

# The State of Ireland 2019

A review of housing and infrastructure in Ireland



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## Who we are

With over 25,000 members, Engineers Ireland is the voice of the engineering profession in Ireland. Engineers Ireland was established in 1835, making us one of the oldest and largest professional bodies in Ireland. Members come from every discipline of engineering and range from engineering students to fellows of the profession.

## Our responsibilities

- Promote knowledge of engineering
- Establish and maintain standards of professional engineering and engineering education
- Provide opportunities for continuing professional development (CPD) for engineers
- Maintain standards of professional ethics and conduct
- Ensure that professional titles are granted to qualified candidates, and
- Act as the authoritative voice of the engineering profession in Ireland

## Foreword

Welcome to The State of Ireland 2019, the ninth in Engineers Ireland's series of annual assessments of the key elements of our system of infrastructure. Each year, the aim of the report 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 year's report, for the first time, focuses on Ireland's housing sector.

Homes, including how they are built and where they are located, influence each of our lives and represent a major component of the built environment. Also an influence in our daily lives is our residential environment and supporting amenities (such as green space, public facilities and access to sustainable travel. Ireland faces major challenges in our housing sector, not only in increasing supply to meet current housing needs, but also in improving the quality of the existing stock and preparing for the future.

Government policy, legislation and funding has responded to this crisis with initiatives such as Rebuilding Ireland, Project Ireland 2040 (National Development Plan 2018-2027 and National Planning Framework) and the Construction Sector Group. Meanwhile, Local Authorities, Approved Housing Bodies, NGOs and many other organisations are contributing to an important and evolving public policy debate on housing.

As the professional body for more than 25,000 engineers, Engineers Ireland and our members have a central role to play in this debate and in directly delivering solutions. Across five broad headings, the recommendations contained in The State of Ireland 2019, informed by our expert advisory group of more than 20 professionals, highlight actions which we believe will improve the performance of our housing sector.

Climate change is one of the greatest global challenges for this and future generations. The recently-published Climate Action Plan is an ambitious programme to tackle climate breakdown and we are pleased to see that many of the actions mirror those included in this and previous State of Ireland reports.

Engineers are to the forefront of delivering compact and smart settlements, innovative buildings and

construction methods, a strong digital economy, enabling the transition to a low carbon and resilient society and the sustainable management of water and other resources. However, engineers are in high demand and skills shortages have the potential to undermine the delivery of housing and other engineering-led solutions. We must therefore innovate to increase the capacity and productivity of our sector and collaborate to promote the rewarding careers engineering has to offer.

Finally, I would like to acknowledge the time and expertise of all those who contributed to The State of Ireland 2019 project. I would particularly like to thank the President of Engineers Ireland, Marguerite Sayers, for chairing the advisory group and our Deputy Registrar & Policy Officer, Richard Manton, for managing the project.



Caroline Spillane  
Director General  
June 2019

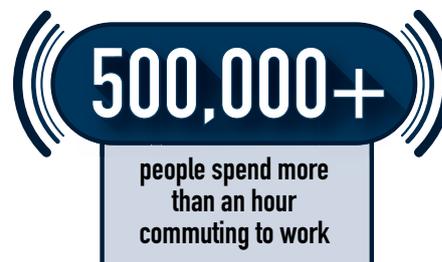
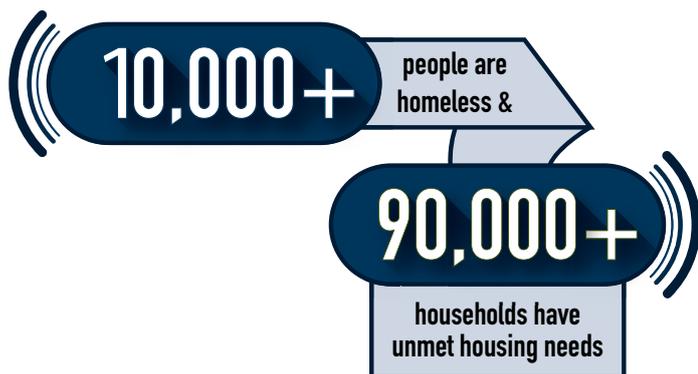


## Executive Summary

The State of Ireland 2019 is an independent assessment of Ireland’s housing and the ninth annual instalment in a series of reports examining the state of critical sectors of the country’s infrastructure. As in previous years, the report’s findings are based on the deliberations of an expert advisory group of engineers and related housing professionals, including CEOs of State bodies and Local Authorities, consulting engineers, home builders, academics and others.

The expert group designated Irish housing a ‘D’ grade, meaning that they believe the sector is of serious concern and requires immediate action. The capacity of Ireland’s housing to meet current and future needs is poor and requires immediate action. The physical condition and connectivity of the existing housing stock to services and infrastructure is mediocre and requires attention. A survey of 1,735 qualified engineers independently arrived at a ‘D’ grade for housing and a ‘C’ overall grade for Ireland’s infrastructure.

### Some of the key facts considered in the assessment were:



The report presents a set of recommendations arising from dedicated advisory sub-groups on land and supporting infrastructure; revitalising our cities, towns and villages; upgrading the existing stock; future proofing the housing stock; and technology and skills. Highlights include:

- Allocate greater levels of public funding for public infrastructure (e.g. water and roads) and to ease the delivery of housing and make housing more affordable
- Develop a whole-of-government plan for the revitalisation of existing towns and villages as attractive environments to live, work and shop
- Implement a radical national retrofit strategy, providing absolute clarity and a roadmap for retrofitting over the next 20 years

- Incorporate a programme of life-time adaptable housing for both new and existing homes
- Establish a Construction Innovation Centre of Excellence to support the adoption of Modern Methods of Construction

The report also emphasises the importance of integrated approach to housing delivery, one which considers the wider system of infrastructure, technology and skills. To this end, shorter updates on the focus areas of previous State of Ireland reports (namely energy, transport, communications, water/wastewater, flooding and waste) are provided in the context of connections to housing.

# Engineers Ireland's report card on infrastructure

 **Housing** 

 **Energy** 

 **Transport** 

 **Communications** 

 **Flooding** 

 **Water / wastewater** 

 **Waste** 

## Overall grading scheme

-  **Exceptional** Well maintained, in good condition, appropriate capacity and planning for future development;
-  **Good** Acceptable standard, properly maintained, able to meet demand, though investment needed in the next five years;
-  **Mediocre** Inadequately maintained, and / or unable to meet peak demand, and requiring significant investment;
-  **Poor** Below standard, poorly maintained, frequent inability to meet capacity and requiring immediate investment to avoid adverse impact on the national economy;
-  **Inadequate** Unacceptable condition, insufficient capacity, and already impacting on the national economy.

# Housing



## Land and supporting infrastructure

- Establish the capacity of infrastructure servicing key underutilised sites in each Local Authority area and enhance the coordination of timely investment (in water, wastewater, transport, energy etc.).
- Allocate greater levels of public funding for public infrastructure to ease the delivery of housing and make housing more affordable. This additional funding should come from both locally-raised and centrally-raised sources.
- Actively manage public land, ensuring the Land Development Agency has a strong mandate and sufficient capacity to coordinate the development of State lands and to assemble strategic land banks from a mixture of public and private lands.
- Strengthen and expand the implementation of policies which can speed up the development process, such as:
  - Strategic Development Zones: for large-scale strategic sites, both regeneration and greenfield
  - Strategic Housing Developments: for larger housing applications
  - Vacant Site Levy: to prevent certain land from lying idle or remaining vacant

## Revitalising our cities, towns and villages

- Use zoning, servicing of land and targeted investment to encourage sufficiently-dense, sustainable urban development (as envisaged in the National Planning Framework).
- Nurture Ireland's Atlantic cities (Cork, Limerick, Galway and Waterford) as Network Cities through social and economic cooperation and fast and reliable connectivity.
- Recognising the environmental impact of one-off housing, only those with a demonstrable economic or social need for these homes should be given planning permission in a rural area under urban influence.
- Develop a whole-of-government plan for the revitalisation of existing towns and villages as attractive environments in which to live, work and

shop, particularly their main streets. Consider incentivisation and actions at Local Authority level and innovative ways to combine public and private sector finance.

## Upgrading the existing stock

- Develop and implement a radical national retrofit strategy, providing absolute clarity and a roadmap for retrofitting over the next 20 years.
- Progress the Centre of Excellence for High Performing Buildings and improve retrofitting decision-making through the preparation of typology-based case studies and other information services.
- Withdraw SI 365/2015, the Building Control (Amendment) No. 2 Regulations 2015, which allows owners of one-off houses to 'opt out' of certifying compliance with the Building Regulations.

## Future proofing the housing stock

- Develop a 50-year spatial plan for housing, infrastructure and services development considering long-term housing need and demographic changes (esp. household size and age).
- Incorporate a programme of life-time adaptable housing for both new and existing homes (potentially based on the Danish model) by 2020.
- Develop and adopt a Smart Readiness Indicator for Ireland and set a target of 80% of all new homes to be Smarter Homes by 2030.
- Introduce mechanisms to provide greater support, understanding and development of Modern Methods of Construction, particularly in respect of demonstrating compliance with regulation, providing confidence for lenders, investors, insurers, construction professionals, builders and ultimately for consumers that they are engaging with fully compliant, robust, systems.

## Technology and skills

- Establish a Construction Innovation Centre of Excellence to support the adoption of Modern Methods of Construction with particular focus on SMEs and public sector clients.
- Encourage more young people to enter and remain in Architecture, Engineering and Construction sectors.
- Increase the number and variety of apprenticeships and training schemes on offer, focusing on:
  - Modern Methods of Construction
  - Sustainable urban design
  - ‘Retrofit managers’ and other retrofitting skills such as heat pump specifiers/ installers.



# Energy

## Recommended actions



- Implement the Climate Action Plan to provide the Irish public with a cleaner, safer and more sustainable future.
- Progress the North–South Interconnector to further bolster security of supply and reduce cost to the consumer, as well as exploring other interconnection options with a view to developing them if and when appropriate.
- The Government should lead by example, with Ministers encouraged to replace their existing fossil fuel-powered cars with hybrids or electric vehicles (EVs).
- Review and revise energy policy every three to five years and inform the process with reports on progress made, gaps to target and new technological developments.
- Maintain investment in the transmission and distribution networks to meet the needs of a growing economy and the transition from fossil fuels to renewables.
- Explore technology solutions such as energy storage and further interconnection to address variable renewable generation.
- Encourage renewable energy in Ireland and harness Ireland’s already identified naturally occurring renewable resources.
- Carry out a deep retrofit of Ireland’s domestic dwellings and public buildings to reduce energy demand and increase energy efficiency.
- Convert the 900,000 homes that are not connected to the gas network and which use solid fuel or oil for heat to an appropriate electric heating solution.
- Incentivise the production of biogas from anaerobic digestion plants to enable 20% of natural gas be displaced by biogas from the gas distribution system.
- Encourage industrial locations which are off the natural gas network to implement biomass solutions for their thermal (heating/cooling) requirements.
- Continue to build out the necessary charging infrastructure to keep pace with EV adoption, including superfast chargers on inter-urban routes.
- Ensure public transport is more accountable in delivering renewable energy sources in transport (RES-T) and carbon emission targets.



# Transport

## Recommended actions



- Increase the allocation of capital investment in transport infrastructure to ensure that there are adequate funds for both the maintenance of existing assets and new build projects.
- Accelerate the purchase of EVs by Irish consumers through further soft incentives such as the use of bus corridors for electric vehicles, revisiting the registration tax and exploring other financial incentives.
- Reuse, recycle and repurpose existing transport assets, such as converting existing roads into specific bus, cycle and car sharing lanes.
- Update Ireland's national aviation policy to optimise the State airports for both passenger and freight purposes.
- Progress the planning and delivery of MetroLink.
- Introduce variable speed limits and multi-point tolling on the M50 to avoid an impending congestion crisis in the short-term.
- Progress the planning and delivery of the M20 Cork to Limerick motorway.
- Bring forward construction on the planned N4, N5, N25/M8, N22 and N28 road projects.
- Develop bus priority routes, core bus corridors and bus rapid transit routes for high frequency bus transfers in each of the five major urban centres.
- Introduce public transport systems that utilise sustainable energy sources, such as hybrid, electric, compressed natural gas (CNG) and liquid natural gas (LNG).
- Plan for the electrification of the heavy rail network and progress essential works in preparation for the DART Expansion Programme.
- Begin planning for the Eastern Bypass to alleviate congestion on the M50.
- Improve connectivity of the north-west and the Atlantic Corridor to Ireland's seaports.
- Publish the Rosslare Europort Masterplan.
- Introduce an adequately funded proactive planned programme of essential renewals for Ireland's heavy rail network.
- Expand the heavy rail fleet capacity to meet the demands of a growing economy and population.
- Increase the longevity of route permissions beyond Environment Impact Statements to secure route corridors.
- Incentivise car sharing clubs and educate young people on the advantages of these approaches to discourage multicar households and on-street urban parking.
- Extend the Luas lines and provisions for Park & Ride to encourage more commuters to leave their cars at home and take public transport to work.
- Build out the CNG network as proposed.

# Communications



## Recommended actions

- New building developments should include provision for infrastructure to support broadband rollout, for example, ducting for easier access to homes and businesses.
- Award the contract for the National Broadband Plan (NBP) without delay and with expedited timelines for delivery.
- Support the development and deployment of farm-based applications and digital services, the 'Internet of Farm', to ensure the prosperity of the rural agri sector.
- Continue to develop the capacity of the National Cyber Security Centre and further engage with national and international stakeholders around proactively securing systems and responding to incidents.
- Continue to reduce service costs when rates and speeds are not equal in rural / urban areas.
- Continue the intensive negotiations on Brexit-related issues, including agreeing a strategy to manage data post-Brexit.
- Continue to address any barriers to commercial deployment of broadband and mobile infrastructure and to ease the full build and rollout of the network planned under the NBP.
- Continue to research and develop the network in anticipation of 5G services.
- Future proof the network to ensure it is scalable and complies with any revisions to the EU broadband speed targets.

# Waste



## Recommended actions

- Continue the roll-out of the organic waste collection system to households and businesses and increase indigenous treatment capacity for this stream.
- Additional treatment capacity (lined and unlined) is needed for the management of soil wastes. The lifetime limit for permitted facilities should be increased to help support secure and viable operations of this scale.
- Ensure the necessary policy environment and infrastructure is put in place to deliver the prevention and recycling targets as set out in the regional waste management plans and EU Circular Economy Action Plan.
- Compile and publish a live register of waste treatment facilities to support the roll-out of future investment.
- Prioritise the development of indigenous waste treatment facilities including anaerobic digestion and biological treatment capacity, lined soil recovery capacity, mechanical processing capacity to produce quality recyclables and additional thermal recovery capacity for hazardous and non-hazardous wastes.
- Review the need for establishing contingency landfill capacity to prevent serious waste-related events that threaten the health of citizens and our environment.

# Water / Wastewater



## Two-year recommended actions

- Improve the protection of human and environmental health by providing groundwater and surface water Source Protection Plans for all viable supplies and upgrade well heads and abstraction points where deficiencies are immediately apparent.
- Undertake Drinking Water Safety Plan risk assessments and implement mitigation measures to address all high and very high risk hazardous events identified in Drinking Water Safety Plans to protect public health.
- Carry out the identified upgrades on private Group Water Scheme (GWS) treatment facilities listed on the GWS Remedial Action List.
- Complete an extensive review of the GWS sector to devise a rationalisation and amalgamation programme to form more sustainable water supplies.
- Reduce network leakage from 44% to 40% (saving the equivalent of 10,000 Olympic-sized swimming pools of water per year) by scaling up investment in active leakage control, supported by water mains rehabilitation and replacement.
- Upgrade existing key strategic infrastructure such as water supply at Vartry (Wicklow), water treatment at Lee Road (Cork) and wastewater treatment at Ringsend (Dublin) and Cork Lower Harbour.
- Plan for sustainable growth in accordance with the National Planning Framework and Regional Spatial & Economic Strategies. Progress projects such as the Eastern & Midlands Water Supply and the Greater Dublin Drainage Project.
- Target investment at the elimination of all untreated wastewater discharges and achieving compliance with the EU Urban Wastewater Treatment Directive.
- Review the operation of new and existing domestic water supplies and wastewater treatment.
- Incentivise a major expansion of desludging of domestic wastewater treatment systems and plan for the management of sludge generated



# Water / Wastewater



## Five-year recommended actions

- Launch a Sustainability Education Programme on the water cycle, water quality and the value of water, targeting in particular domestic water and wastewater systems.
- Expand research and application of sustainable water resource management.
- Improve cross-sectoral communication on the implementation of existing water management with a longer-term vision of implementing innovative solutions to challenges such as leakage control, hydraulic performance and water quality.
- Fully assess the environmental sustainability of existing abstractions in the context of likely future water demand and adopt a sustainable approach to water abstraction by, for example, amalgamating inefficient water supply schemes into more appropriately located and efficient schemes.
- Implement a rationalisation and amalgamation programme for the GWS sector focusing on small private supplies with less than 100 domestic connections.
- Develop and implement Source Protection Plans for all GWS private supplies.
- Achieve significant milestones in working towards a safe and secure drinking water supply for the entire country through the implementation of mitigation measures identified in Source Protection and Drinking Water Safety Plans.
- Implement effective land use management plans within catchment areas to mitigate the risks of contamination occurring, which should dovetail and be in conjunction with the work to achieve EU Water Framework Directive compliance.
- Further reduce network leakage to 35% (saving the equivalent of a further 12,000 Olympic-sized swimming pools of water per year) as part of a roadmap to resource efficiency.
- Achieve and maintain compliance with the EU Urban Wastewater Treatment Directive and EU Drinking Water Directive.
- Start construction on the Eastern & Midlands Water Supply Project, the Greater Dublin Drainage Project and other projects to ensure water and wastewater capacity in all major towns and cities.
- Implement the recommendations of the review of domestic water supplies and wastewater treatment with a view to transferring knowledge, ownership and accountability of clean water supplies and non-polluting wastewater treatment systems on the domestic user.

# Flooding



## Recommended actions

- Develop a strategic plan for the efficient delivery of schemes identified in Flood Risk Management Plans (Flood Plans) and smaller schemes, drawing on international best practice and including the following key components:
  - Multi-annual budgeting for the implementation of Flood Plans and a programme of proactive maintenance of existing structures and associated waterways;
  - A multi-stakeholder taskforce to review the operation of legislation and policy governing flood risk management. Consider whether a dedicated authority with statutory powers be established to manage flood risk, pollution and land management at a catchment scale.
  - Standard methodologies for the translation of current knowledge on climate change into design guidance for resilient infrastructure;
  - A public engagement campaign on flooding causes and the full array of hard and soft risk management options, including nature-based water retention options and managed retreat. Showcase the functioning of completed flood risk projects.
  - Phasing and coordination to encourage the organisations involved to upscale their capacity to construct and deliver these projects.
- Maintain and extend the network of permanent measurement facilities (e.g. automatic rain gauges, rainfall radar, water level monitoring, satellite / remote measurement and continuous GPS).
- Prevent escalation of assets at risk from flooding, including coastal, especially through the implementation of the National Planning Framework, Regional Spatial & Economic Strategies and local authority development plans, in accordance with flood risk management planning guidelines.
- Provide national guidance and put in place an overarching framework which allows different organisations to work together and to develop the most suitable solutions to surface water flooding problems under a coordinated plan (surface water management plan).
- Compile an inventory of groundwater flood events and establish a framework for describing groundwater flooding extent, severity and frequency and calculating associated return periods.
- Compile a register of all significant dams in Ireland. Develop and implement a system of assessment for multi-functional dams in Ireland.
- Continue the development of the National Flood Forecasting and Warning Service and improve local warning systems to assist emergency response.
- Progress the national Integrated Coastal Management Plan and pilot environmentally sustainable and economically feasible projects such as sand engines and sand dune generation to break up wave actions.
- Consider wider flood risk, e.g. rural flooding and coordinated catchment-based opportunities for flood risk management as part of future cycles of the EU Floods Directive.
- Undertake research and establish appropriate design standards for flooding infrastructure with multiple benefits, e.g. integrating with water quality and environment-supporting conditions.
- Enhance permanent measurement and monitoring facilities as well as comprehensive data systems and analysis to reduce uncertainties in quantifying flood risks.
- Develop a national database of flood risk management facilities to enable the protection of critical infrastructure, e.g. hospitals, power stations and wastewater treatment plants.



