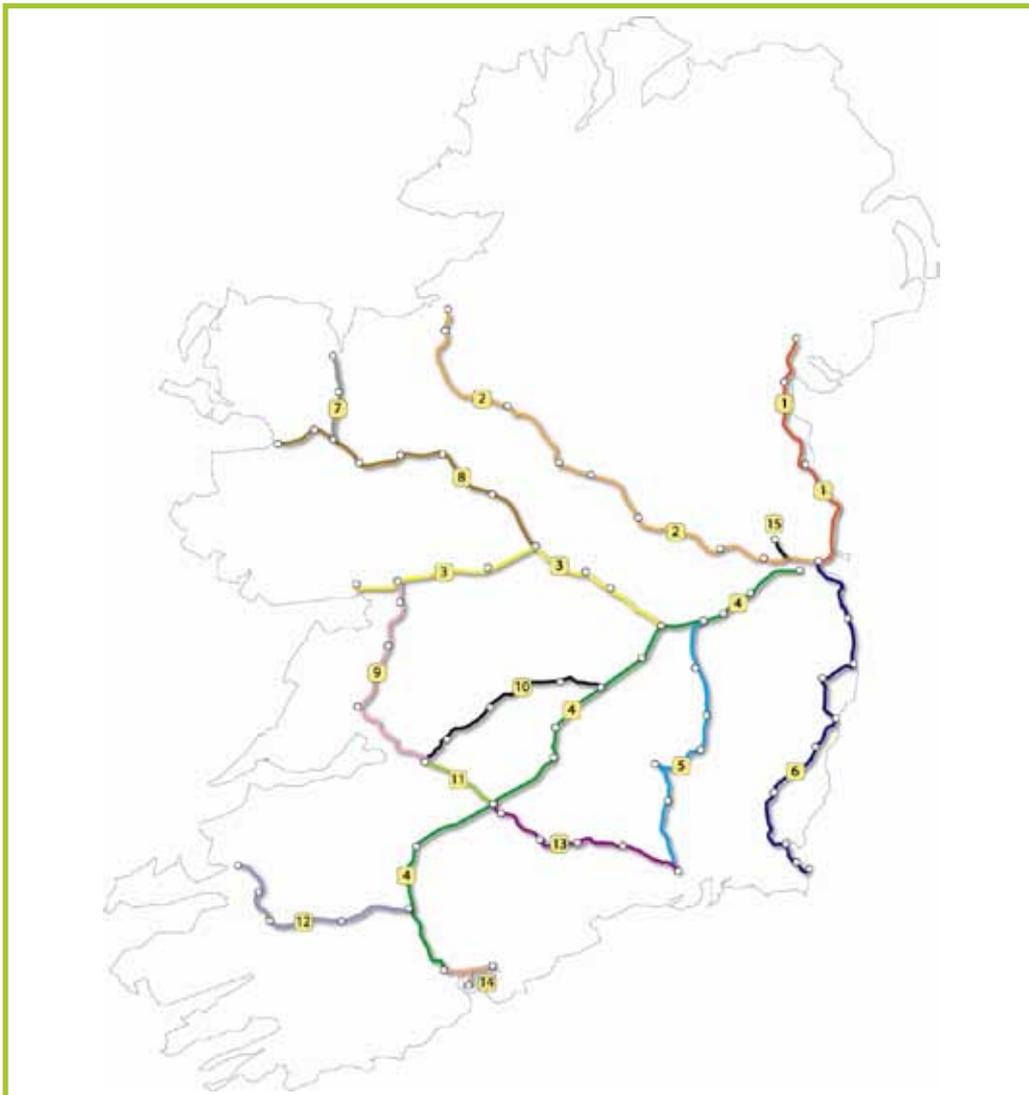
5.6 Passenger Boardings

The National Rail Model allows the reporting of demand based on geographical sectors, which moves away from the difficulties associated with the allocation of passenger demand to routes as described earlier. In doing this, demand can also be disaggregated into commuting, business and

leisure to better understand the use of the route in different parts of the network.

Figure 5.9 below proposes the definition of a number of corridors for the rail network, within which demand can be reported for various trip purposes.

Figure 5.9: Definition of Rail Corridors



In the above definition, interchange stations are allocated to the major corridor. For example, Mallow is allocated to the Dublin-Cork corridor, and Athlone to the Portarlinton-Galway corridor. A summary of corridors is provided below.

Weekday passenger boardings for each sector is outlined in Table 5.3. Note that the total for business travel is an outline estimate based on market research information from 2009 which is as yet insufficient to validate actual volumes of business travel.

Table 5.2: Reporting Sectors

Sector	Name	Routes Supported
1	Connolly to Border	Belfast InterCity, Commuter, DART
2	Connolly to Sligo	Sligo InterCity, Commuter,
3	Portarlinton to Galway	Galway InterCity, Commuter
4	Heuston to Cork	Multiple InterCity, Commuter
5	Kildare to Waterford	Waterford InterCity, Commuter
6	Connolly to Rosslare EP	Rosslare EP InterCity, Commuter, DART
7	Ballina Spur	InterCity Connections
8	Athlone to Westport	Westport InterCity
9	Athenry to Limerick	Galway – Westport InterCity
10	Ballybrophy to Limerick	InterCity Connections
11	Limerick Spur	InterCity Connections
12	Tralee Spur	InterCity, Commuter
13	Waterford to Limerick Jn	InterCity Connections
14	Cork Commuter	Commuter
15	Navan Commuter	Commuter
16	Dublin City	DART, Commuter

Table 5.3: Boardings by Rail Corridor (average weekday, March 2010)

Sector		Commuting	Business	Leisure	Total
1	Connolly to Border	9753	649	2382	12784
2	Connolly to Sligo	10066	1294	4745	16105
3	Portarlinton to Galway	763	319	1253	2335
4	Heuston to Cork	10820	2030	7863	20713
5	Kildare to Waterford	494	165	707	1366
6	Connolly to Rosslare EP	3599	379	1413	5391
7	Ballina Spur	10	4	17	31
8	Athlone to Westport	74	63	287	424
9	Athenry to Limerick	308	23	108	439
10	Ballybrophy to Limerick	48	4	21	73
11	Limerick Spur	75	87	339	501
12	Tralee Spur	96	69	271	436
13	Waterford to Limerick Jn	42	29	139	210
14	Cork Commuter	564	152	562	1278
15	Navan to Connolly*	0	0	0	0
16	Dublin City	48399	8058	28925	85382
Total		85111	13325	49032	147468

* Not in operation in March 2010

The data shows the dominance of commuting on the main corridors serving Heuston and Connolly Stations. The Ballybrophy to Limerick, Waterford to Limerick Junction and Manulla to Ballina remain lightly used in comparison to other lines. All of these lines are heavily dominated by leisure travellers.

5.7 Passenger Kilometres

On many of the InterCity routes, the dominance of commuting can distort the true picture of passenger demand. Comparing the passenger km of travel against the length of each corridor allows a measure of the intensity of use of that corridor to be reported. Results are presented below in Table 5.4.

Table 5.4: Passenger km travelled by ticket type

Sector	Corridor	Commuter	Business*	Leisure					Total	Length (km)	Passenger km/km
				Adult	Student	Child	First	Concession			
1	Connolly to Border	635176	55441	244093	256	16834	6093	49716	1007609	87	11585
2	Connolly to Sligo	300795	50654	250635	0	3524	0	76499	682107	219	3119
3	Portlrington to Galway	52549	27947	145259	138	1344	2877	96657	326771	141	2314
4	Heuston to Cork	509715	228383	1075027	1008	36218	93542	421726	2365619	267	8872
5	Kildare to Waterford	41898	19293	102574	0	451	363	46023	210602	124	1701
6	Connolly to Rosslare EP	357236	45593	198209	8	19594	0	30638	651278	168	3866
7	Ballina Spur	448	229	1441	0	0	0	1637	3755	33	114
8	Athlone to Westport	9348	10209	55604	306	180	1003	33357	110007	134	822
9	Athenry to Limerick	16615	1306	16479	76	306	76	2671	37529	96	391
10	Ballybrophy to Limerick	3345	164	1764	0	0	0	963	6236	84	74
11	Limerick Spur	7526	6384	30820	2	1062	632	11310	57736	36	1625
12	Tralee Spur	6526	8771	38732	0	2270	1896	19530	77725	100	780
13	Waterford to Limerick Jn.	1540	1193	6711	0	237	262	1440	11383	87	131
14	Cork Commuter	14306	5612	24706	370	1208	0	4565	50767	29	1775

* Business travel is based on aggregate proportion of 22% from Market Research surveys in 2009, which assuming zero commuter use of InterCity services

The results of Table 5.4 offer understanding of the level of use of the different corridors. The Connolly to Border corridor remains the most intensively utilised infrastructure on the rail network, undoubtedly influenced by the very high levels of commuting traffic on the northern commuter route.

The results for Cork are also quite high overall, but the contribution of commuting to this result is significantly less. The dominating feature on the Cork corridor is the high level of km travelled by Business Users, again reflecting the high level of end-to-end intercity movements on this corridor. At 0.23 million passenger km each weekday, this corridor caters for a significant proportion of rail travel nationally.

The Rosslare Europort corridor is also dominated by commuting along the suburban corridor, with commuting responsible for almost 54 per cent of all kilometres travelled on this corridor. This is second only to the Connolly-Belfast corridor in terms of the scale of the commuting contribution to the overall km travelled.

On the Sligo corridor, the level of passenger km remains strong, although is also heavily dominated by commuter traffic which is also catered for by InterCity services. The Portarlington - Galway and Limerick Junction - Limerick corridors, on the other hand, both report reasonable levels of use, but with quite low reliance on commuter services to provide for that demand. Both are second only to the Cork corridor in terms of intensity of use when commuting services are excluded from the analysis.

Demand on the Ballybrophy – Limerick, Waterford – Limerick Junction and the Ballina Spur remains low, even when considered relative to line length.

5.8 Financial Performance

Knowing the total passenger km travelled on each network segment, and applying a unit fare per km travelled will allow a measure of the fare revenue per track km for each network segment. This calculation is outlined below in Table 5.5, and is based on an average fare of 12c/km for intercity travel. Fare adjustments are applied to users as follows:

- **Standard ticket types**
fare of 12 cent per km
- **Commuters**
uplift of 30 per cent to reflect higher unit rate for shorter distances
- **Student tickets**
Discount of 25 per cent
- **Child tickets**
discount of 50 per cent
- **First Class tickets**
uplift of 50 per cent
- **Concession tickets**
no fare revenue

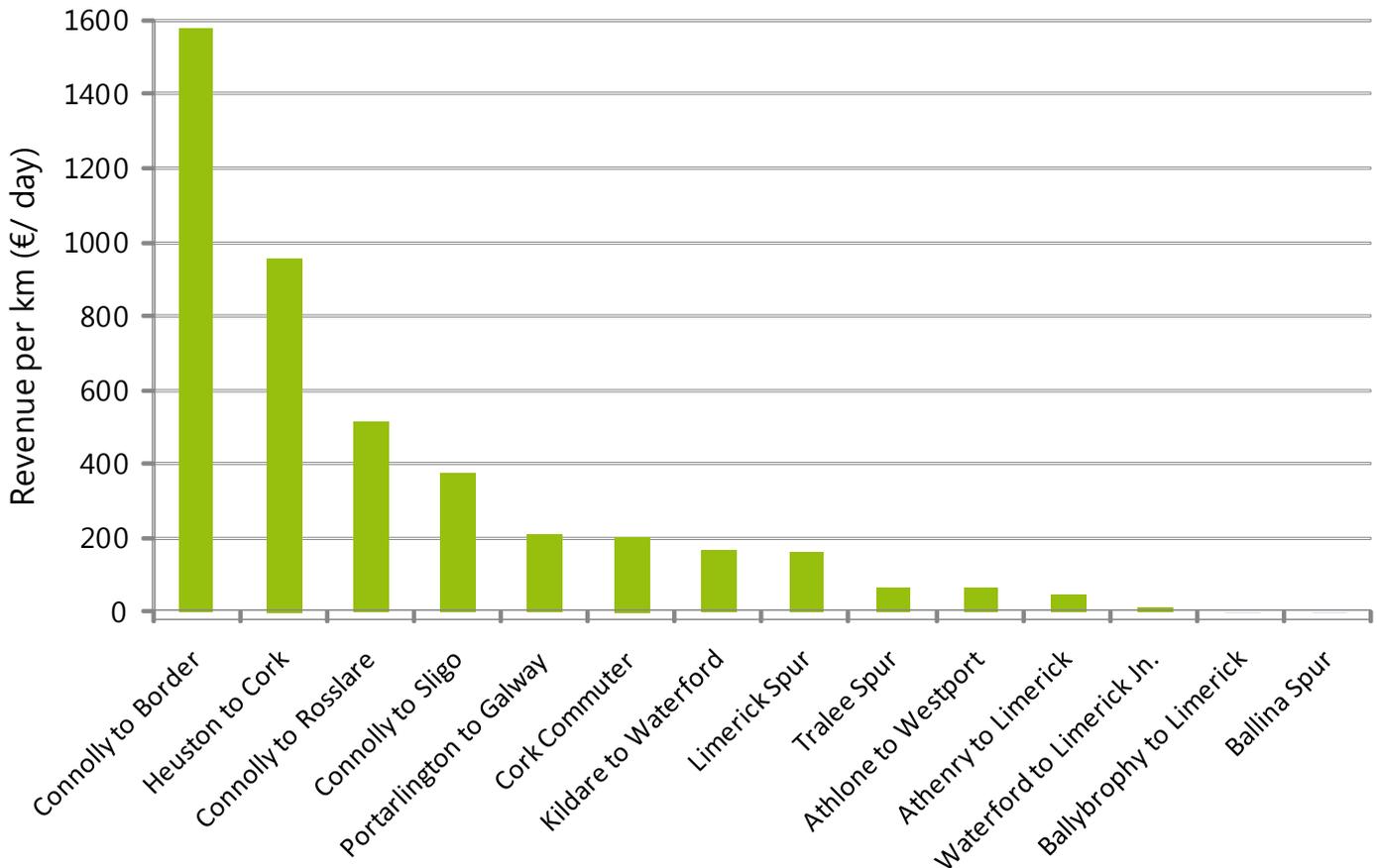
Table 5.5: Reporting Sectors

Sector	Corridor	Total Revenue per day (€)	€/km
1	Connolly to Border	137161	1577
2	Connolly to Sligo	83290	380
3	Portarlinton to Galway	29593	210
4	Heuston to Cork	255026	955
5	Kildare to Waterford	21253	171
6	Connolly to Rosslare EP	86161	513
7	Ballina Spur	270	8
8	Athlone to Westport	9575	71
9	Athenry to Limerick	4765	50
10	Ballybrophy to Limerick	753	9
11	Limerick Spur	5816	162
12	Tralee Spur	7196	72
13	Waterford to Limerick Jn.	1250	14
	Daily Total	€648k	

The results of this exercise are graphed below in Figure 5.10. This analysis provides a clear indication of the financial performance of different sections of the network on the basis of the current pattern of services. It highlights the relatively high subsidies that are required to maintain the Ballina, Ballybrophy and Clonmel lines, mainly as a result of the low existing passenger volumes. Whilst

some lines do show a strong position with regard to financial performance, it is accepted that there is an element of cross subsidy between heavily and lightly used sections of individual lines and this may be distorting the above results. Further more refined definition of sectors would assist in understanding the position at a more micro level.

Figure 5.10: Revenue on Key Corridors



5.9 Mode Competition

Given that the Rail Model has been constructed in a manner that is compatible with the National Traffic Model, it is possible to assess the competitive position of rail on key inter-urban corridors.

