

Irish Academy of Engineering

SPATIAL PLANNING on the island of IRELAND

CONTEXT AND CHALLENGES



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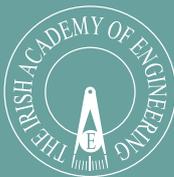
THE IRISH ACADEMY OF ENGINEERING

The Irish Academy of Engineering is an all-island body, concerned with long-term issues where the engineering profession can make a unique contribution to economic, social and technological development.

Its members are Irish Engineers of distinction, drawn from a wide range of disciplines, and membership currently stands at 145.

Drawing on the experience and knowledge of its distinguished members, the Academy works to facilitate communication and dialogue on engineering related matters. It regularly publishes reports and analyses, some jointly with other learned and professional bodies.

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FOREWORD

The Irish Academy of Engineering (IAE) established a number of Working Groups to prepare the following series of complementary Policy Discussion Papers to assist policy makers in both jurisdictions on the island in the ongoing development of spatial planning policy, and to inform decision-making on associated major infrastructure development over the coming decades:

- ▲ Spatial Planning on the island of Ireland – Context and Challenges (this document)
- ▲ Dublin – Belfast Economic Corridor
- ▲ Atlantic City Regions - Development and Connectivity
- ▲ Sustainable Transport Infrastructure 2035
- ▲ National Broadband Strategy for Ireland
- ▲ Critical Infrastructure – Adaptation for Climate Change: A Progress Report

These Policy Discussion Papers have been prepared following research and wide ranging discussions with senior executives from the public and private sectors in both Ireland and Northern Ireland. They are available on the Academy's website www.iae.ie, together with all previously completed reports. A further Paper will be prepared by the Academy as an input to spatial planning, in relation to economic development across the North West cities on the island, Sligo and Letterkenny / Derry / Londonderry. The Academy's approach has been to focus its attention on economic and balanced regional development and on the "connectivity" infrastructure - transport and broadband - required to support such development.

Based on comments received on these Discussion Papers, the Academy intends preparing a single summary report as an input to the Department of Environment, Community and Local Government in its preparation of the proposed National Planning Framework (NPF). A similar report will be made to the Department for Regional Development in Northern Ireland in relation to any future review of its current Regional Development Strategy 2035.

This Introductory Paper identifies the main factors which will influence the development of spatial plans and associated infrastructure development programmes. It sets out the key concepts on which development of spatial planning frameworks should be based and highlights the main challenges to be addressed in developing these frameworks.

CHAPTER 1: BACKGROUND AND CONTEXT

The following background factors will need to be considered in the development of spatial planning frameworks and associated infrastructure development programmes on the island of Ireland:

1. Demographics

Recent projections suggest that the population of the island could reach 8 million in the mid-2030s. For Ireland, Central Statistics Office (CSO) projections (Table 1), forecast a population of 5.99m by 2036 under the M1F1 strong growth scenario and 5.34m under the more moderate M2F2 growth scenario¹. These projections indicate a population increase between 2011 and 2036 of 1.40m under the M1F1 scenario and of 0.75m under the M2F2 scenario (Table 2). The UK Office of National Statistics and Northern Ireland Statistics and Research Agency are projecting a population of 2m for Northern Ireland by 2036, an increase of 0.18m over 2014².

Most of this population will live in the eight main coastal city regions - Belfast, Dublin, Waterford, Cork, Limerick, Galway, Sligo and Derry/Londonderry. It is expected that about half of the island's population, will live within the Dublin-Belfast corridor, and approaching 1.5m within the

hinterland of the Atlantic Cities – Waterford, Cork, Limerick and Galway.

This projected increase in population will put a significant strain on essential services and associated infrastructure over the next 20 years – housing, transportation, energy, health, education, water services etc., much of which has suffered from under-investment not only during the downturn in the economy, but in some cases for years previously.

The shortage of affordable housing and associated services infrastructure poses a particular problem for spatial planners in Ireland. Not alone is there need to provide additional housing and services to accommodate an additional 0.75m to 1.41m people between 2011 and 2036, but there is also need to address the backlog of people now seeking housing who could not purchase or rent during the recession.

