

The State of Ireland 2012

A review of infrastructure in Ireland

COMMUNICATIONS

WASTE

WATER AND FLOODING

ENERGY

TRANSPORT

Engineers Ireland is the voice of the engineering profession in Ireland, with almost 24,000 members drawn from every discipline of engineering.

We have been representing the engineering profession since 1835. As one of the oldest and largest professional bodies in Ireland, Engineers Ireland is an invaluable resource in providing professional expertise to the benefit of all sections of Irish society.

Our members are vital to the conception, construction, maintenance and development of all key areas of infrastructure in Ireland.

Director General's Foreword

This report is an independent assessment of infrastructure in Ireland in 2012.

Based on our first report produced in 2011, members of Engineers Ireland have once again assessed the existing quality and future needs of the Republic of Ireland's infrastructure.

I would like to thank them for their time and commitment in producing this updated report. Similar to 2011, it is a commentary on Ireland's infrastructure rather than a piece of original research. The ambition of the report is to offer a fair and accurate appraisal of the current state of infrastructure in Ireland. The report also outlines the actions which we believe are vital to improve the condition of that infrastructure. It underlines the importance of long-term planning in sustainable economic development, increased competitiveness and in improving the lives of all Irish citizens. In preparing this report we are cognisant of our country's financial difficulties and the limited resources available but we still believe that every effort should be made to invest in productive infrastructure, which will always have a positive payback. Very clearly, given the constraints, a process of prioritisation needs to be undertaken with respect to the recommendations herein. Therefore, this report is intended to inform those who make investment decisions about infrastructure in Ireland: politicians at national and local level, civil and public servants, regulatory bodies and trade organisations. Our essential aim is to

contribute to the debate on Ireland's future, to stimulate that debate and to recommend actions vital to the future prosperity of Irish society as well as informing the general public. This is the second year of The State of Ireland report and it is intended the annual reports will create a framework to measure Ireland's success in improving its international competitiveness through productive infrastructure. Too often in Ireland, the best of plans are not carried through to fulfilment: this must change. This report is our contribution to the challenge of strengthening Ireland by identifying the future needs of infrastructure investment and addressing existing deficiencies.



John Power
Chartered Engineer
Director General

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Why Infrastructure

Almost every aspect of Irish life depends on the quality of our infrastructure

It is clear that productive infrastructural development is central to economic prosperity. If Ireland is to prosper, infrastructural development across every aspect of the economy will be an essential part of the process.

Our prosperity – and the future prospects of our children – depends on the continued ability of this country to attract inward investment and to trade our goods and services internationally. In both cases, our competitiveness is paramount and is hugely dependent on the quality, efficiency and reliability of our infrastructure.

Aside from its economic importance, infrastructure is the cornerstone of modern society. We rely upon treatment plants and water mains to supply us with drinking water; energy plants and gas pipelines for heat and light; broadband to connect us to the

worldwide web; roads, rail and ports to deliver the goods we buy and sell; and a waste management network to recover renewable resources.

In recent times Ireland has been subject to extreme weather and repeat incidences of severe flooding, which have highlighted just how vital infrastructure is to the smooth running of modern Irish society. Failure to maintain and invest in vital infrastructural services can only increase Ireland's vulnerability to disruptive events.

Indeed, history demonstrates that societies have become more and more dependent on the quality of their infrastructure. It seems certain that this dependence will continue to increase in the coming decades. The accelerating pace of change – as well as its sheer unpredictability – accentuates the challenge in addressing infrastructural needs.

The challenge of maintaining and developing the capacity of infrastructure to meet the future needs of Irish society is further sharpened by the simultaneous need to address climate change.

In the pursuit of a low-carbon society, the sustainability of infrastructure and the way infrastructure can facilitate environmentally friendly initiatives at all levels is of essential importance. This report provides an independent assessment of what we need to do to protect and develop the sophisticated and inter-dependent system upon which the people of Ireland rely.

When we published our first The State of Ireland report in 2011, our ambition was to help to prioritise the productive infrastructure and projects that are most critical to our future. While we retain that ambition, Engineers Ireland also recognises that, in these times of

Grading System

Analysis of key areas of infrastructure includes a straightforward grading system. Engineers Ireland has assessed each area of infrastructure using the following grades:



Well maintained, in good condition, appropriate capacity and planning for future development.



Acceptable standard, properly maintained, able to meet demand, though investment needed in the next five years.

Matters



economic hardship in Ireland, not all infrastructural programmes can be supported, no matter how desirable they may be. It is impossible to ignore the simple fact that 2011 was a year of increased economic hardship and spending cuts which affected all areas of Irish society. The obligations entered into under the EU/IMF Programme of Financial Support in late 2010 curtail the ability of government to make decisions, not least because of the financial restraints related to the commitment to reduce the annual budget deficit to 3% of GDP by 2015. In this context, in November 2011, the Department of Finance delivered its Medium-Term Fiscal Statement, setting out the Government's strategy on budgetary reform and the achievement of sustainable finances. The report estimated that the fiscal adjustment necessary to close this gap

between tax and spending would total €12.4bn over the four-year period 2012-2015. Inevitably, capital spending on infrastructure-related programmes has been and will be affected. Indeed, from the high of 2008, current capital spending has declined year-on-year to reach just €3.9 billion for 2012; this is a fall of more than 50%. That figure is set to drop another €600 million in 2013, before finally dropping to €3.2 billion for 2014-2016. This brings the overall total for the Exchequer Capital Investment Framework for 2012-2016 to €17 billion. A late 2011 report from the Department of Public Expenditure and Reform concluded that the core focus of capital investment would be the upkeep of existing infrastructure, rather than investment on new projects. In parallel with these changes in

investment priorities, the report also committed the Government to the procurement of greater non-traditional funding sources for infrastructure via Public Private Partnerships (PPP) and the recently established NewERA and Strategic Investment Funds. Engineers Ireland acknowledges the reality of the need to reduce public expenditure and close the deficit. Nonetheless, capital investment is vital to meet the Government's desire to stimulate the economy. Crucially, vital skills are being lost to the Irish economy and the Irish construction industry through the absence of major infrastructural projects. This report is intended as our contribution to the debate on building the future of Ireland. It recognises the challenges facing the country and sets out fundamental steps which should be taken to meet those challenges.



Inadequately maintained, unable to meet peak demand, and requiring significant investment.



Below standard, poorly maintained, frequent inability to meet capacity and requiring immediate investment to avoid adverse impact on the national economy.



Unacceptable condition, insufficient capacity, and already impacting on the national economy.

Key Recommendations 2012

ENERGY

TRANSPORT

Overall grade

B

Overall grade

C

Well planned and properly executed investment in infrastructure will yield a dividend for Ireland.

This outlay is essential for attracting inward investment in the future and for improving the lives of Irish people.

These are the key recommendations which Engineers Ireland believes are vital to the recovery and future prosperity of Ireland:



Status: Energy infrastructure in Ireland has served the country well in the past but is now facing significant challenges, including security of supply, competitiveness and meeting carbon emissions targets.

Vision: The strategic development, taking cognisance of today's financial constraints, of a reliable, competitive, sustainable supply of energy to meet the needs of Irish society and its economy, and possibly provide a source of income through the export of natural energy resources.

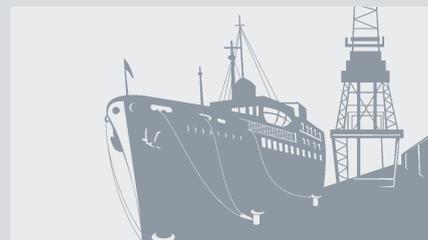
12-Month Recommendations

- Develop a scaled-up energy conservation programme aimed at reducing energy consumption by 20% in 2020.
- Revise the planning process to remove the high planning risk for energy infrastructure projects that are vital to security of energy availability.
- Continue to invest in research and development of ocean, offshore wind, marine energy and smart grid technologies; and provide adequate support for the renewable energy sector.

Five-Year Recommendations

- Achieve a 10% reduction in national energy consumption by 2016 through the energy conservation programme.
- Increase energy security by providing long-term strategic storage capacity of 20% of annual natural gas usage on the island in line with international norms.
- Strengthen the electricity transmission grid in accordance with the Eirgrid "Grid 25" targets.

Sector	Grade
Electricity	B
Gas	B
Petroleum products	B



Status: Ireland's transport system is of mixed quality, where top quality signature projects sit alongside much poorer infrastructure.