## Introduction

The state of Ireland's housing has rightly attracted considerable attention in recent years. Homelessness, lack of affordability, poor-quality or generally unsuitable accommodation are problems that face many thousands of our citizens, despite a return to strong economic growth.

In September last year, in his Presidential Address to Engineers Ireland, Peter Quinn called for 'engineering solutions' to these and other housing problems. He proposed four elements of a 'blueprint for housing': (i) a strategic approach to housing and infrastructure, (ii) active management of public land, (iii) off-site, rapid construction of social housing, and (iv) reinforced building standards. Peter concluded that "no real progress can be made in any of these areas without the

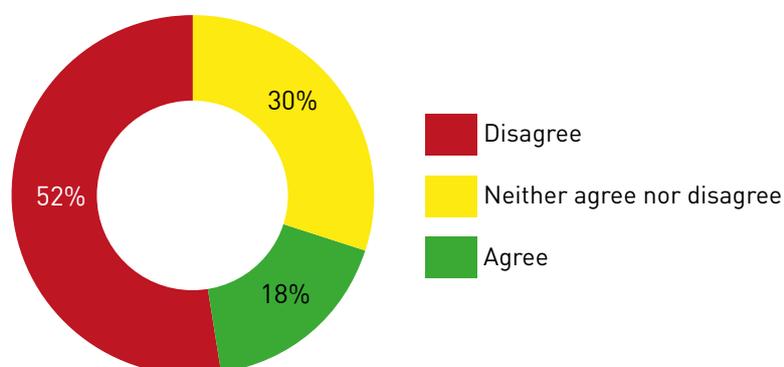
leading role of the engineering profession and its voice, Engineers Ireland."

### Engaging our engineering membership

Building on that call, and as a first step, we set out to engage our members' knowledge and experience of the built environment, including housing and the various sectors of infrastructure. When asked to assess the current state of Ireland's infrastructure, of the 1,735 qualified engineers who responded, 52% told us that – in their view – Ireland's infrastructure is not in good condition and does not have capacity for future development (see below). Meanwhile, just 30% believe that Ireland's infrastructure is in good condition with capacity for future development.

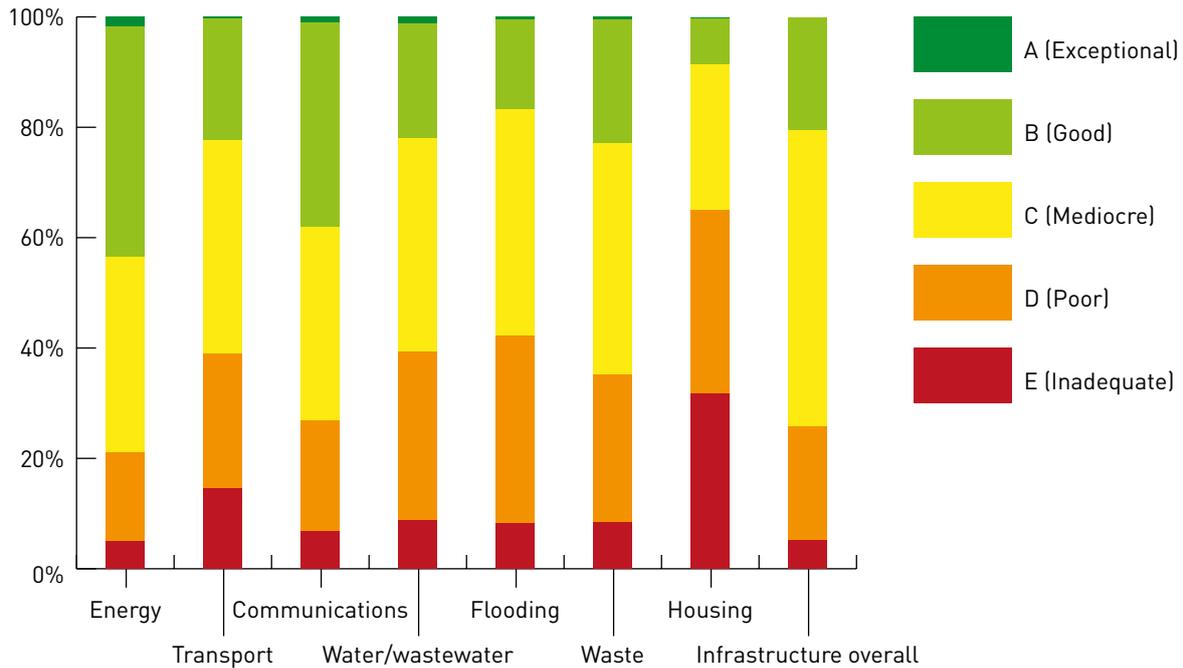
Ireland's infrastructure is in good condition with capacity for future development

*n = 1,735 Engineers*



In the same survey, we asked our members to grade the condition and capacity of seven sectors of the built environment in Ireland, using a scale of A (exceptional), B (good), C (mediocre), D (poor) and E (inadequate). Overall, they designated Ireland's infrastructure a 'C' grade, a mediocre result in line with our previous State of Ireland reports. Of the seven sectors, housing was of greatest concern and received a 'D' grade. Almost two-thirds of our qualified engineers described Ireland's housing as 'poor' or 'inadequate' (see next page).

To develop our engineering solutions to improve Ireland's housing standard and capacity, Engineers Ireland convened an advisory group of housing experts, drawn from the highest levels of the public and private sectors. Over the last six months, these engineering and related professionals developed assessment criteria, analysed various aspects of the housing sector, awarded grades, deliberated in sub-groups and developed recommendations for action.



## The State of Ireland 2019

I am glad to announce that we have made real progress on developing some engineering solutions to Ireland’s housing challenges. The State of Ireland 2019 report presents information on the engineering components of housing,

tackling issues such as land, infrastructure, building standards, sustainable planning, technology and skills. While we cannot offer a panacea for all housing ailments, our recommendations, if implemented, would improve the condition, capacity and connectivity of Ireland’s housing, and make a real difference in people’s lives.

One major theme of advisory group’s deliberations that I would like to highlight was the interrelationships between housing and the various other sectors of the built environment. Whether it is renewable energy supplies, public transport connections, broadband access or water capacity, a holistic approach to our complex built environment is needed if we are to overcome our current and future housing challenges.

I would like to sincerely thank the members of the expert advisory group for contributing so generously of their housing expertise and their time. Their work was complemented by volunteers who contributed to the shorter report sections on energy, transport, communications, water/wastewater, flooding and waste.

Marguerite Sayers  
 Chartered Engineer  
 President of Engineers Ireland  
 Chair of the State of Ireland Advisory Group



## Advisory group members

**Marguerite Sayers**, President, Engineers Ireland (Chair)  
**Dr Richard Manton**, Deputy Registrar & Policy Officer, Engineers Ireland (Project Manager)  
**John Bailey**, Chartered Engineer, Engineers Ireland Structures & Construction Division  
**Pat Barry**, CEO, Irish Green Building Council  
**Conall Boland**, former Deputy Chair, An Bord Pleanála  
**Cormac Bradley**, Chartered Engineer, Engineers Ireland Civil Division  
**David Browne**, President, Royal Institute of the Architects of Ireland  
**Peter Browne**, Senior Business Development Manager, McAvoy Group  
**Jude Byrne**, Managing Director, Cairn Homes  
**Orla Corr**, Executive Chairperson, McAvoy Group  
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**John O’Connor**, Chief Executive, Housing Agency  
**Warren Phelan**, Technical Director, RPS

## Glossary

ABP	An Bord Pleanála	NBP	National Broadband Plan
AIRO	All-Island Research Observatory	NDP	National Development Plan 2018-2027
BER	Building Energy Rating	NESC	National Economic and Social Council
BIM	Building Information Modelling	NPF	National Planning Framework (Ireland 2040)
BRT	Bus Rapid Transit	NSAI	National Standards Authority of Ireland
CIRI	Construction Industry Register Ireland	nZEB	Nearly Zero Energy Building
CPD	Continuing Professional Development	OPW	Office of Public Works
CPR	Construction Products Regulation	PE	Population Equivalent
CSO	Central Statistics Office	SCSI	Society of Chartered Surveyors Ireland
DCCAE	Department of Communications, Climate Action and Environment	SHD	Strategic Housing Development
DHPLG	Department of Housing, Planning and Local Government	SDZ	Strategic Development Zone
EPBD	Energy Performance of Buildings Directive	SEAI	Sustainable Energy Authority of Ireland
EV	Electric Vehicle	SI	Statutory Instrument
hENs	Harmonised European Standards	SILC	Survey on Income and Living Conditions
LA	Local Authority	SME	Small and Medium Enterprise
LIHAF	Local Infrastructure Housing Activation Fund	TfL	Transport for London
MMC	Modern Methods of Construction	TOD	Transport-Oriented Development
NBC	National BIM Council	VITO	Flemish Institute for Technological Research
		VSL	Vacant Site Levy



# Housing

This report by Engineers Ireland has designated a D grade to Irish housing. The capacity of Irish housing to meet current and future needs is of serious concern and requires immediate action. Meanwhile, the condition and connectivity of the existing housing stock is mediocre and requires attention.



Ireland's housing challenges of recent years have been well reported. Homelessness, lack of affordability and generally unsuitable accommodation are problems that face many thousands of our citizens, despite a return to strong economic growth. Government policy, legislation and funding has responded to this crisis with initiatives such as Rebuilding Ireland, the National Development Plan 2018-2027 (NDP) and the National Planning Framework (NPF, Ireland 2040). Meanwhile, many NGOs and other organisations have contributed to an important public policy discourse on housing.

As the voice of the engineering profession, this report is Engineers Ireland's contribution to this public policy discourse. While our housing challenges are shaped by a wide variety of factors (financial, political and technical to name a few), this report focuses on the engineering element of housing, tackling issues such as land, infrastructure, building standards, sustainable planning, technology and skills. The Expert Advisory Group (see page 3) convened by Engineers Ireland to assess and develop recommendations for Ireland's housing sector were drawn predominantly from engineering and related professions.

A key theme of the report is the need for an integrated and long-term approach to delivering housing and creating communities. Over the next 20 years, our population is expected to increase by one million people. In line with international trends, we must prepare for the majority of this population and jobs growth to be focused in urban centres. An ageing population and smaller family sizes mean that we will need an additional half a million homes to accommodate this growth. Without proper planning, growth will be haphazard and uneven.

Engineers will be crucial in delivering compact, efficient and smart growth, enhanced regional accessibility, high-quality international connectivity, a strong digital economy, transition to a low carbon and resilient society and the sustainable management of water and other resources. We must take an integrated approach to housing delivery, one which considers the wider system of infrastructure, technology and skills. For example, appropriate sites, clean water and energy supplies, public transport, schools, hospitals and broadband, are all needed if we are to build sustainable communities.

## Report structure

This report focuses on housing, while shorter updates are provided on other sectors to illustrate the integrated nature of the built environment and the actions needed:

- **Energy (p40-41):** The transition to more sustainable energy sources, managing demand and promoting energy-efficiency are key actions for our society, environment and economy.
- **Transport (p42-43):** The connection between transport and land-use (especially residential) is a fundamental principle of sustainable planning, required to reduce car dependence and improve accessibility.
- **Communications (p44-45):** An important element of making regional cities and rural towns and villages more attractive for living and working is an improvement in communications connectivity.
- **Water / wastewater (p46-47):** Increasing capacity in water and wastewater services is needed to meet the additional demand generated by new housing developments.
- **Flood risk management (p48-49):** Implementing the measures identified in the OPW's Flood Risk Management Plans will protect current and future homes and businesses.

## Background: Assessment method

The State of Ireland 2019: A review of housing and infrastructure in Ireland is the ninth report in Engineers Ireland's annual series of assessments of Ireland's built environment. As in previous years, an Expert Advisory Group was convened from many of the main stakeholders in the housing sector, particular emphasis being placed on engineering and related professions.

Representatives were drawn from the public sector (State agencies, Local Authorities, universities etc.) and private sectors and contributed insights and recommendations throughout.

The State of Ireland approach is adapted from that of the Institution of Civil Engineers' State of the Nation report and the American Society of Civil Engineers'

Infrastructure Report Card (ASCE, 2017). However, as previous reports focused on networked infrastructure, the grading scheme has been adapted to cater for the unique characteristics of the housing sector.

The grades are based on performance against three main assessment criteria, chosen by the Expert Advisory Group:

- Capacity of the housing sector to meet current and future needs
- Physical condition of the housing stock
- Connectivity of the housing stock to services and infrastructure

## Grading scheme



The housing sector is **fit for the future**. The condition and connectivity of the existing stock is excellent and meets capacity needs for the future.



The housing sector is **adequate for now**. The existing stock is in good condition and is well connected, but is not future-proofed for changing capacity needs.



The housing sector **requires attention**. The condition and connectivity of the existing stock is only mediocre and there is a shortage of capacity in some key areas.



The housing sector is **of serious concern**. The existing stock is in poor condition, is poorly connected or the lack of capacity requires immediate action.



The housing sector is **unfit for purpose**. The existing stock is in unacceptable condition, the system lacks capacity to meet demand and is already impacting on the national economy.

The first phase of this project focused on an assessment of the Republic of Ireland's existing housing stock, i.e. our current housing assets. Five major housing types were considered (Figure 1). While these types do not include the entire stock of approximately two million homes, they broadly represent the stock.

This approach also enabled the use of Central Statistics Office (CSO) data, Building Energy Ratings (BER) and other quantitative metrics. The CSO defines a rural one-off as detached houses with individual sewerage systems. A comprehensive building typology is available from the TABULA project (IEE, 2017) and these data were considered in the assessment.

Members of the Expert Advisory Group were asked to consider typical features of each housing type, assess these homes against the criteria (capacity, condition and connectivity) and award grades. A set of grades for Irish housing as a whole was compiled based on the completed assessment forms and supporting evidence. This approach helped to identify challenging areas and to develop recommendations for action.

The following pages briefly summarise the Expert Advisory Group's assessment of Irish housing against the three criteria and with reference to the data sources considered and the challenges identified.

### Quantities of five Irish housing types



Figure 1 – Five Irish housing types considered from Census (CSO, 2016) and typical appearance (Intelligent Energy Europe, 2017, projects TABULA and EPISCOPE ([www.episcope.eu](http://www.episcope.eu)))

## Capacity

We have designated the capacity of Irish housing a grade D. The capacity of the housing sector to meet current and future needs is of serious concern and requires immediate action.



According to the Housing Agency (2018), there are 71,858 households whose proven need for social housing support is not being met (Figure 2). As of March 2019, there are 10,305 homeless people in emergency accommodation, including 3,821 children / dependents (DHPLG, 2019). These alarming statistics (combined with indicators of unaffordability) point to acute housing shortages – and particular shortages of certain housing types and tenures. These shortages are primarily a reflection of the collapse of new home building over the past decade.

The CSO developed a new methodology for measuring the number of New Dwelling Completions based on Census results, ESB Networks connections, BER certificates, building control documentation and other data (Table 1). While the use of ESB Networks connections figures tended to overestimate housing completions (as these include reconnections etc.), these enable a longer-term perspective (Figure 3).

In 2006, at the peak of the Celtic Tiger building boom, the construction industry delivered up to 90,000 homes per year. This fell to fewer than 5,000 in 2013. There were 18,072 new dwellings completed in 2018 (Figure 4), expected to rise to 22,000 in 2019. While this represents more than a three-fold increase in the

past five years, this level is still far below the estimated level of housing demand based on demographic trends (approximately 35,000 dwellings per year) or even of long-term demand of at least 25,000 per year to 2040. 550,000 homes will be needed by 2040, according to the National Planning Framework (NPF). Demand is likely to increase with inward migration.

The dynamics of current and future housing demand are contributing further pressure. Average household sizes have fallen from 4.1 people in 1971 to 2.75 today, thereby generating additional demand for housing units. Nevertheless, Ireland’s average household size remains the second highest in Europe and further decreases to European norms will generate further and varied demand (such as for apartments).

The concentration of employment growth in urban areas, particularly the Greater Dublin Area, is also accentuating demand. While a very large proportion of vacant properties are rural, one-off houses (where demand is lower), capacity is particularly low in Dublin and in apartments (where demand is greatest). For example, the four Dublin Local Authorities account for 43% of households on the waiting list. Over the past decade, relative to demand, too few of the dwellings completed were apartments or were in urban areas.

Table 1 - New dwelling completions in Ireland (CSO, 2019)

	Urban				Rural				Grand total
	Single	Scheme	Apartment	Total urban	Single	Scheme	Apartment	Total rural	
2011	573	1,251	814	2,638	4,239	106	6	4,351	6,989
2012	462	917	431	1,810	3,037	47	13	3,097	4,907
2013	457	1,107	471	2,035	2,490	48	1	2,539	4,574
2014	458	1,759	746	2,963	2,517	36	2	2,555	5,518
2015	594	3,230	661	4,485	2,658	64	10	2,732	7,217
2016	699	5,032	1,165	6,896	2,964	52	4	3,020	9,916
2017	858	7,858	2,216	10,932	3,406	58	11	3,475	14,407
2018	906	10,913	2,348	14,167	3,793	88	24	3,905	18,072

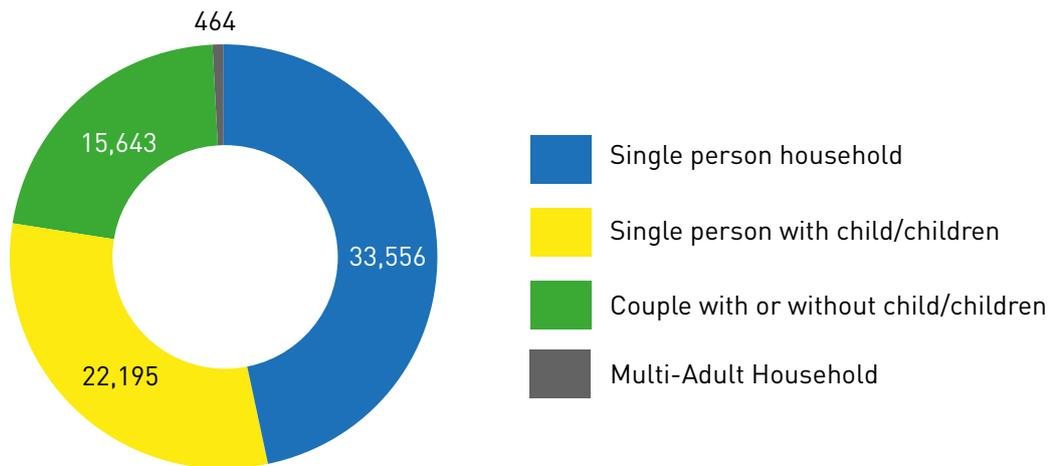


Figure 2 – Estimated housing need in 2018 by household type (Housing Agency, 2018)