Mode competition is generally represented by mode share models, which allocate demand to different modes on the basis of the utility associated with different modes. The utility is an expression which describes all monetary and non monetary costs associated with a travel choice as a single measure and includes:

- Journey time to a stop or station for public transport trips;
- Fare for public transport trips;
- In-vehicle journey time;
- A penalty for interchanging between public transport services;
- A time penalty to reflect timetable restrictions for planning journeys by public transport (service penalty);

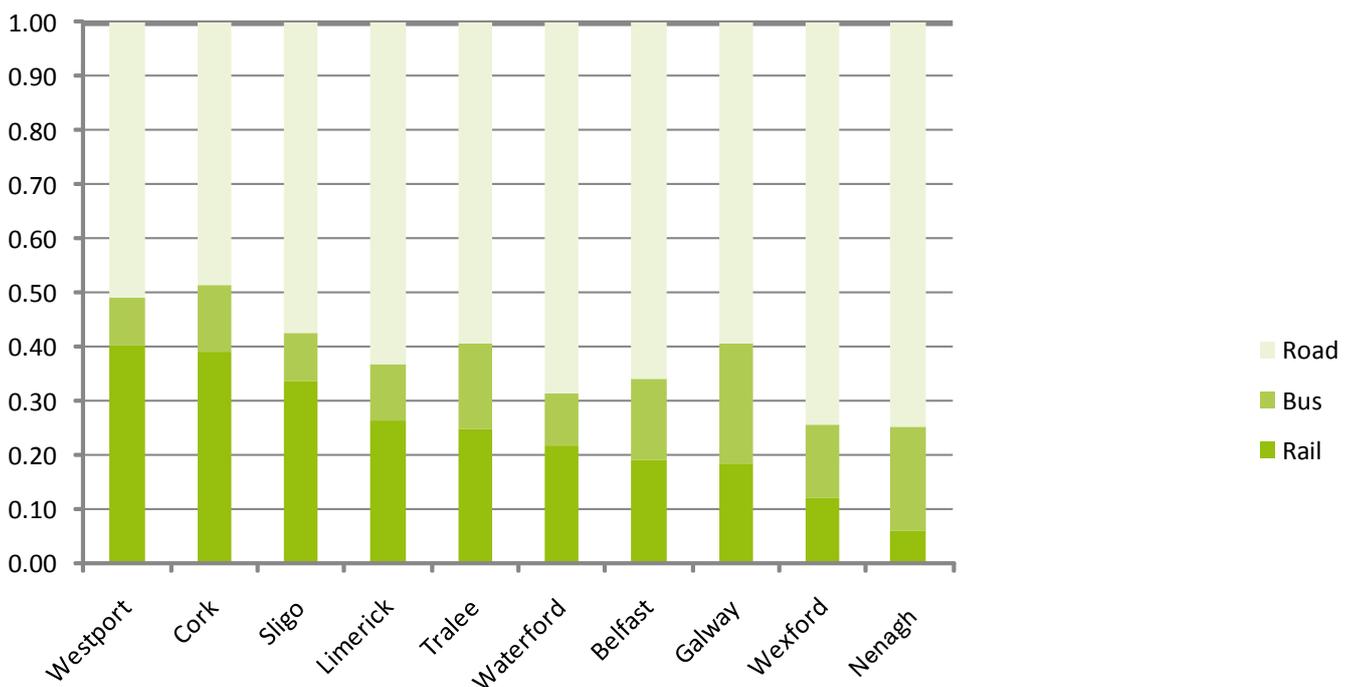
- Journey time from a stop or station for public transport trips;
- A vehicle quality factor (to reflect the comfort of travelling);
- Tolls and fuel costs for travel by road; and
- A weighting applied to access and egress from a stop or station for public transport services;

Mode choice models are 'nested'. That is, users first make the decision whether to travel by road or public transport, before making the decision as to whether rail or bus will be the preferred public transport option.

Mode share models have been prepared to reflect the existing situation for each inter-urban railway corridor, and have been validated by examining origin destination information from both the National Rail Model and the National Traffic Model. The competitive position of rail, bus and car for a number of major inter-urban movements is set out in Figure 5.11.

The data demonstrates the Cork to Dublin route captures a significant proportion of journeys undertaken between these locations. The variation in the capture rate between routes reflects the frequency and quality of passenger experience provided by each route, in addition to the difference in journey times between each travel mode.

Figure 5.11: Existing Mode Competition on key destinations from Dublin



The analysis shows that routes from Dublin to Westport, Sligo and Tralee capture a relatively high market share, mainly as a result of the lower quality of road infrastructure. The high market share for Cork is a result of the competitive journey time. It is noted that the market share for Limerick is somewhat hampered by the requirement for interchange at Limerick junction, without which the rail share would be comparable to those for Cork.

The analysis shows that in general, passenger demand on the south western corridor to Limerick, Tralee and Cork is quite strong, operating in excess of 70 per cent of potential demand. Elsewhere, however, demand is relatively low with significant enhancements in passenger demand possible on the Galway, Waterford, Wexford and Belfast routes. The demand on the Belfast route is extremely low, explained to some extent by the presence of the border, but likely as a result of the more limited levels of service and higher competition by road.

5.11 Conclusions

The development of a National Rail model has facilitated valuable interrogation of rail demand data for 2009 demand data. It is based on the compilation of data from the 2006 Census of population, on-board occupancy surveys, station boarding/alighting surveys and market research information to provide a single source of all rail passenger data.

The analysis has led to a number of important conclusions:

- That the Dublin-Cork corridor remains the dominant corridor on the rail network, carrying a high level of passenger demand, and a significant level of inter-city movements, particularly by business travellers. It also competes strongly with car for trips between Dublin and Cork city;
- Although the route summaries suggest that the patronage on the Galway Services are relatively low, the demand on services between Dublin and Athlone/Ballinasloe is quite strong, and is comparable with sections of the Cork and Belfast corridors. In fact, the Galway corridor performs a very strong intercity function, with only 16 per cent of passenger kilometres accounted for by commuters. Competition with road on this route is severely impacting on passenger volumes, although the train can offer competitive journey times to intermediate destinations such as Tullamore;

- The Dublin to Belfast corridor carries a relatively high level of passenger demand, although much of this is accounted for by outer-commuting services to Drogheda and Dundalk. The low level of business travel on this corridor is particularly notable;
- The high levels of demand on the Dublin – Sligo route are mainly accounted for by trips from the outer commuter belt of Dublin, with relatively low levels of passenger demand to/from Sligo.
- The Waterford – Limerick Junction, Ballybrophy – Limerick and Manulla Junction – Ballina all carry quite low passenger volumes and low levels of passenger kilometres. The existing demand on the Ballybrophy to Limerick line is especially poor; and
- The contribution of concessionary travellers to total passenger between 10% on the core network and 40% on those parts of the network furthest from Dublin (Tralee, Westport and Ballina). The Dublin – Cork, Kildare – Waterford, Tralee Spur, Ballina Spur and Athlone – Westport carry notably high levels of concessionary travel.

An aerial photograph of a city street, likely in Dublin, Ireland. A tram is visible on the tracks in the lower-left quadrant. To the right, there is a large, multi-story building with a classical architectural style, featuring a prominent statue on its roof. The street is lined with buildings and has a 'RESERVED' marking on the pavement. The entire image is overlaid with a semi-transparent green filter.

6 Infrastructure &
Service Review

6.1 Introduction

The quality and level of service provided by rail varies substantially across the network. At the upper end, the Dublin – Cork corridor provides high quality rolling stock at hourly frequencies offering competitive journey times with car, whilst some regional services provide nominal service frequencies using more dated rolling stock and at relatively slow speeds. This section of the report examines the issues that dictate overall level of service throughout the railway network.

6.2 Network Classification

In describing the network, a classification has been developed which allows the function and relative contribution of each line to be understood. The following classification is considered reflective.

Using these definitions, Figure 6.2 shows the classification of existing lines on the basis of current infrastructure and service provision. It also shows the number of services per day on each corridor.

Figure 6.1: Network Classification

PRIMARY	SECONDARY	TERTIARY
High Quality Rolling Stock		Functional Rolling Stock
Journey times comparable with road		Poor journey times in comparison to road
Limited stopping		Frequent stopping
At least hourly frequency	Up to 8 trains/day	Less than 4 trains/day

The graphic clearly shows the importance of the corridor leading from Heuston Station to Cork, with supporting connections to Tralee, Limerick, Galway/Westport and Waterford. Other inter-urban routes to Sligo and Belfast complete the corridors which may be described as 'Secondary Corridors'. Using this approach, it is noted that a number of key services (particularly those into Limerick) would be defined as Tertiary, in addition to the Rosslare Europort/Wexford services from Dublin.

Comparing the classification against service frequencies, a number of contradictions exist as follows:

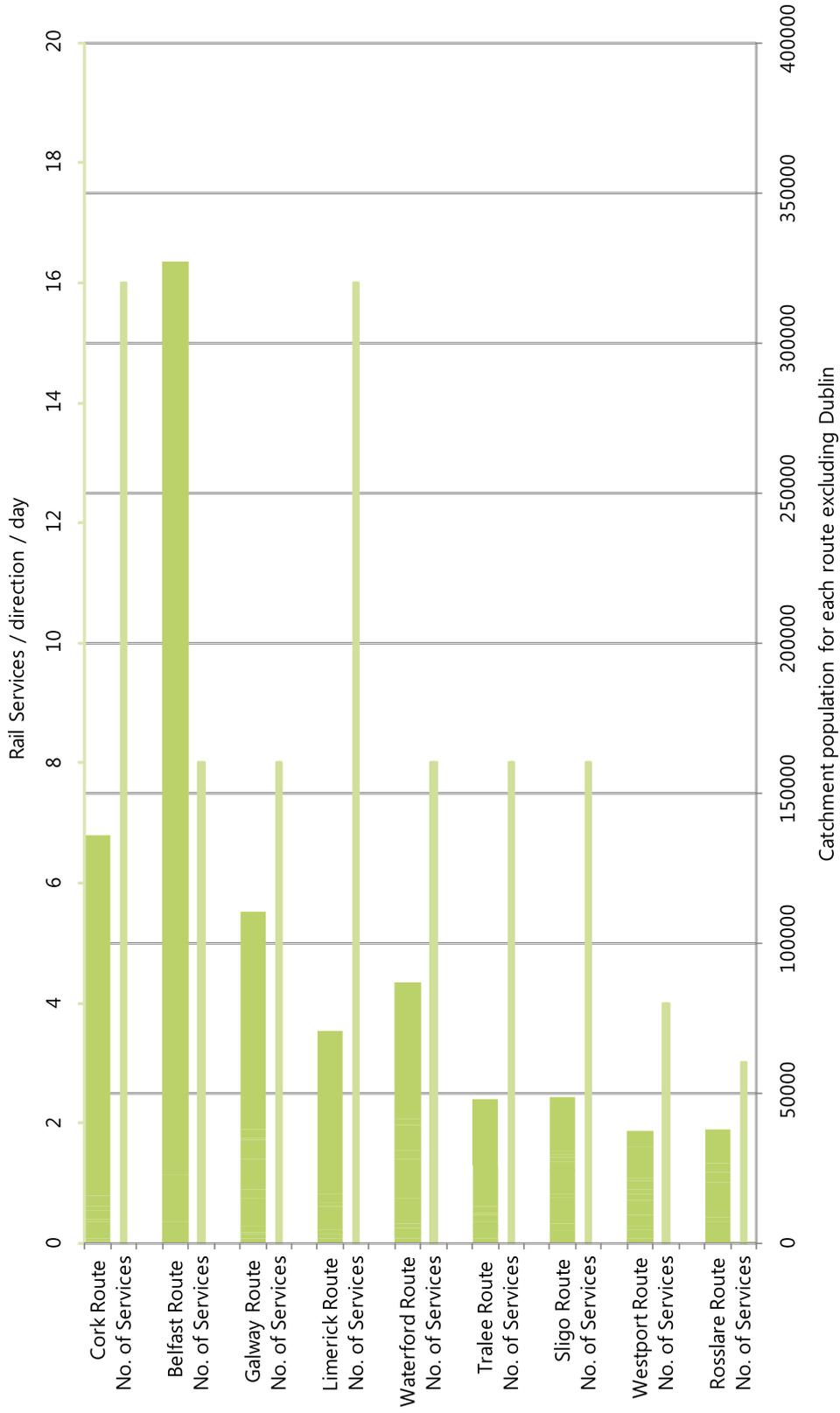
- The Wexford corridor, which has a frequency of 5 trains per day, but with the use of commuter rolling stock on certain services, and the slow running speed dictating its definition as a tertiary service;
- The Limerick junction to Limerick connection, which operates at high frequency and good running speed, but using rolling stock not normally associated with intercity travel; and
- The Western Rail corridor, which offers poor running speeds and lower quality rolling stock.

6.3 Population Catchments

Further insight into the setting of service frequencies can be gained through an examination of population catchments along each line. In defining population catchments, useful information is available from the 2006 Census of Population, which reports population levels in each town cluster, and which is generally associated with a defined railway station. In circumstances where a station is served by a number of routes (in the case of Kildare, Sallins, Newbridge and Portarlinton), the population of that town has been allocated to each route on the basis of the number of services from each route, whilst also allowing an allocation to commuting services.

Figure 6.3 shows population catchments along each of the mainline services terminating in Dublin (excluding the population of Dublin City). Current weekday service frequencies by route are also shown.

Figure 6.3: Population Catchments on routes from Dublin



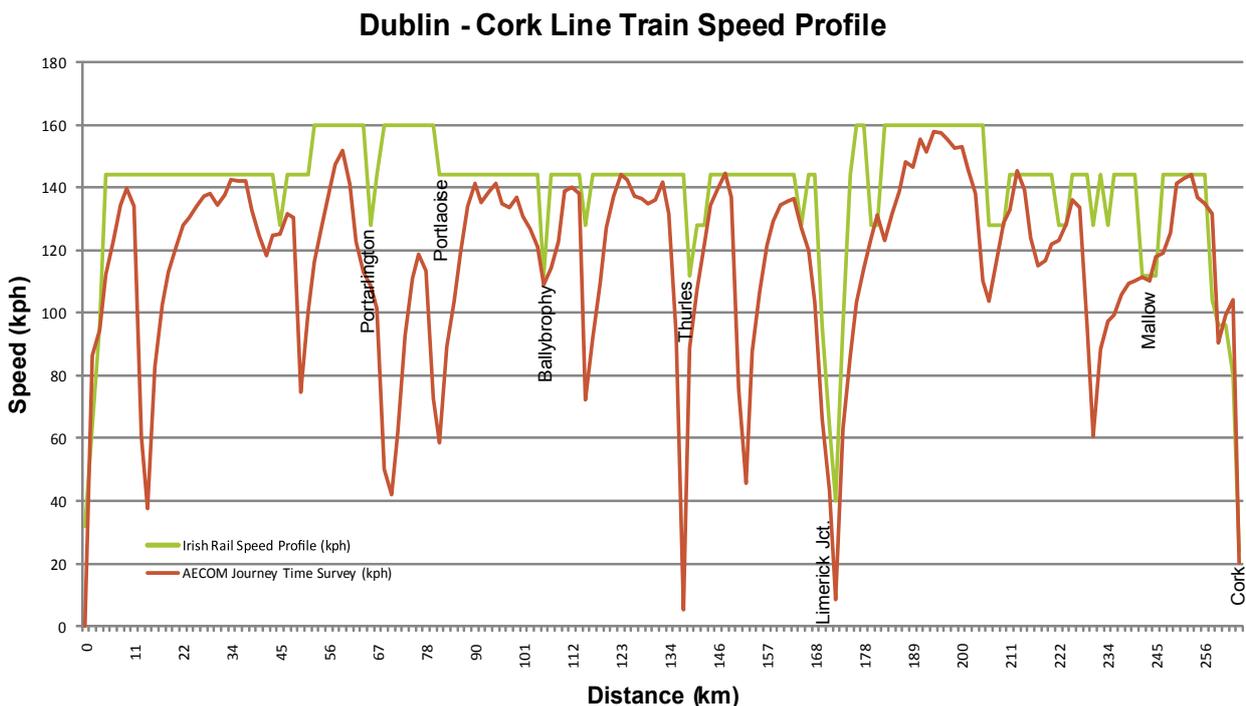
The plot demonstrates the dominance of the population catchment of the Belfast corridor, which retains quite a moderate service frequency, at 8 services per day. Interestingly, both the Cork and Galway corridors have a similar population catchment, with the Galway corridor relying more on the catchment in the intermediate towns (including Tullamore, Athlone and Ballinasloe). Despite this, the service provision on the Cork corridor is significantly higher at 16 trains per day – this level of service provision is also available to Limerick despite a lower catchment population.