Vision: The development of an integrated and competitive transport network which meets the needs of a growing economy by providing internal and external connectivity of the very highest standard.

12-Month Recommendations

- Undertake a full review of the National Spatial Strategy.
- Execute a funding programme for integrated (public/private) transport plans in each of the Gateway Cities within 12 months.
- Commit funding to improve the speed and quality of mainline rail.

Five-Year Recommendations

- Reconsider the development of major transport projects in Dublin and commence work.
- Implement a ports plan to access deeper water for quicker turnaround times and the accommodation of larger vessel sizes.
- Consider and decide on the advancement of the construction of the Atlantic Corridor.

Sector	Grade
Road: Motorways	B
Road: Other routes	D
Rail	D
Airports	B
Sea ports	C

WATER AND FLOODING

Overall grade **C**



Status: Ireland retains many natural advantages and investment over the last decade has helped to improve water quality, which had been deteriorating. Challenges remain, however, not least in flood protection and in mitigating the effects of climate change.

Vision: The development of a safe, healthy, plentiful supply of water at low cost is fundamental, as is the management of the quality of water resources. The improvement of resilience to the increased dangers of flooding.

12-Month Recommendations

- Commence universal water charging and metering programme.
- Establish Irish Water and commence the transfer of responsibilities from local authorities.
- Publish the National Flood Forecasting and Warning Study and provide resources to commence implementation of recommendations.

Five-Year Recommendations

- Reduce unaccounted for water (UFW) to 30% nationally and reduce carbon footprint of water services by 20%.
- Complete the Catchment Flood Risk Assessment and Management (CFRAM) plans nationally by 2015, including the preliminary flood risk assessments in 2011 and the flood risk maps for 2013.
- Achieve the 2015 targets for “good” water quality status as adopted in the River Basin Management Plans.

Sector	Grade
Water supply and wastewater	C
Water quality	C
Flooding	D

WASTE

Overall grade **C**



Status: The industry is proactively moving towards an integrated approach to waste management and to a position where waste is considered a resource which can generate energy and employment while retaining an ongoing commitment to recycling.

Vision: An integrated approach for the management of residual waste, taking into account recycling ambitions and the need to meet EU objectives.

12-Month Recommendations

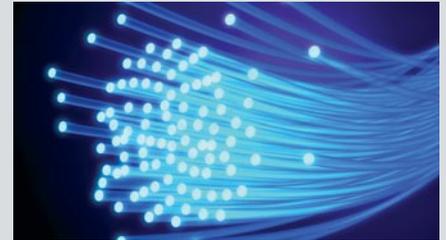
- Vest the ownership of household waste in local authorities and confirm their power to direct waste to higher order treatment tiers in the EU waste hierarchy.
- Regulate the collection of household waste by a fair, transparent and competitive tender process.
- Progress the development of waste recovery treatment capacity and commence the construction of the Poolbeg energy-from-waste (EfW) facility.

Five-Year Recommendations

- Have revised and co-ordinated regional waste management plans in operation.
- Have the Poolbeg energy-from-waste (EfW) facility and other waste recovery facilities operational to meet our 2016 landfill diversion targets.
- Have dedicated expert waste management engineers available to the industry from university courses.

COMMUNICATIONS

Overall grade **B-**



Status: The deficiencies of Ireland’s communications infrastructure prevent it from meeting producer and consumer needs.

Vision: Ireland needs to have a fast and reliable communications infrastructure which drives the knowledge economy and compensates for our peripheral status.

12-Month Recommendations

- Develop infrastructure to deliver advanced broadband speeds (100Mbps or more) and continue measures to bring regional broadband costs down to match rates available in Dublin.
- Continue to fund broadband roll-out and make it available to all parts of the State, including islands, with high-speed broadband available to more than 95% of the population.
- Identify risks to national communications systems, e.g., reliance on one or two sub-sea cables, and commit to funding recommendations.

Five-Year Recommendations

- Bring broadband costs down to not more than 5% above EU and UK norms within five years.
- Achieve universal high-speed broadband to substantially all parts of the State by 2016 through the continued development of the ‘fibre to the cabinet’ (FTTC) and ‘fibre to the home’ (FTTH) networks as well as satellite-based access services.
- National and regional broadband infrastructure to be in the top five of European league tables in terms of availability, uptake and speed by 2016.

RECOMMENDATIONS 2012

12-Month

Develop a scaled-up energy conservation programme aimed at reducing energy consumption by 20% in 2020.

Revise the planning process to remove the high planning risk for energy infrastructure projects that are vital to security of energy availability.

Continue to invest in research and development of ocean, offshore wind, marine energy and smart grid technologies; and provide adequate support for the renewable energy sector.

Five-Year

Achieve a 10% reduction in national energy consumption by 2016 through the energy conservation programme.

Increase energy security by providing long-term strategic storage capacity of 20% of annual natural gas usage on the island in line with international norms.

Strengthen the electricity transmission grid in accordance with the Eirgrid "Grid 25" targets.

Sector	Grade
Electricity	B
Gas	B
Petroleum products	B

Overall grade



B

ENERGY

The prosperity of the Republic of Ireland depends on the quality of its energy infrastructure. Generating heat and electricity is central to the operation of Irish society and the economy. The demand to reduce carbon emissions to already agreed targets presents a major challenge to the energy industry. Further, the basic matter of guaranteeing security of supply must also be addressed through planning and investment. And, on top of that, the cost of providing energy is fundamental to our national competitiveness and job creation.

Three major aspects of energy infrastructure are analysed here: electricity; natural gas; and, petroleum products.

Electricity

Electricity is vital to virtually every aspect of people's lives and to the economy. Its importance is increasing with time, particularly due to the development of the knowledge economy and the communications infrastructure which underpins it. In the future electricity is also expected to play an increasing role in the transport sector. An increase in the use of indigenous resources for this electricity and the decarbonisation of same is critical to the medium- to long-term health of the Irish economy, once delivered in a secure and competitive manner.

What is the current state of the infrastructure?

Given the sharp downturn in electricity demand since 2008 and the likelihood that economic growth will be lower in the near future than was previously envisaged, Ireland's existing electricity infrastructure is largely capable of meeting short- and medium-term demand. During 2011 demand for electricity was again dampened. Growth in capacity to produce renewable energy continued in 2011. This growth averages at more than 150MW per year, reaching 1,585MW by September 2011. In order to meet Ireland's obligations in

2020, however, the infrastructure that supports renewable energy will need to be significantly reinforced. Under the EU's overarching 20:20:20 strategy (20% saving in final energy consumption, 20% improvement in energy efficiency and 20% saving in carbon emissions), Ireland has to supply 16% of its total final energy consumption from renewable sources and, according to our own national policy, 40% of our electricity generation must come from renewables by 2020. It must also reduce its greenhouse gas emissions to 80% of 2005 levels.

Electricity infrastructure in Ireland is, on the whole, well maintained and safe; it meets international standards in terms of reliability, safety and power quality. There has been very substantial investment in Ireland's power generation facilities in the past ten years. In that time over 4,500 megawatts (MW) of generation were added to a system with a peak demand of just 5,000MW. That included 2,570MW of combined cycle gas turbine (CCGT) and combined heat and power (CHP) plants, 1,180MW of wind-powered generation, 250MW of peat-fired generation and 320MW of open cycle gas turbine (OCGT) plants. The upshot is that the existing electricity generation capacity in Ireland is potentially sufficient to

meet projected needs for the next decade. The need for decarbonisation of our generation portfolio and a transition to more indigenous sources of electricity must be considered in this context. Nonetheless, based on national projections for 2020 targets, more flexible power generation and electricity storage will be needed to match the intermittency of renewable electricity. Older, less efficient power generation plants should be retired off the system to allow new, more efficient plants to operate on a cost-effective basis; this has been signalled by Eirgrid in its latest Generation Adequacy Report. In addition, the ESB has spent in excess of €4 billion in upgrading Ireland's transmission and distribution networks in the past decade. This included the replacement of the rural 10kV distribution system with a new 20kV distribution system. This has greatly improved the continuity and quality of supply to rural areas. By international standards, and correctly in light of the country's needs, Ireland's electricity transmission network was constructed to meet relatively low transmission requirements, with the exception of the Moneypoint 400kV lines to Dublin. The recent addition of a considerable amount of wind-powered generation located remote from population centres has changed the transmission requirements. Accordingly, a number of the low-capacity lines (both 110kV and 220kV) are now being upgraded. There are, however, locations in the country, particularly in the north-west, where the transmission network is relatively weak and is incapable of supporting either major industrial projects or major renewable energy development at present. In some instances network development may be required to precede generation demand and the network owner must be permitted to be proactive in this respect within regional planning policy. Overall, the safety record in this area is excellent, particularly since the major investment in the distribution networks, which has dramatically reduced

the number of conductor breaks during storms. In general, Ireland's electricity infrastructure is capable of supporting current demand, but it will need to be reinforced to provide a more decarbonised network.