Table 1: CSO Population Projections 2031-2046 for Ireland

CSO Scenarios	Actual (m) 2011	Total Projected Population (m)			
		2031	2036	2041	2046
	4.59				
M1F1		5.64	5.99	6.36	6.73
M2F2		5.19	5.34	5.49	5.64

Note: M1F1 Scenario uses strong population growth assumptions. M2F2 Scenario uses more modest growth assumptions.

Table 2: Population increases in Ireland based on CSO 2031-2046 projections

CSO Scenarios	Projected increase in population over 2011 (m)			
	2031	2036	2041	2046
M1F1	1.05	1.40	1.77	2.14
M2F2	0.60	0.75	0.90	1.05

2. Economic Development

The Irish economy has recovered dramatically since the downturn and has proved more robust than many economists forecast. While there are certainly future potential risks to be taken into account (a potential Brexit, slowdown in China; political uncertainty in the US; fears of deflation in Europe, etc.), on balance the international economic outlook is reasonably benign. Both the US and the UK, our two main trading partners, are experiencing growth, and economic forecasts in both economies are reasonably positive, albeit with some potential downside risks. The EU is slowly beginning to emerge from the recession with growth returning, although at lower levels than in the US and UK. Interest rates and energy prices, while expected to rise over the coming years, are not expected to increase dramatically in the short term.

Ireland's multi-national sector and foreign direct investment, particularly from the US, have been

resilient during the downturn and are continuing to grow, with growth forecast to continue for the foreseeable future. The indigenous SME sector is also growing. The Department of Finance in the 2016 Budget, forecast a reduction in the annual growth rate during 2016 and 2017 from the current exceptionally high growth rates, to a more sustainable annual growth rate of around 2.5% of GNP over the following years (Fig 1).

Notwithstanding potential risks materialising and economic or population growth being lower than anticipated, long term planning strategy, and associated investment in essential infrastructure, must accommodate current economic and population growth projections. A growing economy will further sustain an already growing population. There is need to plan not only to meet the service needs of such population growth, but also plan to support and facilitate economic growth itself.

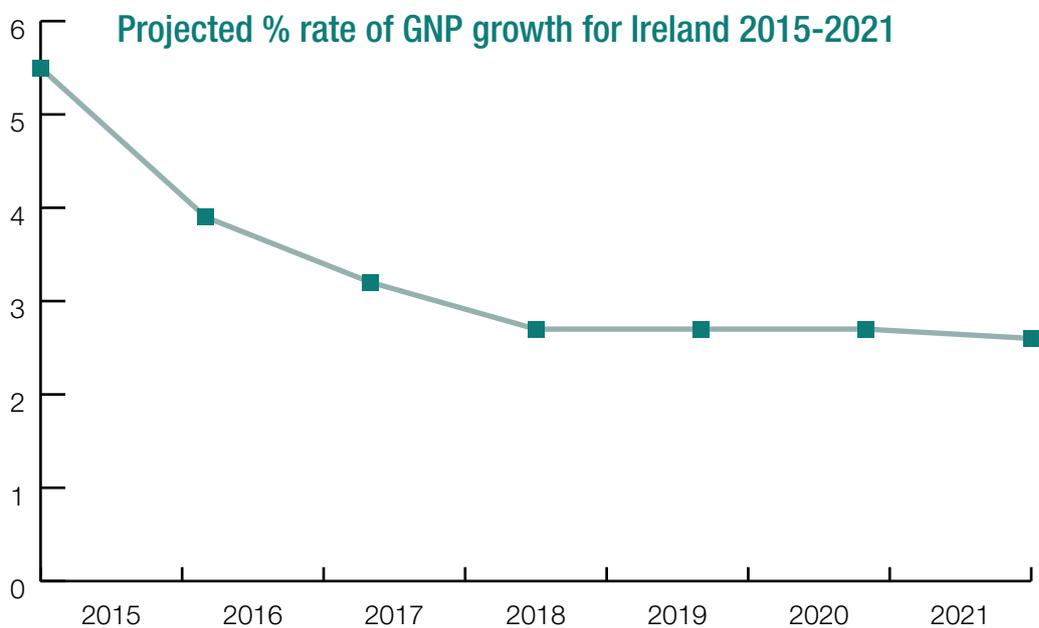


Fig.1: Projected GNP Growth for Ireland 2015 - 2021

Source: Department of Finance macroeconomic forecasts, Budget 2016

3. Advances in Technology

In producing this series of Policy Discussion Papers, the Academy is mindful of the changing technological background against which spatial planning for the next number of decades must be carried out. Technological developments are emerging at an ever increasing rate and impact on every aspect of social, economic and infrastructure development. Increasingly sophisticated technology is being built into everyday domestic, commercial and industrial processes, appliances and machinery.

