

## Future Places: GIS and Housing

The Housing Executive's Interim Chair, Professor Peter Roberts, welcomed more than 40 housing and Geographic Information Systems (GIS) professionals to the fifth *Insight* Housing Market Intelligence Exchange in March 2017. Professor Roberts explained that the agenda for the event had been inspired by a research project, commissioned by the Housing Executive, which sought to harness the capability of GIS to commence an exploration of the dynamics and spatial distribution of the private housing sector (owner occupied and rented) in Northern Ireland.

The emphasis of the research was on collating and mapping data from multiple sources to help policy makers plan for the future by gaining a greater understanding of current spatial patterns, on the basis that *knowledge* (in the form of data alone) can be useful, but *understanding* is necessary to transform knowledge (data) into *intelligence*.



This *Insight Briefing* summarises the information that was shared and the discussions that took place on the day, and provides signposts to other recent research and policy developments.

### Background: How GIS Benefits the Housing Executive

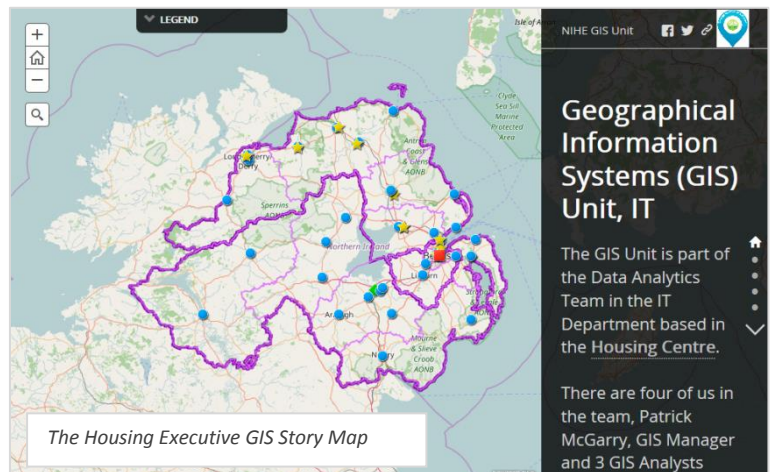
In line with advancing technology and software, the capability of the Housing Executive's centralised corporate GIS Unit has developed significantly over the last two decades. Using a [Story Map](#), the Housing Executive's GIS Manager, Patrick McGarry, explained that he and his team help the organisation to make better use of data to inform decision-making and provide more streamlined services by retrieving and linking information from various systems and databases, bringing it together in a way that is customised to meet the needs of a range of internal clients. Since a large proportion of the data held by the Housing Executive is geographic (i.e. addresses, postcodes, estates), applying GIS technology is a natural fit to help use this information as efficiently as possible.

#### GIS projects

As well as providing a wide variety of maps and mapping resources, the GIS team also undertakes larger scale, bespoke projects to assist the work of the Housing Executive's Landlord, Regional and Asset Management divisions. Examples

include the Land Terrier project, which mapped both current and former Housing Executive land and property holdings, and which has helped refine the land and house sales process considerably in recent years, and the Grounds Maintenance Map Viewer.

The Grounds Maintenance Viewer has been customised to assist the Housing Executive's grounds maintenance teams in their work by quickly and easily identifying which spaces within estates across Northern Ireland consist of planted amenities, grass or hard surfaces without having to consult paper maps or carry out a physical inspection. As well as allowing users to search for specific locations, the viewer also facilitates interaction with the data, for example through creating charts and running queries. Patrick explained that the GIS team was also in the process of undertaking a pilot project to capture data on all the trees maintained by the Housing Executive, particularly ancient or 'veteran' trees which may be a considerable age and/or have high landscape/amenity value. Other developments that are currently being explored include 3D modelling, mobile GIS, and integration with business analytics and dashboard technology. Far from being simply *software*, Geographic Information Systems are a way of optimising an organisation's location data by facilitating more and better analysis of existing information sources.