What does the future hold?

While the recession has dampened demand for electricity, there remains an acute need to develop Irish infrastructure to meet low carbon and general environmental concerns. To meet Ireland's 2020 targets, full support must be given to the National Energy Retrofit Programme (Better Energy), the National Renewable Energy Action Plan, the Eirgrid 2025 plan and to the SEAI home energy efficiency grants. Population growth in Ireland during the 1990s and for much of the 2000s significantly contributed to the growth in energy demand in the country. There is now significant uncertainty as to both the direction and scale of population movements in the coming decade leaving it more difficult to anticipate how demographic change will contribute to infrastructure requirements. Further, there have been very significant technical advances in recent years, which will contribute to reducing electricity demand and related emissions in the future, including developments in lighting, appliances, smart meters, smart homes and distributed generation. There is a considerable ongoing debate on the implications of reaching the targets which have been set and this debate is an important process in the evolution of a pragmatic energy policy. There are other challenges to overcome. Ireland has the advantage of access to wind, ocean and wave energy resources, but the challenge is to harness these renewable resources and to integrate them into the existing infrastructure. With this in mind, the completion of current feasibility studies is essential to understanding and solving the technical, economic, environmental and regulatory challenges faced in optimising these resources.

What actions do we need to take?

Transmission and distribution systems must be operated and maintained to the highest standard as they are a prerequisite of economic recovery. The Scottish interconnector has been faulty since 2011 and should be either repaired or replaced. In general, work must continue to replace ageing assets.

Grants for energy conservation measures in industry were removed during 2011, while grants for insulation and home energy generation were reduced. These decisions operate in opposition to the ambitions set out in respect of meeting Ireland's obligations under 20:20:20. Allowing for the current economic climate, these decisions should be reversed. In terms of investment requirements for Irish electricity infrastructure, the new North-South Interconnector should be fast-tracked. It is vital that this project proceeds as quickly as possible. The development of the planned 400kV network would allow a very substantial increase in north-south transfers, from 200MVA at present to almost 1,500MVA. The planning process in Ireland can be especially challenging and lengthy for the delivery of overhead transmission lines, wind farms and other network assets. However, of far greater concern is that society allows those that do not accept a planning decision to frustrate the delivery of such projects at great cost to the State. We must address these issues if we are to deliver infrastructure necessary for the common good. The cost and technical difficulties associated with putting the required high-tension cables underground means that in many cases these must be placed overhead.

The depletion of oil reserves, concerns about energy security and the environmental threat of greenhouse gases mean that Ireland cannot exclude consideration of nuclear power in the longer term. In the interim, grid planning should take due account of the likely permanent need for a large scale despatchable low carbon source of base-load generation, whether this be gas, nuclear, waste to energy or coal with carbon capture and storage.

Natural Gas

One-third of Irish households and many commercial premises, schools, hospitals and industries rely on gas for heating. While Ireland has a significant mix of coal, oil and gas power plants available, gas has become the preferred fuel of choice due to its cost competitiveness and low carbon emissions.

What is the current state of the infrastructure?

Ireland's gas infrastructure meets the best international standards. This infrastructure has adequate capacity to meet all projections of demand and is capable of supporting projected economic development. Following the completion of Interconnector 2, the Pipeline to the West, the Galway-Mayo pipeline and the South-North pipeline there is a very considerable amount of spare capacity in the system. This should be fully utilised given the improved international outlook for both gas availability and prices.

The extension and development of gas infrastructure in Ireland has contributed substantially in helping to reduce carbon emissions from Ireland in the industrial, commercial and residential sectors, but particularly in the power generation sector.

What does the future hold?

One of the key missing elements is the completion of the Corrib gas field project, which is essential for securing Ireland's gas needs. Gas from the Corrib field must be introduced into the system as soon as possible. A second key element is the development of further gas storage facilities. At present there is a single gas storage facility in Ireland located off the south coast. This facility has the capacity to store only 3.5% of Ireland's annual gas consumption, whereas the average strategic gas storage capacity in mainland European countries is 20%. One would expect that the country at the end of the pipeline would have the highest storage capacity and not the lowest.

What actions do we need to take?

The national infrastructure is extensive and major centres of population are well supported by infrastructure. There are, however, a number of towns and areas in cities that are not supplied with natural gas.

The availability of gas could make a noteworthy contribution to communities that do not already have it, by facilitating a significant reduction in both energy costs and in energy emissions. Nonetheless, in terms of supply, future planning needs to address the question of whether there is the demand to extend gas to every town in Ireland.

To diversify Ireland's natural gas supply network, it is important to develop a port facility for the importation of liquefied natural gas. The development of gas from renewable resources should also be considered, including from landfill sites and from grass-based biomethane.

Ireland needs to continue to explore the opportunities that are available which may improve its energy supply.

On the transport network, gas offers an alternative to diesel. To facilitate diversification of fuels used in road transport, it should be Government policy to ensure that liquefied natural gas for freight vehicles is available throughout the motorway network. There is also potential to develop indigenous biofuels from a number of sources to complement or replace compressed natural gas as a fuel for vehicles in the future, further reducing the need for imported gas.

Petroleum Products

Petroleum products are the key source of transport energy in Ireland, for cars, trucks, public transport, aviation and marine transport. A secure supply of these products is essential for mobility and for economic activity. In addition, in Ireland significant amounts of gas, oil and kerosene are still used for heating in areas outside the gas service areas.

What is the current state of the infrastructure?

In respect of petroleum products, the facilities for importation are adequate. There is, however, an inadequate amount of petroleum products held in storage in Ireland, particularly in the Dublin area. While Whiddy Island in Cork provides some storage, at the moment almost half of Ireland's strategic petroleum stocks are held for Ireland in other countries. The National Oil Reserves Agency (NORA) has undertaken a process of increasing storage of stocks in Ireland, but if there were to be a serious crisis tomorrow there are question marks as to whether we would be able to access sufficient stocks. This is not so much an infrastructure problem as a management problem, but it is a potentially serious risk to energy supplies.

What does the future hold?

A further risk in this sector is the road tanker fleet. If, for any reason, the gas supply was restricted and the electricity sector was forced

to transfer to the use of petroleum products, there are not enough road tankers capable of replenishing stocks in the power stations beyond the five days' stock each power plant is obliged to hold under current regulations.

There is a move to convert the heavy oil storage facilities at older oil-fired power stations, which are no longer in operation, or are planned for closure in the near future, for the storage of lighter oil products. This could significantly improve the security of our petroleum supply system. This process is in its early stages and will require a significant investment in both refurbishment and new infrastructure.

A further risk is the danger of a sudden oil price rise. The Irish economy is particularly vulnerable to serious price shocks, which could have a dramatic impact on the country's GDP. Indeed, the impact would most likely be more severe on Ireland than on other European countries, because of our high dependence on oil imports. This was evident from political events in North Africa and the Middle East during 2011.

Since January 1st 2012 consumers have seen a significant hike in prices at the fuel pump. This phenomenon highlights our susceptibility to price fluctuations, in this instance the weakening strength of the Euro relative to the currencies in which oil prices are set.

What actions do we need to take?

To minimise risks to Ireland in respect of petroleum products, the State needs to diversify and to use sustainable sources for as much of its energy needs as it can particularly in the heating and transportation sectors. A clear and coherent plan needs to be pursued to meet this ambition, realising that there are risks of 'stranded assets' and cost penalties if a balanced approach is not taken to the transformation to a more sustainable energy sector. Over one-third of all the energy imported into Ireland is used for heating homes and businesses. Oil is the primary fuel source for home heating and supplies approximately two-thirds of the heating market. A reduction in this level of dependency on oil for heating is required. Ireland's building stock has significant potential for improvement in terms of energy efficiency via the retrofit of insulation and renewable energy technologies. The National Retrofit Programme should be fully supported as it aims to retrofit up to one million homes by 2020. The introduction of a grant to allow for the modification of cars so that they become flex-fuel and can receive bio-ethanol or petrol should be considered. Equally, investigation should be undertaken of agricultural capability for bio-ethanol and bio-diesel production.