6.4 Line Quality

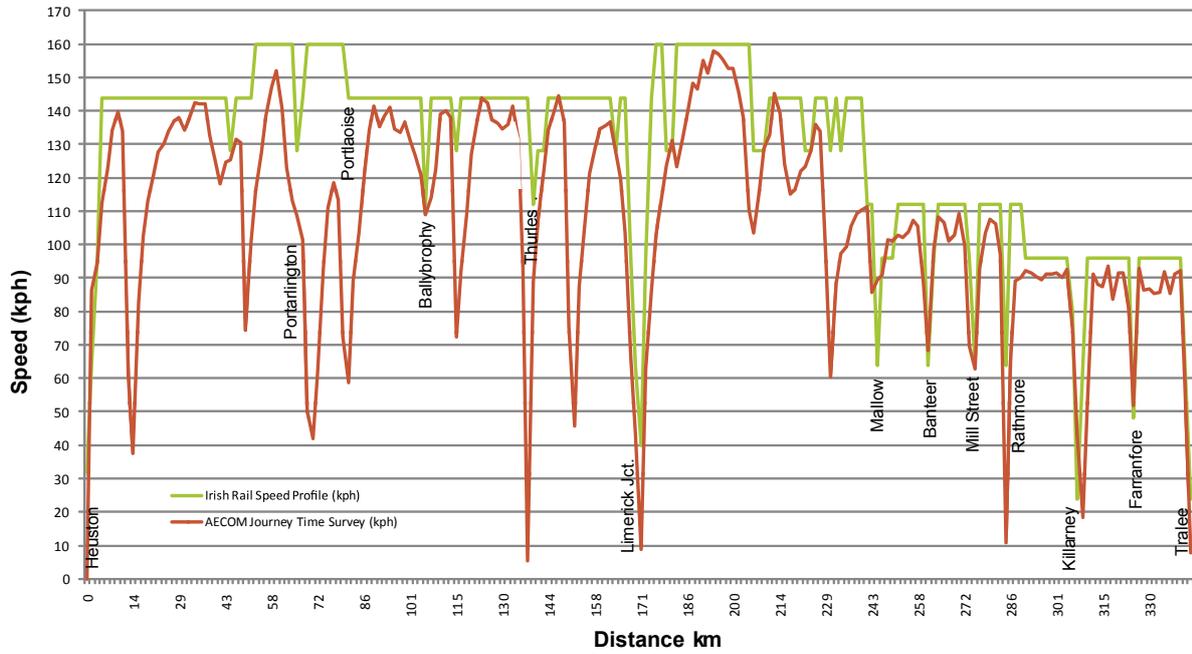
Line quality defines the ability of trains to travel existing corridors at high speed, thereby offering an attractive service which can compete effectively with travel by road. Line quality can be measured

through an assessment of existing line speed and track condition, which defines speed ratings for various parts of the network. Nevertheless, journey times are also dictated by the number of stops (which in turn increase acceleration/deceleration requirements), temporary and permanent speed restrictions, and the disruption caused by passing loops on single track. Furthermore, driver behaviour does not always follow rated line speeds, as drivers may not always operate the locomotive or railcar at maximum acceleration or deceleration rates.

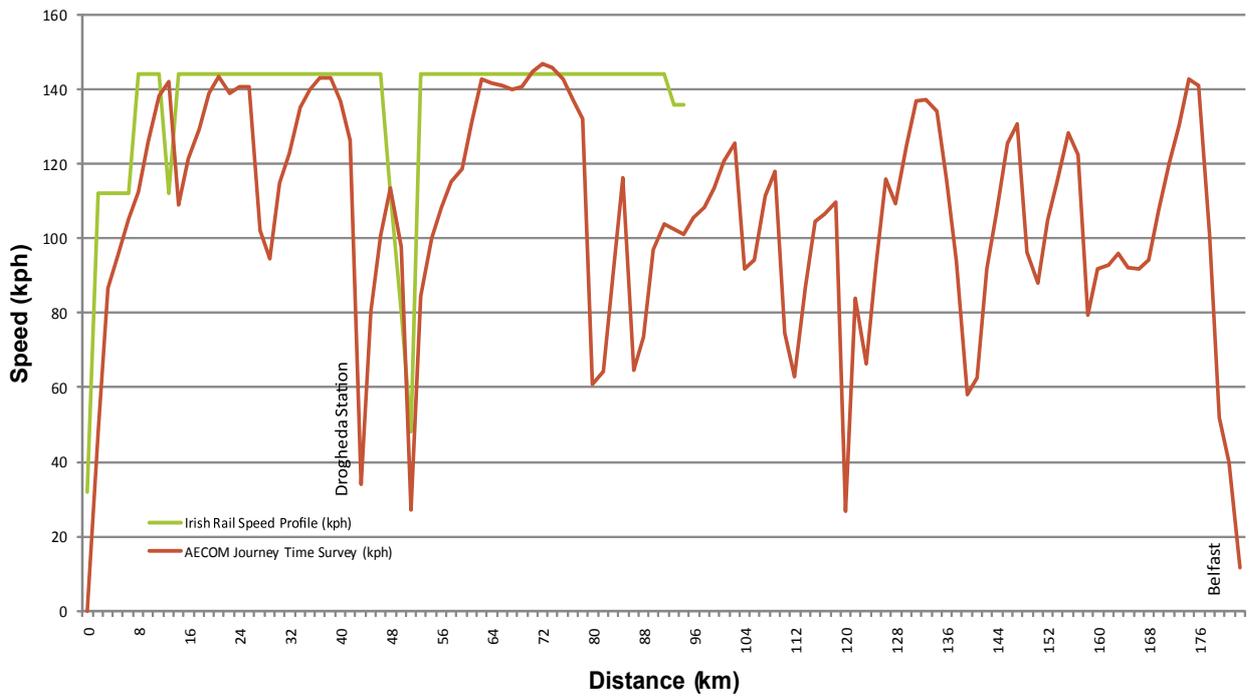
In order to further explore line quality, GPS Tracker technology was used on each route radiating from Dublin to highlight the impact of such factors. The results of the GPS Tracking have been overlaid on rated line speeds for each route as outlined below:



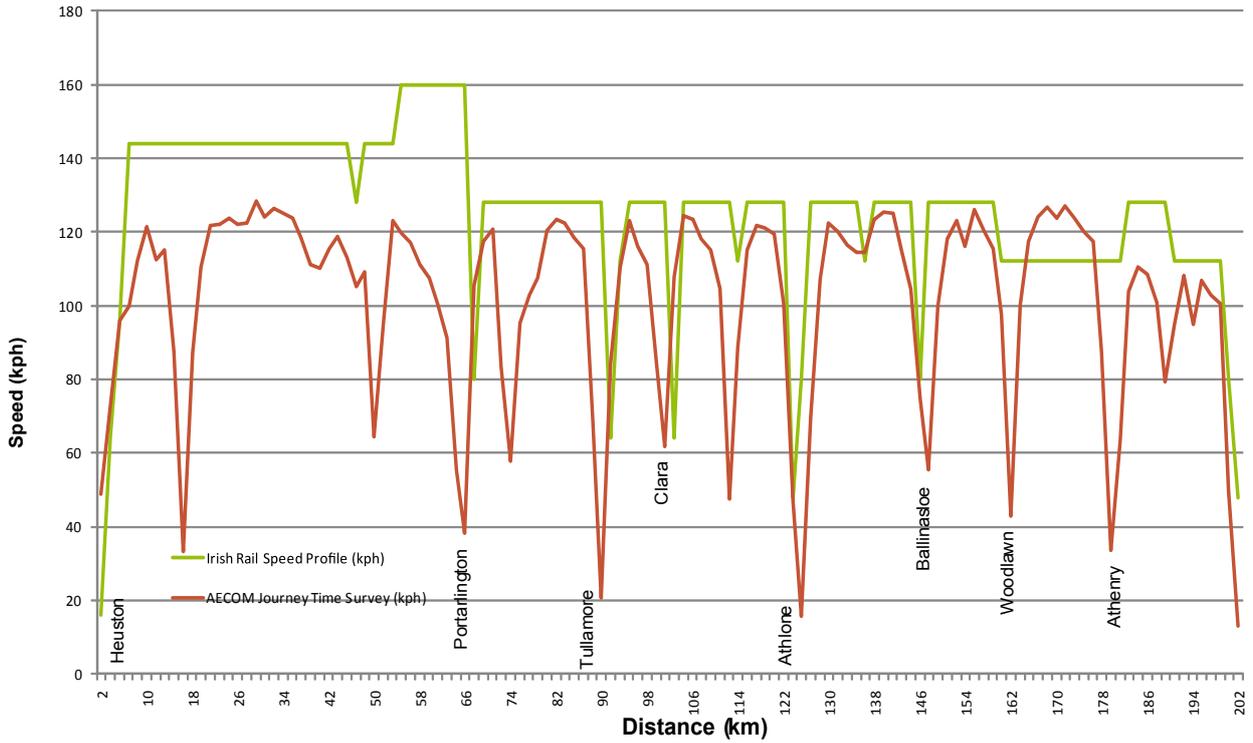
Dublin - Tralee Line Train Speed Profile



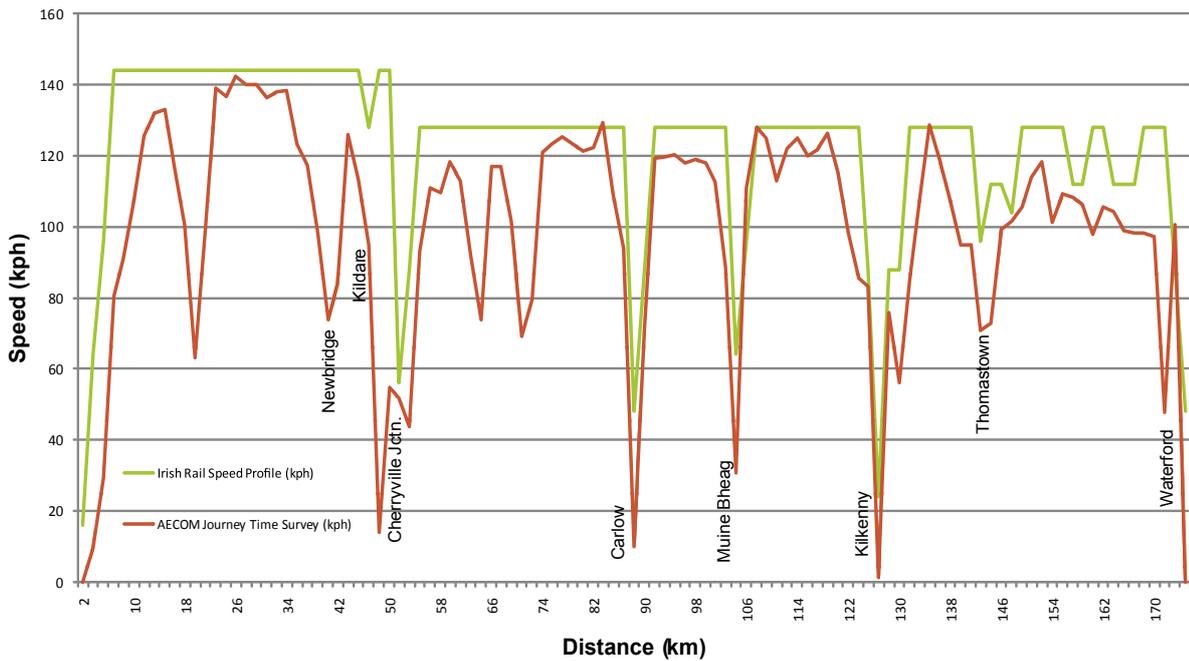
Dublin - Belfast Line Train Speed Profile



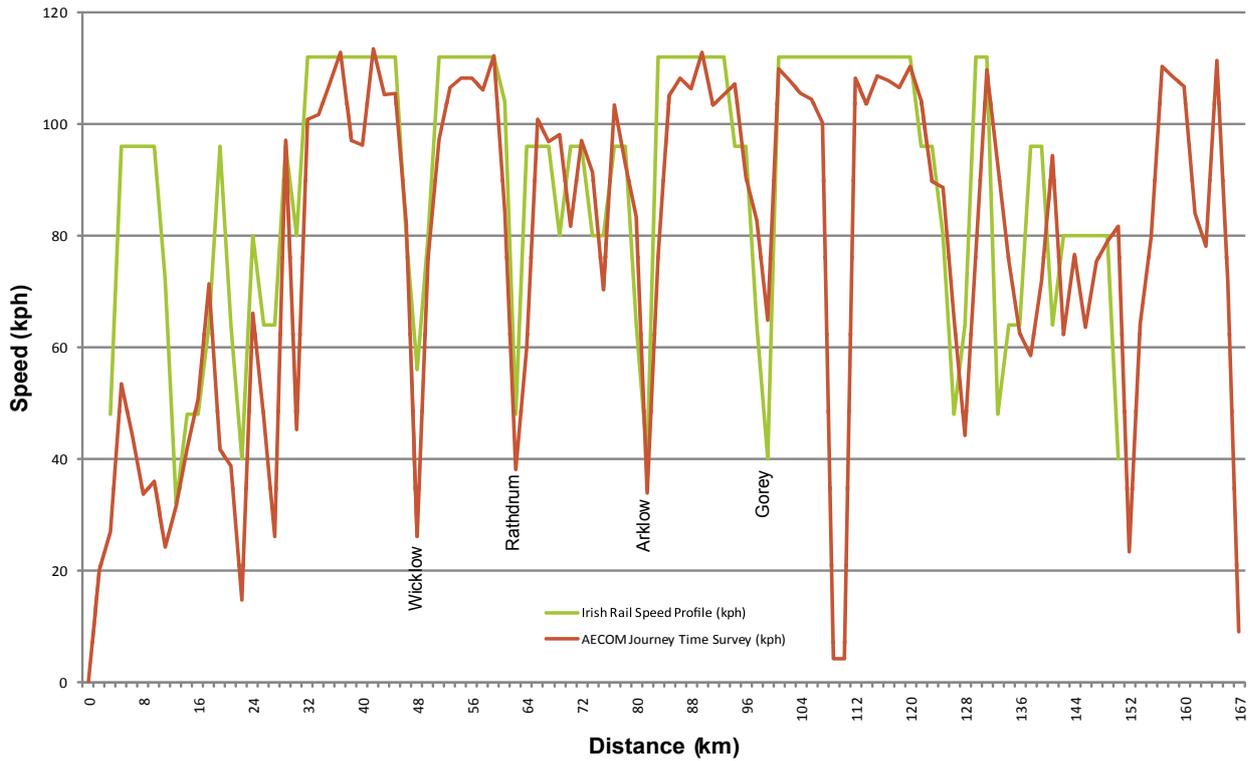
Dublin - Galway Line Train Speed Profile