In response to questions, Patrick noted that the data the GIS team works with is 'owned' by other business units within the Housing Executive. However, where possible and appropriate, data sharing agreements are in place (for example with local councils) to enable better informed decision-making.

## Future Places: The Private Sector Mapping Project

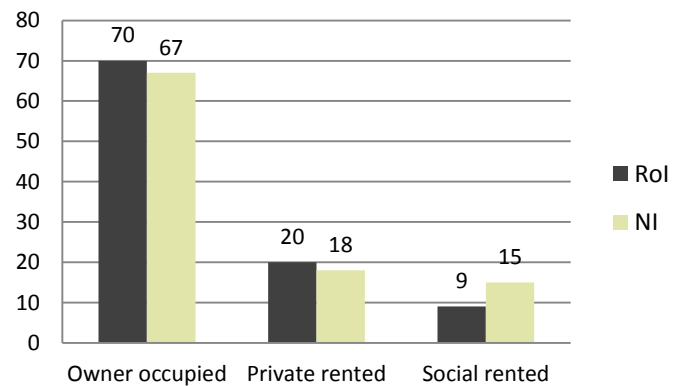
As part of its programme of research into the housing market in Northern Ireland, the Housing Executive commissioned the International Centre for Local and Regional Development (ICLRD) and All-Island Research Observatory (AIRO) to undertake a private sector mapping project. The aim of the work was to provide a more comprehensive and holistic view of the regional housing market by bringing together available data to create a user-friendly mapping tool that would provide improved intelligence on the dynamics and geographical distribution of the private housing market, particularly the private rented sector.

Justin Gleeson, AIRO Project Manager, introduced the project and gave an overview of the wider work carried out by the observatory, which aims to support better planning and decision-making through collection and analysis of data and provision of evidence for both Northern Ireland and the Republic of Ireland. Previous work carried out by AIRO includes the [Atlas of the Island of Ireland](#), which was developed in collaboration with ICLR and funded by the European Union's INTERREG IVA Programme. The Atlas maps socio-economic census data at Small Area level across the island of Ireland. Justin summarised some key housing statistics before moving on to discuss the Housing Executive mapping project.

In **2016**, the available data indicates that the housing stock across the island of Ireland totalled **2.798 million** units, of which **72%** were located in the Republic of Ireland (RoI) and **28%** in Northern Ireland (NI). On census night **2011**, there were around **336,000 vacant properties** on the island; the vacancy rate in the RoI was **14.5%**, while in NI the rate was **6.2%**. Of the **2.35 million households** on the island in 2011, **73%** lived in the RoI and **27%** in Northern Ireland. The total number of households had increased by **29%** since 2001, but the rate of growth was much higher in the RoI (36%) than in NI (13.5%).

In 2011, 69% of occupied homes on the island of Ireland (1.6 million) were owner occupied, of which almost half (49%) were owned outright. Nearly one fifth of homes were privately rented (19%) and just over one tenth (11%) were social rented. However, as Figure 1 indicates, the proportion of homes rented from social landlords was substantially higher in Northern Ireland (15%) than in the Republic of Ireland (9%). In line with these statistics, the figures also show that social renting accounted for a higher proportion of the total rented sector in Northern Ireland (45%) than in the Republic (30%). In both jurisdictions, social housing is predominantly an urban phenomenon while, in contrast, the highest rates of owner occupation are in peripheral areas.

Figure 1: Tenure breakdown for permanent private households (%), RoI and NI, 2011



Over the decade to 2011, there was considerable change in the structure of housing tenure across the island of Ireland:

- The number of households that were renting (either from a private or social landlord) increased by 60%; this was mainly attributable to change in the RoI, where renting increased by 89% and there was substantial growth in the number of households living in both the private rented sector (+102%) and the social sector (+63%).
- While the number of households living in the private rented sector increased at an even greater rate over the period in Northern Ireland (+114%), the numbers in social housing fell by around one fifth (21%).