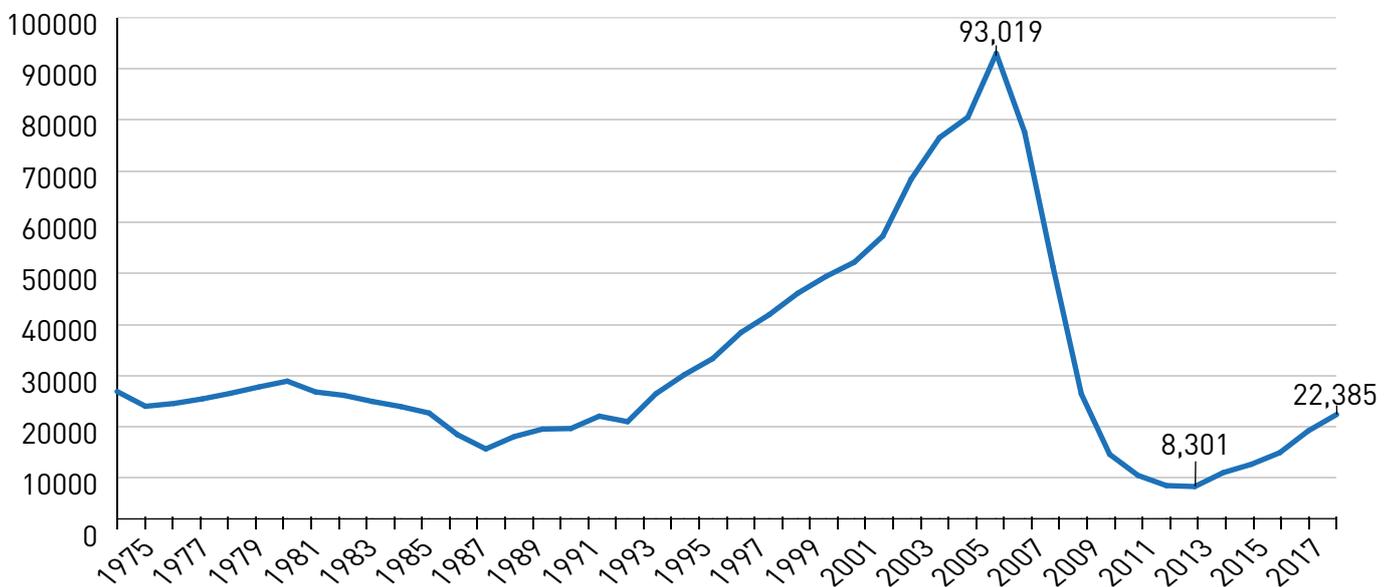


Figure 3 – ESNB domestic connections 1975-2018 (CSO, 2019)

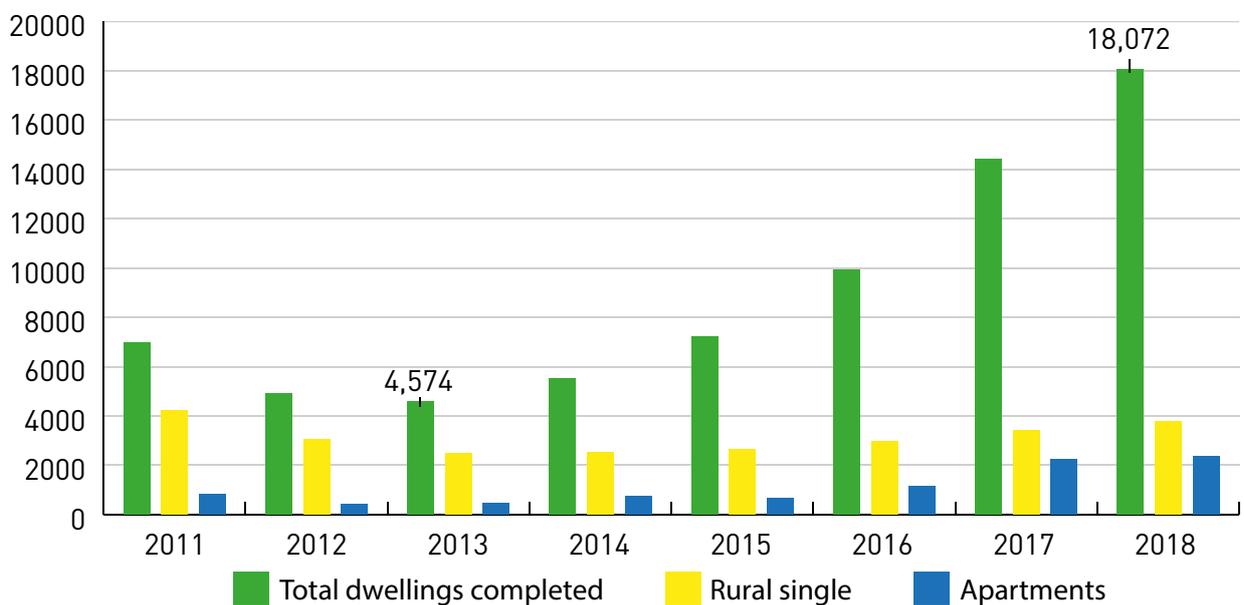


Figure 4 – Dwellings completed 2011-2018 (CSO, 2019)

## Condition

We have designated the condition of Irish housing a grade C. The physical condition of the housing stock is mediocre and requires attention.



The condition of the current housing stock has major health, social, environment and economic implications for individuals and the State. For example, the physical condition of a building has been shown to impact the occupants' health (e.g. mould impacting respiratory health) and could present a major risk of harm to the public in the case of fire and structural collapse.

The design and construction of buildings is regulated under the Building Control Acts which provide for the making of Building Regulations and Building Control Regulations. All new buildings and existing buildings which undergo an extension, a material alteration or a material change of use must be designed and constructed in compliance with the Building Regulations (see page 28 for more information).

Building Regulations provide for health, safety, welfare and accessibility of people in and around sustainable buildings. There are also Minimum Standards for Rented Accommodation for areas such as structural repair, absence of damp and rot, sanitary facilities, heating, ventilation, light and safety of gas and electrical supply.

Building Energy Ratings (BER) are an indicator of the energy consumption of buildings. The majority of dwellings in each of the bands from 1961 until 2008 achieved a BER of D or C mid-range. There has been significant and measurable improvement in building quality for new homes with the introduction of new Building Regulations in 2005, 2008, 2011 etc. (see Table 2 and Figure 5).

According to the SEAI (2018), Ireland's carbon emissions per household are 58% higher than the rest of Europe. The average floor area of Irish homes increased by 15% between 2002 and 2016, which partially negated these gained energy efficiency benefits.

According to Eurostat (2017), 12.6% of the Irish population (approx. 600,000 people) lives in a dwelling with a leaking roof, damp walls, floors or foundation or rot in window frames or floors. This is close to the EU28 average of 13.3% (Figure 6). An earlier Eurostat survey (2015) found the prevalence of other housing quality issues to be: noise (9% population), single glazing (7%) and poor lighting (6%). A small number of homes are also affected by deleterious materials such as Pyrite and Mica.

Table 2 – Average Primary Energy Use by period of construction and type of dwelling (kWh/m<sup>2</sup>/year) (SEAI, 2018)

Period	Detached house	Semi-detached house	Mid-terrace house	Apartment (mid-floor)	All dwelling types
1700-1899	409	378	364	384	399
1900-1929	420	383	373	429	406
1930-1949	398	342	324	281	360
1950-1966	353	305	298	289	324
1967-1977	298	282	254	255	286
1978-1982	251	253	222	239	248
1983-1993	233	241	222	252	238
1994-1999	207	226	224	236	221
2000-2004	191	210	192	204	203
2005-2009	161	175	156	161	167
2010-2014	98	83	84	94	94
2015-2018	56	55	51	50	55

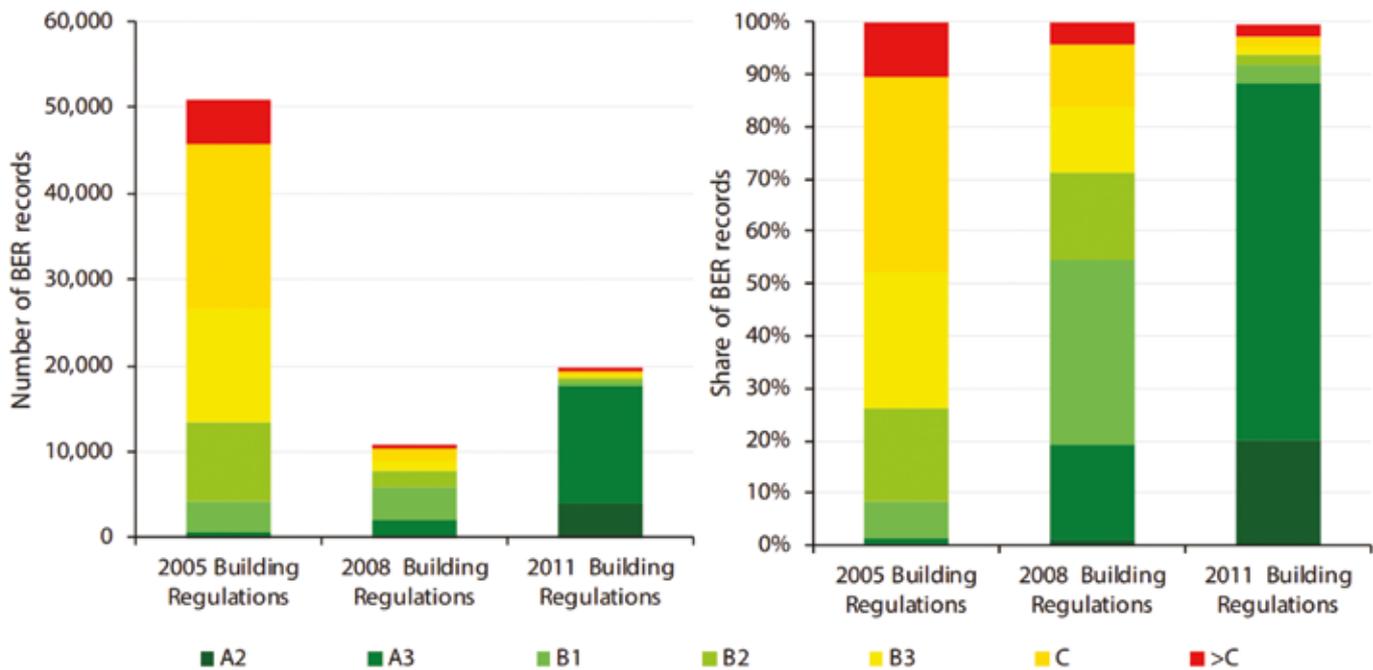


Figure 5 – Distribution of BERs in the BER database split by Building Regulations (SEAI, 2018)

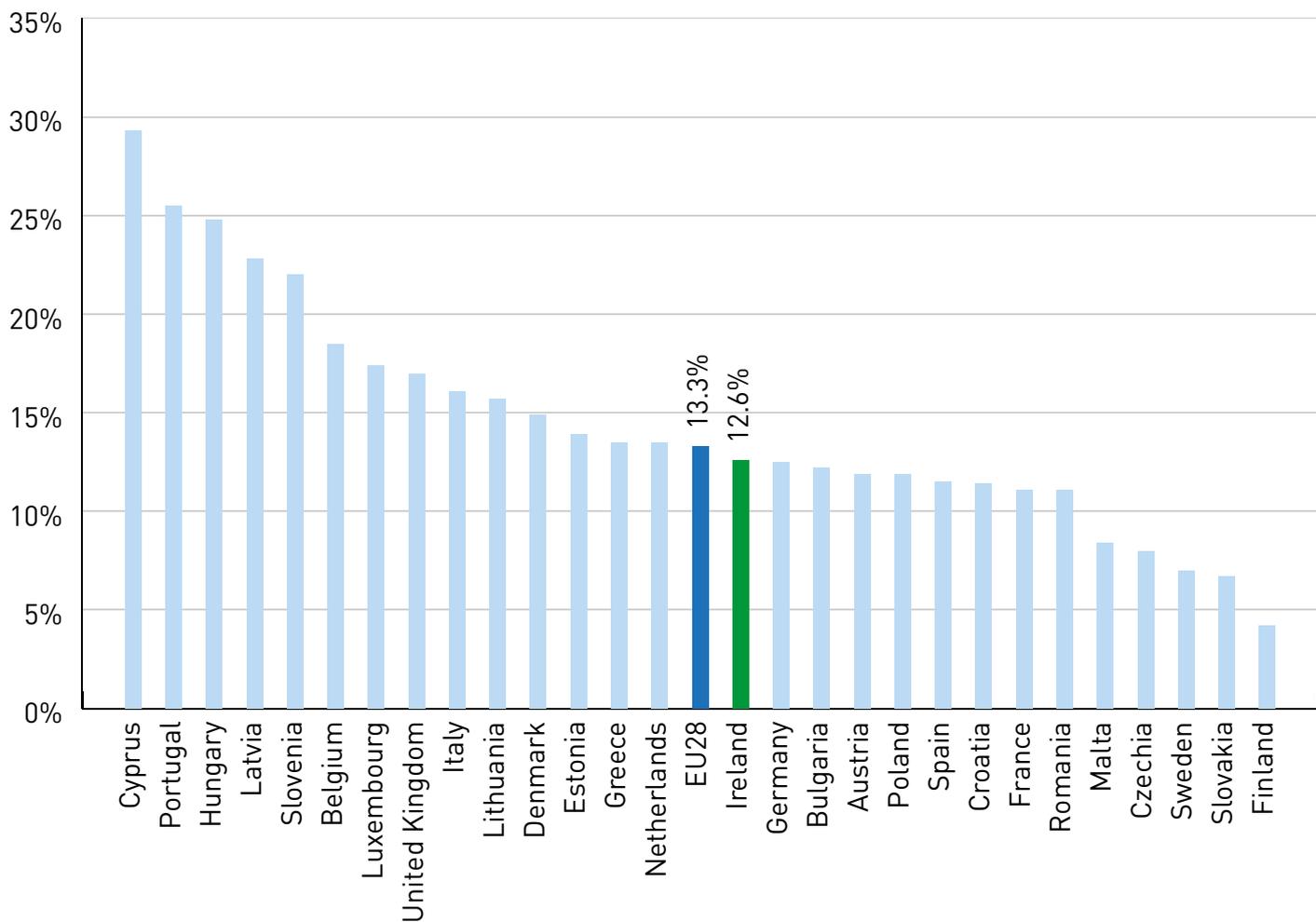


Figure 6 – Population living in a dwelling with a leaking roof, damp walls, floors or foundation, or rot in window frames of floor (Eurostat, 2017)

## Connectivity

We have designated the connectivity of Irish housing a grade C. The connectivity of the housing stock to services and infrastructure is mediocre and requires attention



Ireland’s population density at 70 people per square-kilometer is relatively low. Furthermore, our residences are particularly dispersed with 37% of people living in rural areas (defined by the CSO as settlements with fewer than 1,500 inhabitants). Table 1 shows that 25,104 of the 71,600 homes (35%) built between 2011 and 2018 were single rural houses. This form of development increases the cost of providing public services and utilities and is damaging to the natural environment.

Ireland’s transport system is highly car-dependent. This is partly as a result of this dispersed residential development, but also a result of lack of planning and investment in high quality public transport. More than 70% of commuters drive to work, rising to 90% of commuters travelling from rural areas (Table 3). The average commute has increased to more than 15 km (CSO, 2016). In terms of travel time in rural areas, car-based transport can provide good connectivity, but those who do not drive experience very long commutes by bus and train (Table 3).

The All-Island Research Observatory’s Accessibility Mapping Tool (AIRO, 2019) provides an indication of the connectivity of settlements to key services and infrastructure in transport, education, healthcare and other sectors in Ireland, north and south (see Figure 7 and Figure 8). While AIRO’s scores are based on average drive-time speeds (and congestion), the graphics are a good indicator of the catchment areas of, for example, large urban centres or 24-hour emergency hospitals.

Communications represents a further example of the variability in the connectivity of Ireland’s housing stock to critical services and infrastructure. While more than three-quarters of homes now have broadband access, large-scale State intervention is required to bring connectivity to more than one million people through the National Broadband Plan (see Communications section for further analysis).

The efficient provision of public water and wastewater networks is also challenged by dispersed development. In Ireland, there are approximately 500,000 septic tanks and 100,000 private wells. In 2016, almost half of the septic tanks inspected by Local Authorities under the National Inspection Plan failed. Of the sites inspected with private wells, more than half failed. For these and other reasons, in *The State of Ireland 2018*, Engineers Ireland awarded both private wells and domestic wastewater a D grade.

Finally, the management of flood risk to communities, urban and rural, is currently inadequate. While flooding is a natural process, risk has been exacerbated by unsustainable urbanisation and land-use practices. Climate change poses further challenges. By 2018, 28% of the 34,500 at-risk properties had been protected. Upon completion of the Flood Plans, this will rise to 95% protection (OPW, 2018).

Table 3 – Means of travel and time taken commuting to work (CSO, 2016)

	Total	Urban	Rural	Urban			Rural		
				<30 min	30-60 min	60+ min	<30 min	30-60 min	60+ min
<b>Car*</b>	1,375,578	788,601	586,977	59%	31%	9%	57%	31%	12%
<b>Foot</b>	175,080	150,280	24,800	80%	18%	2%	94%	5%	1%
<b>Bus</b>	111,436	103,426	8,010	22%	48%	29%	24%	31%	45%
<b>Train</b>	63,133	58,563	4,570	13%	52%	35%	5%	21%	74%
<b>Bike</b>	56,837	53,149	3,688	69%	29%	3%	71%	25%	5%

\*Includes van, motorcycle and car passenger etc.