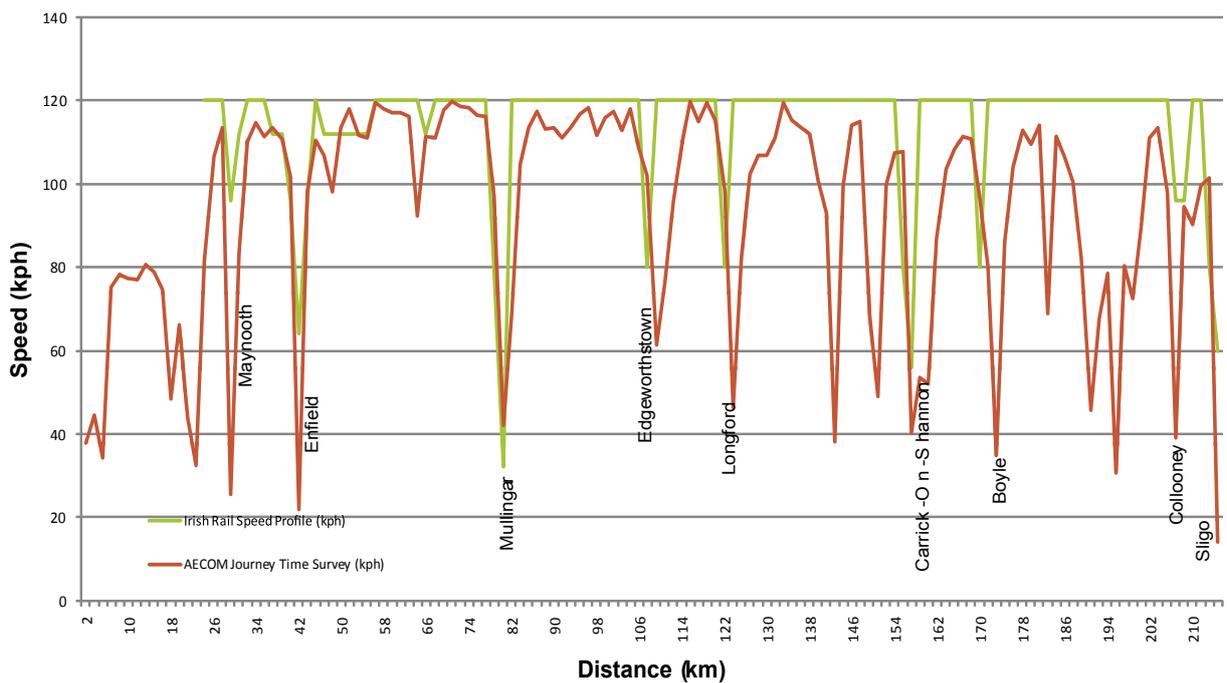
Dublin - Waterford Line Train Speed Profile



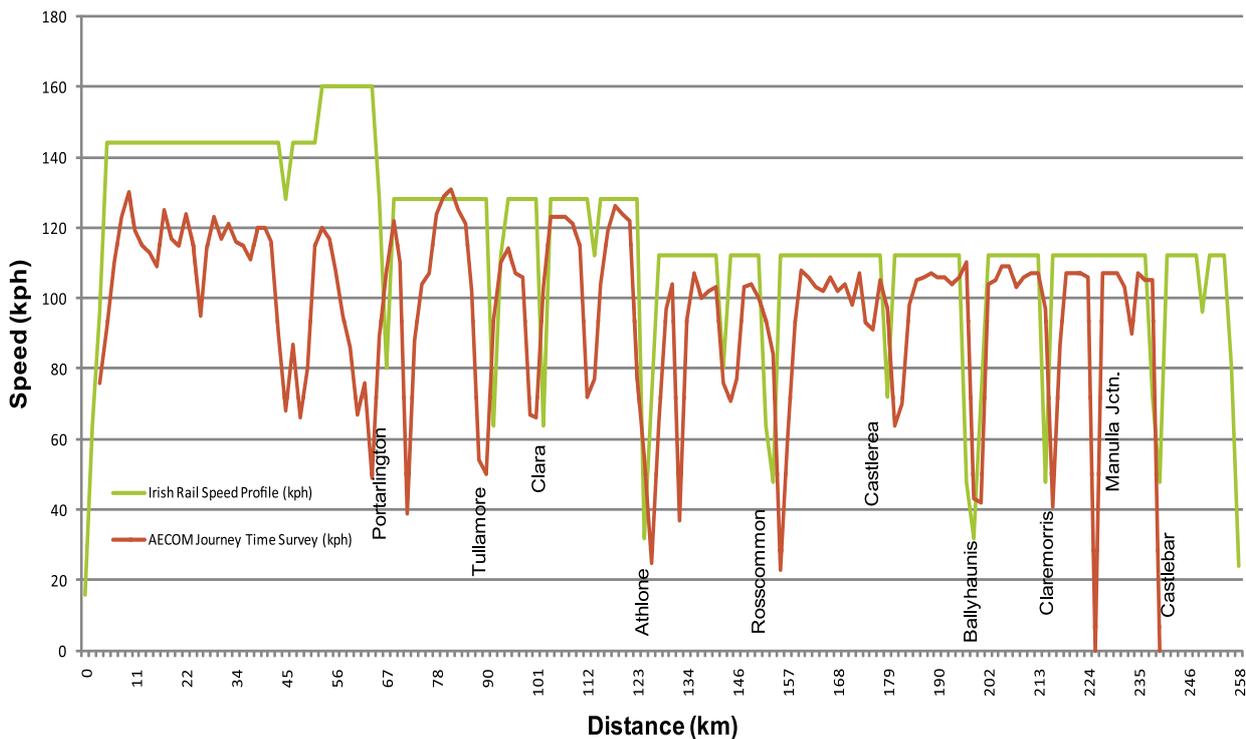
Dublin - Rosslare Line Train Speed Profile



Dublin - Sligo Line Train Speed Profile



Dublin - Westport Line Train Speed Profile



The outputs show the impact braking and acceleration requirements has on train speeds, providing a more realistic picture to that drawn from examination of rated line speeds. The plots show the significance of temporary speed restrictions or delays due to line congestion. For example, the Cork route experiences no less than 12 significant speed reductions on a service with 4 scheduled stops – this leads to a notable increase in journey time.

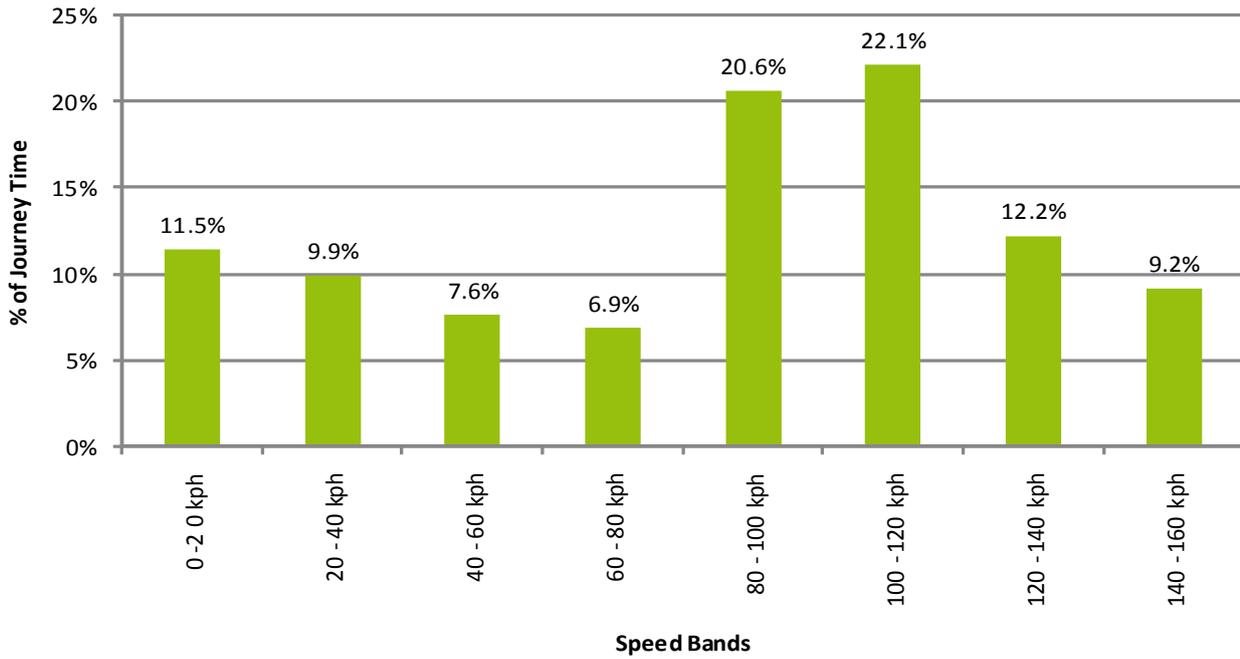
As seen in the plots above, almost all of the routes surveyed experience a large number of significant speed reductions, resulting from planned or unplanned maintenance, scheduled stops, or passing loops.

As a further analysis, routes can be allocated into speed bands, showing the proportion of time a particular service will travel within that speed band. Speed bands have been defined for 20kph bands up to a maximum of 160kph, with the proportion of time within each band represented as a histogram for each route. The steeper the rise on the histogram, the more efficient a service performs, with less time spent at lower speeds. Results are outlined below for each of the key routes.

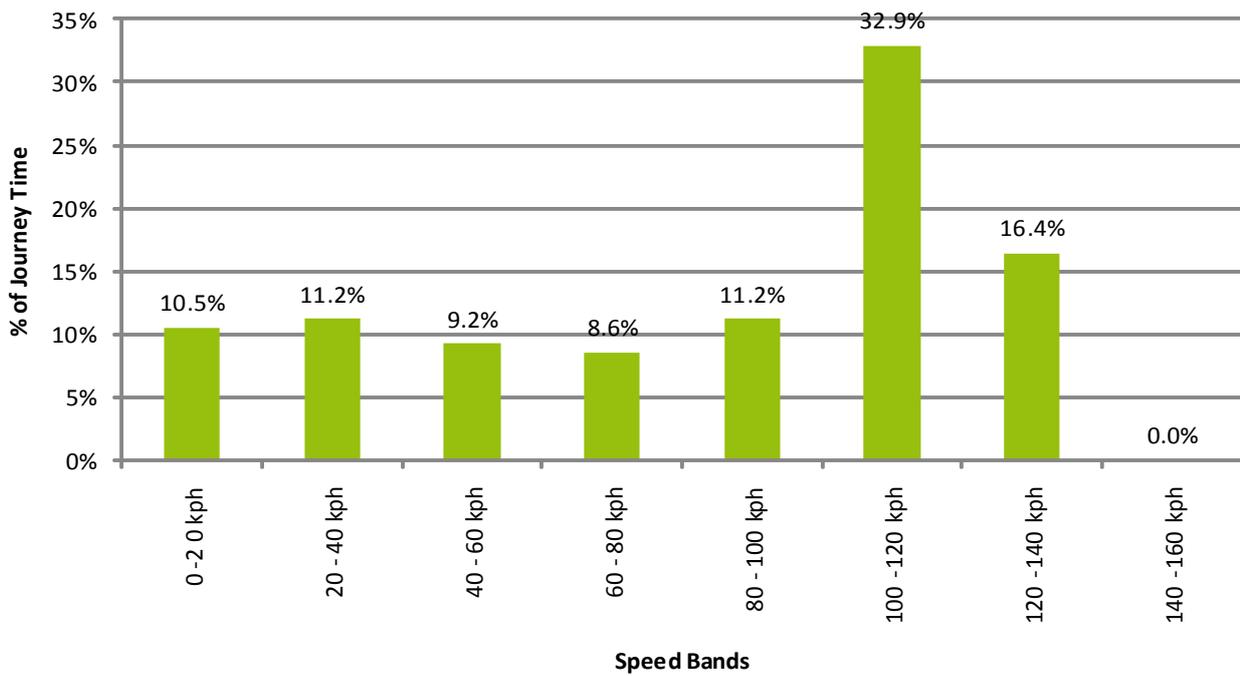
Figure 6.4: Proportion of Journey Times at different Operating Speeds