### The Future Places Mapping Project

Recognising that information on the social housing sector has generally been richer than for the other sectors in Northern Ireland’s housing market, the Housing Executive commissioned the private sector mapping project to help address this ‘data gap’ by providing information on the owner occupied and private rented sectors. A key aspect of the project was the use of GIS to bring together a range of existing data sources in a way that allows users to interrogate the information and quickly obtain an overview of housing data for a specific locality. Jason explained that the work had been planned in two phases, with AIRO developing new data and tools for integration with the Housing Executive’s geographic information systems, and the ICLRD due to facilitate reporting on the work through participation in specific events, such as the Insight Exchange, and the [Borderlands](#) journal.

AIRO collated datasets from a range of sources, including Land & Property Services Northern Ireland, the Housing Executive and the 2011 Census to enable:

- provision of mapped outputs based on the Census;
- sub-division of the [Pointer](#) address dataset into social and private housing, using a probability score to generate information on proportions of owner occupied and private rented properties; and
- development of geo-profiling toolkits for housing tenure, type and age of property; social characteristics; and indicators to allow comparisons between small area and national data.

#### Private Rented Probability Scores

With comprehensive information available on the location of social sector properties, AIRO was able to provide a ‘private rented’ probability score for remaining Pointer residential addresses based on Small Area housing statistics, so that:

Probability	% Private Rented
Very High	>90%
High	75% to 90%
Medium	25% to 75%
Low	10% to 25%
Very Low	0 to 10%

*Pointer contains details on house type: apartment/flat; detached; semi-detached; or terraced.*

The spatial coverage of the datasets available varied from Small Area to Northern Ireland level, with Census variables providing a range of housing-related data (type, tenure, occupancy rating, persons per room, rooms per house, household spaces, heating and persons per household) down to Small Area level. Datasets were developed for Small Areas, Wards and All-Island Small Areas (to enable cross-border analysis for areas such as Derry/Londonderry-Letterkenny and Newry-Dundalk), and extensive aggregations were produced to develop a hierarchy of results for each Small Area.