The Academy highlights below two areas of potential technological change in particular, related to the crucial issue of connectivity, which must be considered in carrying out long-term spatial planning. It will be important to build in flexibility to decision making to accommodate potential “game-changing” technological developments over the coming decades, while ensuring this does not prevent decisions on necessary infrastructure development being made in a timely manner.

3.1 Transport

The European Commission’s *2016 Country Report on Ireland*³ states:

“Transport infrastructure is critically important for spatial planning and economic development”.

The Academy strongly concurs with this statement which is widely accepted internationally⁴. Transport is on the cusp of potentially fundamental change over the next two decades, perhaps more so than other infrastructure sectors. Rapid and non-linear developments in the transportation sector include:

- ▲ Traffic management systems, such as smart signalling and real time congestion charging are becoming ever more sophisticated.
- ▲ Vehicles connected to the internet – radar based adaptive cruise control, city-safe braking; camera-based lane-keeping; radar-based lane-change warning; self-parking technology.
- ▲ Smart-city developments, which can promote public and shared transport, reduce congestion, improve safety and deliver a sustainable transport system.

- ▲ The increasingly discussed potential for driverless cars where trials are moving from contained sites to public motorways this year.

In addition, there is the potential to leverage technological developments to promote modal shift from private car usage to more sustainable travel modes, thus supporting climate change objectives.

3.2 Broadband

Achievement and ongoing maintenance of high quality digital connectivity, to standards which are competitive internationally, is an essential requirement for future economic and social development. The availability of high-speed broadband can foster the establishment of local enterprise and employment and attract workers dependent on that technology to live and work in rural areas which are currently devoid of employment opportunities.

Ireland has quite a dispersed population pattern with significant numbers of people living in smaller towns, villages and more remote rural areas. Improved broadband connectivity can contribute significantly to the achievement of economic growth, more balanced regional development and reduce the pressure on the larger cities on the island.

Ongoing advances in technology within the industrial and services sectors, and associated IT-based operations, provide increasing opportunities for individuals, using broadband services, to work from home or from satellite locations remote from the central location of an enterprise. Improved broadband service can also contribute to reduction in greenhouse gases by reducing the amount of work-related travel.

Technological advances, increase in speed and capacity potential, and changes in delivery platforms within the broadband sector, have been dramatic over the past decade. There is every reason to believe that future advances in broadband technology and its use in industry and society at large, will continue to increase over the coming decades. Long term planning strategy must seek to harness the potential that broadband connectivity offers, while retaining the flexibility to react appropriately to increasing service demands,

technological advances and potential “game – changers” within the industry.

The Academy’s two 2016 Policy Discussion Papers, *Sustainable Transport Infrastructure 2035* and *National Broadband Policy for Ireland*, deal with the above two connectivity issues in some detail.

4. Climate Change

The COP21 climate change deal adopted in Paris in December 2015 by 195 countries, including Ireland, confirmed that climate change is already with us and poses significant ongoing challenges for planners into the future. Even if we could successfully cap greenhouse gas (GHG) emissions, we will not stop the effects of climate change over the coming decades. The impact of climate change must be taken into account in preparing spatial planning strategy and in planning and designing essential infrastructure:

- ▲ The island’s critical infrastructure and in particular its coastal cities are at risk as a result of changes to rainfall patterns, rising sea levels and more severe storms.
- ▲ The need to reduce GHG emissions has led to mandatory EU targets for renewable energy generation.
- ▲ There is a need to reduce transport-based GHG emissions by building more compact cities and towns and by promoting a modal shift from cars to public transport.

Climate change thus presents planners with two of the greatest challenges facing society:

- ▲ How to substantially reduce GHG emissions to the extent considered necessary to reduce the risk of further global warming, while not suppressing economic activity.
- ▲ How to adapt our critical infrastructure, cities and towns to cater for the likely impact of climate change, including changes caused by GHG emissions to date.