RECOMMENDATIONS

12-Month

Undertake a full review of the National Spatial Strategy.

Execute a funding programme for integrated (public/private) transport plans in each of the Gateway Cities within 12 months.

Commit funding to improve the speed and quality of mainline rail.

Five-Year

Reconsider the development of major transport projects in Dublin and commence work.

Implement a ports plan to access deeper water for quicker turnaround times and the accommodation of larger vessel sizes.

Consider and decide on the advancement of the construction of the Atlantic Corridor.

Sector

Grade

Road: Motorways	B
Road: Other routes	D
Rail	D
Airports	B
Sea ports	C

Overall grade



C

TRANSPORT

For much of the history of independent Ireland, investment in transport infrastructure was inadequate. Substantial improvements have been made since the end of the 1990s.

Developing a transport infrastructure which meets the requirements of Irish society and the Irish economy is essential to the future prosperity of the State. Critical to this is an integrated approach to road, rail, air and sea transport.

Roads

This section refers to the State's road network and its use for both private and public transport.

What is the current state of the infrastructure?

In terms of motorway, substantial improvements have been made over the last number of years. Ireland now has a radial motorway network out of Dublin that is on a par with those in Europe. The inter-urban links to Dublin are new and in good condition. The new motorways are well maintained and have appropriate capacity. Investment in roads has been targeted at upgrading roads where there is highest demand. There has been a clear strategy for this investment and Ireland's motorways are certainly capable of meeting demand. One caveat is that Ireland's motorways invariably link to Dublin. Links between other cities are much less impressive. The Cork to Limerick road, for example, is of very poor quality. Significant investment is needed in terms of connecting Galway, Cork, Limerick and Waterford to each other. The Atlantic Corridor is yet to be advanced sufficiently. In January 2012 the DECLG published the Spatial Planning and National Roads Guidelines for Planning Authorities. As defined in this document, the primary purpose of the national road network is to provide strategic transport links between the main centres of population and employment including key international gateways such as the main ports and airports and to provide access between all regions.

There is a considerable difference between inter-urban motorways and other roads. Beyond the motorways, Ireland's remaining road network often consists of poorly maintained roads which are not capable of meeting usual demand, certainly not to an international level. On such roads there is significant congestion, especially at peak periods. For example, the links that pull the rest of the traffic onto the motorways are not of sufficient quality, or are non-existent. The quality of non-motorway infrastructure has deteriorated and has been repaired only on a patchwork basis. Roads that were repaired and strengthened in the 1990s are now due for maintenance again, as there has been little investment in maintenance over the last ten years. The recent severe winters have also damaged many of our roads. In addition to deficiencies in the road surfaces, there is also a need to implement an asset management system to maintain road markings and signage on both urban and rural roads. In 2010, the National Roads Authority (NRA) rolled out a significant maintenance strengthening and rehabilitation programme, but this is only in its infancy. Budgetary measures mean that funding for the maintenance of the national road and motorway network will be reduced by 1% in 2012.

What does the future hold?

Ireland's national secondary roads and regional roads are in need of a substantial overhaul, and the priority should be secondary roads that connect the primary network. The condition of

these roads is poor and worsening. There are two issues here: the first is that the local authorities do not have the resources; and the second is related to systems. It is only recently that national standards developed for primary roads are being applied to secondary and regional roads. Currently, the NRA is rolling out the Eirspan bridge programme with local authorities to address concerns over the condition of road bridges on regional roads. This is an important programme that will identify the maintenance and repairs needed to keep the bridges in a safe condition. While the implementation has been delegated to local authorities with the oversight of the NRA, it is important that all local authorities do the inspection work speedily and uniformly, and without resource constraints.

What actions do we need to take?

Capital expenditure by the Department of Transport and Tourism in 2012 is down by €267m to €1,231m. Funding for national road restoration and improvements will fall from €680m in 2011 to €605m in 2012 and to €278m in 2013, €288m in 2014 and €253m in 2015. It is within this context that infrastructure projects will be undertaken in the short term. As it is most unlikely that there will be any new projects commenced, it is an imperative that work continues on improving the quality of national primary and secondary roads, and regional roads, while further work needs to be done to connect the main road network to air and sea ports. The development of rest and refuelling stations needs to continue on the motorway network. Ideally, the road system should be developed further to link the coastal cities of Waterford, Cork, Limerick and Galway (The Atlantic Corridor) but this is obviously very much dependent on our future financial outlook and will have to be advanced in the context of prioritisation. Urban areas require substantial investment to move towards a low-carbon sustainable model. This will involve investment in bus lanes, cycle lanes, pedestrian facilities and facilities for the mobility-impaired. There is also a major deficit in park-and-ride facilities. Currently, Irish road

infrastructure is not geared towards environmental and low carbon concerns. Significant investment is needed to draw people out of their cars for even part of their journey. There are major policy initiatives to develop cycling across Ireland, including the introduction of cycle lanes in new roads. The ambition is that 10% of all trips should be made by bicycle. In particular, it is hoped that many city trips will be made by bicycle. In this respect, there is consideration being given to making Galway a cycling town. Bord Fáilte is also seeking to develop tourist cycle loops out of various tourist towns.

Rail

The introduction of the Luas in Dublin and the enhancement of suburban rail commuting services have increased the number of people travelling by train to work by at least two-thirds, according to the most recent survey figures.

What is the current state of the infrastructure?

Although the Luas, the Dart and inter-city trains are fully utilised at peak times, they are usually capable of meeting demand. Irish heavy rail infrastructure is generally well maintained following the installation in places of new track to facilitate higher train speeds and increased commuter demand; this work needs to be continued across the network. A number of schemes to increase commuter capacity and electrify the existing lines are also at the planning stage, such as the Navan Railway Project, Kildare Railway Project Phase 2 and Maynooth Railway Project. Such schemes will increase capacity as far as both Heuston and Connolly Stations. The light rail system in Dublin appears to be well maintained. The main deficit in terms of both light and heavy rail in Dublin is still connectivity, for example the Luas Green Line finishes at St Stephen's Green where it has no connectivity to any other rail networks. With the Luas BXD on hold until 2015 the situation will remain the same for some years to come.

What does the future hold?

Irish rail infrastructure is not geared to address environmental and low carbon concerns. It is not designed to take people out of their cars or to drive a significant modal shift. It is not sufficiently attractive to travel by train. The dispersed nature of the population does not facilitate the economic development of the passenger network and makes it difficult for the train system to compete with road travel. Even in terms of the development of park-and-ride facilities, the basic infrastructure to support greater use of the train is largely absent, and where it is available pricing strategies often deter usage. In this, Ireland lags a long way behind the rest of Europe. This is partly a function of geography and of the reality that Ireland is a small island, with a dispersed population. The launch of Iarnród Éireann's 'Rail Vision 2030' has given some insights into the future priorities for the rail network in Ireland.

What actions do we need to take?

If a modal shift in the use of transport is envisaged, then rail is not capable of supporting projected economic development. Further investment is needed to get people out of their cars and onto bus and rail. Such investment should also attempt to link up the existing rail facilities, particularly in Dublin. The Government's decision to defer funding for Metro North, Dart Underground, the Navan Railway Line and the Western Rail Corridor leave the LUAS BXD line as the only major project likely to be undertaken. Allowing for this, planning must still recognise the future desirability that the rail network can be linked up in an efficient manner and with other transport modes. Decisions need to be taken and communicated. While rail in its current state is capable of meeting current demand, the system needs further development to improve the linkages between the major centres of population. The impending end of the EU derogation for the separation of rail infrastructure and management of the operation of trains in May 2013 will certainly have an impact on the future of planning for the rail network.

Airports

Ireland is an open economy with substantial inward investment. This investment relies in large part on the ability to access Dublin and the regional gateways from international air transport hubs. International air connectivity is critical for tourism and business travel, and our reliance on our airports was clearly demonstrated in April 2010 when volcanic ash closed Irish and European air space temporarily.

What is the current state of the infrastructure?