# AIRO/NIHE Census Mapping Tools

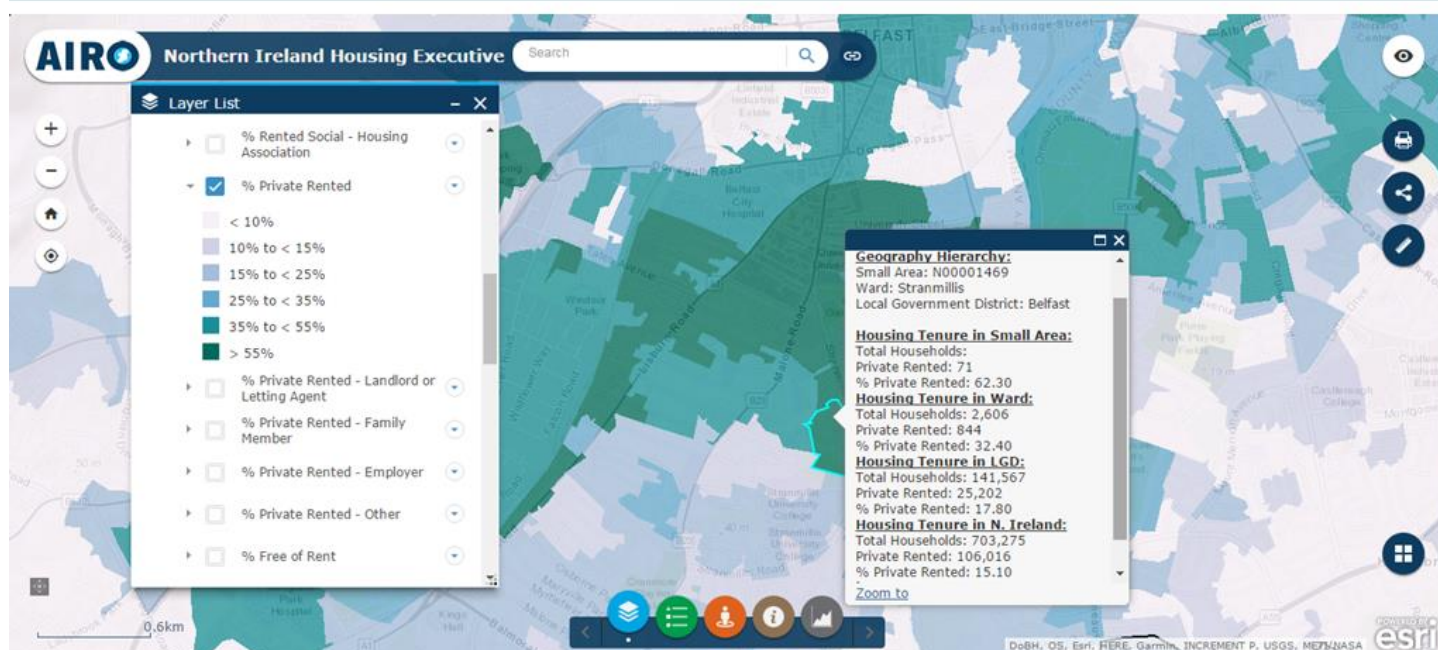


Figure 2: Mapping Tool screenshot

Figure 2 provides an illustrative screenshot of the mapping tool, which uses the popular ESRI software platform. While the tool was still being finalised at the time of the *Insight* event, when in use it will assist the Housing Executive in the analysis of the private rented sector, giving a greater understanding of how it relates to other tenures and therefore a greater understanding of the housing market. In particular, the model will assist the organisation's Place Shaping teams in carrying out housing market analysis and housing need assessments and informing [Housing Investment Plans](#) and the Housing Executive's input into community planning.

## Contemporary issues in Irish housing and the role of housing intelligence

Dr Dáithí Downey, Head of Housing Research, Policy and Development with Dublin City Council's Housing and Community Services department, gave the final presentation, which provided an insight into the role of GIS in helping to (a) discern patterns and (b) reveal the outcomes of decisions taken and the relationships between places. Dr Downey's talk focused on the dynamics of Dublin's housing market in the wake of the global financial crisis, with particular reference to the role of *residential capital*. He explained how the collapse in housing output since 2007, growing unmet demand for housing, large-scale problematic housing debt and unsustainable mortgages among owner-occupiers and investor-landlords have combined to produce an array of 'knotty problems', particularly in the provision of affordable housing across all tenures.

### Background: Housing, Capital and the Global Financial Crisis

In the decades preceding the global financial crisis, the 'financialisation' of housing drove expansion in Ireland's mortgage market and resulted in unprecedented house price inflation in the pre-EMU period (1996-2000) and immediately after the impact of the dotcom bust had dissipated, from 2001 onwards. The movement of capital into real estate produced bubble effects in global housing markets, not least in Ireland where, after increasing steadily from around 16% in 1990 to 30% in 2002, the proportion of gross domestic fixed capital formation accounted for by capital formation in *housing* jumped rapidly to more than 40% by 2004. It remained at this level until 2006, before decreasing at a similarly rapid pace – back to around 23% in 2008 – in the wake of the global financial crisis, which was triggered by rising default in the USA subprime mortgage market. A key aspect of the crisis was shadow banking (see page 5) which,



according to the Financial Stability Board's [Global Shadow Banking Monitoring Report 2015](#), continued to account for a substantial proportion of Ireland's total financial sector (in the form of 'other financial institutions') in 2014.

## Shadow Banking

The Financial Stability Board (FSB) has described the shadow banking system in broad terms as 'credit intermediation involving entities and activities *outside of the regular banking system* (emphasis added)'. While noting that intermediating credit through non-bank channels can have important *advantages* and contribute to the financing of the real economy, the Board also cautions that such channels can become a source of systemic *risk*, especially when they are structured to perform bank-like functions (e.g. maturity and liquidity transformation, and leverage) and when their interconnectedness with the regular banking system is strong.