The Academy’s 2016 report “*Critical Infrastructure – Adaptation for Climate Change - A Progress Report*” details progress made to date in implementing recommendations contained in

its earlier 2009 report “*Ireland at Risk: Critical Infrastructure – Adaptation for Climate Change*”⁵.

5. Investment in Infrastructure

The Academy believes that having good quality infrastructure and associated services available across the island is a priority objective in preparing long term planning strategies. We believe this view is reflected in public sentiment amongst the majority of the population on the island regarding the importance of public services.

There is widespread international agreement on the economic and social benefits of investment in essential infrastructure across transport, broadband, electricity, gas, water services and waste management. For example major international studies such as the SACTRA Report and the Eddington Report⁶ identify the ways in which economic growth and regional development is stimulated by properly targeted transport investment. The European Commission’s *Country Report on Ireland 2016* comments on the benefits of infrastructure investment stating⁷:

“Public investment in infrastructure typically has a potent short-term stimulus effect, but its main benefits are to be gauged in terms of the impact on long-term growth potential”.

However, while the benefits of investment in infrastructure are generally accepted, Ireland has a substantial infrastructure deficit as highlighted by a range of recent reports. The following quote from the EC’s *Country Report on Ireland 2016* succinctly summarises the challenge⁸:

“As in other EU countries, general government capital expenditure was one of the first items to be cut in order to reduce the budget deficit. Following a peak of 5.2% of GDP in 2008, public investment fell to a low of 1.8% of GDP in 2013 before slightly recovering in 2014. It was still well below the EU average. In addition, the crisis appears to have led to a structural shift in the composition of general government expenditure away from investment towards current spending. In 2010-2013, capital expenditure averaged only 4.8% of the total, less than half the long term average during 1995-2008.”

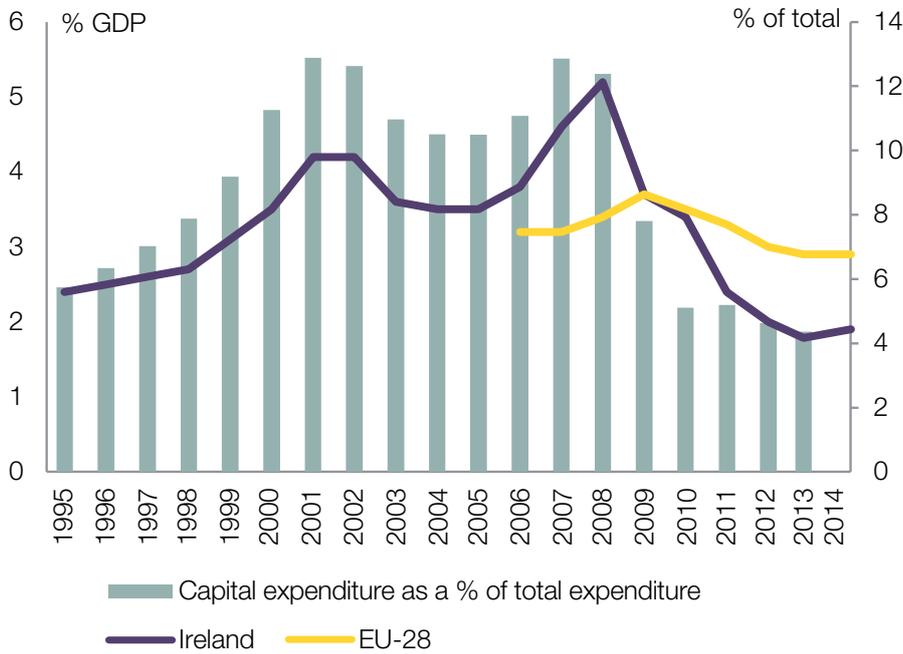


Fig. 2: General government gross fixed capital formation

EC Country Report Ireland 2016 - Source Eurostat

The need for increased investment in transport infrastructure is also highlighted by the latest TomTom traffic index which shows both Belfast and Dublin ranking among the top ten most congested cities of any size among more than 200 cities monitored for peak morning and evening hour traffic.