Irish airports and air traffic control systems are well maintained and the Dublin Airport Authority (DAA) and the Irish Aviation Authority (IAA) continue to invest to maintain the safety and security of the infrastructure. The new terminal buildings are important State assets, and their value will be seen in the medium to longer term as traffic volumes increase again. The DAA has plans to develop a second runway and this investment will be required, albeit perhaps not in the short term but when a business case for its development is put forward.

The development of the inter-urban motorways has put increased pressure on air transport within Ireland. As road travel times have improved, prospective air passengers are less willing to spend time waiting in airports for flights.

What does the future hold?

If Ireland's export-driven economic recovery is to continue, then we will see a return to growth in our airports. In many respects, the recent completion of the new terminals in Dublin and Cork has Ireland well positioned to accommodate such growth. However, airport infrastructure takes a long time to deliver and we must not lose sight of the need to progress connectivity and further infrastructure developments to avail of opportunities such as a hub for Asian airlines en route to the US.

The regional airports will continue to face pressure as internal air transport competes with improved road transport travel times.

Operating subsidies paid to regional airports by Government has been reduced by €5.3m. This includes a cessation of funding for Sligo and Galway airports from the end of 2011. While continued funding for Ireland West Airport Knock, Waterford, Donegal and Kerry will remain, this funding will be reduced by at least another €1m to €9m per annum in 2014.

These airports, however, are crucial for foreign access to peripheral areas of the country, and are therefore vital for inward investment in those areas.

What actions do we need to take?

In the short to medium term we need to continue to invest in the maintenance of our airports and protect these assets to support economic recovery. In the longer term we need to plan so as to exploit opportunities that present themselves and continue to rectify weaknesses in our existing infrastructure and travel experience.

Smaller regional airports must be maintained because of their importance for the economic development of Ireland outside of Dublin.



Sea ports

Ireland's commercial sea ports are vital for most exports and imports, as well as for the tourism sector. Furthermore, our marine infrastructure includes both large and small fisheries harbours and small leisure harbours.

What is the current state of the infrastructure?

The commercial ports are generally well maintained by the port companies, such as Dublin Port and Port of Cork. There has been significant investment in the larger fisheries harbours in recent years, such as Killybegs and Castletownbere. While there has been some investment in the smaller harbours, there remain many small quay walls around the coast that are in need of repair and replacement.

In recent years the volume of traffic through ports has declined, although this is changing as exports begin to recover. More importantly, the changing market conditions are driving the need to invest in new port infrastructure, for example the international trend towards larger vessels.

What does the future hold?

The changing market conditions and logistics will fuel the need for bigger berths and deeper water locations. Inner city renewal will also push more port activities out of city centres and release valuable land for development.

However, port infrastructure tends to be large and can take many years from planning to delivery; therefore, ports must plan far in advance for such infrastructure. The completion in early 2012 of a ports policy offers the opportunity to develop a strategy which will drive policy in this area for the foreseeable future.

What actions do we need to take?

Ireland needs to develop its commercial ports beyond city centres into deeper water where larger vessels can be accommodated with quicker turnaround times. It is imperative, also, to streamline the statutory planning process to ensure that this infrastructure can be delivered in a timely fashion.

Strategic traffic in the context of the national roads primarily comprises major inter-urban and inter-regional traffic which contributes to socio-economic development. The transportation of goods and products, especially traffic to and from main ports and airports, both freight and passenger related, is key to the sustainability of Ireland's economy. It stands to reason then that the connectivity of our sea ports with other transport modes needs to be improved, particularly for freight.



RECOMMENDATIONS

12-Month

Commence universal water charging and metering programme.

Establish Irish Water and commence the transfer of responsibilities from local authorities.

Publish the National Flood Forecasting and Warning Study and provide resources to commence implementation of recommendations.

Five-Year

Reduce unaccounted for water (UFW) to 30% nationally and reduce carbon footprint of water services by 20%.

Complete the Catchment Flood Risk Assessment and Management (CFRAM) plans nationally by 2015, including the preliminary flood risk assessments in 2011 and the flood risk maps for 2013.

Achieve the 2015 targets for "good" water quality status as adopted in the River Basin Management Plans.

Sector	Grade
Water supply and wastewater	C
Water quality	C
Flooding	D

Overall grade



WATER AND FLOODING

Most nations face a crisis of water supply in the coming decades and many also face the challenge of rising sea levels. These are global issues and Ireland is better placed than most to meet them; however, the country must defend these natural advantages.

Three aspects of water in Ireland are considered here: water supply and wastewater; water quality in the natural environment, and flood management.

Water Supply and Wastewater

Raw water is taken from the natural environment and then treated, stored, and distributed through pipes into people's homes. After use, it is then collected as wastewater, treated again and returned as clean water to rivers or coastal waters.

What is the current state of the infrastructure?

The DECLG published a position paper on the reform of the water sector in Ireland in January 2012. This paper, based on a substantial review undertaken by PricewaterhouseCoopers, summarises the current position of water services.

In accordance with EU directives, and with part-funding from central Government through the Water Services Investment Programme, local authorities have made significant progress in the last 15 years in the improvement of public water and wastewater infrastructure. As the EU Commission Review of the Urban Waste Water Treatment Directive from December 2011 demonstrates, there remains a great deal of work to be undertaken, particularly in the areas of monitoring and sampling. The Urban Waste Water Discharges report published by the Environmental Protection Agency (EPA) in February 2012 stated that 46% of waste water treatment plants did not meet all wastewater quality standards or EPA guidelines.

The Rural Water Programme has been instrumental in the improvement of private group water schemes. However, the need remains to add tertiary treatment in many areas to address issues such as cryptosporidium. The prevalence of *E.coli* in private group water schemes at levels in excess of those in Northern Ireland, England and the Netherlands (for example) remains a major concern.

In general, there remain significant challenges. The patchwork of different schemes which are stitched together to comprise the national supply of water contains elements which are entirely outdated. Some parts of the system date from the Victorian era; others come from the 1950s and 1960s when Ireland replaced sections of the network using asbestos cement. The network is not now of the required standard. The problem is compounded by breakages which result in leakage on a large scale. Indeed, water leakage, unauthorised usage and metering errors are major problems for county councils and in some areas mean that more than 50% of water is unaccounted for. On top of the antiquity of the system, the failure of building inspection regimes and the absence of contract sign-offs has meant that some housing estates built in the last ten years do not comply with the building regulations. This has resulted in increased pipe breakages (especially in cold weather). Further, a number

of pumping stations and treatment plants were put in by developers as short-term measures and are now defunct, while others which were intended to be permanent plants have not been maintained and are no longer operating in compliance with planning conditions. Infrastructure for wastewater collection and treatment plants is of variable quality across the country. A lot has been done to develop treatment plants in compliance with the EU Urban Waste Water Treatment Directive. This is particularly the case in large towns and cities which have been addressed, and some advance has also been made with smaller towns and villages. The EPA's Remedial Action List (RAL) is driving the improvement of water treatment plants with good results. A further difficulty with existing infrastructure is the amount of infiltration into the main sewers. In some areas, infiltration remediation projects have not been successful and some systems may need to be replaced as a consequence.

What does the future hold?

Certainty of water supply at reasonable cost gives Ireland a distinct competitive advantage in developing indigenous industries and in attracting foreign direct investment (FDI). The planned