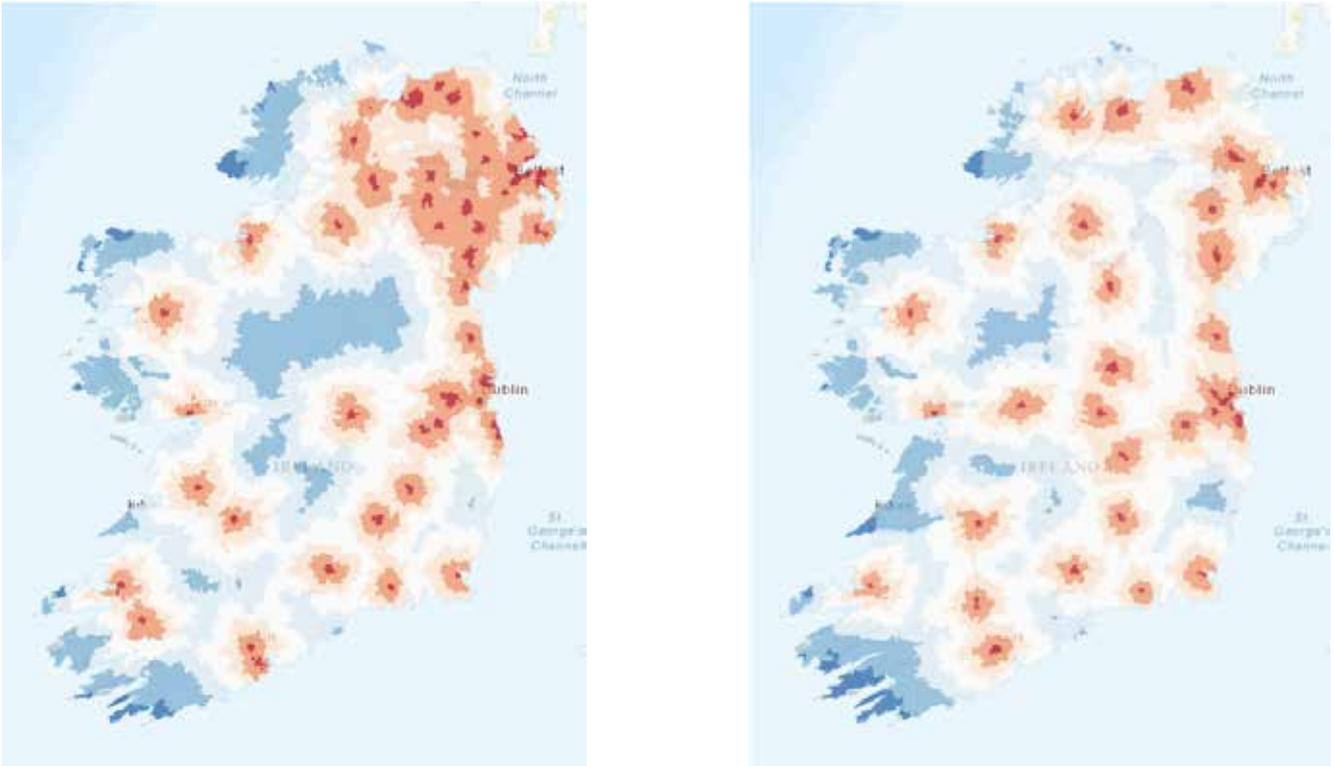


Figure 7 – Drive-time accessibility to settlements over 10,000 population (left) and 24-hour emergency hospitals (right) (AIRO, 2019)

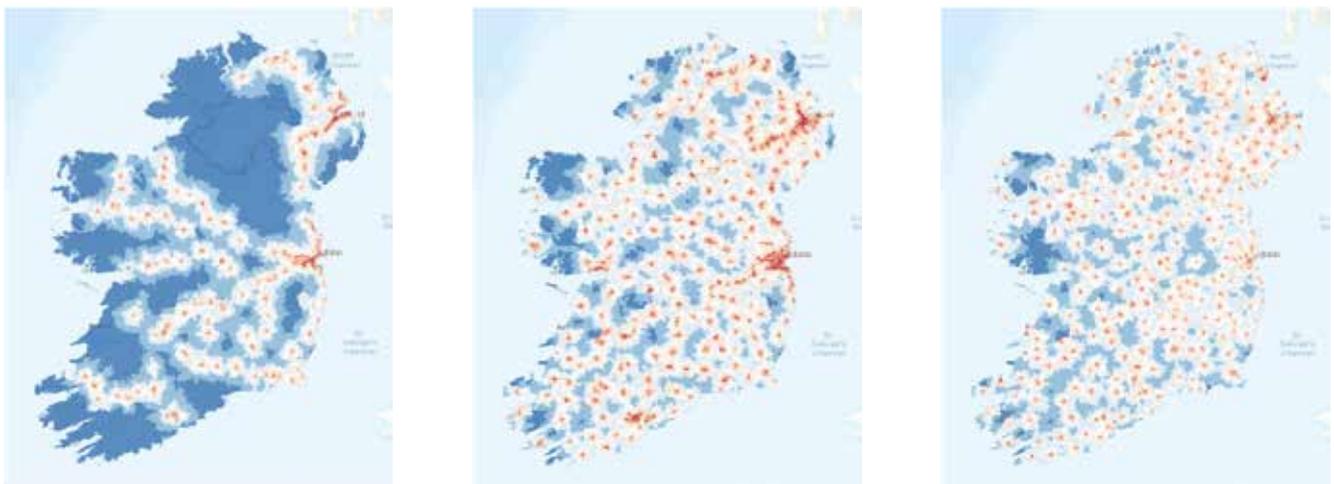


Figure 8 – Drive-time accessibility to railway stations (left), grocery stores (middle) and fire stations (right) (AIRO, 2019)





# 1. Land and supporting infrastructure

## Co-ordinating infrastructure and land use

A current constraint to delivering housing in many cases is the non-availability of public infrastructure, such as transportation (roads, public transport services), sanitary services (water and wastewater), telecommunications and energy (electricity and gas). In many cases zoned land is available but it is not fully serviced, which is delaying planning permission or construction.

Infrastructure deficit, particularly water and wastewater connections, can be a significant constraint on development. Responsibility for infrastructure is shared among many bodies including Local Authorities, Irish Water, NTA, TII, ESB Networks, Gas Networks Ireland and others.

Land that is already serviced should be prioritised for development. In local development planning, more emphasis is required on the future infrastructure requirements to prioritise investment to support effective housing delivery. Local Authorities should examine existing infrastructure capacity for each development, working alongside relevant bodies. Where there is a finite infrastructure capacity available in an area, the allocation of that capacity should favour priority housing projects as identified by the Local Authority.

### Recommendation

Establish the capacity of infrastructure servicing key underutilised sites in each Local Authority area and enhance the coordination of timely investment (in water, wastewater, transport, energy etc.).

## Funding infrastructure to service housing

At present, infrastructure to service housing areas is paid for in a variety of methods, including Local Authority funding, developer investment, investment by bodies such as Irish Water. As a key initiative of the Rebuilding Ireland Action Plan for Housing and Homelessness, the Local Infrastructure Housing Activation Fund (LIHAF) was announced to fund the

provision of public off-site infrastructure to relieve critical infrastructure blockages and enable housing developments to be built on key sites at scale.

In addition, in Budget 2019 to support the introduction of affordable housing, including Cost Rental, the Government made €310m available to Local Authorities through the Serviced Sites Fund (SSF) in order to support local authorities in the provision of key enabling infrastructure on public lands, to get the sites ready for the delivery of affordable housing (see next page).

Developers pay the local authority 'development contributions' and in some cases are also required to fund specific infrastructure (such as roads and footpaths) or to build public infrastructure as part of their scheme. In some cases, infrastructure costs falling onto the private development company can be a significant factor in making a project unviable to build. The reliance on individual developers to complete roads, footpaths and other services can also result in a piecemeal and haphazard implementation of public services.

In the short term, the LIHAF/SSF model should be reconsidered and if necessary expanded to include a greater number of areas. Further rounds of funding can open up lands that will offer a mix of social / affordable and private dwellings and in tandem offer a significant linkage to other routes/ facilities. This will encourage further provision of housing once adequate supporting infrastructure is installed.

A re-examination of the funding of public infrastructure serving new housing areas is required. This funding stream must be definitive and robust for both private and public housing providers. Stronger public responsibility for and coordination of planning, funding and delivery of infrastructure will improve stability of supply and affordability of housing.

### Recommendation

Allocate greater levels of public funding for public infrastructure to ease the delivery of housing and make housing more affordable. This additional funding should come from both locally-raised and centrally-raised sources.

## Local Infrastructure Housing Activation Fund and Serviced Sites Fund

The Local Infrastructure Housing Activation Fund (LIHAF) was established under Pillar 3 of Rebuilding Ireland to increase housing supply by overcoming critical infrastructure blockages. According to DHPLG (2017):

“Local public infrastructure such as access roads and public services to site boundaries in order to facilitate housing development is normally paid for by local authorities from revenues received from local development contributions. These costs are in turn passed on in the sale price of the house.”

“The serious decline in development and budgetary consolidation since 2008 meant that local authorities did not have sufficient resources to fund the provision of the necessary local public infrastructure to enable housing development on land for which there is planning permission to take place. The pace of new developments is not currently adequate enough to meet demand in Dublin and major urban areas or to provide sufficient revenues to enable local authorities to fund local supporting infrastructure for private housing development.”

The Local Infrastructure Housing Activation Fund (LIHAF) was designed to activate housing supply by putting in place the enabling public infrastructure necessary to ensure that large-scale development could take place on key sites in urban areas of high housing demand. Final approval was given for 30 projects under LIHAF in 2017 and these projects will stimulate development of approximately 20,000 housing units across 14 local authorities. Projects included:

- €15.75 million for a new public transport bridge across the River Dodder in Dublin City with 1,500 housing units to be provided by 2021
- €15.5 million for road upgrades at South Docks in Cork City with 620 housing units to be provided by 2021
- €15.19 million for road upgrades and a bridge in Cherrywood in Dun Laoghaire Rathdown with 2,000 housing units to be provided by 2021

Since the original call under LIHAF in 2016, significantly increased funding has been made available for enabling infrastructure through three new funds: the new €2 billion Urban Regeneration and Development Fund (URDF) and the €310 million Serviced Sites Fund, operated through the Department of Housing Planning and Local Government and the €1 billion Rural Regeneration Development Fund (RRDF) operated by the Department of Rural and Community Development.

The URDF is designed to leverage a greater proportion of residential and commercial development, supported by infrastructure, services and amenities, within the existing built-up areas of our larger urban settlements

The new Serviced Sites Fund (SSF) under which relevant Local Authorities can apply for funding for key facilitating infrastructure on public lands, to support delivery of affordable homes to purchase or rent.

On foot of a first call for proposals under the SSF approval issued for ten projects costing €43m, which will support 1,400 affordable homes, in December 2018. Infrastructure works on these projects will begin as soon as possible and delivery of affordable homes is anticipated from early 2020 onwards. Projects included:

- €11 million for road upgrades at Church Fields, Mulhuddart in Fingal with the potential for 753 affordable homes.
- €7.65 million for electricity, water and road works at Cherry Orchard in Dublin City with the potential for 183 affordable houses
- €4.97 million for a crèche and associated site works at Boherboy Road in Cork City with the potential for 103 affordable homes.

A second call for proposals issued in April 2019. As a result, 19 local authorities who carried out economic assessments, which identified affordability issues in their areas, were invited to make applications for funding in respect of additional sites earmarked for affordable housing. The bids received are currently being assessed by the Department of Housing, Planning and Local Government.

## State-owned land

There are particular land pressures in Ireland's urban areas, where the demand is greatest and is projected to rise into the future. Urban land redevelopment offers major potential to rejuvenate areas of our towns and cities. The State is a significant landowner and should also play a more significant role in the land market. A new Government agency, the Land Development Agency (LDA), has been established to manage State-owned lands, to develop sustainable, liveable communities and to regenerate underutilised sites.

The LDA will also buy private land adjoining existing prime sites held by State and semi-State organisations in order to assemble land holdings that will then be developed for housing. The Government has compared the Agency to the establishment of the ESB, IDA and Aer Lingus. The Agency will unlock the State-owned sites for private development to facilitate the construction of 150,000 homes by 2040. Under the plan, developers will have to agree to requirements such as ensuring the site has 30% affordable housing and 10% social housing.

A core component of the LDA's work will be to assemble strategic landbanks from a mix of public and private lands, making these available for housing in a controlled manner which brings essential long-term stability to the Irish housing market. The LDA should progress the comprehensive audit of all State lands – across all sectors of government and agencies including health, transport, defence and education – with a view to identifying underutilised sites that have the potential to deliver substantial housing and mixed-use schemes in accordance with NPF objectives.

This audit should, for example, identify underutilised open space in existing urban and suburban areas. Some suburban housing developed in the latter half of the 20th century includes excessive swathes of windswept, uninviting open space. The opportunity should be seized to re-imagine and enhance such spaces, possibly by creating greater identity and amenity value along with additional residential development.

There are several landbanks inherited by the State from dissolved companies (through NAMA or otherwise). While these will no doubt feature in the LDA's work, where landbanks are serviced with adequate infrastructure and primed for development, they could be given to the Local Authority in the first instance for timely utilisation at a time of such significant social need for housing provision.

There are several successful international examples of the active management of public land – the LDA should learn from international best practice. The LDA should, for example, consider the work of Transport for London (TfL). TfL has significantly expanded its capacity in land value capture and property development in recent times. It is now a key actor in urban development and affordable housing supply in London. For example, TfL forms strategic partnerships to develop areas around its transport hubs, including affordable housing, commercial, retail and parks.

The potential for the work of the LDA to transform Ireland's approach to land management should not be underestimated. The LDA must have a strong legislative and policy mandate and should be adequately resourced in terms of funding and expertise to fully grasp these opportunities for physical, social and economic transformation.

According to the National Economic and Social Council (NESC): "Effective active land management [...] requires well-staffed and well-led urban development agencies that are dedicated to the task and have the professional competence to draw up master plans and engage in complex arrangements for implementation with the private sector and community groups." (NESC, 2018).

## Recommendation

Actively manage public land, ensuring the Land Development Agency has a strong mandate and sufficient capacity to coordinate the development of State lands and to assemble strategic land banks from a mixture of public and private lands.

## Strategic Development Zones

Strategic Development Zones (SDZs) are landbanks of strategic importance designated for fast-track planning (see next page). SDZs can deliver attractive urban areas, high quality residential communities, sustainable land use and good transportation connectivity.

The SDZ approach should be employed to a greater extent for the development of large-scale sites, both regeneration and greenfield. The Government should commit to prioritising the delivery of public infrastructure required to service the SDZ lands. Meanwhile, Local Authorities should revise their policies and development contribution schemes to prioritise the timely delivery of SDZ schemes. New mechanisms are also required to ensure the availability of funding for key infrastructure underpinning SDZs, and equitable contributions from central government, Local Authorities and developers.

Dublin, Cork, Limerick, Galway and Waterford should adopt a more ambitious approach to identification of large-scale development areas, as opposed to piecemeal development of individual land-holdings. The cities should aim to avoid the sprawl that characterised growth in the 20th century. The SDZ approach should be employed to plan these areas, including a high quality and high-density approach to neighbourhood design.

## Strategic Housing Development

Introduced in 2017 Strategic Housing Developments (SHDs) enable applications for planning permission for 100+ residential units or 200+ student bed-spaces to be made directly to An Bord Pleanála (ABP). This new type of application has been introduced to speed up the planning application process and accelerate delivery of larger housing and student accommodation proposals.

The process involves a mandatory pre-application process which brings together the developer, planning authority and ABP. The resulting planning application must be decided by ABP within 16 weeks. In 2018, permission was granted in 27 cases for a total of 7,102 housing units (3,284 houses and 3,818 apartments) and 4,479 student bed spaces.

Indications are that the system is efficient and is encouraging well designed schemes, that align well with national planning policy and guidance on creating new, high-quality residential neighbourhoods. It is recommended that the SHD system (introduced on a temporary basis) should be extended until at least 2021,

albeit following a review which should include (but not limited to): (i) whether the system should remain mandatory, (ii) the 100 unit threshold, and (iii) whether ABP should be allowed to seek further information.

## Vacant Site Levy

The Vacant Site Levy (VSL) system requires Local Authorities to identify vacant land in their administrative area falling into one of two categories: (i) land suitable for residential development, or (ii) land in an area in need of regeneration. Once added to the Vacant Site Register, this land will be subject to an annual financial levy relating to the value of the site. This levy is now becoming payable in 2019/2020 on the sites already identified and placed on the Register.

The implementation of the VSL system should be embraced more vigorously by Local Authorities to prevent land in areas in which housing is required and in areas which are in need of renewal from lying idle or remaining vacant. The funds generated by the VSL could be used to provide critical funding for public infrastructure delivery to strategic land banks.

## Recommendation

Strengthen and expand the implementation of policies which can speed up the development process, such as:

- Strategic Development Zones: for large-scale strategic sites, both regeneration and greenfield
- Strategic Housing Developments: for larger housing applications
- Vacant Site Levy: to prevent certain land from lying idle or remaining vacant

## Strategic Development Zones

Strategic Development Zones (SDZ) were introduced in Planning and Development Act 2000 as a response to the strong demand for residential and non-residential development that was associated with the previous buoyant phase of Ireland's economic cycle. The SDZ model offers developers a holistic, plan-led approach and a fast-track planning procedure for development and supporting infrastructure and facilities in areas that are considered by Government to be of economic and social importance to the State. The model thereby facilitates the effective delivery of large scale and strategic developments.

The first step in the process is the designation by Government of the area of land in question and its purpose. A Development Agency (often the Local Authority) is then required to prepare a Planning Scheme which, when adopted, forms the long-term master-plan for the area. The Planning Scheme is adopted by Elected Members of the local authority, and can be appealed to An Bord Pleanála. Applications for development within an SDZ must be granted permission if they comply with the Planning Scheme, and there is no right of appeal to ABP. While initially envisaged to support the development of employment zones (e.g. industrial estates), in effect the model has been mainly used to support new settlements and residential communities. Six SDZ Planning Schemes across Dublin City and County have been adopted since 2003.

Adamstown in South Dublin is among the most successful SDZ and has enabled a new town with parks, schools a train station and other amenities to be delivered in tandem with roll out of attractive medium density housing (a combination of houses and apartments). Work is underway in Cherrywood SDZ on new a new residential community and town centre scheme, and the completion of the redevelopment of Dublin Docklands is also continuing under an SDZ scheme. The redevelopment of Grangegorman in Dublin City Centre as a mixed use educational, healthcare and community urban quarter is also a successful SDZ initiative. In April 2019, the Poolbeg SDZ Planning Scheme was approved, which includes 3,000 residential units to be served by district heating, alongside business and port related activity. Waterford is advancing the regeneration of its North Quays as a mixed-use city quarter by means of a SDZ Scheme adopted in 2018, and a further SDZ has been designated at Knock Airport in County Mayo.

Not all SDZ schemes have been successful nor were the projects immune to the recent economic downturn. One of the key challenges is to ensure that Government and Local Authority support for the scheme is manifested in prioritisation of infrastructure to serve the SDZs. It is also crucial to find the right balance between economic incentive for the developer and public gain in terms of high-quality communities.



## 2. Revitalising our cities, towns and villages

### Network cities

National development must be rebalanced to ensure more widespread access to the economic recovery and to relieve the mounting pressure on Dublin. Some steps have been taken towards developing critical mass along the Atlantic Economic Corridor (Waterford, Cork, Limerick/Shannon, Galway, Sligo and Letterkenny/Derry), which could act as a counterbalance to Dublin in terms of attracting population, employment and investment.

The combined population of the area between Waterford, Cork, Limerick and Galway at two million people is slightly larger than the population of the Greater Dublin Area. However, these regional cities can only grow to the potential envisaged under the NPF when the required infrastructure and services are put in place. It will be important for these four cities to collaborate (and not compete) to create an effective network between them in order to, collectively, achieve a scale which will be attractive for FDI.

The State should follow exemplars from other European Countries which nurture an ‘innovative class of polycentric urban configurations’ known as ‘Network Cities’. Examples include Randstad – Netherlands, the Flemish Diamond, and the RheinRuhr Area.

According to Batten (1995): “A network city evolves when two or more previously independent cities, potentially complementary in function, strive to cooperate and achieve significant scope economies aided by fast and reliable corridors of transport and communications infrastructure under which each city benefits from the synergies of interactive growth via reciprocity, knowledge exchange and unexpected creativity. Creative network cities place a higher priority on knowledge-based activities like research, education and the creative arts.”

### Recommendation

Nurture Ireland’s Atlantic cities (Cork, Limerick, Galway and Waterford) as Network Cities through social and economic cooperation and fast and reliable connectivity.

### Compact growth & reusing existing assets

At sustainable densities, there is already adequate land in Ireland’s cities and towns to support projected population growth while tackling the existing shortage of housing capacity. The NPF established ‘compact growth’ as one of ten National Strategic Outcomes.

Vacant houses, empty holiday homes, unused upper-floors, and ‘dead space’ in estates can all help to relieve housing shortage in the short term. Every City/County Development Plan and Local Area Plan should therefore start with an audit of under-utilised land and empty buildings to determine the suitability and potential of housing development.

The densification of existing suburban semi-detached housing estates could be encouraged using small infill apartment schemes, developing underutilised corner sites, development of excessively long rear gardens with mews type development and inserting residential uses above retail units to achieve further densification.

A further advantage of rehabilitating existing properties within urban areas is that the social and economic infrastructure required to support the population is generally already in place. In fact, the repopulation of town centres can renew facilities such as schools and attract employment and services. Consideration should be given to establishing development boundaries and / or green belts around cities and towns to promote sustainable densification.

### Recommendation

Use zoning, servicing of land and targeted investment to encourage sufficiently-dense, sustainable urban development (as envisaged in the National Planning Framework).

## Mixed-use, transport-oriented development

Transport-oriented development (TOD) should be prioritised, that is denser development around urban public transportation hubs and along public transportation corridors. This form of development encourages people to walk to and use public transport as the most efficient way to travel around our cities, thereby rendering public transportation the movement mechanism of choice over the car. In short, communities should be built around their public transport systems.

The TOD challenge is a combination of improved public transport and more efficient land-use approach, as opposed to piecemeal development of low-density housing. High quality public transport should be planned and implemented, with residential development following the transport arteries. A more ambitious approach to transport built around new light rail services should be pursued. For example, there are over 25 light rail systems throughout France – some serving cities of less than 100,000 population.