In the run-up to the Global Financial Crisis, shadow banks had a growing role in turning home mortgages into [securities](#). This started with a mortgage that was bought and sold by one or more financial entities until it ended up as part of a package of mortgage loans used to back a security that was sold to investors. The value of the security was related to the value of the mortgage loans in the package, and the interest on a mortgage-backed security was paid from the interest and principal paid by home owners on their mortgage loans. From creation of the mortgage to sale of the security, almost every step in this chain was outside the direct view of regulators.

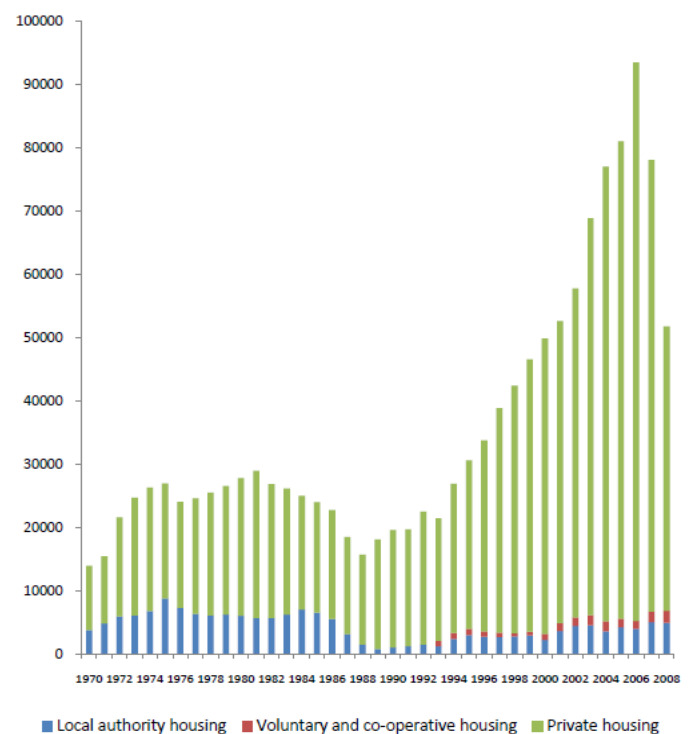
While this was not, in itself, inherently wrong, problems arose when investors grew nervous about what the longer-term assets were really worth and withdrew their funds. In order to repay investors, shadow banks had to sell assets, reducing their value and forcing other shadow banks (and some regulated banks) with similar assets to reduce the value of those assets on their books. At the peak of the crisis, so many investors withdrew their funds that many financial institutions (both banks and non-banks) ran into serious difficulty. (For a fuller analysis see [What is shadow banking?](#))

*In its 2015 monitoring report, the FSB notes that some authorities and market participants prefer to use other terms such as "market-based financing" instead of "shadow banking". The use of the term "shadow banking" is not intended to cast a pejorative tone on this system of credit intermediation. However, the FSB uses the term "shadow banking" as it is the most commonly employed and, in particular, has been used in G20 communications.*

The strong flow of capital into the Irish housing market had resulted in a surge in output; around 480,300 housing units were built in Ireland in the six years to 2006, representing more than one quarter (26%) of the estimated total housing stock at that time. During this period, completions increased from around 50,000 in 2000 (already around twice the long-run average since 1970) to a peak of over 93,000 in 2006 (Figure 3).

House price inflation followed a similar pattern; average prices increased rapidly across all regions, reaching a peak of around €500,000 in some parts of Dublin in 2006/07, and rising price levels encouraged the growth in output – until the global financial crisis and associated 'credit crunch' saw capital 'go on strike' from the built environment. House prices declined substantially between 2007 and 2009, as did the level of housing output, while from 2009 onwards the level of mortgage arrears in Ireland increased sharply (and at a much greater rate than other EU states), with a very significant impact on household liabilities. By 2013, the number of housing completions had fallen by 91% from the 2006 peak.