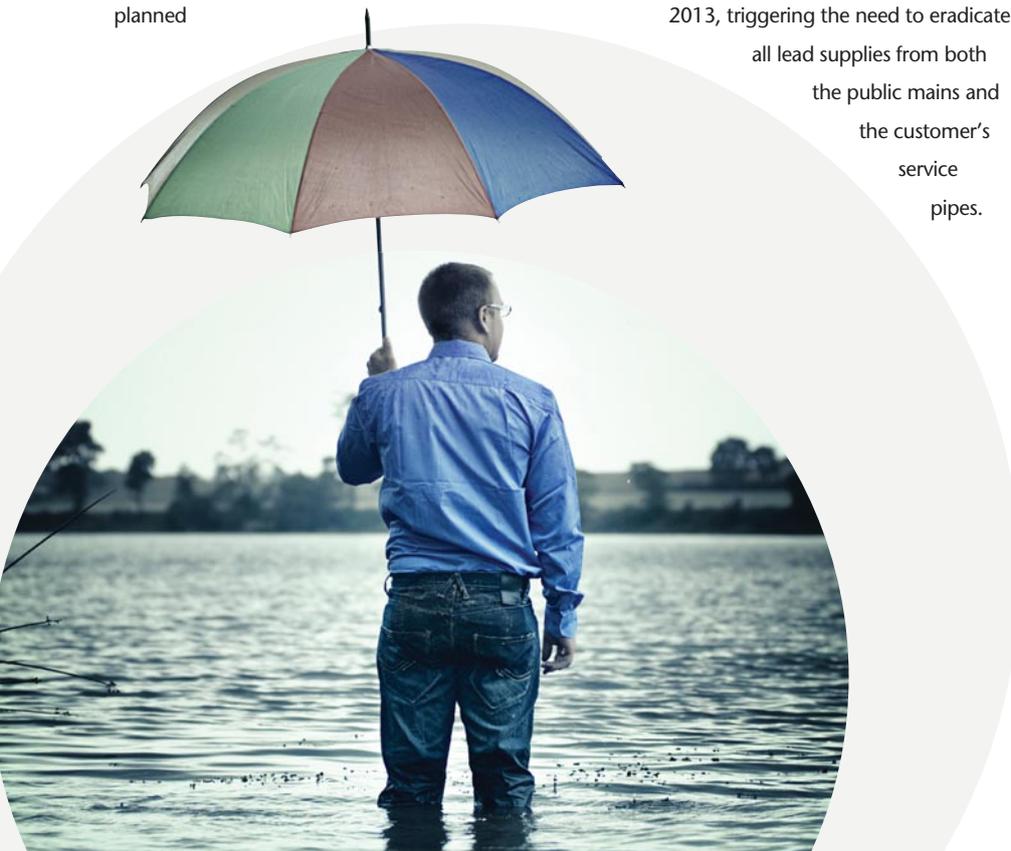
development of the national water network needs to be aligned with an updated national spatial strategy to support investment in new industries. Currently, the basic cost to Irish non-domestic customers of public water supply and waste water collection is €2.30 per cubic metre (on average). In Germany and Denmark this can be more than €5 per cubic metre, because those countries seek to achieve full cost recovery. Furthermore, widespread infiltration of groundwater into the sewer network results in increased volumes of sewage being pumped unnecessarily. On top of that, there is a high volume of unaccounted for water (UFW) due to leakage in the water supply system. This makes the cost of services more expensive than it needs to be.

Energy costs present a future risk. Ireland needs to manage water carefully so that the treatment and transportation costs do not become excessive. Climate change will place Ireland's water supply system under significant pressure. Longer dry spells will dictate that more storage is required. Ireland needs to consider the design of water management systems to ensure that there is more storage capacity. Tighter standards for lead solvency in drinking water are being introduced from

2013, triggering the need to eradicate all lead supplies from both the public mains and the customer's service pipes.

What actions do we need to take?

The consolidation of water services from 34 local authorities to a single vertically-integrated publicly-owned water utility company from 2012 should benefit the consumer. Irish Water must manage the drinking water and wastewater assets on a national basis to achieve efficient service delivery and capital investment; without jeopardising the skills and knowledge already in the local authorities and supply chain. The complementary introduction of a Water Regulator should guarantee sustainable water financing and professional consumer engagement. Ireland is currently working to the Water Services Investment Programme 2010-2012. Adequate funding for this programme, and its successors, is vital. Indeed, developing an appropriate funding model for water services in the longer term is central to the development of Ireland's water and wastewater infrastructure. Water charges need to be introduced in Ireland for all users, independently of progress on metering, and without costly universal allowances. This is not simply a matter of generating revenue, but is also about improving the management of the system. Steps must be taken to secure a long-term water supply for the Dublin region as the key economic driver of the country. The current proposal by Dublin City Council to extract excess water from the Shannon, and store it in a worked-out peat bog in the Midlands, presents an appealing opportunity to secure a water supply for Dublin. The future trend will be to reduce the mass transfer of water from remote reservoirs. More rainwater harvesting at homes and businesses will be required to limit the need for bulk transfers at high energy cost. Further, Ireland must reduce the carbon footprint of the water distribution system, through the use of wind power at pumping stations, for example. Renewal of water pipe infrastructure is vital. In many countries there is a strategic imperative to replace a certain percentage – at least 1% – of water infrastructure on an annual basis. It should be a national imperative that we upgrade at least 1%, or more, of water and wastewater infrastructure on an annual basis.



Water Quality

This section deals with the quality of water in the natural environment – lakes, rivers, groundwater, and coastal bays and estuaries.

What is the current state of the infrastructure?

The money that has been invested in major wastewater treatment schemes has begun to have a positive impact on water quality. Ireland's rivers, lakes, groundwater and coastal waters are in the top 10%, internationally, in terms of the quality of water. Of 13,200km of rivers surveyed in Ireland between 2006 and 2008, 70% were unpolluted, 19% slightly polluted, 10.5% moderately polluted and 0.5% seriously polluted.

The quality of Ireland's bathing waters is good, with 93% of designated bathing areas meeting EU standards. The quality of the water continues to improve. Until a few years ago, untreated raw sewage was discharged into Dublin Bay. The water quality of Dublin Bay has now improved dramatically with Dollymount Strand awarded a Blue Flag.

A major programme – the River Basin District Management Plans – is underway to meet the objectives of the EU's Water Framework Directive, which is designed to protect all high status waters, prevent further deterioration of all waters,

and restore degraded surface and ground waters to good status by 2015. The Directive was introduced in response to the increasing threat of pollution and the demand from the public for cleaner rivers, lakes and beaches. Now, for the first time, there is a framework for the protection of all waters including rivers, lakes, estuaries, coastal waters and groundwater, and their dependent wildlife habitats, under one piece of environmental legislation. The EPA Water Quality Report (Feb 2011) indicated that 52% of river and 47% of lake water bodies are at "good" or better ecological status.

In 2009 the European Court of Justice also reprimanded Ireland for not properly implementing EU rules on wastewater in rural areas, in the way septic tanks and other private wastewater treatment systems are installed and maintained throughout the countryside. The Court said that – with the exception of Co. Cavan, which introduced water pollution bye-laws in 2004 – Ireland had failed to implement properly an EU directive on wastewater. The Water Services (Amendment) Bill 2011 has been enacted in early 2012 to introduce registration and inspection of septic tanks, although the funding basis is questionable and this will impact on the effectiveness of the scheme.

Significant investment in municipal wastewater treatment plants has ensured that huge progress has been made in the last decade and Ireland's water is recovering, though much work remains to be done.

What does the future hold?

The future risks to water quality include those from increased development pressures, which bring more wastewater to be

treated and assimilated back into the environment. There are risks also from climate change. In drought conditions there is not enough water to dilute treated sewage in Ireland's rivers. In heavy rainfall, the storm overflows from sewers will release untreated wastewater into the water environment. Cryptosporidium outbreaks have demonstrated the fragility of water supply and its importance to normal living. Many Irish water schemes are under threat from cryptosporidium because of inadequate barriers in treatment. Comprehensive water safety plans and catchment management plans are required to manage this risk.

What actions do we need to take?

The monitoring of water quality by the EPA is comprehensive, but sufficient resources are not always available to act on the recommendations which come from monitoring. It is important that this situation be resolved. Furthermore, the December 2011 review by the EU Commission of the Urban Wastewater Treatment Directive highlighted that while Ireland has 91% secondary treatment installed on urban wastewaters, the compliance outcomes are very low (22%). This may be indicative of operational difficulties and/or sampling failures, but must be addressed.

The key action in this area is to implement the River Basin Management Plans which have been adopted. The plans aim to increase the proportion of rivers and canals at good or high status from just over 50% to 68% by 2015, with further improvements up to 2027. An implementation report and annual progress report should document this process. A properly-resourced programme of catchment risk management plans and of groundwater protection plans is vital for every water source and adequate funding must be provided if Ireland is to meet the targets set for it. There appears to have been little progress in this aspect in the last 12 months.

Flooding

Flooding can come from a range of sources: coastal/tidal, fluvial (rivers), pluvial (heavy intense rainfall), and groundwater (turloughs). It is predicted that climate change will bring wetter winters and drier summers to Ireland. On top of that, sea levels are predicted to rise throughout the current century and, with more frequent and more severe storms also predicted, many parts of Ireland will be at an increased risk of flooding.

What is the current state of the infrastructure?