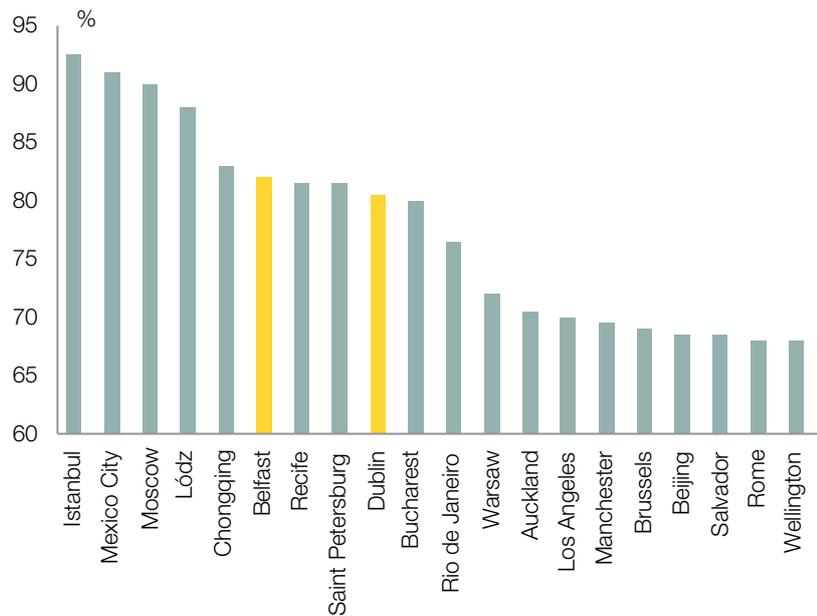


Fig. 3: Peak hour congestion index, top 20 cities

EC Country Report Ireland 2016 - Source TomTom congestion index

The infrastructure deficit is also reflected in the most recent World Economic Forum's *Executive Opinion Survey*¹⁰ which assesses perceptions about the quality of infrastructure (Fig 4) Perceptions of quality in Ireland still lag the OECD average and are well behind leading performers.

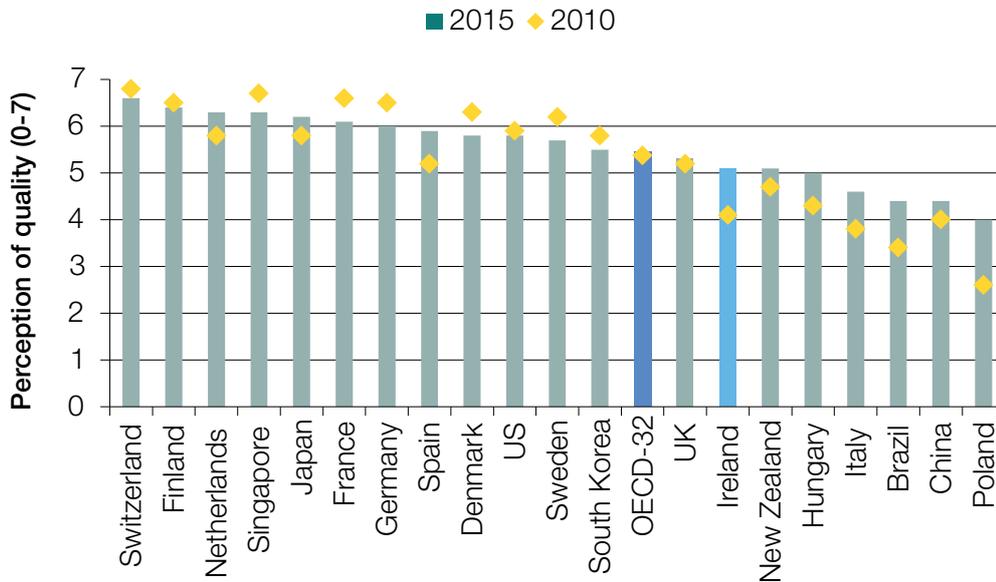


Fig. 4: Perception of the quality of overall infrastructure 2015

National Competitiveness Council's *Ireland's Competitiveness Scorecard 2015* - Source: World Economic Forum

Conclusion on Investment

The shortfall in investment in infrastructure and the perceptions of the quality of our infrastructure highlighted above, allied with the ongoing needs of a growing population and economy, means that long term planning strategies must cater for significantly increased investment in infrastructure.