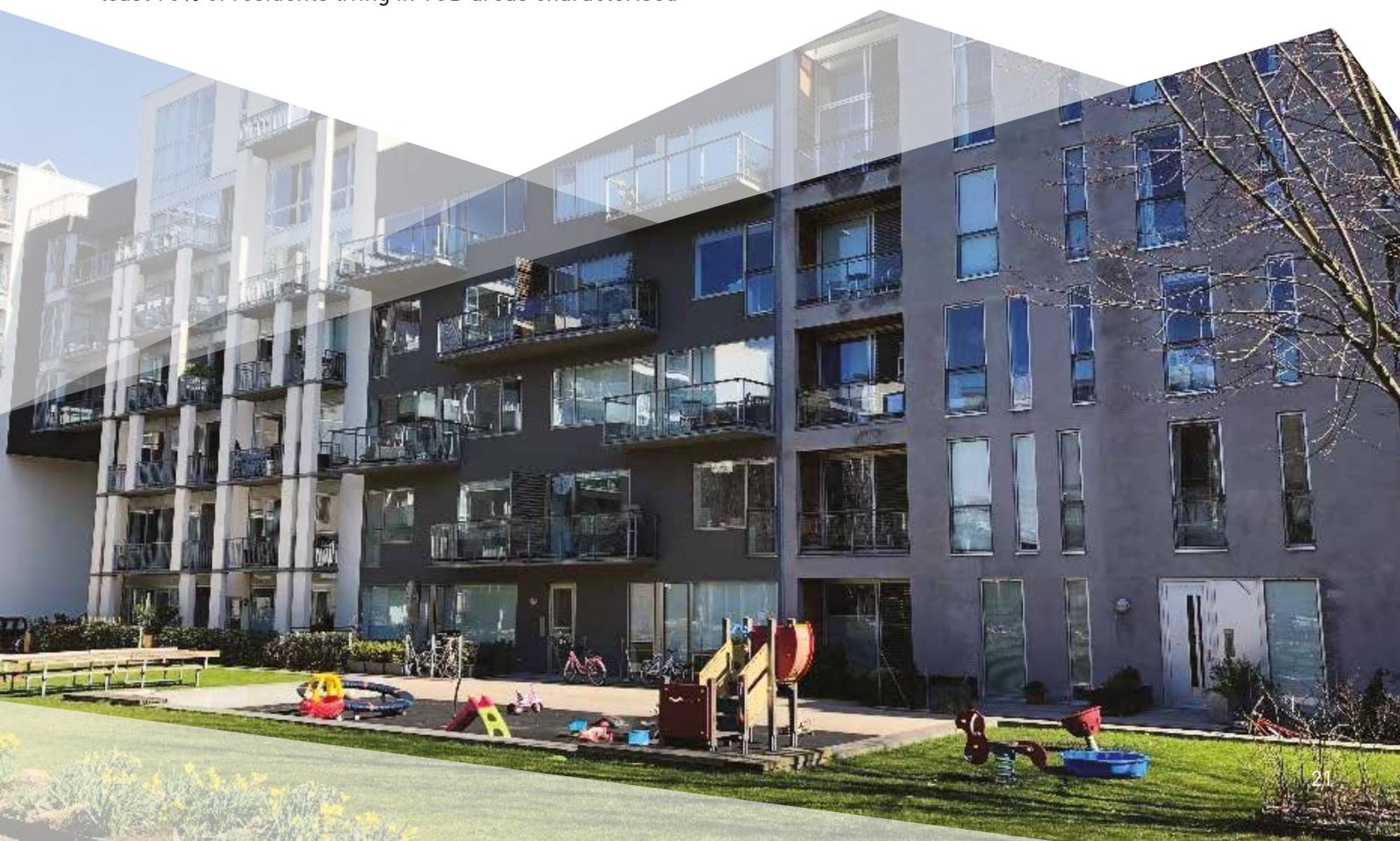
Urban areas within 500-800 metres of major transport stations, such as trains, trams and Bus Rapid Transit, should target much higher density than the average of the city or town. Larger cities should aim to have at least 70% of residents living in TOD areas characterised

by convenient mass transport services. Greater accessibility (along with pleasant walking environments) to transport facilities must also be offered.

Mixed-use development complements this approach. According to the Green & Smart Urban Development Guidelines, homes should be within a 500-800 metre radius of a wide variety of amenities such as schools, post offices, banks, retails, clinics, activity centres, restaurants, etc. Blocks should be less than or equal to 2 hectares and all residences should have accessible public space within 500 metres.

Planning Authorities should review their Development Contribution Schemes to align with the goals of compact urban development and higher density, quality urban living. Schemes that avail of existing services and are well connected should be incentivised over schemes/dwellings that are more remote or require greater public investment.

This said, living at higher densities will require a change of mindset. Research carried out by Amárach for the Housing Agency (2018) sheds light on housing attitudes and aspirations, which they note are often driven by childhood experience. For example: “Apartment living was viewed as suitable for renting, but there was little appeal for apartments when it came to long-term living and bringing up a family.”



## Creating liveable rural towns and villages

Rural populations over the past 50 years have moved from town and villages to the suburbs or open countryside with significant environmental and social consequences. Current and future rural housing needs should be met within rural town and village envelopes.

However, the provision of such housing is contingent on the provision of services commensurate with urban living – shops, local transport, connection to national transport links, medical services, recreational services and the social environment that facilitates urban living. The inter-relationship between housing and these services is demonstrated by the demise of the high street shop, replaced by the ‘out of town’ shopping centre.

Furthermore, there is a developed perception that town centre living means small flats with no garden, no parking etc. Modern town centre developments were in many cases poorly designed and targeted at a rental market. Upgrading mixed-use building stock in rural towns and villages to promote residential use could therefore address a number of socio-economic issues.

Facilitating employment in rural towns and villages must be central to any attempt at revitalization. Towns could encourage the development of shared office space, a range of hot desks and virtual office services to allow people to have a professional work environment near to where they live (as an alternative to working from home or long commutes).

Another key feature in improving our towns and villages is a community-based approach, drawing on successes such as the Tidy Towns competition. This could include the formation of a ‘Town Team’ consisting of Local Authority staff and key stakeholders such as community leaders and local businesses. A town plan (or vision statement) is essential to support public realm improvements, town parks and other urban amenities.

The Society of Chartered Surveyors Ireland’s ‘Rejuvenating Ireland’s small town centres’ is a call to action for stakeholders in the regional high street, including local, regional and central government, residents and business communities in 200 towns with populations of 1,500-10,000 (SCSI, 2018). They set out seven priority recommendations to ensure that regional high streets can thrive and become vibrant and successful community hubs.

Meanwhile, the Royal Institute of the Architects of Ireland have published ‘Creating Places for People: RIAI Town and Village Toolkit’. This represents expert advice for people to assess the quality of the towns and villages in which they live, work or have responsibility (RIAI, 2019).

Drawing on the expertise of these professional bodies, Local Authorities and community groups, a Government plan should be developed on ‘liveable towns and villages’. The plan should enable the transformation of the urban fabric into an attractive residential environment with high-quality supporting amenities (such as green space, public realm, culture, sustainable travel) and modern employment opportunities.

This will require many or even all Government Departments to align funding schemes and policies with the objective of revitalising towns and villages. Such an outcome should be sought as a core component of delivering the NPF objective of compact growth as well as achieving climate action targets and improving social inclusion.

### Recommendation

Develop a whole-of-government plan for the revitalisation of existing towns and villages as attractive environments in which to live, work and shop, particularly their main streets. Consider incentivisation and actions at Local Authority level and innovative ways to combine public and private sector finance.

The environmental impact of one-off housing is too great to ignore, particularly once whole-of-life building (including transport) emissions are considered. It is therefore insufficient to simply make rural towns and villages attractive, constraints on one-off housing development must be put in place. Only those with a demonstrable economic or social need to live in a rural area should be given planning permission for single housing in a rural area under urban influence (i.e. within the commuter catchment of a large town or employment centre). The renovation of existing rural houses should be required instead of building on greenfield sites.

This is stated in the National Planning Framework and should be implemented in Development Plans. The NPF describes large towns and employment centres as towns with a population of more than 10,000 people or more than 2,500 jobs and their catchments generally extend to those areas where 15% of the workforce is employed in the urban/employment centre.

The reuse and renovation of existing rural houses is available to others who wish to live in the countryside. Meanwhile, grant aid could be offered to encourage occupants of one-offs to move to sites within the town/village. For example, older people living in one-off rural housing could be encouraged to relocate to appropriate age-specific accommodation with supporting services. Such an approach would need major consideration of the health, wellbeing and community implications of relocating vulnerable people and requires suitable housing to be built in towns for the ageing population etc. (see Section 6).

### Recommendation

Recognising the environmental impact of one-off housing, only those with a demonstrable economic or social need for these homes should be given planning permission in a rural area under urban influence.



## The role of Local Authorities

Any major public plan to revitalise urban (or rural) areas will require Local Authorities to play a leading role. Engineers, architects, planners and other staff in our city and county councils have the local knowledge, networks and expertise to deliver exemplary projects for their communities.

Nevertheless, Local Authorities require:

- Financial supports, e.g. making renovation financially advantageous and enabling Local Authorities to invest in supporting amenities
- Technical guidance, e.g. addressing technical barriers to providing high-quality residential accommodation

Elements of this are already in place and Local Authorities should maximise the use of funds, such as:

- Urban Regeneration and Development Fund
- Rural Regeneration and Development Fund
- Serviced Sites Fund
- Town and Village Renewal Scheme

Meanwhile, existing guidelines should be implemented in forthcoming City and County Development Plans, such as:

- Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas
- Urban Development and Building Heights Guidelines for Planning Authorities
- Bringing Back Homes: Manual for the Reuse of Existing Buildings' supports and facilitates the reuse of older / vacant buildings in towns and cities for residential use, by providing clear guidance on how current regulatory requirements apply to common, existing building types and demonstrating how best to facilitate the reuse of these building types.

### Vacant Homes Action Plan & Louth County

Local Authorities have produced Vacant Homes Action Plans for their administrative areas, setting out goals and targets to show how they intend to deal with levels of vacancy. Each local authority has a designated Vacant Homes Officer, who acts as a central point of contact within their organisation and liaises with central government and other stakeholders. Vacant Homes Officers also provide information, advice and support for owners of vacant homes and for members of the public in their administrative area.

Local Authorities should follow the example set by Louth County Council who have successfully implemented a programme to identify, purchase, refurbish and let derelict and vacant residential properties. Compulsory Purchase Order (CPO) powers under the Housing Act have been employed where necessary. The initiative both addresses urban blight and secures good quality social housing at reasonable cost.

### Living City Initiative & Limerick City

Consideration should be given to extending and refocusing the Living City Initiative, to address the underuse of older buildings in key city and town locations. For example, Limerick City Council received funding to develop 'Limerick's Living City Georgian City programme' which includes the demonstrator block involving the renovation of Georgian Buildings and streetscape/laneways for town centre living – this could be an example of good practice.

### Public-Private finance & Savannah, Georgia

Innovative ways to combine private sector and public sector finance should be explored to provide for sustainable redevelopment and revitalisation of Irish cities, towns and villages. One successful example is the Savannah Landmark Redevelopment Project carried out from the 1970s through 1990s. In the 1950s and 1960s the historic colonial core of Savannah, Georgia was gentrified and the poorer population was pushed out into the adjacent Victorian District.

By the mid-70s, the Victorian District was being gentrified and the displacement of the poorer residents was being repeated. To counter this cycle, the Savannah Landmark Rehabilitation Project decided to purchase half of the 1,200 properties in the Victorian District and convert each house into two apartments, thus allowing the existing residents to remain in place. Private finance was combined with finance from the US Department of Housing and Urban Development and the Ford Foundation to enable the project to be realised.

### 3. Upgrading the existing stock

#### Long-term retrofit strategy

A nearly Zero Energy Building (nZEB) has a very high energy performance, defined in the Energy Performance of Buildings Directive. The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby.

All new buildings (public and private) will be nZEBs through new regulations coming into effect towards the end of 2019. Additionally, major renovations of existing buildings where works affect more than 25% of the surface area of a building envelope will be required to achieve an energy performance level of 125 kWh/m<sup>2</sup>/yr (a BER of B2 or equivalent for dwellings) or to a cost optimal level.

The NDP committed €3 billion to the retrofitting of homes between 2018 to 2030, increasing from 30,000 to 45,000 homes per annum from 2021. The Climate Action Plan meanwhile commits to completing 500,000 building retrofits to achieve a B2 BER /cost optimal equivalent or carbon equivalent by 2030. However, almost two million housing units in Ireland are required to be retrofitted (to achieve an energy performance level of 125 kWh/m<sup>2</sup>/yr) for the Irish national housing stock to be considered nZEB standard.

This will require an ambitious programme of retrofitting or replacing the existing housing stock, targeting best return on investment, achieving energy-efficiency targets and occupant health benefits, and avoiding carbon lock-in. The cost of retrofitting the housing stock to nZEB standard has been estimated at €35-50 billion.

Furthermore, we must treat household carbon holistically and the homes with the greatest carbon mitigation potential should be prioritised for retrofitting. Decisions on size and location impact on total resource consumption and carbon emissions over a home's lifetime and there should be greater priority for homes that will be car-free, for example through revitalising city, town and village centres.

A suitable financial model is required to stimulate and support the national retrofit programme. A stepped grant system could be considered which offers a grant based on total carbon mitigation potential. Integrated and higher grants could be offered for the conversion of derelict buildings in cities, towns and villages.

Housing stock with excellent potential exists (e.g. Georgian Limerick) but needs investment beyond the reach of most families or individuals to be refurbished into sustainable, vibrant urban fabric. Low-interest loans could be provided for Retrofitting to B or A rating – with a move away from oil-fired central heating and better insulation.

A range of approaches are used in other countries. The provision of a blended loan / advice / grant scheme one-stop-shop similar to the KfW bank rebuilding Germany could be advanced. The European Investment Bank's PF4EE and Smart Finance for Smart Buildings could be utilised by the Strategic Banking Corporation of Ireland to provide low cost loans via pillar banks. EU Structural Funds can also have a continued role in the upgrading of social housing (local authority and housing association) properties.

European best practice should be examined to identify programmes which could facilitate higher volume and deeper retrofit on a more targeted basis or similar. For example, the EU Energiesprong programme commenced in the Netherlands and is now being rolled out in other EU Member states. Other examples include SuperHomes, managed by the Tipperary Energy Agency.

#### Recommendation

Develop and implement a radical national retrofit strategy, providing absolute clarity and a roadmap for retrofitting over the next 20 years.

## Towards large scale deep energy renovation: Unlocking Ireland's potential

For 2 years, the Irish Green Building Council (IGBC) worked in close cooperation with the Department of Communications, Climate Action and Environment (DCCAE) to build a community of experts and stakeholders to develop Ireland's new National Renovation Strategy. Recommendations were grouped under nine headings: develop a comprehensive national framework; provide long-term certainty; invest in deep energy renovation now; make deep energy renovation desirable; facilitate deep energy renovation; make sure we have the right skills; set the right standards; develop quality data; collaborate & engage.

This work was completed as part of the EU-funded Build Upon (2017) project and influenced the development of the Energy Performance of Buildings Directive (EPBD) 2018 Recast, including the following recommendations:

- National Energy Renovation Strategies must be drafted with the aim of transforming the building stock, into a "highly efficient and decarbonized building stock by 2050, facilitating the cost-effective transformation of the existing buildings into nZEB".
- Strategies must be publicly consulted and there shall also be an inclusive consultation during the implementation phase.
- EU countries have to set 2030 and 2040 milestones and define "measurable progress indicators" e.g. renovation rates or a maximum energy consumption per square meter.
- Support for the implementation of energy efficient and green mortgages for certified energy efficient building renovations

The IGBC is also working with its members to implement recommendations such as:

- Energy Efficient and Green Mortgages (Recommendation 3.12)
- Building Renovation Passports (Recommendation 5.6)
- Upskilling Building Professionals and Construction Workers in holistic energy renovation (Recommendation 6)
- Minimum Energy Efficiency Standards for rented properties (Recommendation 7.4)

## Data- and standards-driven upgrades

Building owners, investors, tenants, the construction industry, providers of energy efficiency solutions and planners have different interests and are involved in different phases in the life cycle of buildings. There is a general lack of understanding, transparency, and uniform methods when it comes to the overall process of nZEBs.

To inform the retrofit programme, pilot and demonstration projects are recommended to improve understanding. SR54: Code of practice - Methodology for the energy efficient retrofit of existing dwellings provides technical guidance on the energy efficient retrofit of the building fabric and services, the application of retrofit measures on a whole dwelling basis, general building science and the management of retrofit projects. 10-20 typology-based retrofit case studies with detailed retrofit analysis should be prepared to guide people to make sensible retrofit decisions (similar to the 2014 Tabula project, but with

updated costs and energy pricing). A United Nations Economic Commission for Europe (UNECE) Centre of Excellence for High Performing Buildings is being developed in Wexford, supported by Wexford Local Authority and Waterford Wexford ETB.

A projected yearly primary energy and CO<sub>2</sub> emissions factor for the electricity grid should be incorporated when designing a new building or retrofit design as the electricity grid is to become more decarbonised in the future from a changing fuel mix. This is particularly important if prioritising renovation strategies for homes with greatest carbon mitigation potential.

Accurate technical building characteristics including building element thermal properties are essential for developing cost effective retrofit strategies. Physical monitoring of Irish residential building element thermal properties prior to developing cost effective retrofit solutions is essential if the focus is a fabric first retrofit design strategy.

Much of the older terraced housing has existed successfully, without substantial harm for 100 – 200 years. For the past 30 – 40 years, redevelopment of this potential housing stock has been restricted through planning and building regulations. We are now at a point where we either let these buildings continue to deteriorate or take steps to enable their rejuvenation. A significant amount of work has been done by DHPLG in this area and a manual has been produced for the reuse of existing buildings (Bringing Back Homes).

Condition surveys or building renovation passports could be introduced to evaluate each building and carry out a basic cost benefit analysis alongside the BER.

Aspects to consider include:

- Condition, energy efficiency
- Location and accessibility
- Flood risk / erosion risk
- Economic / enterprise value
- Cultural / heritage value
- Whether home / site is viable currently or could be considered for either higher density or carbon sequestration.
- Age profile of occupants

This approach would help to establish a clear plan for the building including:

- How near zero energy or net zero carbon can be achieved in step-by-step or otherwise
- External environment: building in climate change resilience, including flooding, ecological/biodiversity enhancement
- Internal environment: improvements in health and wellbeing including mitigating overheating risk, daylighting and Indoor air quality.

In the transition away from oil boilers and gas boilers towards heat pumps, phasing needs to be managed very carefully to ensure a suitable alternative is available, with adequate supply chain and at a reasonable cost, bearing in mind that the heat demand in many existing houses should be significantly reduced before a heat pump is used. A standard should be developed by NSAI/SEAI for the design and installation of heat pumps along with a national training programme for heat pump specifiers/installers.

## Recommendation

Progress the Centre of Excellence for High Performing Buildings and improve retrofitting decision-making through the preparation of typology-based case studies and other information services.



## Reinforcing Building Regulations

The Building Control (Amendment) No. 2 Regulations 2015 (SI 365/2015) allows an owner constructing a new one-off dwelling or extension, on a single unit development, the facility to sign a declaration of intention to opt out of statutory certification, i.e. to opt-out of the certification requirements of the Building Control (Amendment) Regulations 2014 for one-off houses (see box below).

The owner is effectively dispensing with the registered construction professional (e.g. a Chartered Engineer) and declaring that they understand their statutory requirements to prove compliance and will ensure that the dwelling or extension is designed and constructed in accordance with the relevant requirements of the Building Regulations.

This affects the very people (one-off builders and self-builders) who would benefit most from the engagement of a registered construction professional. The lack of a requirement to have the works certified by design professionals is a weakness in the current system and may be viewed negatively by financial institutions and have implications for insurance or sale of these properties.

## Recommendation

Withdraw SI 365/2015, the Building Control (Amendment) No. 2 Regulations 2015, which allows owners of one-off houses to 'opt out' of certifying compliance with the Building Regulations.