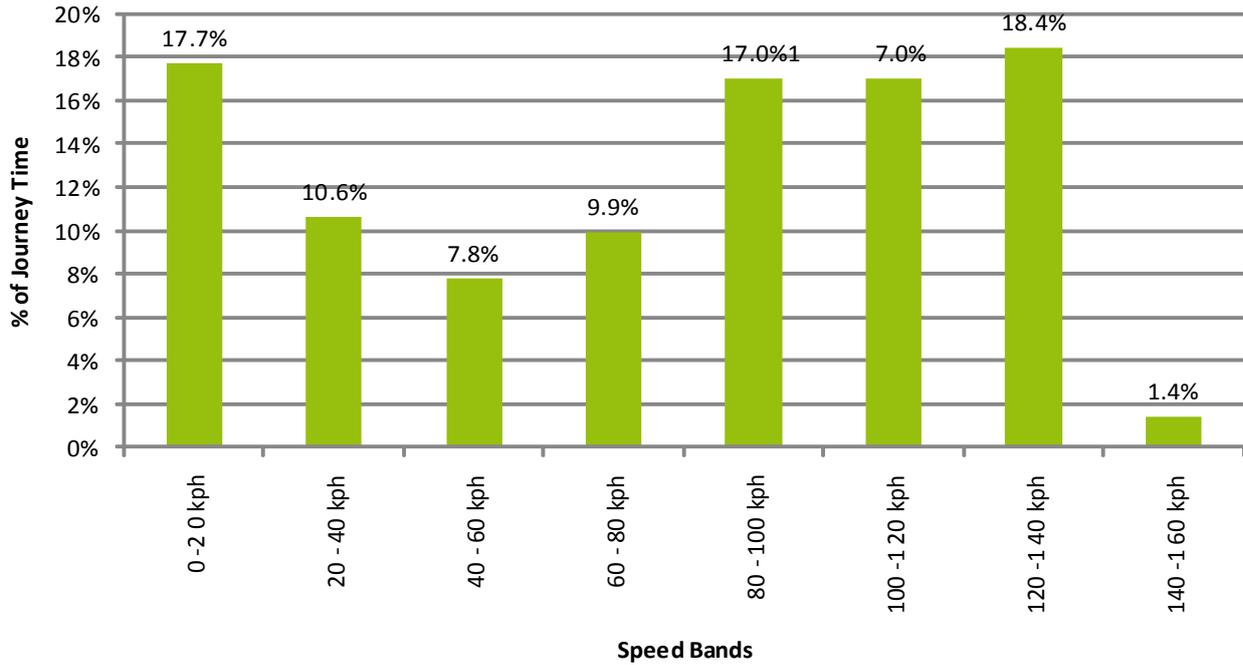
Dublin / Belfast Rail Service



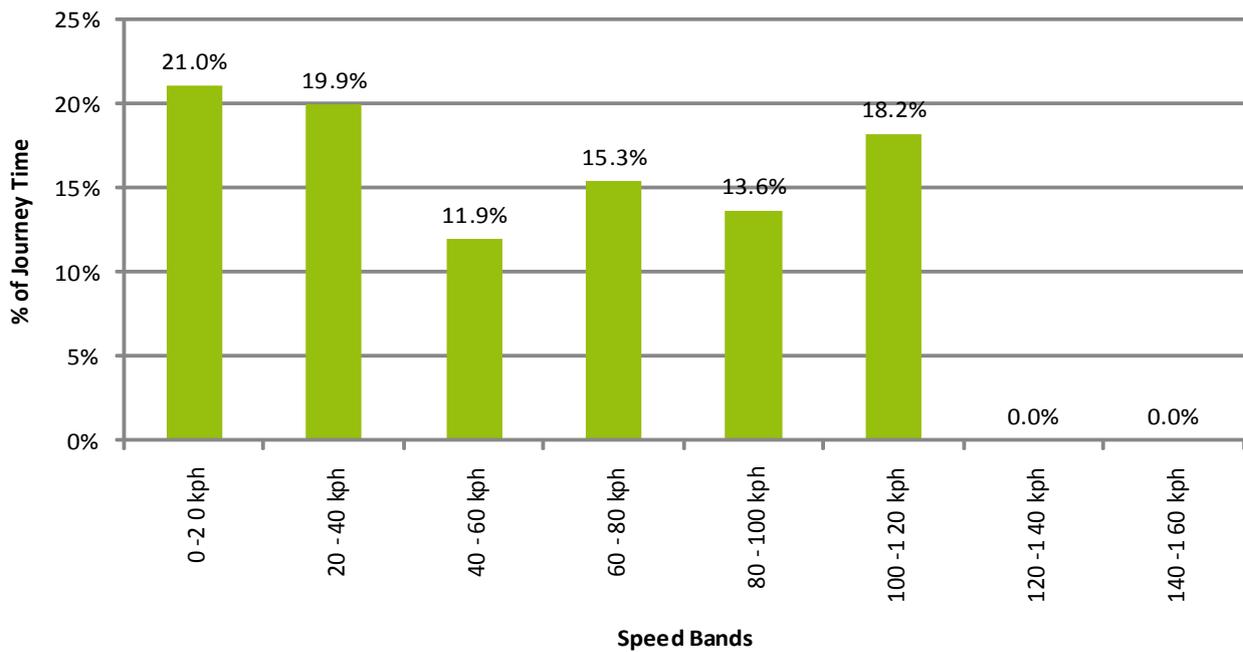
Dublin / Galway Rail Service



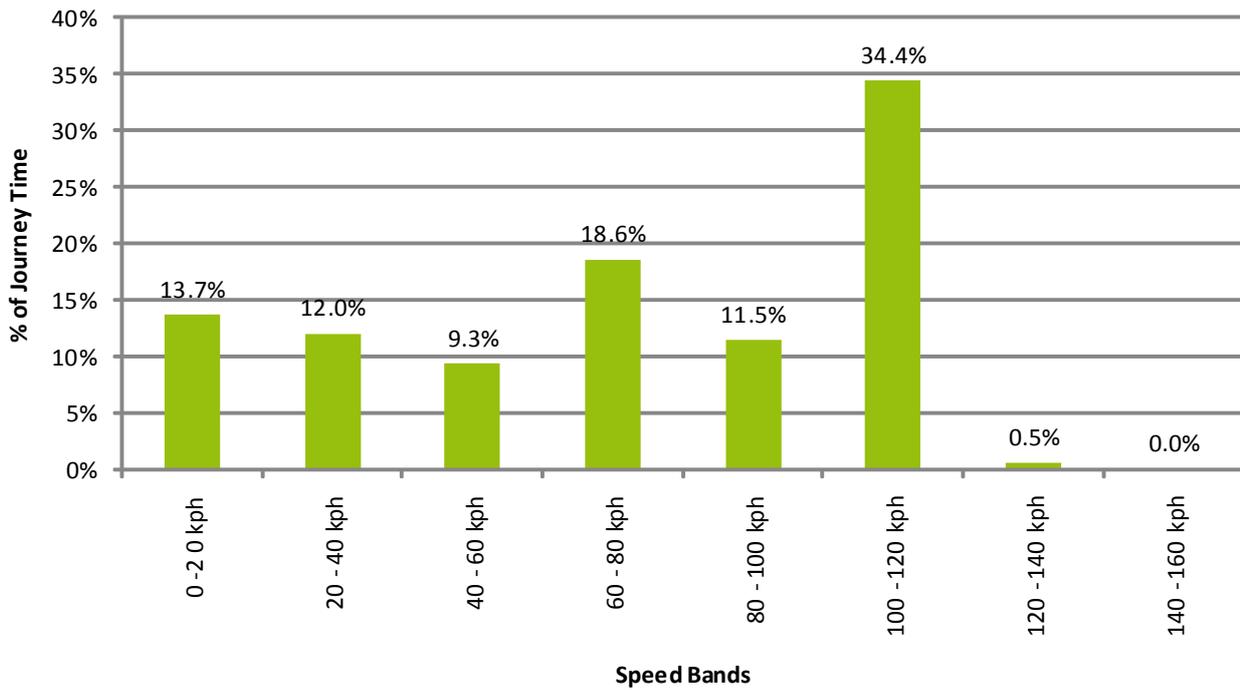
Dublin / Waterford Rail Service



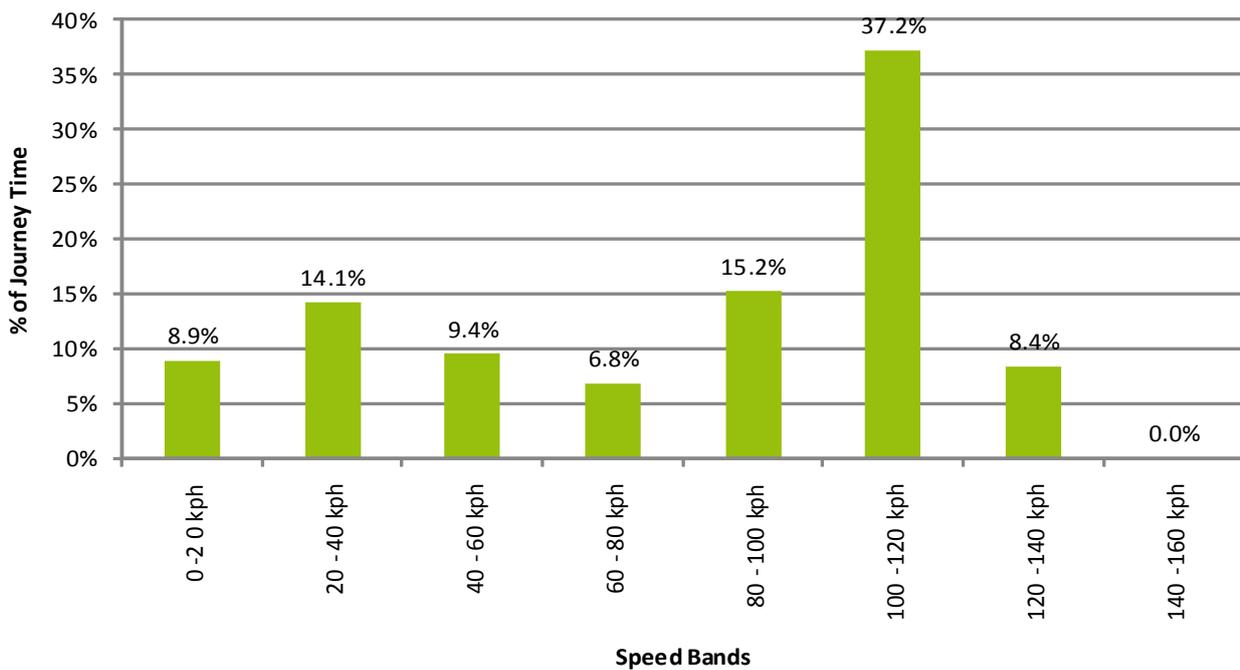
Dublin / Rosslare Rail Service



Dublin / Sligo Rail Service



Dublin / Castlebar Rail Service



The results show that considerable variance exists amongst different routes, with Cork showing the highest time proportions travelling at higher speed. Whilst Galway does show a high proportion of time travelling in excess of 100kph, it is restrained by large time proportions at very low speeds (as a result of the high number of stops and time restrictions through passing loops). Rosslare Europort and Waterford in particular show large periods of slow running.

By defining Slow Running as that time spent travelling at less than 80kph, it is possible to identify a measure of lost travel time for each route. Figure 6.4 below shows the percentage of

time on each route where trains were considered to be slow running. It is evident that the Cork and Limerick routes exhibit the least amount of time travelling between 0 – 80 kph whilst the Rosslare Europort, Waterford and Sligo services exhibit the highest levels. A high percentage of slow running was also observed on the Belfast and Galway routes, suggesting that there may be scope for improvement in travel times through addressing existing temporary and permanent speed restrictions, and through reducing the requirement for stopping. The high percentage displayed by the Belfast service is of particular concern as there were only four schedule stops on that particular service.







7 Passenger Demand Forecasts

7.1 Introduction

A key requirement of the Review is a forecast of demand for rail passenger services. This was based, in part, on the network transport demand model developed by the consultants, as outlined in Section 5. In using this model to forecast rail passenger demand, detailed area-based forecasts of the population and jobs are needed to project where people will live and work. These area-based forecasts were derived so as to ensure that when aggregated they were compatible with national population projections as set out below. A full exposition of the area demographic forecasting model is contained in a Technical Paper that is available on request.¹⁷ The focus of this Section of the Review is on explaining the provenance of the national population projections that were used.

While the network transport demand model provides bottom-up forecasts, it was necessary to supplement this with a forecast of aggregate demand for rail services that would be sensitive to economic growth prospects. A time series demand model was devised for this purpose. The forecasts for rail passenger demand that emerged were derived from the network demand model adjusted so that the forecast demand for travel on the network as a whole summed to that forecast by the aggregate demand model. This Section of the Review also outlines the results of the demand forecasting process.

7.2. Demographic Environment

There have been a number of official population projections published in the past number of years. In April 2008, the CSO published their national population projections for 2011-2041 based on the 2006 census¹⁸. On foot of this, they released the

regional population projections for 2011-2026 in December 2008. In January 2009, the DEHLG issued the national and regional population projections for 2010-2022¹⁹. The revised figures by the DEHLG take account of the regional population projections by the CSO and update that Department's figures first issued in 2007. In addition, in May 2008, the ESRI Medium Term Review²⁰ outlined the demographic structure of the population up to 2020 enabling population estimates to be inferred for the period.²¹

The population projections made by these authorities are based on assumptions about fertility (F) and migration (M). The DEHLG and the ESRI made a single projection while the CSO made several projections with different assumptions for fertility and migration. The most critical assumption is that relating to migration.

Whilst recognising the uncertainty regarding future migration flows, the CSO identifies two main scenarios for net migration. Firstly, they propose that immigration will continue at a high level before moderating in the longer term. They suggest net immigration of over 60,000 per annum in the 2006-2011 period, moderating to over 30,000 per annum from 2021 onwards. This forecast is referred to as M1. Secondly, they propose immigration to continue at levels that are more moderate with net immigration of 50,000 per annum in the 2006-2011 period, before levelling off at 10,000 per annum from 2021 onwards. This forecast is referred to as M2. The CSO also include projections based on zero net migration (M0), which assumes inflows of 20,000 per annum being offset by equivalent annual outflows.

The CSO have introduced two new projections based on zero net migration, F1M0 and F2M0. These projections are significantly lower than

¹⁷ Goodbody/Aecom. Technical Paper 1: Demographic and Economic Context. 2010.

¹⁸ CSO Population and Labour Force Projections 2011-2041, April 2008

¹⁹ Department of Environment Heritage and Local Government, National Population Projections and Regional Population Targets 2010-2022, January 2009.

²⁰ ESRI Medium Term Review 2008-2020 May 2008

²¹ At present, neither the CSO nor the DEHLG are expected to revise their national population projections. The CSO's next projections will be published following the 2011 Census. The DEHLG has indicated that no national population projections are envisaged at this time

either the DEHLG or the CSO F1M1. The bulk of this difference stems from the zero net migration assumed by the CSO. These estimates are also lower than the ESRI estimates up to 2020. In 2020, the ESRI estimates are over 400,000 higher than the CSO M0 estimates. Thus, the CSO M0 projections now look the most realistic.

The Department of Transport requires the RPA and the CIE group of companies to provide Business Cases in respect of proposed investment projects. The Department is concerned that the population projections underlying the Business Cases may no longer be valid. The Department has addressed this problem by requiring a set of sensitivity tests,

based on different projected populations. However, their central population assumption is a Moderate Growth Scenario This scenario is broadly in line with CSO F1M0 scenario. A scenario consistent with F1M0 "traditional" is favoured whereby national population is projected to increase from 4.233m in 2006 to 4.766m in 2021.²²

The F1M0 projection is based on the 2006 population and implicitly assumes large out migration over the period to offset the net immigration experienced in 2007 and 2008. Consequently, the F1M0 projections are the most realistic medium growth scenario over the period.

Table 7.1: Population Projections 2006 - 2025 (CSO and DEHLG)

	DEHLG Low	CSO F1M2	CSO F2M0	CSO F1M0	ESRI
2006	4,232,900	4,232,900	4,232,900	4,232,900	4,232,900
2010	4,584,900	4,591,784	4,378,406	4,383,782	4,532,529
2015	4,928,317	5,011,233	4,540,306	4,571,520	4,833,137
2020	5,299,560	5,380,125	4,665,605	4,735,460	5,172,402
2025	5,708,124	5,649,728	4,756,111	4,861,661	
2030	6,164,713*	5,862,198	4,818,998	4,958,884	

Source: CSO Population Projections 2008; ESRI Medium Term Review 2008; Dept of Environment 2009. Dept of Environment population targets extend to 2022. Figures for 2025 and 2030 were obtained by applying the equivalent 5 year growth rate for the 2016-2022 period.

²² This assumes fertility rates remain at the 2006 level of 1.90.

**Table 7.2: National Population Projections
2006-2030**

	F1M0
2006	4,232,929
2010	4,383,782
2015	4,571,520
2020	4,735,460
2025	4,861,661
2030	4,958,884

Source: CSO

The table shows that the population is projected to grow by approximately 575,000 from 2010 to 2030. This corresponds to an annual average growth rate of 0.6 per cent. Examining the previous 20 years from 1990 to 2010 the annual average growth rate in the population was 1.1 per cent. The fall in the average annual growth rate is largely the result of falling immigration.

Based on demographic area based modelling, the current and projected distribution of the population is summarised in Figures 7.1 and 7.2.