CHAPTER 2: KEY SPATIAL PLANNING CONCEPTS

While the living standard and quality of life of people on this island are among the highest in the world, the challenge for government in both jurisdictions is to plan for and support the levels of social and economic development necessary to maintain or indeed improve this standard. The Academy believes that achieving this objective will require a long term spatial planning framework which focuses on the parameters, structures and actions necessary to achieve this.

The Academy therefore recommends that spatial planning frameworks across the island should be based on the following concepts. While these are specifically referenced below towards planning in Ireland, broadly similar concepts will apply in Northern Ireland.

1. An appropriate long-term spatial planning approach

Preparation in the Republic of the proposed National Planning Framework (NPF) is under way¹¹. The Academy believes this document is intended to be high level in nature. The NPF should therefore require that detailed long term spatial plans and associated detailed long-term infrastructure action plans be prepared by relevant government sectors and agencies and at regional and local authority level. These plans should detail the main infrastructure projects planned over the long term, with indicative budgets and timescales. The NPF and associated sectoral, regional and local plans should have a particular focus on promoting economic growth and balanced regional development, thus contributing to social conditions for society.

Major nationally important infrastructure development and significant infrastructure development which crosses local authority and regional boundaries should be included in a National Infrastructure Development Programme which should be managed and budgeted for on a national basis.

A central body should take charge of managing delivery of such major infrastructure projects. The Academy in its 2011 report *“The Cost-Effective Delivery of Essential Infrastructure”*¹² called for the establishment of a National Infrastructure Authority charged specifically with the delivery of strategic infrastructure. The establishment of Transport Infrastructure Ireland in 2015 is a significant step in this direction. The implementation of the proposed National Planning Framework will

most likely highlight other strategic infrastructure besides transport which needs to be delivered. The NPF should clarify how delivery of such nationally important infrastructure will be managed centrally and delivery monitored and reported on to government and the public.

The proposed National Planning Framework should allow for the fact that overall planning lead times for major infrastructure (involving preliminary and detailed design, environmental assessment, public consultation, planning activities and procurement) can take many years prior to construction activity commencing.

There is need to ensure that funding for infrastructure development is maintained at a consistent and appropriate level over the long term and not subject to disruption due to temporary downturns in the economic cycle. It would be folly to allow proper medium and long term planning be compromised by short term financial constraints.

2. Cities supporting balanced regional development

It is generally recognised that larger cities, by virtue of their population, services and infrastructure, are attractive locations for multinational and indeed for many indigenous companies to locate their activities. These cities also attract many of the skilled staff, both Irish and international, which such companies require. However, lack of adequate investment in essential infrastructure has led to further pressure on already overloaded services in cities. In particular a shortage of housing supply in our larger cities and appropriate urban and commuter transport systems, pushes up accommodation costs and acts as a disincentive for skilled staff to live in or adjacent to these cities and thus for large employers dependent on a ready supply of such staff to locate there.

Government policy in both jurisdictions aims to achieve balanced regional development. The Academy believes that this can best be done by focussing on the potential of the main cities to revitalise towns and villages within their hinterland - cities should not be seen in isolation from their regions. It is estimated that for every ten jobs created by foreign direct investment (FDI) firms, up to seven additional jobs are created in the rest of the economy. Many of these spin-off jobs can be located in more rural areas provided the appropriate level of connectivity exists in terms of broadband and transport infrastructure.

The Academy believes that co-operation where appropriate between the island's coastal cities can both maximise the economic potential of our main cities while also contributing significantly to development within a 40-60km radius from these cities (Fig5). Outlying areas in the regions will benefit from the growth in these cities and their hinterland

through the provision of services, IT support, outsourced manufacturing/sub-supply, and increased numbers of tourists. Increased economic growth will also benefit the more outlying regions by generating the taxation resources necessary for the social and economic development of more dispersed locations. The Academy's two 2016 reports "*Dublin – Belfast Economic Corridor*" and "*Atlantic City Regions - Development and Connectivity*" deal in more detail with the opportunities for economic development and the challenges to be addressed in realising these opportunities.

Building on the potential of our coastal cities, balanced regional development will improve the quality of life for society across the island while minimising the strain on services and infrastructure in the larger cities, particularly in Dublin, Belfast and Cork.