Building Control Authorities do not have the resources to provide a fully-functioning independent inspectorate for all building projects and consequently they have been set a modest target of 12-15% of all projects for inspection. The resources of Local Authorities should be increased to ensure that they have the necessary inspection and enforcement capacity and competency. In the absence of such an initiative, the emphasis on certification by design and construction professionals is all the more pertinent.

The Government's intention to place the Construction Industry Register Ireland (CIRI), the voluntary register of builders, contractors and specialist sub-contractors, on a statutory footing is welcome. The move towards a statutory register will help to promote a greater commitment to compliance with the building regulations thereby promoting greater safety and quality for the consumer and the public.

### Building Regulations and Building Control Regulations

The design and construction of buildings is regulated under the Building Control Acts 1990 to 2014 which provide for the making of Building Regulations and Building Control Regulations. The Building Regulations 1997-2017, set out in 12 parts (classified as Parts A to M), provide for the health, safety, welfare and accessibility of people in and around sustainable buildings. Technical Guidance Documents show how the requirements of the Building Regulations can be achieved in practice.

The Building Control Regulations 1997-2015 require owners, builders, and registered construction professionals to demonstrate through the statutory Building Control Management System (BCMS) that the works or building have been designed and constructed in compliance with the Building Regulations. The Building Control (Amendment) Regulations 2014 (SI 9/2014), established the roles of Design Certifier and Assigned Certifier which can only be carried out by competent qualified professionals (Chartered Engineer, Registered Architect or Registered Building Surveyor).

All new buildings and existing buildings which undergo an extension, a material alteration or a material change of use must be designed and constructed in compliance with the Building Regulations. The Regulations require the submission to the Building Control Authority, via the online BCMS, of statutory notices of commencement and completion accompanied by certification of design and construction, lodgement of compliance documentation, proposed inspections regimes and evidence of inspections during the construction phase and validation and registration of certificates.

## 4. Future-proofing the housing stock

### Long-term planning

Ireland's population is increasing in number, age and diversity. Any projection of future population and housing needs is only a best estimate as to future trends in demographics, economics and housing preferences. Nevertheless, these trends have the potential to precipitate a new "housing crisis" in the near future. As well as addressing our current housing crisis, a longer-term perspective on our future housing needs is required.

The population of the Republic of Ireland is forecast to grow from 4.76 million in 2016 to between 5.6 and 6.7 million (the median forecast being approx. 6.2 million). Therefore, an additional 1.48 million people must be housed by 2051. At the current household size of 2.7 people per household this will require at least 548,148 additional housing units by 2051, or an average of 15,661 units per year.

Should Irish household size reduce to EU average of 2.3 persons, then at least a further 95,330 housing units would be needed or 2,723 units per year. Therefore, if current population and household trends continue, Ireland will need an average of 18,384 housing units per year. If the highest population forecast is used with the household number reduction, the requirement is 24,099 housing units per year. As these figures exclude building obsolescence, real demand will be higher.

Furthermore, the population projection which informs the NPF may be an underestimate as it incorporates a net inward migration of just 8,000 per annum to 2021, rising to 12,500 per annum thereafter. This is in stark contrast to the CSO's migration estimates showing 19,800 net surplus in 2017 and a 34,000 net surplus in 2018.

The proportion of the population of working age (15-65 years) is currently approx. 66% and this is forecast to fall to approx. 55% by 2051. The change is largely due to the current population bulge at 30-50 years ageing and living into extended middle age. This suggests that there will be more people living alone and more older people in need of appropriate services.

The proportion of the population in the greater Dublin area is forecast to rise from 39% to 42% by 2031 with no indication that this trend will slow after that date. Therefore 10,121 housing units per year will be needed in the greater Dublin area.

With these trends in mind, it is concerning that the longest-term planning horizon in the Republic of Ireland is less than 25 years. The design life of major infrastructure meanwhile is 100-120 years. The planning phase to progress an infrastructure project from inception to handover (which can be as long as 15-20 years for major projects) combined with the short planning horizon means that infrastructure is often swamped or redundant by the time it is constructed. To effectively plan for the provision of infrastructure, the planning horizon should be extended to at least 50 years.

### Recommendation

Develop a 50-year spatial plan for housing, infrastructure and services development considering long-term housing need, demographic changes (esp. household size and age).

### Designing for adaptability

Communities need a mix of accommodation types and over-reliance on conventional mono-type rows of terraced houses or indeed semi-detached houses is not a future-facing approach. We need to embrace developments that are able to mix the models of accommodation units available: different bedroom configurations (in terms of numbers) for young families and slightly more mature families; apartments of one or two bedrooms that might be better suited to older people so that the other members of the community can look out for them. More varied residential unit types would also enable people to transition to suitable homes at different stages in their lives.

Housing should be designed with flexibility and adaptability in mind - e.g. allowing internal subdivision or evolution in layout of rooms and open spaces. Adaptability by design to make dwellings more responsive to occupiers' needs should be encouraged, e.g. ageing population, smaller household sizes, shared living spaces. Flexibility to expand/join units may also be part of the solution and some focus on minimalist starter homes which can be improved based on Dutch/Danish models (less luxurious kitchens and bathrooms which can be upgraded later with possible room for expansion into roof spaces etc.).

Given the fact that there is a relatively small number of housing types in Ireland (as shown in TABULA), building professionals should be able to identify, design and communicate a catalogue of potential adaptations and the extent to which they can facilitate life change. This approach could draw on the SEAI's Deep Retrofit Pilot, which is building a costed catalogue, with empirical results, of options to upgrade homes for energy efficiency. They are also testing the supply chain's ability to deliver the work.

Moreover, development should be informed by what the needs of the community/area are and should be properly assessed – often apartment developments are designed simply to comply with a standard or guidelines as opposed to being designed to meet the needs of a particular community, a family, single person etc. For example, the provision of crèches within new large-scale estates should be reconsidered, as many remain dormant due to a lack of demand. Shared green areas that promote social interaction are more likely to be attractive to a greater section of the population.

The state should encourage the development of assisted living small units for older people, to incentivise down-sizing. These units should be located within communities and should be a mixture of private and social housing – a financial incentive could be made available to encourage downsizing. Building attractive retirement apartment blocks and villages with good facilities aimed at retired people should be considered.

### Recommendation

Incorporate a programme of life-time adaptable housing for both new and existing homes (potentially based on the Danish model) by 2020.

### Smarter Homes

Smarter homes are those with greater use of communications and information technology to improve comfort, connectivity and energy efficiency. A smarter home will be more easily adapted to avail of future improvements in telecommunications and internet-enabled services. It will also facilitate working from home and decentralised collaboration.

Ireland should be actively involved in the development of a Smart Readiness Indicator for Buildings (see Energy Performance of Buildings Directive (EPBD) 2018). According to the Flemish Institute for Technological Research: "This indicator will allow for rating the smart readiness of buildings, i.e. the capability of buildings (or building units) to adapt their operation to the needs of the occupant, also optimizing energy efficiency and overall performance, and to adapt their operation in reaction to signals from the grid (energy flexibility)".

A smart readiness indicator will also move Ireland closer to rating buildings on the basis of their operational performance, as distinct from their design or standing at a single point of assessment. Rating on the basis of performance will facilitate a more material valuation of the asset. It will accelerate the value, definition, and adoption of a Smart Readiness Indicator. An innovation fund and programme should be introduced to promote integrated smart homes, creating more hands-free homes (incorporating internet of things) with a target of 80% of all new homes to be smarter homes by 2030.

### Recommendation

Develop and adopt a Smart Readiness Indicator for Ireland and set a target of 80% of all new homes to be Smarter Homes by 2030.

## Considering total environmental impact

The environmental impact of housing has been covered extensively in other sections of this report. For example, it has been noted that the energy efficiency of new homes has dramatically improved with the introduction of the BER and the improvement in the Building Regulations. The major challenge in this area remains existing stock which requires significant upgrades, as outlined in the previous section.

This said, while the introduction of the BER was a major step forward, it does not measure the total environmental impact of new homes. Furthermore, current government policies (driven by EU national targets) often simply shift the carbon emissions to the country of manufacture rather than taking responsibility for purchasing decisions arising in Ireland.

The measurement of the total environmental impact of housing, such as Home Performance Index or alternative Government scheme, should be researched. It should consider not only energy per square metre, but also the size of the home or embodied impacts, land use, ecology, density etc. Sizable carbon reductions from new homes are only possible if policies across transport, land use and energy efficiency are linked. The introduction of such a measure would allow the Government to base future fiscal policy upon the total environmental impact of new homes. This could be based initially simply on defaults, for example a standard figure of 700kg CO<sub>2</sub> x m<sup>2</sup>, but offering incentives to measure.

Embodied carbon is now at least 50% of total life cycle carbon for a new nZEB home, but is front loaded in year of construction. To avoid a climate tipping point over the next 10 years, radical measures to reduce emissions from embodied carbon are needed. Further improvements in regulations should account for this. 500,000 homes and many other buildings and infrastructure will be built by 2040. Unless embodied carbon is reduced, it could represent 30-50 million tonnes of carbon over the 22 years of Project Ireland 2040. This is also an issue of resource consumption and developers could realise cost savings from optimisation of the quantities of materials particularly through enhanced structural design.

In addition to environmental impact and thus the benefits that can be directly assessed in monetary terms, there are also various co-benefits to higher

standard housing, which often cannot be assessed directly in monetary terms and therefore do not appear in the life cycle cost analysis. These benefits and co-benefits consist of marketability, rentability, value development, comfort, but also image and climate protection.

Transport is a major component of total environmental impact and there are further benefits to be realised from a reduction in private vehicle ownership. Since the 1930s, housing has been largely planned around 'the car', leading to huge inefficiency in land use. Yet technology is enabling a transition to innovations such as shared ownership, pay-for-use, and peer-to-peer sharing. These innovations have the potential to dramatically reduce the number of cars in urban centres with major benefits. For example, central Oslo from 2019 is car free, and the freed-up space will be used to enhance the public realm.

While EVs are discussed in more detail in the transport section of this report, EV charging is an important element of future-proofing the housing stock. EV charging infrastructure should be provided for new apartment complexes, terraced, and urban housing, in particular where there is no 'driveway' to position ones own chargepoint to charge overnight. This is becoming a significant challenge in urban environments. The EPBD, once implemented, will likely require provision of charge-points for 10% of new developments – although this doesn't fully address the broader need for 'on-street' charging to facilitate urban dwellers.

## George's Place, Dún Laoghaire, County Dublin

George's Place is a rapid-build development of 12 homes on a brownfield site in the centre of Dún Laoghaire. The site was previously a council depot and, within walking distance of the harbour, main street and Dart station, will help to revitalise the area.

The homes are two bed two storey buildings in a gable-fronted terrace and a wider-fronted terrace. The buildings achieved a BER of A1. A heat recovery ventilation system ensures excellent indoor air quality whilst further reducing energy costs. To improve comfort, high quality triple glazed windows were designed to achieve excellent day lighting but also to minimise winter discomfort.

The design architects were dlr architects, while A2 Architects acted as enabling architects and O'Mahony Pike acted for the builders, Sisk. The scheme was constructed through a design build public works contract awarded to Sisk under a rapid delivery programme. From initial design, the development took 21 months to deliver and tenants moved in just five days following completion. The homes were built at a cost of €249,000 each (including VAT).



## 5. Technology and skills

### Modern Methods of Construction

Modern Methods of Construction (MMC) is a term used to describe a number of construction methods which differ from 'traditional' construction. Other terms that are commonly used for these methods are: off-site construction, factory-built, industrialised or system building and pre-fabrication.

Types of MMC include:

- Volumetric construction - three-dimensional modular units which are produced and fully fitted-out in controlled factory conditions prior to transport to site;
- Panelised systems - panels with timber or light steel framing, structural insulated panels or cross-laminated timber produced in a factory and assembled on-site to produce three-dimensional structures;
- Hybrid techniques that combine panellised and volumetric approaches;
- Pods - used in conjunction with another construction method, e.g. bathroom or kitchen pods;
- Floor or roof cassettes, pre-cast concrete foundation and frame assemblies, pre-formed wiring looms, mechanical engineering composites and innovative techniques such as tunnel form or thin-joint block work;
- Other sub-assemblies and components - larger components incorporated into new homes, including wall, floor and floor assemblies etc.

There are great advantages to be gained from growing the volume of offsite-manufactured homes to significant levels, including better and more innovative design. The key beneficiaries should be those households seeking better value for money, better quality, cheaper cost in use and higher amenity in their home. The general public, as consumers, should be made aware of the benefits of MMC.

Marketing will be an important tool in increasing public demand and acceptance and the media, as an important influencer, should be informed on the benefits of MMC. Successful and innovative projects should be promoted in order to create a climate of acceptance and enthusiasm for homes built using MMC.

The potential is evident and MMC need champions to outline their benefits to house builders, constructors and the public. MMC certainly should not be considered as a threat to traditional methods of construction. Furthermore, producers of MMC should learn from best practice within the traditional sector in order to achieve greater product efficiencies.

MMC can significantly reduce whole-life costs, especially if critical mass is achieved and mass production becomes prevalent. However, at this point in time, the sector is not yet mature enough to offer large cost savings through economies of scale and the use of mass production. For example, companies are working on a project-by-project basis with differing specifications on each scheme.



## Growing MMC

Implementing the National BIM Council (NBC) Roadmap to Digital Transition of the Irish Construction Industry 2018-2021 is an important step in growing MMC. The four pillars of the NBC Roadmap should remain 'front and centre' when considering recommendations for growing MMC:

1. Leadership – The Irish Government must lead the way through the formation of a Centre of Excellence envisaged in the NBC Roadmap which will support the rollout of MMC in Ireland.
2. Standards – The role of the National Standards Authority of Ireland (NSAI) will be critically important by ensuring appropriate standards are introduced to provide clarity and confidence to insurers and consumers in respect to MMC.
3. Education – All stakeholders need to be educated as to the benefits of MMC and the significant contribution it can make to expatiating housing delivery in Ireland.
4. Procurement – Introduce contractual frameworks that will support the rollout of MMC in Ireland.

The above pillars should be supported by a research programme focused on MMC. Careful consideration should be given to engaging with internationally positioned initiatives, such as the Construction

Scotland Innovation Centre and the newly established Construction Transformation Alliance in the UK.

In addition, there should be a single point of reliable, independent and factual information developed. This could take the format of a portal that could search smartly for information about MMC. This would be an invaluable resource giving lenders the confidence that information is accurate and can be relied upon when reviewing lending policy or in making individual lending decisions.

The government should also support MMC by creating an environment of cooperation and joint ventures, particularly to allow SMEs to access and invest in larger production plants. Government should consider how it can give some risk mitigation to potential new entrants and suppliers. This should include looking at initiatives such as the newly proposed P-DfMA (Platform Design for Manufacture) led by the UK's Infrastructure and Projects Authority.

### Recommendation

Establish a Construction Innovation Centre of Excellence to support the adoption of Modern Methods of Construction with particular focus on SMEs and public sector clients.



## Regulation, certification and procurement

All designs and systems incorporating MMC must, like all other forms of construction, conform to all applicable Irish legislation. Particular attention is drawn to the Building Regulations and the requirement that key elements of residential construction have a durability in the order of 60 years with a normal level of maintenance.

Where works involve products, materials, techniques or equipment, for which published national standards do not yet exist, third party certification can demonstrate compliance with Building Regulations and durability requirements. Such certification may include, in part or in total, a European Technical Assessment or Agrément certification or equivalent.

This is key to ensuring that minimum quality and durability standards are met and are providing confidence to investors, construction industry professionals, builders and importantly the consumer, especially in the context of the building defects and building system failures that have unfortunately arisen with some innovative systems.

The performance requirements of buildings and works are set out in the second schedule to the Building Regulations and they are written in broad performance terms and do not refer to materials or methodologies. They represent the minimum legal requirements for all new buildings and works. A suite of technical guidance documents has been prepared to provide guidance for non-complex buildings.

The materials, methods of construction, standards and other specifications (including technical specifications) which are referred in the technical guidance documents are those which are likely to be suitable for the purposes of the Regulations. Where works are carried out in accordance with the guidance in these documents, this will, prima facie, indicate compliance with the performance requirements of the Second Schedule of the Building Regulations.

However, the adoption of an approach other than that outlined in the guidance is not precluded provided that the relevant requirements of the Regulations are achieved. Third party certification is a means for demonstrating compliance for innovative forms of construction. These are experts in the field of product certification, system design and regulatory requirements.

NSAI has developed standards for many aspects of the construction industry, one such example is I.S.440- 'Timber Frame Dwellings', first published in 2009. The standard was developed in conjunction with the industry. The standard deals with domestic housing and apartments and specifies all the requirements which must be adhered to for materials, design, manufacture, construction details, site work and quality control and is the essential reference point for anyone involved in specifying, manufacturing or building in timber frame. As new systems become more prevalent and converge in terms of details; there are opportunities to develop a standardised approach through mechanisms such as that followed by the timber frame construction.

There are many different materials that can be used in the MMC process and the suitability of each must be intensively scrutinised before a decision is made on which approach to use. Research into the greater potential of MMC should be commissioned, working with established stakeholders who currently undertake testing, validation and regulatory monitoring in the performance of MMC.

Since July 2013, CE Marking is mandatory for construction products covered by harmonised European Standards (hENs), when placed on the market. CE Marking for construction products is not a quality mark. Designers and specifiers must be aware of and understand the common technical language used in the hENs. The primary aim of the Construction Products Regulation (EU) No 305/2011 (CPR) is to remove technical barriers to the trade of construction products, while ensuring that reliable information on the performance of construction products is available.

The CPR achieves this by establishing a common technical language, which is used: by manufacturers when declaring product performance by national authorities when specifying requirements for products, and by users when choosing products most suitable for their intended use in construction works.

MMC are recognised as an important part of the industry in terms of speedy delivery, addressing the skills issue and also increasing productivity of the industry. The public sector has reflected this, in particular in relation to housing, in the development of procurement frameworks of design build contractors using offsite construction.

The Office of Government Procurement established a nationwide contractor’s procurement framework to support local authorities and Approved Housing Bodies delivering rapid delivery social housing. In addition, Dublin City Council is developing a volumetric rapid delivery programme for apartment developments. A procurement framework of

Design Build Contractors for the delivery of these units is in the process of being established. It is expected that the framework will soon be in place. DHPLG works closely with Local Authorities and State agencies to increase and accelerate the delivery of a range of social housing programmes and supports.

### Recommendation

Introduce mechanisms to provide greater support, understanding and development of Modern Methods of Construction, particularly in respect of demonstrating compliance with regulation, providing confidence for lenders, investors, insurers, construction professionals, builders and ultimately for consumers that they are engaging with fully compliant, robust systems.