Figure 7.1: Population Projections by DED 2006

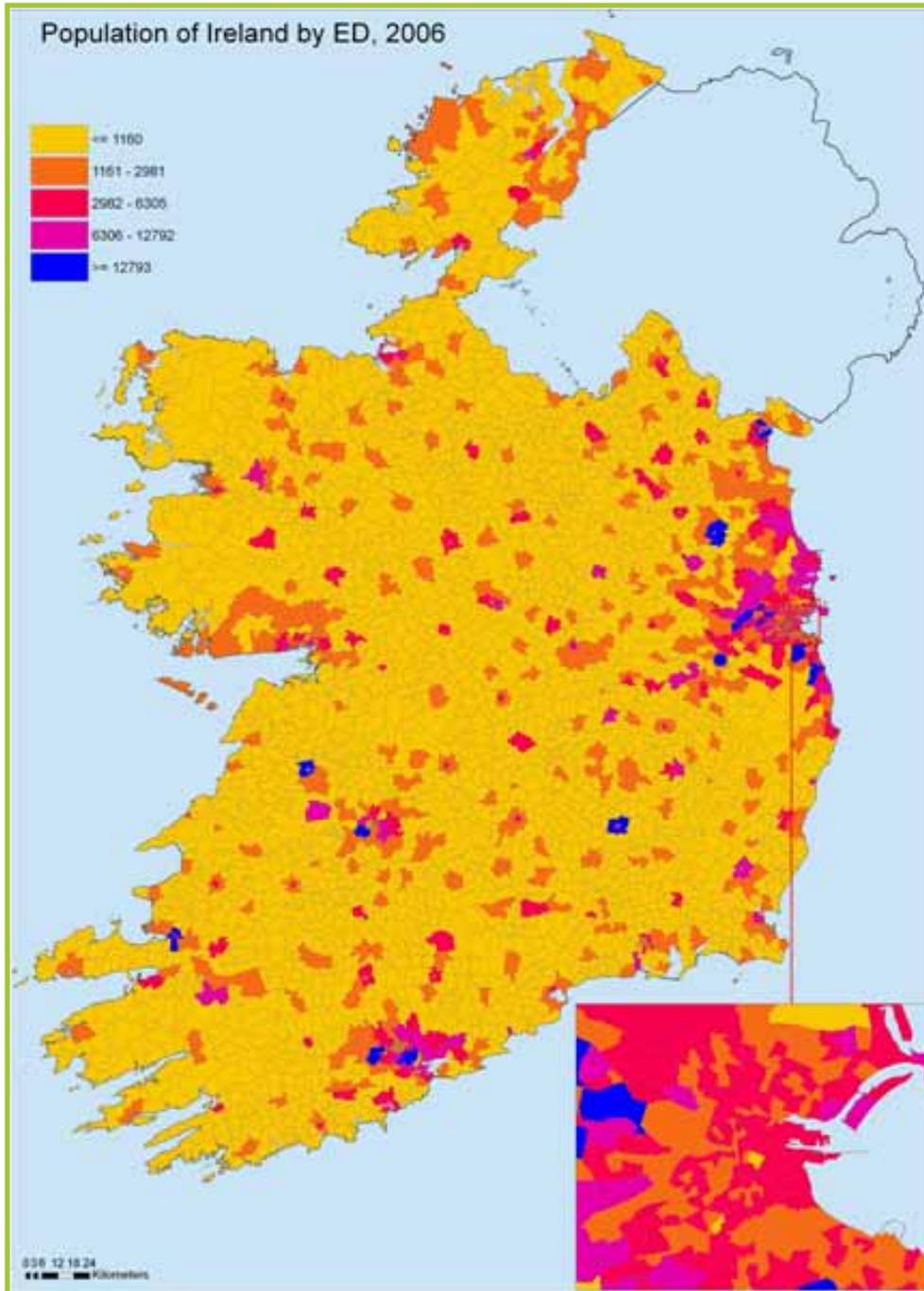
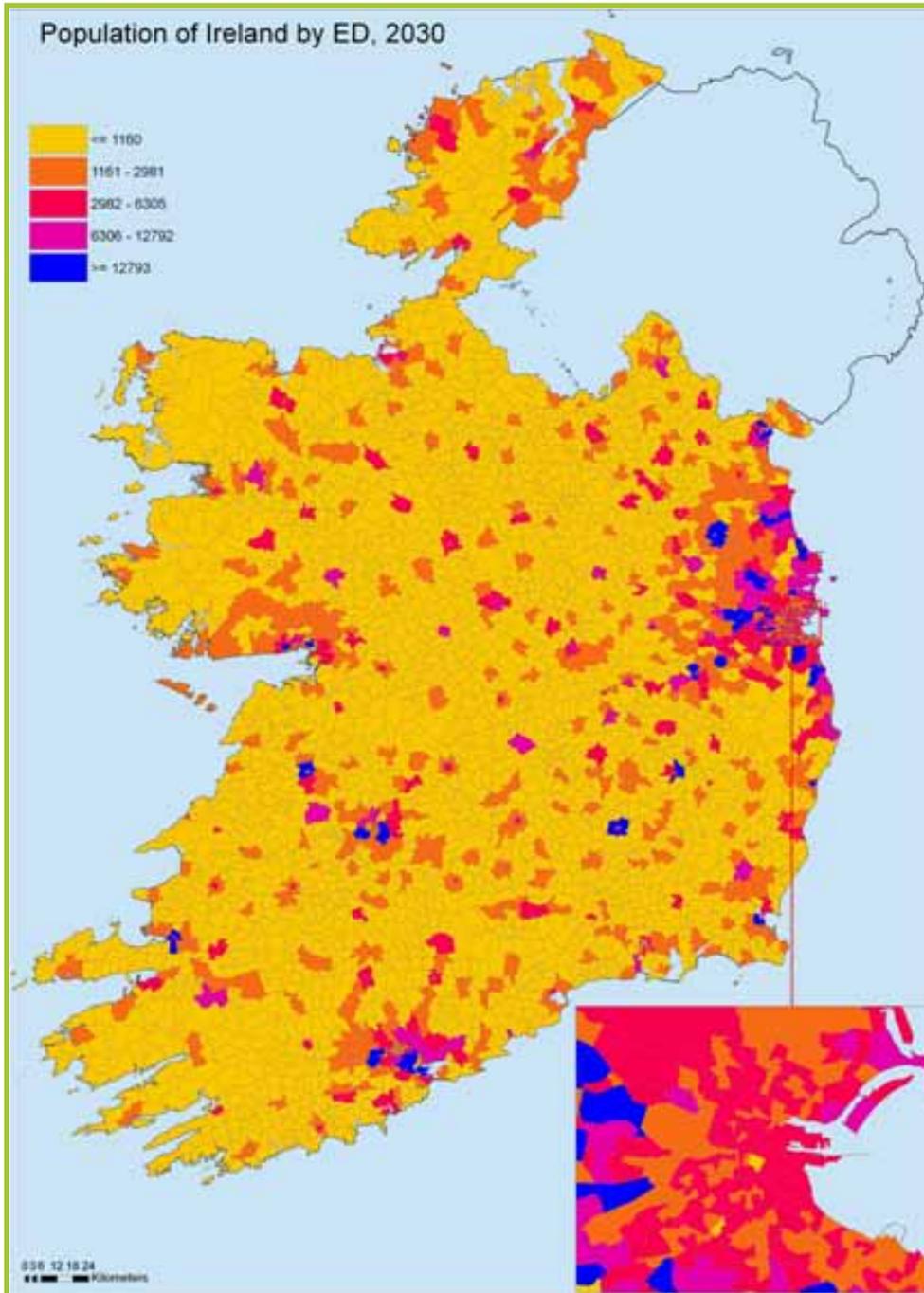


Figure 7.2: Population Projections by DED 2030



The population projections were also used to determine projections of the labour force and jobs. The CSO Labour Force Projections are completed up to 2021. Consequently in order to obtain figures up to 2030, the assumptions for 2016-2021 period were extended for the next 10 years to 2031. Interpolation was subsequently required for 2010 2015 2020 2025 and 2030 projections. Employment numbers are derived from the Labour Force applying unemployment rates. Unemployment is assumed to peak at 14 per cent and decline gradually from 2014 to 5 per cent by 2025. From 2025-2030 the unemployment rate is expected to stabilise at 5 per cent. The growth rate in the Employment Projections is equivalent to the growth in job numbers nationally and is used to inflate DED job numbers over the projection period.

The Population and Labour Force Projections are presented in Table 7.3 below. The projections show that the labour force is projected to grow by 10 per cent between 2010 and 2030. This corresponds to an annual average growth rate of 0.5 per cent. Over the same period the population of working age is expected to grow by 5 per cent.

Table 7.3: Population & Labour Force Projections 2006 -2030

	Population	Labour Force
2006	4,232,929	2,118,262
2010	4,383,782	2,188,271
2015	4,571,520	2,250,171
2020	4,735,460	2,299,779
2025	4,861,661	2,348,799
2030	4,958,884	2,398,864

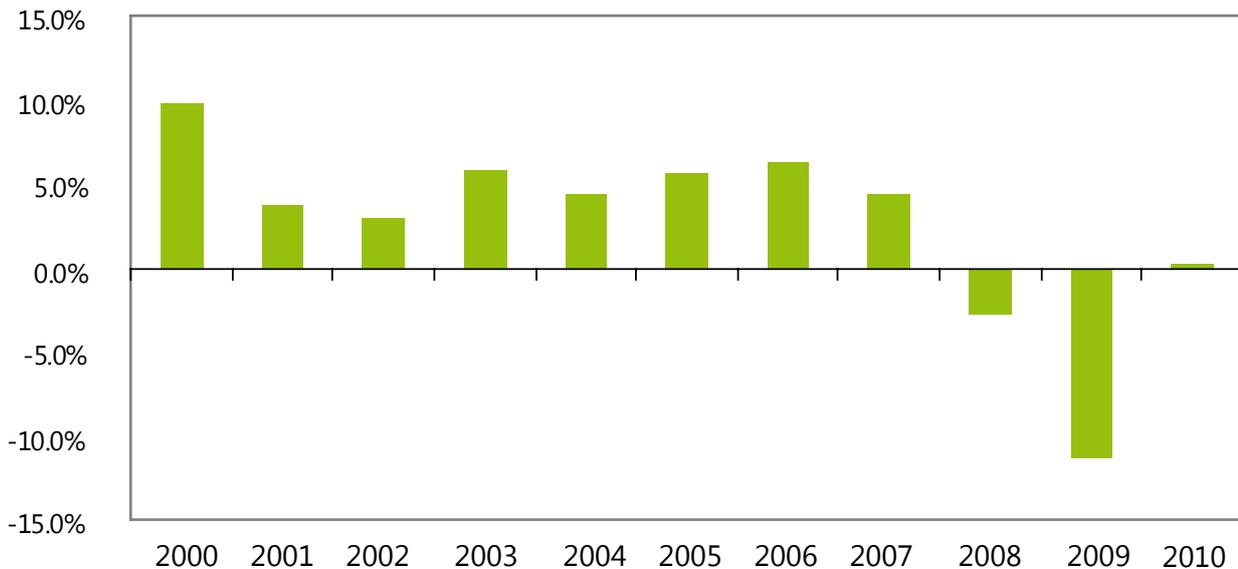
Source: AECOM

7.3 Economic Environment

Ireland’s economy is currently suffering from the combined effects of a world wide economic slowdown and a huge adjustment in the national property and financial markets. After experiencing over ten years of unprecedented growth, our economic fortunes changed dramatically in 2008. The economy shrank by 2.8 per cent in 2008 and by a further 11.3 per cent in 2009, before stabilising in 2010. GNP has fallen a total of approximately 15 per cent from its peak.

Ireland’s economic growth in the period immediately prior to 2008 was fuelled by easily available, cheap credit being used to buy land and buildings in Ireland. Debt levels and property prices reached unsustainable levels. This fragile growth came to a sudden end in 2008. Since then, a vicious cycle of falling property prices and huge losses of capital in the banking system have led to the current recession.

Figure 7.3: GNP Growth in Ireland 2000-2010



Source: CSO

This change in fortunes has had serious negative effects on welfare and public finances. Unemployment was consistently low during the years of economic growth. It has recently grown sharply and reached 14.7 per cent in March 2011.

The sudden reduction in taxation revenues and increase in social welfare spending as a result of this recession put severe pressure on the public finances. Government finances have transformed from an extremely healthy stage where an excess of receipts over current spending was being invested in capital spending, to a situation where Government spending was well in excess of receipts. Despite decisive action to curtail spending and raise taxes, government spending will exceed revenue by an amount equal to 11.6 per cent

of GDP for 2010. At the time of writing, a four year plan for national recovery has been devised encompassing severe restraints on Government spending and on the imposition of additional tax revenue raising measures.

However, Ireland's economy still has the potential for substantial growth in the longer term period, which is relevant to this Review. The long term growth potential of the economy is determined by the rate of growth in labour productivity and the increase in the labour force. Taken together, these two factors indicate a potential GDP growth rate of some 3 per cent in the long term. The ESRI is also of the view that the recovery will take some time to have effect, that so the near term projections are for growth rates at a lower level.²³

²³ During the course of the preparation of this Review, Ireland's economic performance and short term prospects were continually being revised downward and policy initiatives to redress the Exchequer imbalances were ongoing. Given the long time horizon for the review, the consultants took the view that establishing the long term growth paths was the prime concern and that further economic decline in the short term would simply mean postponement of given passenger demand levels for a number of years.

7.4 Energy Environment

7.4.1 World Oil Prices

By late 2010, oil costs between \$70 and \$80 per barrel. At the beginning of 2009, oil prices were \$40 per barrel as the onset of the global financial crisis curbed oil demand. In early 2008, prices had crossed the symbolic \$100 per barrel threshold and reached a peak of just under \$150 per barrel in July of that year.

Oil prices are determined by four broad factors: non-OPEC conventional liquids supply; OPEC investment and production decisions; unconventional liquids supply; and world liquids demand. Since 2009, world oil prices have been especially sensitive to demand expectations, with producers, consumers and traders looking for any indication of a possible recovery in the world's economy and a likely corresponding increase in oil demand. In addition, several factors are contributing to a lack of investment in exploration and production projects. For example, severe problems in the global credit market that began in 2008 have made it difficult to finance some projects. The full extent of the limits of credit availability for oil supply projects will not be fully realised for some time, as projects stalled due to lack of financing would not have brought supply to the market for several years. Equally, the oil price slump experienced in August 2008 saw the delay in the commencement of oil projects, some of which have yet to be revived. Because there is a time lag between investment decisions and oil coming to the market, medium term supply growth may be constrained if delayed projects are not restarted in the short term. The decline in factor costs (cost of materials, labour and equipment) which commenced in 2008 have also encouraged delays in some projects as investors

play a wait and see game in order to secure contracts at the lowest possible price.

It remains unclear how the world's economy and the demand for liquids will recover, and what non-OPEC resources will be brought to the market and what production targets OPEC will set or meet. Equally, in a climate of volatile oil prices, there is uncertainty around whether or when individual unconventional liquid projects will come on line. As a result of this uncertainty, the EIA in preparing oil price forecasts, have developed a broad range of scenarios, with a differential of \$160 per barrel (in real terms) between their High and Low Oil Price forecasts for 2035.

As part of their reference forecasts (which assumes that current practices, politics, and levels of access will continue in the near to mid-term and long terms developments will be determined largely by economics) world oil prices (low-sulphur, light crude oil delivered to Cushing Oklahoma) will reach \$95 per barrel in 2015 and \$133 per barrel in 2035. According to the Low Oil Price scenario, 2035 oil prices will stabilise at \$51 per barrel, compared to \$210 per barrel in the High Oil Price scenario. In the High Price scenario conventional production is restricted by political decisions and economic access to resources: use of quotas, fiscal regimes, and various degrees of access restrictions by major producing countries, whilst consuming countries increasingly turn to high cost unconventional liquids to satisfy demand. The Low Oil Price scenario depicts a situation where non-OPEC producing countries develop stable fiscal policies and investment regimes directed at encouraging development of their resources, to increase their market share of total liquids of 50 per cent in 2035, up from 42 per cent in 2008. Table 7.4 sets out EIA forecast oil prices to 2035.

Table 7.4: EIA Forecast Oil Prices (2008 dollars per barrel)

	Reference	High	Low
	\$	\$	\$
2008	99.6	99.6	99.6
2015	94.5	144.8	51.6
2035	133.2	209.6	51.4

Source: Annual Energy Outlook 2010, EIA

7.4.2 Future Oil Prices in Ireland

Ireland imports all of its oil requirements either in the form of crude oil (into Whitegate refinery) or as finished refined products such as petrol and diesel. The total market for oil in Ireland is about 0.2 per cent of the world total. As such, Ireland is a price taker in the world market for oil. The prices consumers pay for petrol and diesel in Ireland depends on a number of factors including: world crude oil prices; refinery prices; exchange rates; government taxes; inventories; transportation costs; competition in the retail market and company margins etc.

As part of a report completed by the National Competition Authority²⁴ in 2008, it was found that government taxes and levies accounted for 69 per cent and 54 per cent of the pump prices of petrol and diesel respectively. The actual cost of the refined petrol and diesel products made up 26 per cent and 37 per cent of the final pump prices respectively. (The remainder was accounted for by inland delivery charges, credit and profit margins for wholesalers/distributors/retailers). Because Ireland imports all its oil requirements and owing to the fact that oil is traded in US dollars, there is

the potential for changes in world oil prices (both upwards and downwards) to be offset in Ireland by corresponding movements in the dollar/euro exchange rate.