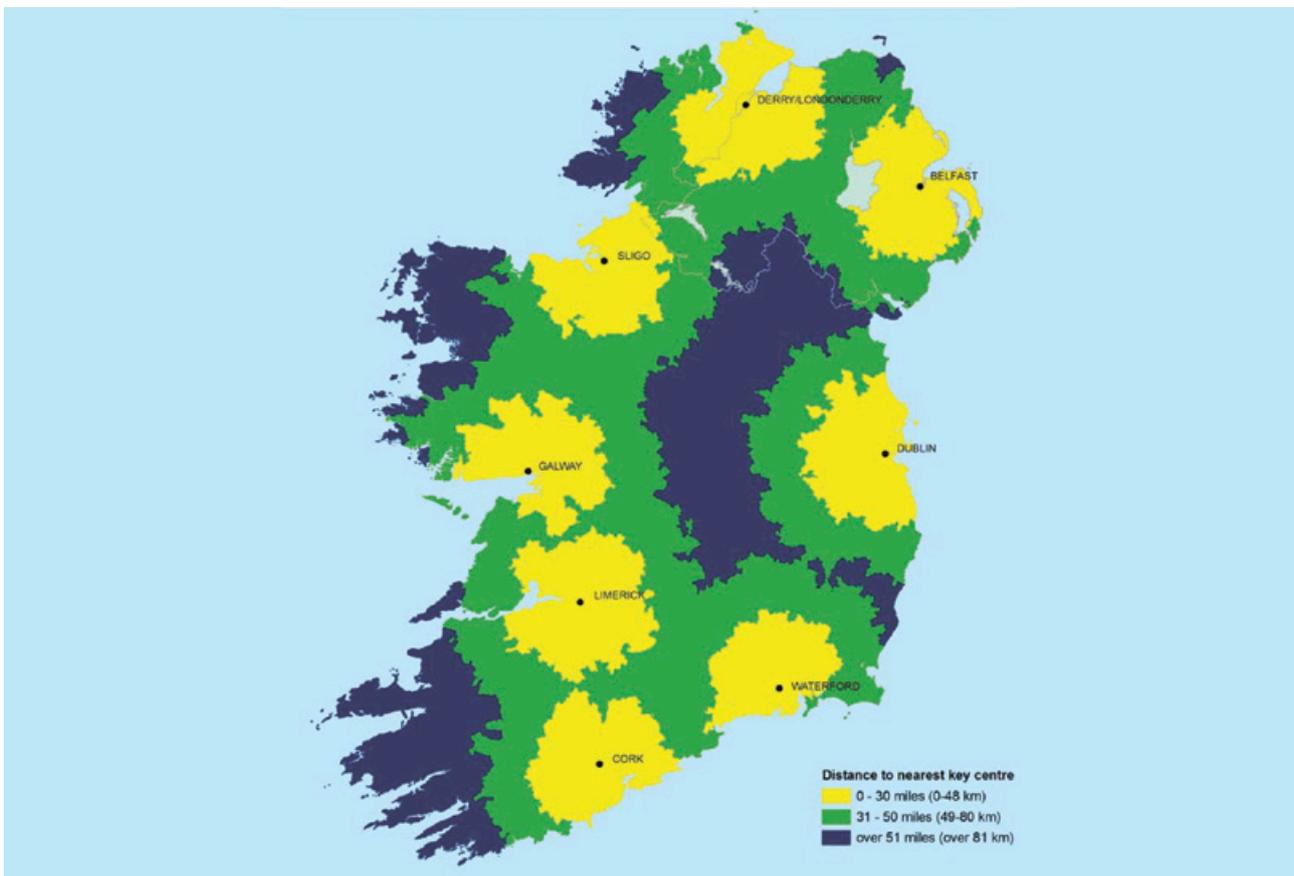


Fig. 5 Distance by Road to the Largest Settlement in Each of Eight City Regions

Source: Strategic Investment Board NI

3. The importance of connectivity

Connectivity, primarily broadband and transport infrastructure, will play a dynamic and essential role in maximising the potential for economic growth in the island's cities and in spreading the benefits of such growth across the regions. Good transport infrastructure between our cities and between cities and their hinterland and outlying towns, is essential in improving the efficiency and reducing the cost of transporting people and goods. Of equal importance is the need to ensure best possible digital connectivity across all areas on the island. A country wide quality broadband service is now an essential economic necessity in an increasingly competitive international market. Employers require a high quality broadband service not only at the locations where their operations are centred but also to enable their employees connect from home to their Irish and international operations, customers and suppliers.