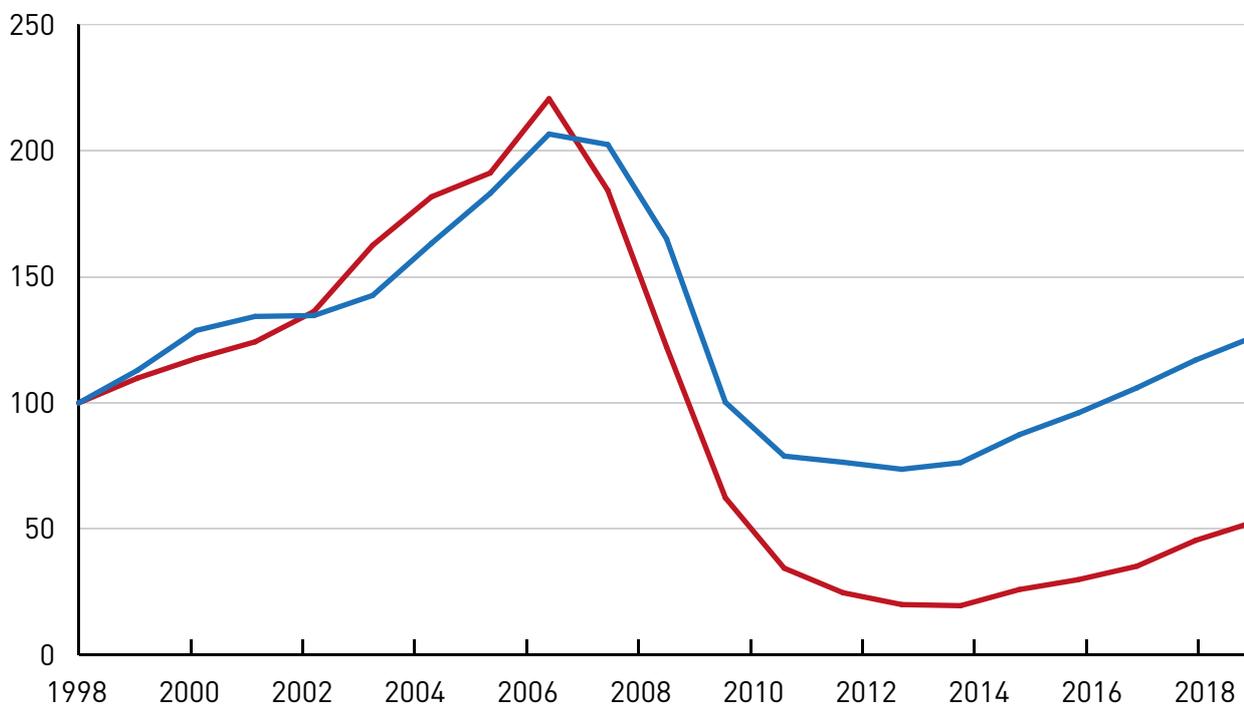


Figure 11 – Persons employed in construction (blue) and housing output estimated by ESNB connections (red), both indexed to 1998 (CSO)

## Skills supply for housing supply

There are acute skills shortages in the construction sector. The number of people employed in construction peaked in 2006 at 237,300. Today, there are 144,000 employed in the sector, almost 100,000 fewer (Figure 11). Housing output is a key determinant of construction employment and stability in housing output can engender stability in construction employment. For example, housing output in Austria has varied by 20% over the last 30 years compared to 100% in Ireland. Meanwhile, construction employment in Austria has varied by just 5% compared to 150% in Ireland.

Engineers Ireland's Engineering 2019 report shows that there are particular shortages of engineers. In 2017, there were 3,865 graduates from Level 7 and Level 8 engineering courses. This represents a 1% increase since 2016, but a 15% decrease over the past five years. This worrying decline can also be seen in engineering's proportion of all Level 7 and Level 8 graduates which fell from 12% in 2012 to 10% in 2016 and 2017. A particular cause of concern is the 5-year trend in Civil & Building Engineering, graduates of which have dropped from 1,494 in 2012 to 669 in 2017, down 55% in five years.

Almost all (94%) engineering employers consider a shortage of experienced engineers to be a barrier to growth – and 48% expect this situation to get worse in the year ahead. The National Skills Bulletin 2018, which informs Government employment and education policy, now recognises shortages in almost all engineering occupations. While this means that there are plenty of job opportunities for engineering graduates, these skills shortages are restricting growth and the delivery of key projects. It is now a very real concern that shortages of Civil & Building Engineers, Mechanical & Electrical Engineers and other construction professionals could undermine the delivery of new homes and infrastructure projects as envisaged in the NDP.

There is also a major shortage of craft apprentices, numbers of which declined dramatically during the economic recession. Apprentices play a vital role in the wider engineering and construction sector and the decline in apprentice registrations is a key component of skills shortages in the sector. The number of new apprentices registering each year fell from 6,763 in 2007 to a low of 1,204 in 2010. This level is increased substantially in recent years and there are 5,381 apprentices forecast to register in 2019 and a population of 16,000 registered apprentices. There has been

particularly strong growth in apprenticeships relating to plumbing, carpentry, electrical and mechanics.

New forms of apprenticeships have been developed in the past five years, led by industry consortia with higher education institution partners. These apprenticeships are flexible in delivery, including on-the-job learning (approx. 70%) and on-campus learning (approx. 30%). Apprentices are employed under a formal contract and are paid for the duration of their apprenticeship. These professional apprenticeships are generally placed at Level 7 on the NFQ with a B.Eng. award upon completion after 2-3 years. By early 2019, there were four of these new professional apprenticeships in engineering with 211 registered apprentices between them. The first cohort of these engineers graduated in 2018 and there are further professional engineering apprenticeships currently in development.

If, as a country, we are to overcome skills shortages in the medium term, we must encourage many more young people to choose careers in construction. Building a sustainable industry, including a steady residential output, fully compliant, robust systems. In this context, one of the biggest challenges facing the sector is bridging the gender gap and promoting a more diverse and inclusive workforce. Just 5% of apprentices and 8% of Civil & Building Engineering graduates are women.

## Recommendation

Encourage more young people to enter and remain in Architecture, Engineering and Construction sectors.

## Key skills to enable The State of Ireland 2019 recommendations

Digitalisation is becoming pervasive in our daily lives and is driving a level of connectivity never before seen in society. New connectivity and production technologies are ushering in a revolution in global manufacturing generally referred to as Industry 4.0 – the 4th Industrial Revolution. At the same time, new technologies such as Building Information Modelling (BIM) are disrupting the construction industry. These developments pose major challenges and opportunities for Ireland, not least in the area of skills.

The skills required to perform many jobs are transforming rapidly such that the demand for manual skills is falling while the need for analytical thinking and innovation continues to grow. The World Economic Forum have referred to a 'reskilling imperative'. In this context, it is positive to note Government's 'Technology Skills 2022: Ireland's Third ICT Skills Action Plan' which targets more than 47,000 graduates with high level ICT skills by 2022. Other policy initiatives include increases in the Training Levy, the €300m Human Capital Initiative and the Future Jobs Initiative.

MMC offers an opportunity to address the skills shortage in the construction industry, for example through volumetric construction, but is not the sole remedy for skills shortages in construction. Traditional on-site construction skills will remain and work alongside MMC. The use of advanced technologies to support the design, installation and maintenance of MMC can be encouraged by ensuring the Government and industry work together on the creation of apprenticeships and training products for all stakeholders that engage in the delivery of MMC projects.

Other sections of this report have called for new approaches to infrastructure planning, revitalising our cities, towns and villages etc. with an emphasis on compact urban growth. A key enabler for these recommendations is the availability of skills and innovative ideas in urban design. Greater priority should be given by State organisations, educational institutions, professional bodies and others to teaching and continuing professional development (CPD) in the area of urban design. These skills will help us to deliver sustainable urban areas in which people want to live and enjoy.

Furthermore, minimum qualifications for the professionals designing and delivering retrofit works, commissioning of works following the retrofit works and post occupancy surveys with householders should be required to ensure the occupants are satisfied with the outcome of the retrofit.

The development of 'retrofit managers' (super-BER) with appropriate L7/L8 qualifications should be progressed, including: courses and ongoing CPD and qualification and quality systems. Funding should be provided for the 'trusted intermediary' so that they can deliver appropriate services (e.g. the German KfW programme funds €4,000 per dwelling). Also, only professionally-overseen deep upgrades should have access to grants and low-cost loans (similar to the current deep retrofit pilot). Finally, a multi-annual awareness, education and skills programme should be undertaken focusing on the normalising of deep and appropriate retrofit skills. Housing management skills and competencies will also be required for the increased level of rental housing provided, skills which have to preserve housing over the long-term.

### Recommendation

Increase the number and variety of apprenticeships and training schemes on offer, focusing on:

- Modern Methods of Construction
- Sustainable urban design
- 'Retrofit managers' and other retrofitting skills such as heat pump specifiers / installers.



# Energy

Ireland's energy demands need to meet the objectives of the energy trilemma by being environmentally sound, economically viable and from indigenous sources.



- Energy efficiency D
- Electricity (RES-E) B
- Heating/cooling (RES-H) C
- Transport (RES-T) C

Plan was published in June 2019 and sets out 180+ actions across electricity, enterprise, housing, heating, transport, agriculture, waste, and the public sector. If implemented, this would track Ireland's progress against targets, take urgent action and to help the public to understand the challenges that are faced and where they can play a more significant role.

## Connecting energy and housing

The housing sector is one of the leading consumers of energy in Ireland, from construction to running a home (heating, electricity etc.). The housing sector accounts for a quarter of the energy used in Ireland and is the second largest contributor to Ireland's GHG emissions. The biggest household use of energy is space and water heating, followed by cooking. Electrical appliances – especially fridges and freezers – also consume large quantities of energy. As outlined on page 31, once household transport and other components are included, total energy consumption rises significantly.

Ireland is committed to reducing these emissions which will significantly address Ireland's overall climate and emissions targets. To achieve these targets, significant investment is needed both by the State and homeowners (see pages 29-38). This said, Government must be conscious of the impact of energy/climate policy on the estimated 400,000 households in Ireland who currently suffer from fuel poverty.

As battery storage and energy management solutions become more widespread, it is likely that increasing numbers of affluent homes, will reduce dependency on the electricity grid and gas network. In Australia, this has had the effect of increasing the overall cost of energy infrastructure for homeowners who cannot afford such technologies. It is essential that investment is equitable, affordable and available to all homes.

Government climate and energy policies/plans published since 2015 (see next page) reiterate Ireland's commitment to reducing emissions and meeting energy and climate change targets. The Climate Action

## Major developments in the past year

The biggest development in the energy sector last year was the operation of Ireland's electricity system for three months without Moneypoint, the coal-fired power station, which was on a long-term outage. In November 2018, for example, the grid ran almost exclusively on gas (44%) and renewables (43%). The reduction in GHG emissions from this period contributed to a reduction in Ireland's overall ETS emissions by over 8% for 2018.

According to SEAI, in 2017, Ireland's energy use increased by 0.5% partly as a result of economic growth, however, energy-related CO2 emissions fell by 2.1%. This translates to a 2.6% reduction in the energy-intensity of the economy. The renewables share of electricity (RES-E) is 30.1%, while the renewable energy sources for transport (RES-T) and heat (RES-H) were 7.4% and 6.8%, respectively. While residential energy use fell by 2.9% in 2017, when adjusted for weather, levels were 0.2% higher than in 2016.

Carbon Capture and Storage (CCS) has been gaining support since the launch of the IPCC Special Report on Global Warming of 1.5°C which stated that there are no credible scenarios to limit global warming to below 1.5°C that do not utilise CCS at large scale. Norway is carrying out two Front End Engineering Design studies on two capture plants and an offshore storage site in the North Sea, while the UK's Committee on Climate Change has stated that the UK Government should not aim to hit its 2050 targets without CCS.

Selected actions (State of Ireland 2016)	Update
<p>Implement the Climate Action Plan to provide the Irish public with a cleaner, safer and more sustainable future. Encourage renewable energy in Ireland and harness Ireland's already identified naturally occurring renewable resources.</p>	<p>Since the publication of the 2015 Energy White Paper, the Government has adopted various climate and energy policies/plans, including the National Mitigation Plan, the National Clean Air Strategy and the draft National Energy &amp; Climate Plan (NECP) 2021 – 2030 (final version due by the end of 2019). The Minister for Communications, Climate Action and Environment, Richard Bruton TD, launched the Climate Action Plan as an all-of-Government plan to tackle climate breakdown. Commitments include an increase in renewable energy sources for electricity (RES-E) to 70% by 2030.</p>
<p>The Government should lead by example, with ministers encouraged to replace their existing fossil fuel-powered cars with hybrids or electric vehicles. Irish state agency car, van and bus fleets should also be progressively converted to electric, compressed natural gas (CNG) and hybrid modes, respectively, with the CNG network rolled out as planned.</p>	<p>In response to the Irish Examiner, just one Minister (Richard Bruton) said that he drives a hybrid while eight ministers admitted driving diesel cars. An Post is transitioning to electric vehicles, meanwhile ESB is replacing vans with electric where electric models exist that can meet the duty. Gas Networks Ireland is rolling out CNG refuelling infrastructure, including 14 fast fill CNG stations across the core TEN-T road network. The NPF set a target network of 70 CNG refuelling stations by 2025 and forecasts 4,050 CNG commercial vehicles and 1,000 CNG buses in Ireland by 2025.</p>
<p>Publish details regarding the Renewable Heat Incentive (RHI) in 2016 as promised, prioritising large industry to commence switching to renewable energy, which should dovetail with smaller industry and domestic residences.</p>	<p>The Government has implemented a Support Scheme for Renewable Heat which provides: (i) operational support for biomass heating systems and anaerobic digestion heating systems and (ii) an installation grant for air source heat pumps, ground source heat pumps and water source heat pumps. Despite Government commitments, other technologies and methods of support, including renewable gas grid injection, have not yet materialised.</p>
<p>Explore technology solutions such as energy storage and further interconnection to address variable renewable generation.</p>	<p>In May 2019, Eirgrid and Réseau de Transport d'Électricité submitted a joint application for up to €750 million funding to the European Commission for the Celtic Interconnector, an electrical link between Ireland and France.</p>
<p>Progress the North-South Interconnector to further bolster security of supply and reduce cost to the consumer, as well as exploring other interconnection options with a view to developing them if and when appropriate.</p>	<p>There is no clear timeline for the final delivery of the North-South Interconnector due to legal challenges.</p>

# Transport

Developing a transport infrastructure that 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.



Airports	(B)
Ports	(B)
Rail	(C)
Road	(C)
Sustainable and urban	(C)

## Connecting transport and housing

Transport infrastructure and services are fundamental to housing, both in terms of construction access and facilitating travel, for example between home and work/school and social activities. The more housing is dispersed, the greater the travel distance and the less effective public transport becomes. Housing should be focused in cities, towns and villages so that the most frequent destinations are within walking distance. These include schools, shops, doctors, etc. Appropriate transport then needs to be provided for destinations that simply cannot be in guaranteed walking distance such as work, hospitals etc.

Without consideration for more densely populated areas or better integrated housing / employment / schooling and social / recreation provisions, we will continue to have a society that suffers from poor land-use planning with the outcome being longer commutes with car-based travel dominating. Greater mass transit is required along with densification of urban settlements, especially close to public transport nodes. There should be a fully integrated public transport system (such as in Copenhagen) which provides regular and reliable heavy rail, light rail, bus, and cycling options.

Transport and land-use planning is fundamental to achieving the objectives of Project Ireland 2040 and promoting more balanced regional population and employment growth. A significant increase in affordable, sustainable and cost-effective public transport could open up locations of the country that will serve as commuter hubs. For instance, higher speed, lower cost rail connections between Limerick-Dublin, Limerick-Galway, Cork-Limerick, Cork-Dublin, must also be

combined with low cost, high speed distribution/feeder rail lines to areas with lower population densities but high availability of land for housing. Those areas then need a co-ordinated local housing and transport plan, including parking at rail stations, feeder buses from new estates, cycle routes and secure bike storage.

This will relieve transport and housing pressures in Dublin as well as create more sustainable urban developments in the rest of the country. Critical infrastructure projects like the M20 Cork-Limerick will be instrumental in achieving a sustainable counterbalance to Dublin. Further development and investment in Cork, Shannon and Ireland West airports to attract airlines to create more routes from these airports will also be critical in attracting FDI away from Dublin. Additional investment in the National Secondary Road Network is also required.

## Major developments in the past year

(see next page for selected updates)

- MetroLink is behind schedule following changes to planning and design
- Consultations have been held and consultants appointed for BusConnects
- A pilot project involving buses using bio gases for fuel commenced in Cork City
- New 55 metre trams have been added to the Green Line Luas
- The emerging preferred option for the Liffey Cycle Route has been published
- Consultants have been appointed for the planning of the M20 Cork-Limerick
- Progress has been made to various degrees on roads schemes
  - N22 Baile Bhuirne-Macroom
  - N4 Collooney-Castlebaldwin
  - N5 Westport-Turlough.
  - M7 Widening Scheme
  - M11 Gorey to Enniscorthy and N25 New Ross Bypass will open this year.
- Work has commenced on the Northern Runway Project at Dublin Airport

Selected actions (State of Ireland 2017)	Update
<p>Increase the allocation of capital investment in transport infrastructure to ensure that there are adequate funds for both the maintenance of existing assets and new build projects.</p>	<p>The NDP provides for several new major transport projects yet makes little reference to maintenance. This said, much of the roads spend of €480m is targeted on the maintenance and minor upgrade of the regional and local road network. When setting transport budgets, Government should be cognisant of the fact that a significant element of TII's core budget has been assigned to longer-term infrastructure projects.</p>
<p>Progress the planning and delivery of MetroLink.</p>	<p>MetroLink is behind programme in terms of procurement and design, likely due to the number of changes being made to the scheme, including the decision to include the Luas Green line and subsequently remove it from the plan. Continued investment and political support are required to deliver this important project which to support the expansion of Dublin Airport and the wider north Dublin area.</p>
<p>Reuse, recycle and repurpose existing transport assets, such as converting existing roads into specific bus, cycle and car sharing lanes. Develop bus priority routes, core bus corridors and bus rapid transit routes for high frequency bus transfers. Introduce bus-focused public transport strategies to each of the five major urban centres.</p>	<p>The BusConnects project held consultations and is now in the process of procuring consultants for stage 1-4 of the TII PMGs (up to and including Oral Hearing). It is incorporating much of the previous work done on various BRT Schemes which had been developed through route selection and preliminary design. The Cork Metropolitan Area Transport Strategy has been published for consultation, while similar strategies are planned for Galway, Limerick and Waterford.</p>
<p>Incentivise consumers and private car operators to purchase electric vehicles (EVs). Introduce more superfast chargers for electric vehicles on inter urban routes.</p>	<p>Incentivise consumers and private car operators to purchase electric vehicles (EVs). Introduce more superfast chargers for electric vehicles on inter urban routes.</p>
<p>Recommence planning for the M20 Cork to Limerick motorway. Bring forward construction on the planned N4, N5, N25/M8, N22 and N28 road projects before the current planned start dates. Improve connectivity of the north-west and the Atlantic Corridor to Ireland's seaports.</p>	<p>Consultants have recently been appointed to develop the M20 Cork-Limerick scheme through stages 1-4 of TII PMGs (up to and including Oral Hearing). The N4 Colloney-Castlebaldwin has commenced construction, while the N4 Mullingar-Roskey is due to appoint consultants shortly. The N5 Westport-Turlough D&amp;B tender has been let and TII has issued a tender for the appointment of consultants for Stages 5-7 of the TII PMG (Procurement, Construction and Handover Phases) for the N5 Ballaghderreen-Scramoge Scheme. Construction has also commenced on the Dunkettle Interchange Improvement Scheme which is being administered under the NEC3 form of Contract. The N22 Baile Bhuirne to Macroom Contract is currently being procured as a D&amp;B with construction likely to commence Q4 2019.</p>

# Communications

Ireland's communications network is responsible for saving lives, supporting business as well as providing citizens with access to entertainment and social media. Our voice and data networks are critical to support our current lifestyle.



**Coverage and connectivity** B

**Meeting the country's needs** C

**Economic impact** C

## Connecting communications and housing

Increasingly, reliable communications infrastructure is recognised as an important aspect of quality housing. As our society becomes more reliant on telecommunications networks and the services provided over these networks, this has the potential to impact willingness of industry to locate in certain areas, or citizens to live within certain houses.

Ireland's dispersed population, particularly the significant number of one-off rural dwellings and local roads, makes it difficult to roll-out fixed and wireless networks. Furthermore, the ability to access wireless telecommunications services, including the use of mobile phones, wireless broadband or WiFi, can depend on the building materials used during the construction or renovation of domestic dwellings (e.g. thickness of walls, types of insulating material used).

According to the Digital Economy and Society Index, Ireland's coverage of fast broadband at 89% is well above the EU average (80%) along with take-up which is at 51%, clearly above the EU average of 33%. However, the key challenge remains the deficit of fast broadband in rural areas. The implementation of the National Broadband Plan (NBP) is an essential enabler to address the digital divide between urban and rural areas.