This was seen in 2008, when between March and September 2008 world crude oil prices fell by 24 per cent and the corresponding ex-refinery prices fell by 22 per cent. When account was taken for movements in the euro/dollar exchange rate over that period, there was a 14 per cent fall in the euro value of the refined products imported into Ireland. Applying the 14 per cent reduction in refinery prices to Irish pump prices resulted in a 5.6 per cent fall in prices, because government taxes make up such a large proportion of the overall pump price. The fact that government taxes and levies account for approximately 60 per cent of the price of transport fuel at the pump, means changes in the price of crude oil, and refined oil, have a proportionally smaller effect on prices at the pump.

Under the high scenario, oil prices could double by 2035. This would give rise to an increase in fuel prices at the pump of some 30 per cent. Research suggests that road traffic elasticity with respect to fuel prices is of the order of 0.12.²⁵ This means that road traffic volumes would decrease by some 3.6 per cent. Based on an estimated road vehicle kilometres of travel in 2008 of 31.2bn, this indicates a diminution in traffic of some 1.1bn. Assuming a car occupancy of 1.5, this amounts to about 1.7bn passenger kilometres or somewhat less than the current passenger kilometres on the whole rail system of 2bn.

The key question is the extent to which the road travel would divert to rail. This depends on the cross price elasticity of rail travel with respect to fuel prices. The estimates in the literature for this

²⁴ Investigation into Petrol and Diesel Price Movements, December 2008

²⁵ The Impact of Fuel Prices on Traffic and Fuel Consumption in Ireland. Goodbody Economic Consultants. 2009

cross price elasticity generally lie in the range of 0.1 to 0.4. This is a large range reflecting the fact that the cross price elasticity is sensitive to the rail modal share. Using this range and a current ICN patronage of 21m passengers suggest a transfer to rail of between 630,000 and 2,500,000 passengers or between 3 and 12 per cent of existing annual patronage levels. These estimates albeit crude suggest that a doubling of oil prices could add at most some 10 per cent to ICCN patronage by c.2030. If an increase in oil prices of some 33 per cent were to occur, then prices at the pump would increase by some 10 per cent and the equivalent boost to rail patronage would be of the order of 1 to 4 per cent.

7.5 Competition from Road

The improvement in the National Road Network over the period to 2010 has been significant. The

Major Inter-Urbans are approaching completion, and the development of the Atlantic corridor is underway. Both programmes remain government priorities in the revised Capital Spending Programme. The status of key road corridors and their relationship to main rail routes is outlined in Table 7.5 below.

It is evident, therefore, that the road network continues to improve and will present further challenges for the rail network. The time advantage of rail has effectively been completely eroded along the inter-urban routes, with time savings now only achievable in urban areas. Following the completion of the current programme of road works by 2011, road is expected to give rise to limited additional competition with rail beyond that which currently exists.

Table 7.5: Summary Key Road Corridors

Route	Road	Status	Tolls	Notes
Dublin Rosslare EP	N11	Dual Carriageway M50 to Rathnew, and bypassing Arklow/Gorey	None	Limited further improvements expected by 2016
Dublin Sligo	N4	Dual Carriageway M50 to Mullingar, with further improvements at planning stage	Enfield	
Dublin Waterford	M9	Dual Carriageway Standards Completed in late 2010	None	
Dublin Belfast	M1	Dual Carriageway Standard along full corridor	Drogheda	
Dublin Cork	M8	Dual Carriageway Standard along full corridor	Portlaoise, Fermoy	

Route	Road	Status	Tolls	Notes
Dublin Tralee	M7, N21	Dual Carriageway M50 to Limerick, low quality thereafter	Portlaoise	Improvements to N21 currently at planning stage.
Dublin Limerick	M7	Dual Carriageway Standard completed late 2010	Portlaoise	
Dublin Galway	M6	Dual Carriageway Standard along full corridor	Enfield, Ballinasloe	
Dublin Westport Ballina	N5	Dual Carriageway M50 to Ballinalack, with further improvements at planning stage	Enfield	
Limerick Jct Rosslare EP	N24/ N25	Local improvements only	None	
Limerick Ballybrophy	N7	Dual Carriageway along full length	None	
Galway Limerick	N18	Dual Carriageway Limerick to Ennis, completed 2010	None	

7.6 Competition from the Bus Mode

7.6.1 Introduction

This section considers the level of competition for rail services arising from the bus mode. In practice,

this competition emanates from Bus Eireann's Expressway services and private operators. Bus Eireann also operates regional services that, by virtue of their location, offer less competition to the rail mode.

7.6.2 Level of Service

In terms of service levels, the bulk of the competition arises from Expressway services. Private services are less prevalent due largely to a restrictive licensing scheme that has been operated since the Road Transport Act 1932. However, private sector competition has emerged on some routes, most notably the Dublin-Galway route (see Table 7.6).

Private Bus Operators have dramatically increased their level of service on the non-stop routes that have shorter journey times. For example, Iarnród Éireann offer 10 services a day (8 direct and 2

indirect) on the Dublin-Galway route. Bus Eireann have a total of 15 services daily, six of which have “6-stops” only and nine which are multi-stop. However, the competition from Private Bus operators is even more intense with Citylink and GoBus between them offering 42 services daily, 26 of which are non-stop. Competition from Bus Eireann and Private Bus operators is also strong on the shorter mainline routes where Iarnród Éireann has less journey time to exploit its competitive advantage. For instance, Iarnród Éireann operates 8 services a day on the Dublin-Belfast route compared to 22 for Ulsterbus / Goldline and it runs 5 services on the Dublin-Wexford route compared to 8 for Wexford Bus.

Table 7.6: Comparison of Travel Modes by Service Frequency (per day)

From Dublin to:	Iarnród Éireann		Bus Eireann	Private Bus Operators
	Direct	Indirect		
Cork	14	1	6	7
Belfast	8		22	22
Galway: Limited-Stop	8	2	6	26
Multi-Stop			9	16
Limerick	3	13	13	8
Waterford	8		9	12
Tralee	1	6	11	n/a
Sligo	8		9	n/a
Westport	4		2	n/a
Wexford	5		20	8

Source: Iarnród Éireann Timetable, Bus Eireann Journey Planner, Various Websites

7.6.3 Journey Times

A key distinction between services provided by private operators and Bus Eireann is that the latter does not operate non-stop interurban services, whereas the private sector does. Journey times on all of Iarnród Éireann's InterCity routes are faster than those of Bus Eireann – and considerably so in some cases:

- Iarnród Éireann is 154 minutes faster than Bus Eireann on the Dublin to Tralee route. Bus Eireann does not operate a direct service on this route and the average "switch" time to change from the Dublin-Limerick bus to the Limerick-Tralee bus is 47 minutes. In addition, there is a 15 minute comfort break on the Dublin-Limerick bus route. This gives a total break time of 62 minutes. The remaining 92 minutes difference is explained by lower average speed; and
- Iarnród Éireann is 111 minutes faster than Bus Eireann on the Dublin-Westport route and 95 minutes faster on the Dublin-Cork route - with a 15 minute comfort break on the former and a 38 minute break on the latter. Given the improvement in the National Primary Route system, non-stopping private sector services are very competitive with rail in terms of end-to-end journey times.

Competition from Private Bus Operators is strongest where the provision of non-stop services has enabled them to match Iarnród Éireann journey times and to surpass those of Bus Eireann. For example, the Citylink and GoBus non-stop Dublin-Galway services have an advertised journey time of 150 minutes. This compares to 161 minutes for Iarnród Éireann and 180 minutes for the "6 stop" Bus Eireann service (See Table 7.6)

7.6.4 Fare Competition

Both Expressway and private operators offer relatively low fares. This is particularly true of the Dublin-Galway route where competition has resulted in very low fares. The bus operators do not vary fares by time of day or give discounts for advanced booking (apart from a discount reflective of reduced administrative costs). Bus fares are low compared to rail walk-on fares, however rail advance fares come close to matching bus fares.

7.6.5 Future Competition

The degree of future competition from the bus mode depends on two factors:

- The degree of liberalisation of access to the bus market; and
- The extent to which Expressway chooses to provide more non-stop or limited stop services.

Table 7.7: Comparison of Travel Modes by Journey Time (in minutes)

From Dublin to:	Iarnród Éireann	Bus Eireann	Private Bus Operators
Cork	170	265	230
Belfast	130	157	150 to 175
Galway: Limited-Stop	161	180	150
Galway: Multi-Stop		200	195
Limerick	137	220	160 to 225
Waterford	143	180	163
Tralee	238	392	n/a
Sligo	185	231	n/a
Westport	209	320	n/a
Wexford	155	170	133

Source: Iarnród Éireann Timetable, Bus Eireann Journey Planner, Various Websites

Table 7.8: Comparison of Travel Modes by Fare

From Dublin to:	Iarnród Éireann		Bus Eireann		Private Bus
	Adult Single	Advance	Adult Single	Online	Standard
Cork	€66.00	€20.00	€13.00	€11.70	€15.00
Belfast	€38.00	€18.00	€15.00	n/a	€15.00
Galway: Limited-Stop	€34.50 / €48.00	€25.00	€15.00	€13.50	€10.00
Multi-Stop					€1 / €5 / €14
Limerick	€50.00	€15.00	€11.00	€9.90	€11.00
Waterford	€27.00 / €34.50	€10.00	€13.50	€12.15	€14.00
Tralee	€68.50	€20.00	€25.50	€22.95	n/a
Sligo	€32.00 / €44.00	€22.00	€19.00	€17.10	n/a
Westport	€35.00 / €48.50	€25.00	€19.00	€17.10	n/a
Wexford	€22.50	€10.00	€16.50	€14.85	€15.00

Source: Iarnród Éireann, Bus Eireann, Various Websites

Both of these factors will be influenced by the bus licensing policy in operation. The Public Transport Regulation Act installed the National Transport Authority as the bus licensing authority. The NTA also influences bus service levels through PSO grant aid. The NTA has indicated how it will approach bus licensing through the publication of Guidelines for the Licensing of Public Bus Passenger Services (2010). These guidelines indicate that the NTA will base decisions of the issuing of additional licences, inter alia, on:

- The demand or potential demand in the entire market;
- The needs of public transport users and the extent to which the market segment is currently serviced;
- The impact of proposed services on existing PSO services on the route; and
- The preservation of good order and safety on public roads through temporal separation of services.

While the NTA has discretion to operate within these guidelines, it is clear that full liberalisation of entry to the market is not envisaged and that existing operators can influence the process by demonstrating that they are supplying existing market segments satisfactorily. In particular, the NTA may be reluctant to license additional services where the effect is to increase rail operating deficits and thus the PSO subvention required.

7.6.6 Overview

The bus mode tends to be more than competitive with rail on the basis of fares and service frequency. In respect of journey times however, it is only on routes such as Galway and Wexford, where rail services are relatively slow and private bus operators are offering services, that rail offers poor service in terms of journey times. It is by no means certain that competition from the bus mode will increase over the medium term. Policy decisions on the part of the NTA will be a determining factor.

7.7 Internal Air Transport

7.7.1 Introduction

This section of the report reviews both the demand for and the supply of domestic air transport passenger services in Ireland; analyses air transport pricing policies being implemented by the providers of domestic air services; and draws some conclusions regarding the level of competition posed by domestic air services to Iarnród Éireann both now and in the future.

7.7.2 Level of Service

Table 7.9 sets out the number of domestic outbound flights operated by each of the nine airports in Ireland (as at September 2010). The flights are categorised by whether they represent AM peak flights (6.00 am – 10.00 am); PM peak flights (16.00pm – 20.00 pm); or other flights (all other times).

As the Table shows, Dublin operates by far the largest number of domestic flight options, with weekday AM peak flights available to Cork, Galway and Sligo and weekday PM peak flights

available to Cork, Knock, Galway, Sligo and Donegal (presumably targeting returning business commuters, as well as other types of passengers).

Cork, Galway, Kerry, Knock and Sligo airports all operate similar levels of domestic flight services, each providing at least one AM and one PM peak flight option to Dublin on weekdays²⁷. In the case of Cork and Galway airports, there are two AM flight options available to Dublin on weekdays. Shannon airport provides just one daily flight option to Dublin, this flight is available during the AM peak period on Monday, Tuesday, Thursday and Saturday.²⁸

As the Table shows there were 109 domestic flights operating weekly out of Dublin to other domestic airports in Ireland in September 2010. There were equally 109 Dublin-bound flights operating weekly from Irish airports. In addition, there were a further 22 flights scheduled between domestic airports in Ireland (which neither departed nor arrived in Dublin airport).

These data show that air travel is a competitor on most radial rail routes, with the Belfast service being the obvious exception. However, where it provides competition, it offers a much less frequent service.

7.7.3 Journey Times

Air journey times from Dublin to other airports are typically some 45 to 50 minutes. They are thus very competitive compared to the rail journey times. However, such comparisons ignore the access and egress times associated with these modes. As airports are situated outside conurbations, the access and egress times associated with air travel tend to be high

7.7.4 Fares

The airlines that provide internal flights operate very flexible fares policies, with lower fares for advance purchase and higher fares for flexible tickets. Ryanair operates a yield management system that results in very low fares on occasion. Advance purchase rail fares tend to be somewhat above the lowest air fares on offer, but not to a significant degree. On the other hand walk-up rail fares are significantly below the equivalent air fares

²⁷ From November 2010, the number of Kerry-Dublin flights will be reduced to one daily flight (during AM peak).

²⁸ Flights from Shannon to Dublin cease for the winter period.

Table 7.9: Summary Domestic Flights and Passenger Numbers

Airport	No AM Peak Domestic Flights (weekly)	No PM Peak Domestic Flights (weekly)	No Other Domestic Flights (weekly)	Total Domestic Flights (Dublin-bound)
Dublin	29	40	40	109
Shannon	4	-	-	4 (4)
Cork	10	9	8	27 (24)
Knock	7	-	-	7 (7)
Kerry	7	-	14	21 (21)
Galway	14	10	13	37 (26)
Sligo	5	7	2	14 (14)
Donegal	6	1	6	13 (13)
Waterford	-	4	4	8 (0)

Source: CSO and Goodbody Economic Consultants

7.7.5 Use of Internal Air Services

Almost one million domestic passengers (940,199) passed through Dublin Airport in 2008. In that year, approximately 450,800 domestic passengers were handled by Cork Airport, while the corresponding figure for Shannon Airport was 211,429. Among the remaining three airports for which domestic passenger data is available, Kerry recorded the largest number of passengers with 126,159

domestic passengers passing through that airport in 2008. See Table 7.10.

Table 7.11 compares the annual number of air passengers on radial routes and the equivalent rail patronage. This shows that air travel has a significant market share compared to rail on Cork, Limerick and Kerry routes, but less so on the Galway route.

Table 7.10: Number of Passengers on Domestic Flights by Airport, 2008

Airport	No. Passengers on Domestic Flights	No. Total Passenger (all Flights)
Dublin	940,199	23,507,205
Shannon	211,429 ²⁹	2,956,951
Cork	450,833	3,259,109
Knock	12,217	629,712
Kerry	126,159	426,115
Galway	90,231	266,473
Sligo	na	42,493
Donegal	na	65,539
Waterford	na	144,253

Source: CSO, Tourism Trends 2008

Table 7.11: Number of Passengers on Rail and Air Routes Compared

Air route	No Passengers on Domestic Flights	Rail route	No Rail Passengers
Shannon	211,429	Dublin - Limerick	741,000
Cork	450,833	Dublin - Cork	2,434,000
Knock	12,217	Dublin – Westport Ballina	417,000
Kerry	126,159	Dublin - Tralee	499,000
Galway	90,231	Dublin - Galway	1,219,000
Sligo	na	Dublin - Sligo	1,207,000
Donegal	na		
Waterford	na	Dublin - Waterford	1,121,000

²⁹ Figure includes transit passengers

7.7.6 Public Service Contracts

In Ireland, many domestic scheduled flights are supported by Public Service Obligations (PSO). EU Regulation allows the imposition of PSOs for reasons of economic development or of territorial connection.