The importance of connectivity to Ireland's competitiveness, and to the potential for economic growth and job creation, is stressed in the National Competitiveness Council's report "*Ireland's Competitiveness Challenge 2015*"¹³ which states:

"Additional investment is particularly essential in the areas of broadband and transport".

The Academy concurs with this sentiment and strongly recommends that the challenge of providing quality transport and broadband connectivity be a key objective in preparing the National Planning Framework.

4. Implementing the NPF over the long-term

A perfectly researched and drafted National Planning Framework will be useless unless it includes simple and accepted structures and processes which ensure adherence to and implementation of the framework, over the long term, by all relevant public bodies and private organisations.

The NPF should clearly set out the responsibilities of all parties involved, including clarity on who is ultimately responsible for overall implementation nationally. It should include the requirement

for sectoral and local detailed spatial plans to be produced with associated infrastructure development plans, budgetary requirements and implementation programmes. The NPF should also include a requirement to prepare multi-annual financial plans and to establish ring fenced budgets for infrastructure investment, in particular for priority infrastructure projects.

The preparation of a National Infrastructure Development Programme and the establishment of a National Infrastructure Authority as proposed above should be included in the NPF and also a structured process for monitoring implementation and reporting to Dáil Eireann on an annual basis.

The NPF should be discussed in detail and approved by the Houses of the Oireachtas and accepted by all political parties for what it is i.e. a national **long term** planning framework which will not be subject to ad hoc change based on changes in the Irish political landscape or on temporary changes in the economic cycle.

5. Cross-border consultation and co-ordination of spatial planning

There is free movement of people and goods between both jurisdictions on the island of Ireland and cross border trade and commerce is significant. Many people live in one jurisdiction and work in the other, and many elements of the island's essential infrastructure are all-island or cross border in nature. Indeed both jurisdictions are closely linked both economically and culturally. Lack of co-operation in spatial planning would result in sub-optimal plans being prepared, with resulting potential reduction in economic growth and development, increase in infrastructure costs and reduction in services to the public. It is therefore essential that long term spatial planning in both jurisdictions is carried out with close consultation, co-operation and co-ordination of plans.

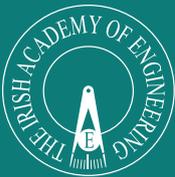
CHAPTER 3: MAIN CHALLENGES

In summary, the Academy believes that governments in both jurisdictions on the island face the following particular challenges in preparing long term spatial planning frameworks:

- 1. Demographics:** The need to plan for an island of 7 to 8 million people by the mid-2030's, with the population of Ireland forecast to grow by between 0.75m and 1.40m by 2036 and that of Northern Ireland by 0.18m
- 2. Economic growth:** The promotion of sustainable economic growth while also catering for the impact of this growth.
- 3. The potential of cities and balanced regional development:** Ensuring improvement in economic and social development across the island through harnessing the potential of cities to achieve balanced regional development.
- 4. Connectivity:** Supporting economic growth and balanced regional development by promoting sustainable transport and digital connectivity between and across regions, cities and towns.
- 5. Advances in technology:** Recognising the potential risk that advances in technology can render some aspects of long term plans redundant, while also catering for the opportunities that future technologies can offer.
- 6. Climate change:** The need to support both reduction in GHG emissions and adaptation of critical infrastructure to cater for the impact of climate change.
- 7. Infrastructure development:**
 - ▲ Recognising the critical part infrastructure development plays in economic and social development
 - ▲ Catering for the exceptionally long lead times it takes to plan, design and implement major essential infrastructure
 - ▲ Ensuring long term planning caters for significantly increased investment in infrastructure
- 8. Continuity of funding for infrastructure:** The need to ensure that funding for infrastructure development is maintained at a consistent and appropriate level over the long term and not subject to change due to temporary downturns in the economic cycle
- 9. Implementation:** In particular ensuring adherence to and implementation of the NPF by all public bodies and where relevant private organisations.
- 10. Cross border co-operation:** Ensuring cross-border consultation, co-operation and co-ordination of spatial planning.

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