The NBP aims to ensure all houses in Ireland have adequate access to fixed telecommunications services, through the rollout of an FTTH network in areas in which it is not commercially viable to do so. The delivery of the NBP would make these locations more attractive as places in which to live and work, thereby increasing suitable housing capacity and relieving pressure on

cities with high demand. High-quality broadband availability would also offer an incentive to develop new housing in rural towns and villages. However, there is a high cost in delivering NBP to all homes; investment should be prioritised to those that commit to use the service.

## Major developments in the past year

The major development in communications infrastructure was the approval of Granahan McCourt as the preferred bidder to the NBP (see next page).

Other recent developments included:

- Eir announced plans to build FTTH network to 1.4 million premises.
- The Commission for Communications Regulation (ComReg) published a decision on Wholesale Local Access and Wholesale Central Access, deregulating the urban WCA market area where Eir competes with Virgin Media and other access seekers.
- The MVNO iDMobile announced its exit from the Irish market.
- The Body of European Regulators for Electronic Communications published a study showing the takeover of O2 by Three Ireland led to higher consumer prices for mobile phone plans.
- The number of subscribers availing of NGA services (FTTC, FTTH or Cable) passes 1 million in 2018.
- ComReg and Eir reached an agreement regarding Eir's Regulatory Governance and an independent Oversight Board was announced.
- ComReg published the first outdoor mobile coverage map, allowing consumers to compare coverage between operators.
- ComReg published Spectrum Strategy Statement and ECS Strategy Statement for 2019-2021.

Selected actions (State of Ireland 2017)	Update
<p>Award the contract for the National Broadband Plan without delay and with expedited timelines for delivery</p>	<p>In May 2019, the Government approved the appointment of Granahan McCourt as the preferred bidder to the NBP. The bid will provide fibre to 98% of all premises with speeds starting from 150 mb/s, rising to 500 mb/s in year ten for residential users and much higher speeds available for business. Over 90% of premises in the State will have access to high speed broadband within the next four years. National Broadband Ireland has been established to build, operate and maintain the network. DCCAIE has stated that deployment will begin immediately and that the maximum cost to the State will be €3 billion over 25 years.</p>
<p>New building developments should include provision for infrastructure to support broadband rollout, for example, internal wiring in buildings, homes and industrial parks.</p>	<p>For new planning applications, Local Authorities have adopted a working practice of requiring access ducts for telecoms infrastructure to be provided by the developer. This practice has focused on providing duct access from the public roadway to the new premises. ComReg has roles in facilitating access to physical infrastructure for the purpose of providing electronic communications under Section 57 of the 2002 Act and under the Broadband Cost Reduction Regulations.</p>
<p>Support the development and deployment of applications for the 'Internet of Farm' to insure the prosperity of the rural agri sector.</p>	<p>There is a growing eco system for farm-based applications and digital services. A host of companies, State bodies and agencies and representative organisations are focused on supporting the development of digital services for the agri sector.</p>
<p>Clarify the security implications for the sovereignty of data within the EU domain, post-Brexit.</p>	<p>It is still unclear how the regulatory regime will evolve in the UK following Brexit. This is a challenge considering cross-border networks with Northern Ireland. The Data Protection Commission has provided some guidance for businesses dealing with this issue and the transfer of personal data to the UK in the event of a 'no deal' Brexit.</p>
<p>Continue to research and develop the network in anticipation of 5G services.</p>	<p>In November 2018, ComReg published the results of a connectivity study which considered how best to meet consumer's connectivity needs, estimating future mobile connectivity network costings and the implications for spectrum awards and coverage obligations. These reports highlight the challenges, solutions and actions required to improve connectivity in Ireland.</p>

# Water / wastewater

Water supply and wastewater infrastructure should reliably protect public health, safeguard the environment and support future development.



- Water resources C
- Public water supply C
- Public wastewater C
- Private water supply and wastewater D

## Connecting water and housing

Housing development is reliant on the availability and capacity of water supply and wastewater infrastructure such as pipe networks and treatment plants. In the short term, if the housing crisis is to be tackled sustainably, sites with access to existing water services infrastructure, with capacity, should be preferentially advanced.

In the medium to long term, holistic planning is required to identify those areas where housing is to be advanced to plan for the design/construction of the necessary supporting public infrastructure. Development must be well-planned and adequate notice given to Irish Water to allow them to develop business plans and secure funding to provide new assets to meet the demand. Planning also needs to take account of where water resources are more sustainable, especially with respect to climate change.

In general, the construction and maintenance of public water and wastewater infrastructure must keep pace with housing developments otherwise existing assets will be unable to cope with increasing demand. The consequences of not improving and growing the infrastructure could be poor customer service, out of sewer flooding, pollution and other environmental issues, non-compliance with regulations and the threat of infraction.

Regarding private water and wastewater, one-off housing is a key driver of septic tank or small-scale systems. Such systems can work well, however, they often suffer from poor design, maintenance and desludging. There should be a focus on changing housing policy in rural areas to housing clusters around serviced villages and towns, making the provision of water/wastewater services more efficient.

## Major developments in the past year

In May 2018, DHPLG published the Water Services Policy Statement 2018-2025 which set out four high-level principles to inform water services policy. In November, the Minister approved the Irish Water Strategic Funding Plan 2019-2024 which outlines Irish Water’s multi-annual strategic funding requirement of €11bn to 2024, comprised of a €6.1bn investment in infrastructure and assets and €4.9bn in operating costs. According to the Plan, this funding requirement will be met through a combination of non-domestic revenue, excess usage charges, Government subvention, non-domestic borrowings and capital contributions.

Irish Water has been investing significantly in addressing water and wastewater deficiencies. Progress has included reducing the number of consumers on long-term boil water notices to almost zero, undertaking significant water network repairs and rehab to reduce leakage throughout the country and upgrading existing deficient wastewater treatment plants.

Significant projects underway include the Cork Lower Harbour Main Drainage Project, Ringsend Wastewater Treatment Plant Upgrade Project and the Vartry Water Supply Scheme (see next page for more information).

Other major developments include the elimination of a number of untreated wastewater discharges to our waters through the construction of new wastewater treatment plants and the provision of new sewerage infrastructure to reduce the risk of sewer flooding and pollution, and the reinforcement of water supplies in some areas. Finally, the EPA published the National Inspection Plan 2018-2021 for private domestic wastewater treatment systems.

Selected actions (State of Ireland 2018)	Update
<p>Improve the protection of human and environmental health by providing groundwater and surface water Source Protection Plans for all viable supplies and upgrade well heads and abstraction points where deficiencies are immediately apparent.</p>	<p>The GWS sector is advancing with pilot studies looking at catchment management, including communications. In 2019, Irish Water (IW) are completing the Zone of Contribution mapping and hazard identification phase for all 353 DWSP Source Risk Assessments. IW upgraded over 50 groundwater abstraction points since June 2018.</p>
<p>Undertake Drinking Water Safety Plan (DWSP) risk assessments and implement mitigation measures to address all high and very high risk hazardous events identified in Drinking Water Safety Plans to protect public health.</p>	<p>IW is reviewing the DWSP approach and work to date, focusing on data quality improvement initiatives. This includes Risk Assessment Methodology (data quality and optimum risk reduction measures), Risk Assessment Completion (assessment of 40,000 hazards to date) and Risk Reduction.</p>
<p>Reduce network leakage by scaling up investment in active leakage control, supported by water mains rehabilitation and replacement. Target a reduction to 40% within two years and to 35% within five years as part of a roadmap to resource efficiency.</p>	<p>IW's work in this area includes: Find &amp; Fix (leak detection and repair), water mains replacement and renewal, backyard service connections, First Fix Free Scheme, pressure reduction, and data improvement by replacing meters across the network and build a more confident understanding of leakage levels.</p>
<p>Upgrade existing key strategic infrastructure such as water supply at Vartry (Wicklow), water treatment at Lee Road (Cork) and wastewater treatment at Ringsend (Dublin) and Cork Lower Harbour.</p>	<p><i>Vartry:</i> New pipeline completed between Vartry and Callowhill and works have commenced on the new Vartry WTP and the Stillorgan Reservoir Upgrade.</p> <p><i>Ringsend:</i> Planning permission granted by ABP in April 2019. Works are ongoing on the 400,000 PE capacity upgrade of the plant.</p> <p><i>Cork Lower Harbour:</i> Wastewater from Passage West and Monkstown will be treated from the end of June 2019. Works will begin on the north side of the Estuary in summer 2019.</p>
<p>Plan for sustainable growth in accordance with the National Planning Framework and Regional Spatial &amp; Economic Strategies by progressing planning on the Eastern &amp; Midlands Water Supply Project (WSP) and the Greater Dublin Drainage Project (GDD). Within five years, start construction on both projects.</p>	<p><i>WSP:</i> The Commission for Regulation of Utilities has been tasked with undertaking an independent review of the project. IW expect to apply for planning permission in June 2020.</p> <p><i>GDD:</i> In June 2018, IW made a planning application for strategic infrastructure development to ABP and an oral hearing was held in April 2019 and a decision is expected in Q3 2019.</p>
<p>Target investment at the elimination of all untreated wastewater discharges and achieving compliance with the EU Urban Wastewater Treatment Directive. Within five years, achieve and maintain compliance with the Directive.</p>	<p>According to the EPA, six untreated discharges have been eliminated since 2016. New WWTPs have been constructed serving 12 towns where raw sewage was discharging directly into the water. IW is progressing plans for another 38 locations. The number of priority areas where treatment needs to improve is down from 148 to 132.</p>

# Flooding

All flooding risk should be holistically managed for the protection of public health, critical infrastructure, and the natural environment.



River	Ⓢ
Coastal	Ⓣ
Urban	Ⓢ
Rural	Ⓢ
Groundwater	Ⓢ
Forecasting and warning	Ⓣ

## Connecting flood risk management and housing

Flood risk management is one of many constraints in sustainable development. Flood risk should be a fundamental consideration in determining new planning applications for housing and this principle should not be allowed to be eroded in the face of current challenges. There are two main areas - dealing with existing risk (legacy) and avoiding future risk.

Following the adoption of the Planning Guidelines and the Core Strategies, many areas at risk of flooding were de-zoned in subsequent plans; the main challenge on future risk is continuing to follow the guidance. There is sufficient land available that is not at risk of flooding to facilitate future housing development, and there is the possibility of re-developing or intensifying development on brownfield sites. There is also a programme of work ahead to address the existing risk. The impact of climate change also needs to be monitored on an ongoing basis so that any necessary changes to policy may be made in good time. In summary, flooding is not necessarily a constraint to addressing future housing requirements.

We need to ensure that the 2009 flood risk management guidelines are implemented, as intended, and the inappropriate development is not allowed to progress through the planning system.

As recommended in The State of Ireland 2018 report, the escalation of assets at risk from flooding, including coastal, should be prevented especially through the implementation of the National Planning Framework, Regional Spatial & Economic Strategies and local authority development plans, in accordance with flood risk management planning guidelines.

## Major developments in the past year

The announcement of the Flood Risk Management Plans (Flood Plans) in May 2018 was very welcome. The Plans outlined feasible structural flood protection measures and nonstructural flood risk prevention and preparedness measures. The main finding of the Flood Plans was that 95% of properties at risk of flooding in the 300 areas assessed can be feasibly protected. This will require the delivery of 118 flood relief schemes and the maintenance of existing schemes.

We are now beginning to see the commencement of the implementation of the schemes outlined in the Flood Plans. To date, a consultancy framework has been established and a number of schemes have been tendered through the framework by Local Authorities. Progress has been made on the governance arrangements for the delivery of the capital programme and engagement of stakeholders (local authorities, OPW, other government bodies), see next page.

Selected actions (State of Ireland 2018)	Update
<p>Develop a strategic plan for the efficient delivery of schemes identified in the Flood Plans and smaller schemes, drawing on international best practice and including the following key components:</p> <ul style="list-style-type: none"> <li>• Multi-annual budgeting for the implementation of Flood Plans and a programme of proactive maintenance of existing structures and associated waterways;</li> <li>• A multi-stakeholder taskforce to review the operation of legislation and policy governing flood risk management;</li> <li>• Standard methodologies for the translation of current knowledge on climate change into design guidance for resilient infrastructure.</li> </ul>	<p>The NDP contained a funding commitment of €1 billion for a 10-year programme of work. However, there may be difficulty in achieving this level of output over the programme duration. A governance arrangement is under development and engagement between Local Authorities and national public bodies. A unit has been established in the OPW to bring forward proposals, for cross-Government engagement on planning, for coastal management and related issues. Climate adaptation policy has been incorporated into OPW briefs, but national guidance is still awaited. Meanwhile, the EPA has carried out some work on regional climate change predictions.</p>
<p>Maintain and extend the network of permanent measurement facilities (e.g. automatic rain gauges, rainfall radar, water level monitoring, satellite / remote measurement and continuous GPS).</p>	<p>Met Éireann has two relevant projects/work programmes. Firstly, around 60 new automatic weather stations are being installed to augment the 25 real-time raingauges currently in place. Secondly, a project to extend and modernise the weather radar network for Ireland has recently commenced. Meanwhile, the OSI is extending the GPS network, the OPW is extending hydrometric network and initial work is taking place on satellite data and coastal monitoring.</p>
<p>Expedite the development of flood forecasting capability for larger catchments and more populated bays around Ireland. Pilot linkages of forecasts and warnings.</p>	<p>Met Éireann’s Flood Forecast Centre is in the process of being set up. The most suitable flood forecasting models for five representative catchments in Ireland will be identified by the end of the year. The output from the Flood Forecast Centre will be daily flood guidance statements and when a flood risk is anticipated, flood advisories and flood alerts will be issued. No flood warnings will be available until a later phase of the Flood Forecast Centre’s development. Stage 1, a 5 year setup, development and trial period for the National Flood Forecasting and Warning Service is due to finalise in 2021. At this stage there will be an operational flood forecasting service for river and coastal flooding at a national and catchment scale. There are two further stages to extend the flood forecasting capability to smaller scales and for groundwater and pluvial flooding. It’s anticipated that the entire process will take 16 years.</p>

# Waste

The waste management sector has a key role to play in Ireland's transition to a circular economy, but a strong national policy framework is required to deliver national targets and support market practitioners to continue to invest in the collection and treatment infrastructure needed.



## Connecting waste and housing

The latest waste statistics published by the EPA show Ireland's recycling rate for municipal waste (i.e. household and commercial waste) has remained static at 41% in 2016. This rate is unchanged from 2014 and has only increased by 1% since 2012. This rate of progress is concerning considering a new headline target of 60% is to be achieved by 2030. This target is part of the European Commission's Circular Economy Package and Ireland faces a steep challenge to reach this level. Targets and significant improvements are needed in our collection system.

Our existing source separated collection infrastructure needs to be reviewed to assess the potential to improve the segregation of recyclable materials at source. More bins or bin compartments for different materials are options for consideration. Investment will be required to research, implement, and optimise better kerbside systems to improve the quality of waste collected. Equally, our Materials Recovery Facilities will require investment in separation equipment to ensure outputs materials are of the highest quality to maximise closed loop solutions.

Construction and demolition (C&D) waste, be it excess soil, demolition concrete and road planings, wood, metal and plastics are typical of the streams generated from development sites. These are growing significantly. The latest data indicates that over 4.3 million tonnes of soil wastes were generated in 2016, an increase of over 20% on the previous year. This trend is expected to continue for C&D waste. Understanding how to plan and manage wastes safely is a critical issue for all development projects.

The quantities of residual wastes exported for treatment in thermal recovery facilities has decreased in recent years. This change is a result of indigenous recovery capacity for the treatment of residual wastes coming on stream. There are two waste-to-energy facilities operating in the State, in Dublin and Meath. This capacity is supplemented by treatment of processed residual wastes (or solid recovered fuels) at cement plants

reducing the level coke used in the manufacturing process. Additional recovery treatment capacity is needed to continue to move away from disposal at landfill and exporting of our residual wastes.

## Major developments in the past year

The Government has established a Construction Waste Resource Group, comprising industry, policy, and regulatory players. This forum is a valuable platform to discuss and monitor issues arising, including the capacity of the sector to manage C&D wastes.

Primary destinations for soil wastes include authorised (i.e. licensed, permitted or registered) soil recovery facilities. The policy of the regional waste management plans is for larger, longer-term facilities to supply the market with secure and properly managed facilities. Soil recovery capacities are mostly unlined which limits the acceptable waste and heightens the risk of pollution to groundwater.

The availability of authorised soil waste facilities in the market is unbalanced. Most active soil recovery capacity exists in the Eastern-Midlands Region. Other parts of the country are principally served by short-term facilities where regulatory action is inconsistent and operations transient. Similarly, there is a lack of lined soil recovery facilities which can accept lightly contaminated soil wastes from brownfield sites. The supply of additional lined facilities is a priority to meet the needs of the market and ensure safe management of these wastes.

Infrastructure gaps remain for other waste streams. For example, we export our hazardous wastes overseas for treatment. Policies in the regional waste plans and EPA National Hazardous Waste Management Plan identified the need to develop either thermal or disposal capacity for specific hazardous wastes. Such capacity remains to be developed for the market. The long-term treatment options for the management of sludge waste also require attention as the current land-based approach is coming under increasing pressure. The development of a dedicated thermal recovery facility may be a viable option for this stream.

To future-proof the State against emergency incidents which generate unexpected volumes of wastes, long-term arrangements for national landfill contingency capacity are being examined. Potential solutions include designating a

dedicated landfill facility (at an existing or previously closed site) or requiring active facilities to retain an amount of available capacity for such incidents.

Selected actions (State of Ireland 2018)	Update
<p>Continue the roll-out of the organic waste collection system to households and businesses, supporting the national transition to pay-by-weight charging.</p>	<p>Progress is being made in this area. The EPA has reported that in 2016 approx. 640,000 households were provided with an organic bin kerbside collection service compared to 572,000 in 2015. The quantity of brown bin waste treated rose from 143,000 tonnes in 2015 to 174,000 tonnes in 2016 (22% increase). There is an increasing trend of brown bin waste collected in Ireland being exported to Northern Ireland for recovery (from 4,000 tonnes in 2013 to 56,000 tonnes in 2016).</p>
<p>Additional treatment capacity (lined and unlined) is needed for the management of soil wastes. The lifetime limit for permitted facilities should be increased to help support secure and viable operations of this scale.</p>	<p>Additional licensed soil recovery capacity has come on stream in the Eastern Midlands Region but a significant lack of long-term licensed capacity in the Southern and Connacht Ulster Regions remains.</p> <p>Lined soil recovery capacity is limited to two facilities (Dublin and Kildare). Further lined capacity is needed to meet development needs across the regions</p>
<p>Review the regulatory threshold on permitted facilities which is hindering the development of medium scale capacity for the recovery of soil wastes – a fast growing waste stream.</p>	<p>The Minister for State at the DCCAE has agreed the proposal from the Construction Waste Resource Group to increase to 200,000 tonnes the lifetime capacity limit for permitted soil recovery sites.</p>
<p>Ensure the necessary policy environment and infrastructure is put in place to deliver the prevention and recycling targets as set out in the regional waste management plans and EU Circular Economy Action Plan.</p>	<p>A new national policy statement is required urgently taking account of the circular economy policy measures and the recommendations of the CCPC’s study on the household waste collection market.</p>
<p>Compile and publish a live register of waste treatment facilities to support the roll-out of future investment.</p>	<p>This action has not been completed to date. The register is needed to track active treatment capacities and identify capacity gaps for the treatment of inert, non-hazardous and hazardous waste streams. The National Waste Collection Permit Office is working on this development.</p>
<p>Prioritise the development of indigenous waste treatment facilities including anaerobic digestion and biological treatment capacity, lined soil recovery capacity, mechanical processing capacity to produce quality recyclables and additional thermal recovery capacity for hazardous and non-hazardous wastes.</p>	<p>Anaerobic digestion capacity remains under developed and needs improvement. Additional lined soil capacity is needed. Additional thermal recovery capacity for hazardous and non-hazardous remains to be developed at the appropriate scale without impacting on recycling targets.</p>

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