Currently, Aer Arann receives PSO subsidies to operate flights from Dublin to Galway, Sligo, Knock and Donegal, while Ryanair receives PSO subsidies for its Dublin to Kerry route³⁰. The value of PSO subsidies awarded on these routes over the previous two subvention periods, namely 2002 – 2005 and 2005 – 2008, are set out in Table 7.12. In May 2008, details were announced of the most recent round of PSO funding which totalled €44.6m allocated up to 2011.

Table 7.12: PSO Contracted Subvention Amounts

Routes	Contract amounts for period July 02-July 05 €	Contract amounts for period July 05-July 08 €
Kerry/Dublin	14,361,100	9,025,482
Galway/Dublin	16,317,100	8,999,571
Donegal/Sligo/Dublin	14,400,000	15,526,782
Knock/Dublin	9,969,600	12,266,066
Derry/Dublin	7,729,668	
Total	62,777,468	45,817,901

Source: Department of Transport Website

The obligations associated with the successful tendering for the provision of PSO scheduled flight services outline minimum levels of service that must be provided by the successful PSO operators. For example, at least three return flights per day, 7 days per week, must be provided on the Galway to Dublin route, and the flights must include a morning flight from Galway to Dublin as well as an evening return flight. On the basis of the published service level obligations, it can be concluded that all of the flights operated between Dublin-Sligo, Dublin-Knock, Dublin-Donegal and Dublin-Kerry and potentially all the flights between Dublin and Galway are PSO flights.³¹

In July 2009, An Bord Snip recommended the ending of PSO air routes in Ireland. More recently, a Value for Money Review of Regional Airport Policy has been undertaken, as the Government considers ways to cut spending in December's Budget. At EU level, under updated EU legislation governing PSO services, it has been signalled that more stringent conditions will apply to future PSO arrangements, having regard, for example, to the availability of other transport connections, and especially rail services, with a travelling time of three hours or less. In early 2011, the Transport Minister removed PSO support for routes between Dublin and Sligo, Knock, Galway and Derry, While continuing that for Donegal and Kerry.

A cessation to the support provided to airlines via PSO subsidies would likely result in a significant reduction in the number of flights operated between Dublin and the currently PSO supported regional airports. Such a situation could result in a modal shift of passengers from air to rail services.

³⁰ Domestic flights to Cork and Waterford are not supported by PSO subsidies.

³¹ In addition to specifying minimum service levels, maximum fare levels are specified which successful PSO operators must implement.

7.7.7 Summary

In September 2010, 109 domestic flights operated weekly out of Dublin to other domestic airports in Ireland. There were equally 109 Dublin-bound flights operating weekly from other Irish airports. There were a further 22 flights scheduled between non-Dublin domestic airports in Ireland.

The number of passengers on domestic flights passing through Dublin airport totalled approximately one million in 2008. The equivalent numbers for Cork and Shannon airports were 450,800 and 211,429 respectively. In that year, just over 126,000 domestic passengers passed through Kerry airport, while 90,000 passed through Galway airport. Air travel has a significant market share compared to rail on Cork, Limerick and Kerry routes, but less so on the Galway route.

PSO subsidies enable airlines to offer attractive fares for PSO supported services. A cessation to the support provided to airlines via PSO subsidies would undoubtedly put the future of these services at risk, and potentially result in a significant reduction in the number of flights operated between Dublin and the regional airports.

7.8 Modelling Aggregate Passenger Demand Forecasts

7.8.1 Introduction

This sub-section of the report uses the population and economic growth projections described above to derive aggregate projections of passenger demand on the ICN. These projections are to be regarded as Do-Nothing projections i.e. they describe the demand that would arise in the absence of any further investments. They are also

likely to be conservative as previous analyses have shown that energy price increases are likely to result in a modal shift to rail and competition from air travel may diminish. Neither of these factors is accounted for in the projections set out below.

The aggregate projection was effected through the development of a time-series demand model. A long times series of passenger data is available for only the rail system as a whole. However, the focus of the study is on the ICN system outside of the Dublin area. Unfortunately, a coherent set of passenger data, which distinguishes between patronage on the Dublin and non Dublin rail systems is not available for the period. As econometric analyses require a reasonably lengthy data period, modelling of demand must be undertaken for the system as a whole, with the ICN demand being derived from that overall model.

7.8.2 Modelling Future Demand

In the past, a relatively sophisticated model of rail passenger demand was developed that related demand to demographic and economic aggregates.³² This study of interurban rail demand found that demand variations could be largely explained by fare levels and consumer incomes, with the latter being the more important factor. It was established that the income elasticity was close to unity i.e. a 1 per cent increase in incomes gave rise to an approximate 1 per cent increase in demand.

More recent studies in the UK also found that incomes (or Gross Value Added) was the driving factor for rail demand outstripping the effects of population and other variables.³³ Another recent report in the UK has found that income elasticity of demand for rail is as high as 2.³⁴

³² H.McGeehan. Forecasting the Demand for Inter-Urban Railway Travel in the Republic of Ireland. Journal of Transport Economics and Policy, Volume 18, Number 3, 1984.

³³ Gerard Whelan. Examining the Influence of Socio-Demographic Change on Rail Demand. MVA Consultancy, 2007.

³⁴ N. Paulley et al. The Demand for Public Transport: the Effect of Fares, Quality of Service, Income and Car Ownership. Transport Policy, 2006.

These studies confirm the dominance of income levels as a driving force in rail demand, although there are different findings in terms of the strength of the income effect.

Some insight into the role of economic and demographic variables in influencing demand on the ICN network can be gleaned from Table 7.13. This Table sets out the changes in rail passenger demand and the main demographic and economic aggregates over the period from 1992 to the peak year of 2007 and in the period thereafter.

Over the period 1992 to 2007, passenger demand grew by 76.3 per cent in total or by 3.9 per cent annually. It may be seen that this rate of growth in demand was half the rate of growth in GNP and 94 per cent of the increase in employment, over the same period.

In the period 2007-2009, which encompasses the current economic downturn, demand has fallen by 14.7 per cent, which is broadly in line with the fall in GNP (-13.8 per cent). This implies a greater sensitivity of demand to changes in GNP in the latter period.

Table 7.13: Growth Rates in Passenger Demand and Economic Aggregates (1992-2009)

Period	Variable			
	Rail Demand (%)	GNP (%)	Employment (%)	Population (%)
1992- 2007:				
Aggregate Growth (%)	76.3	151.2	81.4	22.1
Annual Average Growth (%)	3.9	6.3	4.1	1.3
2007-2009:				
Aggregate Growth (%)	-14.7	-13.8	-8.3	2.8
Annual Average Growth (%)	-7.7	-7.2	-4.2	1.4

Source: Goodbody Economic Consultants

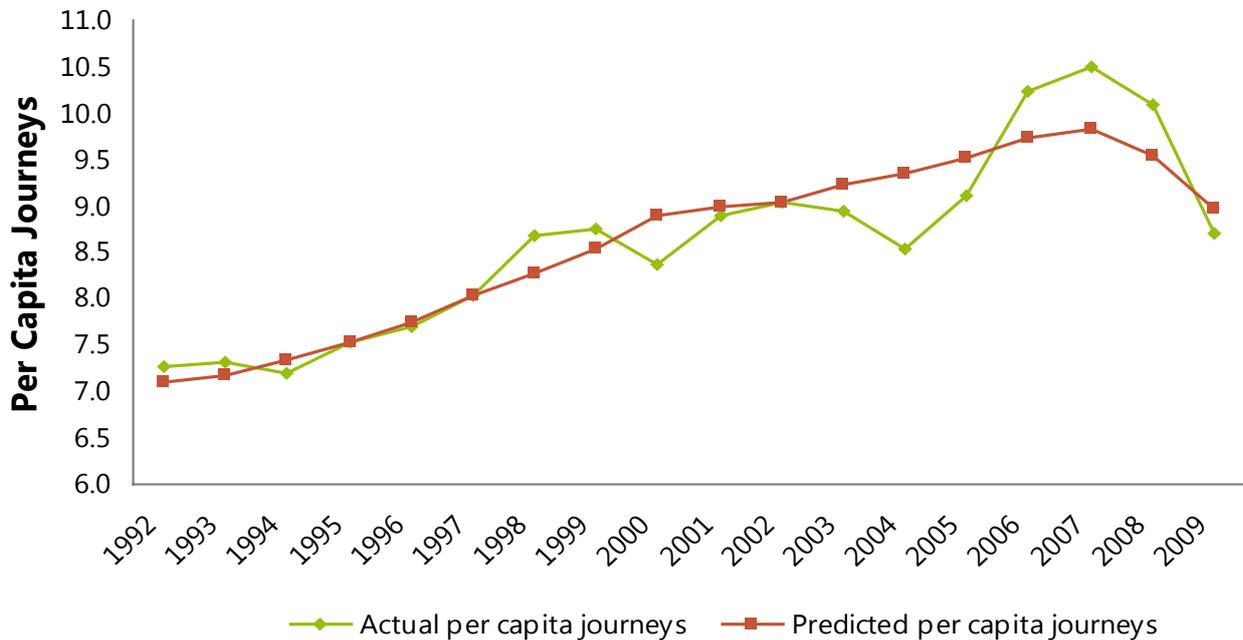
The data from 1992 to 2009 comprise 17 data points. This does not permit sophisticated econometric modelling. Ideally, it would be useful to segment the passenger market and to develop separate econometric models for each segment (commuters, business leisure etc.). However, the broad correlation between GNP and passenger demand suggest that a simple linear regression model that related the two variables might be useful. This was calculated as follows:

$$\text{Passengers/Population} = 4.532 + 0.143\text{GNP/Population}$$

R-square = 0.843; F = 85.7; t (GNP) = 9.26

Figure 7.4 depicts the fit of this model. It indicates that journeys per capita exhibit somewhat greater variability than the fitted model, but that the latter captures both the general upward trend and the decline in the post 2007 period.

Figure 7.4: Actual and Predicted Rail Journeys per Capita, 1992 - 2009



Source: Iarnród Éireann and Goodbody Economic Consultants

7.9 Predicting Future Demand

The model can be used to predict future demand based on assumptions of future GNP and population growth. These assumptions are summarised in Table 7.14 They envisage a slight recovery in GNP in 2011 followed by growth of 4 per cent in 2012 and 2013, before a more modest growth rate of 3 per cent sets in.

The national population is expected to decline in 2010 and 2011 before resuming modest growth as the natural increase offsets the impact of emigration.

Table 7.15 sets out the predicted growth in passenger numbers for the rail system as a whole for the period up to 2030. This suggests that

passenger numbers will fall slightly in 2010 before beginning to recover slowly from 2011. Passenger numbers will not recover their 2007 peak of 45.5m until after 2015. The long term predicted growth rate is 1.9 per cent. This lower growth rate reflects lower population and GNP growth rates in the post Celtic Tiger period. As indicated above, it was not possible to undertake a modelling exercise for the ICN network due to lack of a sufficient time series of data. The ICN share of total traffic was 55 per cent in 2009 and that this has changed only slightly in the recent past. The ICN projections set out in Table 7.14 are based on the assumption that the ICN share of traffic remains at 55 per cent. The projection is for ICN traffic to increase from 21.3m in 2009 to 31.1m in 2030. This represents an increase of 46 per cent or 1.8 per cent per annum.

Table 7.14: Population and GNP Predictions 2010-2030

Year	Population	Population Annual Growth Rate (%)	GNP Annual Growth Rate (%)
2010	4,435	-0.55	-1.1
2011	4,430	-0.10	2.3
2012	4,460	0.68	4.0
2013	4,498	0.85	4.0
2015	4,571	0.80	3.0
2020	4,735	0.70	3.0
2025	4,861	0.50	3.0
2030	4,958	0.40	3.0

Source: Goodbody Economic Consultants

Table 7.15: Forecasts of Passenger Numbers 2009 – 2030

Year	Total Rail Passengers (m)	Annual Rate of Growth (%)	ICN Passengers (m)	Annual Rate of Growth (%)
2010	38.8	-0.8	21.2	-0.8
2011	38.5	1.1	21.4	1.1
2012	38.9	2.3	21.9	2.3
2013	40.8	2.4	22.4	2.4
2015	42.4	1.9	23.3	1.9
2020	46.6	1.9	25.7	1.9
2025	52.8	1.9	28.2	1.9
2030	58.2	1.9	31.1	1.9

Source: Goodbody Economic Consultants

7.10 Prediction of Passenger Demand by Route

Table 7.16 provides an indication of the future passenger demand by route segment. These forecasts assume that no service improvements are made and are thus driven by economic and

demographic factors. In particular, they reflect the differential growth rate in cities and towns across the country. When compared with Table 5.3, it may be seen that an overall growth rate of 33 per cent by 2025. Some parts of the network, Connolly to the Border experience more substantial growth, while city centre stations less so because of slower population growth within the urban area.

Table 7.16: Boardings by Rail Corridor (average weekday, 2025)

Sector		Commuting	Business	Leisure	Total
1	Connolly to Border	13867	920	3367	18154
2	Connolly to Sligo	14337	1867	6798	23002
3	Portarlinton to Galway	995	447	1724	3166
4	Heuston to Cork	14556	2690	10168	27414
5	Kildare to Waterford	668	239	969	1876
6	Connolly to Rosslare	5268	567	2088	7923
7	Ballina Spur	10	6	26	42
8	Athlone to Westport	86	95	385	566
9	Athenry to Limerick	415	37	149	601
10	Ballybrophy to Limerick	59	6	35	100
11	Limerick Spur	87	111	419	617
12	Tralee Spur	105	91	352	548
13	Waterford to Limerick Jn	52	48	187	287
14	Cork Commuter	750	206	755	1711
15	Navan to Connolly*				
16	Dublin City	61587	10469	37464	109520
	Total	112842	17799	64886	195527

* Not considered in this study

7.11 Overview

Passenger demand on the rail system as a whole rose from 25.8m passengers in 1992 to a peak of 45.5m in 2007, and increase of 76.4 per cent or 3.9 per cent per annum. With the onset of the economic recession, demand declined to 38.8m passengers by 2009 or by 14.7 per cent from the peak.

International and domestic studies confirm the dominance of income levels as a driving force in rail demand, although there are different findings in terms of the strength of the income effect. Over the period 1992 to 2007, the rate of growth in total rail passenger demand represented half that experienced in GNP demand.

In the period 2007-2009, which encompasses the current economic downturn, rail passenger demand has fallen by 14.7 per cent, which is broadly in line with the fall in GNP (-13.8 per cent). This implies a greater sensitivity of demand to changes in GNP in the latter period.

Passenger numbers for the rail system as a whole fell slightly in 2010 but are anticipated to recover slowly from 2011. Passenger numbers will not recover their 2007 peak of 45.5m until after 2015. The long term predicted growth rate is 1.9 per cent. This lower growth rate reflects lower population and GNP growth rates in the post Celtic Tiger period.

The ICN share of total traffic was 55 per cent in 2009 and this has changed only slightly in the recent past. The projection is for ICN traffic to increase from 21.3m in 2009 to 31.1m in 2030. This represents an increase of 46 per cent or 1.8 per cent per annum. This may represent a conservative forecast, as there is potential for rail to win traffic from both car and air modes, as a result of increased energy prices and reduced subvention of air services. Increased competition from the bus mode is likely to arise only if a policy shift to liberalisation of the bus market takes place.