The Office of Public Works has done much work in protecting against flooding. Recent projects to provide flood warning and defences in Mallow and Clonmel are a positive development, and other projects are in progress. However, there are significant challenges to be overcome. The poor state of the river defences in the older parts of some towns (for example, the collapsed river walls in Cork City at the Mercy Hospital) is a cause for concern. Previous to this, there were €140m of insured losses suffered in Cork alone from the floods of November 2009. The flooding which occurred in Dublin and along the east coast in October 2011, following a spell of very heavy rainfall, also caused more than €100m of damage; and put the spotlight on our capacity to respond to such incidents in the context of reduced local authority resources. Irish cities and towns are invariably built on rivers; this was the logical location for their development. Accordingly, this will often present a difficulty when there are abnormal events. This is not simply a matter of history, however. Inappropriate building development took place on flood plains during the last ten years and this should never have happened. The Planning System and Flood Risk Management, Guidelines for Planning Authorities prepared by the Department of the Environment, Community and Local Government and the Office of Public Works in November 2009 should eliminate that problem

in respect of new development, though the problem of managing existing developments remains. Local authorities are scheduled to have adopted the planning guidelines into all development plans by 2015, thus reducing zoned development land.

In respect of shock loads or peak events, there is a need for more infrastructure and management measures to be put in place for future flood risk scenarios. The OPW and the DECLG have developed guidelines, templates and protocols for the preparation by local authorities of emergency response plans, and these must be adopted and maintained by local authorities. The maintenance of water courses is not solely the responsibility of the State authorities but also of landowners. The OPW maintains main arterial drainage scheme channels to a published programme, but the responsibilities of riparian landowners further up the catchment are not enforced.

What does the future hold?

Climate change is likely to bring greater risk of flooding through rising sea levels and more intense rain events. In accordance with the EU Floods Directive, Ireland is currently working to identify which parts of the country are most at risk from flooding through Catchment Flood Risk Assessment and Management (CFRAM) studies, which focus on prevention, protection and preparedness. This is done by first determining the extent of flood risk through flood hazard mapping and flood risk mapping. Consequently, objectives for flood risk reduction have to be established, as well as the measures that will be taken to reach these objectives. These are to be laid down in flood risk management plans. This is a national risk assessment exercise that is being used to identify how best to manage flood events and what measures to take to reduce flood risk. The CFRAM plans are scheduled to be completed by 2015, with preliminary flood risk assessments completed in 2011 and flood maps for areas of significant risk published in 2013.

Ireland's capability to plan and implement a maintenance regime to manage flooding is poor, perhaps because of the perception that it is money spent unnecessarily. The curtailment of maintenance regimes to save money in the short term incurs larger costs in the longer term. In respect of the maintenance and management systems for flooding and for arterial drainage, landowners in general are not taking responsibility for water courses going through their property. The pluvial flooding through monster rain events is compounded because the amount of solid material going into gullies and drains increases, causing blockages and flooding. The probability of this occurring can be greatly reduced by the introduction of a proper monitoring, forecasting, reporting and maintenance regime.

What actions do we need to take?

The CFRAM studies will be a major addition to the way Ireland manages flood protection and they are scheduled to be finished by 2015. The Lee CFRAM Pilot Study should be adopted with a commitment to the works required under the plan – and it is disappointing that there has been no progress in 12 months. Across the country, these plans will be central to a pro-active approach for identifying and managing existing and potential flood risks. They must be used to develop an appropriate long-term strategy across the country for dealing with flooding. Ireland needs to move towards tailored flood warning systems across the country and towards an agreed approach to the maintenance of water courses. Significant funding is required for the OPW if it is to implement the measures (structural and non-structural) which are necessary to alleviate flooding. The economic challenges facing the country suggest that this will prove difficult in the foreseeable future. The difficulty is that failure to resolve the flooding issue will, in turn, create still more economic challenges.

RECOMMENDATIONS

12-Month

Vest the ownership of household waste in local authorities and confirm their power to direct waste to higher order treatment tiers in the EU waste hierarchy.

Regulate the collection of household waste by a fair, transparent and competitive tender process.

Progress the development of waste recovery treatment capacity and commence the construction of the Poolbeg energy-from-waste (EfW) facility.

Five-Year

Have revised and co-ordinated regional waste management plans in operation.

Have the Poolbeg energy-from-waste (EfW) facility and other waste recovery facilities operational to meet our 2016 landfill diversion targets.

Have dedicated expert waste management engineers available to the industry from university courses.

Overall grade



WASTE

The challenge for waste management in Ireland is to fully recognise waste as a resource for either material recycling or energy recovery. Current Government policy dates from the 1998 policy document, *Changing our Ways*. Current regional and county waste management plans chart a clear way forward to meet the EU Landfill Directive. There is a need to build on the policy foundations which have been laid and publish a national waste policy statement, ensuring that the requirements of the European Waste Framework Directive are met. The essential challenge is to develop a policy which will consider the entire life cycle of waste and in doing so maximise the benefits to Irish society in a cost-efficient manner.

What is the current state of the infrastructure?

There has been stagnation in infrastructural development over the last number of years due to the policy vacuum which has hindered the treatment capacity development. This stagnation continued through 2011. The ongoing debate over the most appropriate technologies for the management of residual waste in Ireland in recent years has added to the uncertainty in the waste sector and held up the development of a sustainable waste policy. Current difficulties to be resolved include the reduction in biodegradable waste to landfill in accordance with EU legislation, the management of household waste and the development of the waste recovery treatment capacity to treat residual wastes including the stalled energy-from-waste (EfW) facility in Dublin. Although Ireland's waste management structure is really challenged to meet diversion from landfill targets, the fact that economic growth has slowed has alleviated some of the immediate pressure. Nevertheless, Ireland must continue to address waste primarily in terms of prevention, reuse and recycling, then treating further to generate energy and using landfill as a last resort. Ireland also has a substantial number of landfill legacy issues to resolve.

EPA-monitored landfill sites now apply proper environmental management and there is an ongoing focus on landfill gas management to address low carbon

concerns. In addition to that, there stands the challenge of dealing with those landfills which were in fact illegal landfill sites. Historic illegal landfills are an ongoing concern and the ability to address these problems has worsened with the decline in the State's finances. Even during the boom Ireland was not fully addressing these issues. The cost of dealing with these sites is substantial, particularly given the state of the public finances. Current EU legislation requires that the amount of material that goes to landfill actually shrinks.

What does the future hold?

Irish waste management policy needs to be challenged to prevent waste and to move its treatment as far up the EU hierarchy as possible before the planning, design and construction of a new infrastructure to cope with future demands. The outcome of this debate will drive infrastructural development in a range of areas, which will probably be a mixture of incineration with energy recovery of residual waste and the introduction of MBT as a pre-treatment for landfill where incineration does not exist.

There has been a dramatic change of lifestyle in Ireland over the last decade in terms of people's commitment to recycling. The challenge now is to build on that momentum, driven by new consolidated regional waste management plans, to develop a recycling infrastructure in the workplace, in homes and in public spaces. There has been a definite shift away from people burning their own waste or fly-tipping and the momentum gained in this area is at risk in the face of poor collection coverage and increasing waste charges. We now need to ensure that there is a consistent approach to recycling all across Ireland and that every citizen is provided with the

information and the means to
recycle their waste.

Expanding the
kerbside
collection
system to

households and businesses to include the separate collection of food and organic waste is required in order to keep Ireland moving on the right track.

Ireland's commitment to recycling was initially seen as a way to reduce our 'throw-away' philosophy in favour of reusing materials. Latterly, however, waste is being seen as a resource which can lead to employment and investment opportunities. There is an increasing awareness that waste is not just rubbish. RX3 (rethink, recycle and remake) is a Department of the Environment, Community and Local Government initiative to promote the idea that waste is not something that simply must be disposed of. Instead, by a series of selective processes and with the proper incentives, whether it be commercial or financial, elements of waste input are taken and recycled into products. Additionally, the challenge is to retain these recycling activities in Ireland rather than having to export the raw material so that it is reprocessed outside Ireland. By retaining the raw material within Ireland we can generate opportunities for employment here.

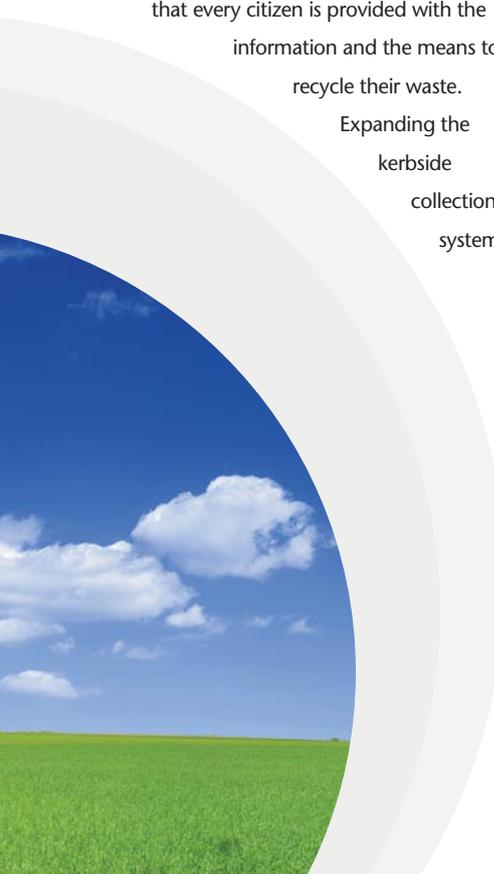
Similarly the website www.FreeTradeIreland.ie, which was developed by engineers, is driving the reuse and prevention agenda. The website, which is free for everyone to use, allows members to pass on and pick up unused and unwanted items. This simple idea has led to the reuse of over 45,000 items and prevented tonnes of material ending up in landfill: a very positive development supported by local authorities and maximising resources.

The imperative of finding new ways to manage waste demands a rethink on the expertise being taught to third-level graduates, and the need to retrain people already working in the field is now clear. It is not that a wholesale change is necessary, more that undergraduate courses must actually be geared to and mirror what the demands outside are. The changing landscape of waste management, with its emphasis on reuse and recovery and pre-processing before final dispatch, will have to be addressed in the future education of engineering and science undergraduates.

What actions do we need to take?

The fact that 39% of Irish municipal waste is now being recovered is evidence of the trend towards greater recycling. It is a trend which must be maintained, based as far as possible on source-separated recycling in terms of green and brown bins for dry and wet recyclables, respectively. The medium-term challenge facing the waste management sector is to meet the challenges of the EU Landfill Directive. The aim of this Directive is to prevent, or reduce as far as possible, negative effects on the environment from the landfilling of waste, during the whole life cycle of the landfill. The number of active landfills in Ireland has decreased from over 200 in the mid-1980s to 29 in 2011.

Rationalisation of disposal facilities will continue as we move from this treatment option. Part of the continued move towards increased recycling and recovery of waste will be further obligations on householders and business owners to segregate their waste between bins for residual, dry recyclables and organic wastes. The proper application of use-based charges, placing a financial penalty on those who do not minimise the waste that goes into black bins, will support the growth of recycling. The future management of residual waste is a pressing challenge, requiring urgent attention if we are to reduce our dependence on landfill. This remains the highest priority from a waste infrastructure development perspective. To enable waste management plans to be implemented will require the proper regulation of waste collection and local authorities to exercise the power to direct waste to higher order treatment facilities. The current unregulated collection of waste in Ireland, which is unique in the EU, cannot be allowed to continue as it is not in the national interest. The ownership of household waste must be vested in the local authority and it is essential that the tender process for household waste collection is fair, transparent and competitive. In addition, the provision of waste infrastructure needs to be planned rather than led by the market.



RECOMMENDATIONS

12-Month

Develop infrastructure to deliver advanced broadband speeds (100Mbps or more) and continue measures to bring regional broadband costs down to match rates available in Dublin.

Continue to fund broadband roll-out and make it available to all parts of the State, including islands, with high-speed broadband available to more than 95% of the population.

Identify risks to national communications systems, e.g., reliance on one or two sub-sea cables, and commit to funding recommendations.

Five-Year

Bring broadband costs down to not more than 5% above EU and UK norms within five years.

Achieve universal high-speed broadband to substantially all parts of the State by 2016 through the continued development of the 'fibre to the cabinet' (FTTC) and 'fibre to the home' (FTTH) networks as well as satellite-based access services.

National and regional broadband infrastructure to be in the top five of European league tables in terms of availability, uptake and speed by 2016.

Overall grade

A large white letter 'B' with a horizontal line through it, set against a dark red circular background.

COMMUNICATIONS

Every time a phone call is made in Ireland, and every time a person in Ireland goes online, they depend on the smooth operation of Ireland's communications infrastructure.

What is the current state of the infrastructure?

In general, the fixed and mobile phone network infrastructure is capable of meeting the demands placed on it. Since the 2011 report, progress has been made in making broadband more widely available to all parts of the State though speed is still an issue. For example, Eircom and UPC have launched fibre-based products to both domestic and business users. The broadband infrastructure, across its current range, is capable of meeting normal and peak traffic demands, albeit sometimes at reduced speeds. Nonetheless, some areas of the country are not yet covered by the broadband network and development of the network is required to extend coverage across the entire State. For phones and for broadband, the current economic recession has reduced the demand for service provision, thereby facilitating the existing network's capability to meet demand. In general, Ireland compares favourably with other European countries in mobile phone usage, with 5.3 million customers and a penetration rate of 119%. However, there have been high termination rates reported recently, which could indicate a fall off in usage. In general, Ireland also compares favourably with other European countries for fixed-line infrastructure, with a high percentage of the network digitised. While there has been increased broadband penetration in recent years, Ireland compares poorly with other European countries on the extent of its internet and broadband penetrations.

What does the future hold?

While mobile phone network infrastructures are capable of supporting projected economic developments, the broadband infrastructure will require considerable enhancement to extend network coverage and to improve broadband speeds. The announcement by the Department of Communications, Energy and Natural Resources to roll out 100Mb broadband to all second-level schools by 2014 is certainly a step in the right direction. The cost and quality of broadband access is fundamental to the economic success of enterprises which need such access for their business. In Ireland, the

cost of broadband access is high and needs to be reduced if small and medium enterprises are not to be disadvantaged by comparison with those in other countries. There is a need for increased development of wireless broadband media throughout the country (e.g., WiFi and WiMax) particularly in areas of the country which are not adequately served by existing landline infrastructure. Crucially, advanced broadband speeds must be delivered on a far greater scale across the country. Ownership of Ireland's telecoms infrastructure is in the hands of foreign investors and a key issue must be the ability of the overseas telecom owners to balance the demands of their shareholders with the needs of the Irish economy.

What actions do we need to take?

By providing voice and video conference facilities, the communications infrastructure has the potential to reduce the need for travel to attend meetings and to reduce carbon emissions. On the downside, hosting and hot-site facilities for network servers have high energy requirements. Nonetheless, the temperate climate in Ireland reduces the requirements for cooling/air conditioning with reduced environmental impact compared to other countries. It will be vital to develop fibre access networks (FTTC and FTTH) and satellite-based access services. These currently account for only a small percentage of total broadband subscriptions and this needs to be dramatically increased in the short to medium term. The cost of backhaul data traffic to Dublin from regional areas has to be reduced. Changes in lifestyle which have implications for network usage include shopping on the internet, downloading music and accessing TV programmes. Investment is required in major network upgrade to cater for the higher speeds which will be required in the future. Cloud computing applications hosted in data centres are a key area of growing economic activity and rely on a high capacity resilient communication service. Ireland's intellectual property (IP) and data protection regimes need to keep abreast of international legislation in order to remain competitive in the global marketplace.

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ABBREVIATIONS

CCGT:	Combined cycle gas turbine	EPA:	Environmental Protection Agency	MW:	Megawatts
CHP:	Combined heat and power	GDP:	Gross domestic product	OCGT:	Open cycle gas turbine
DAA:	Dublin Airport Authority	GHG:	Greenhouse gases	OPW:	Office of Public Works
DEHLG:	Department of the Environment, Heritage and Local Government	IAA:	Irish Aviation Authority	RAL:	Remedial action list
DECLG:	Department of the Environment, Community and Local Government	kV:	KiloVolt	RX3:	Rethink, recycle, remake
DSL:	Digital subscriber loop	Mbps	Megabits per second	UFW:	Unaccounted for water
		MBT:	Mechanical biological treatment		
		MVA:	MegaVolt-Ampere		



Engineers Ireland

22 Clyde Road

Ballsbridge

Dublin 4.

Tel: 00 353 1 665 1300

Fax: 00 353 1 668 5508

www.engineersireland.ie