Figure 3: Housing output by tenure, RoI, 1970-2008



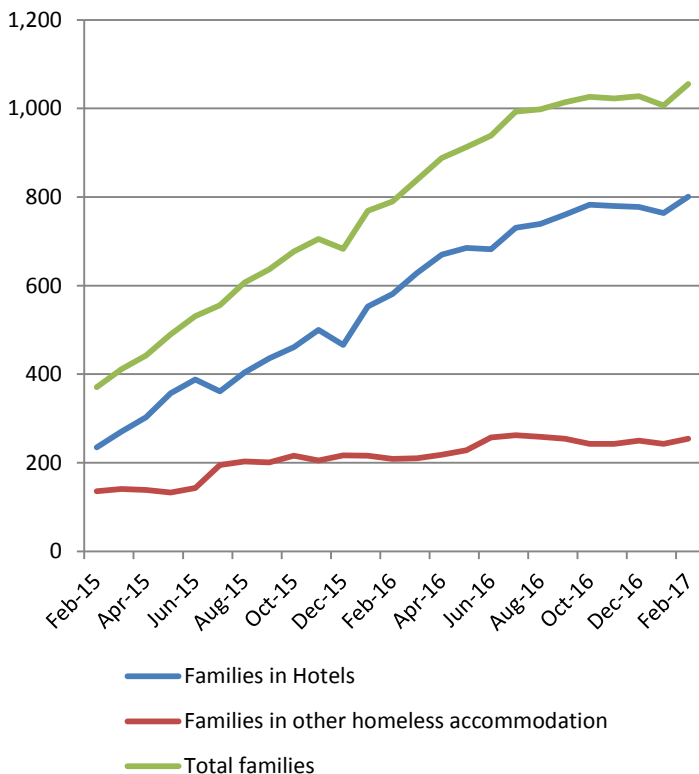
In more recent years, however, asset price inflation has again become evident in Dublin’s regional housing sub-markets. In combination with newly-introduced macro-prudential constraints on mortgage finance lending, house price increases have reduced the affordability of entry to owner occupation, resulting in a substantial and ongoing transfer of demand to private rental housing, and a rapid decline in rental affordability, since 2013. This rent inflation has spread into segments previously occupied mainly by lower income and precarious renter households dependent on state support, with the consequence that growing numbers of renter households – particularly families – are experiencing housing exclusion and homelessness.

### Informing the policy response

In this context, with supply shortages, contested claims about the level of housing output and debates around vacancy and under-occupancy in the existing housing stock, policy makers face a number of challenges including the rising private sector rent levels and rising levels of homelessness. Dr Downey noted that data-mapping has helped build a clearer picture of the dynamics of the housing market, particularly in Dublin region, where the proportion of households renting privately increased from 19% to 32% between 2006 and 2011 and the level of owner occupation decreased. In a tight market, a rising proportion of the properties in the private rented sector have been used to support social housing need through the Rent Supplement scheme and, since 2014, through Housing Assistance Payment (HAP; see box below).

At the same time, the Republic of Ireland has been experiencing an unprecedented homelessness crisis, with 74% of the homeless population located in Dublin at December 2016 and steady increases in the number of families living in emergency accommodation – particularly hotels – in Dublin region since 2015 (Figure 4). It is difficult to manage such high levels of stress, in terms of both the damage to homeless individuals and families whose lives are disrupted by the instability of not having appropriate accommodation, and the cost to the public purse of providing emergency arrangements.

Figure 4: Families in emergency accommodation in Dublin Region



### Rent Supplement and Housing Assistance Payment (HAP)

[Rent Supplement](#) has been paid to people living in private rented accommodation who cannot provide for the cost of their accommodation from their own resources. In general, households qualified for Rent Supplement if their only income was a social welfare payment, and they met other eligibility rules.

In July 2013, the Irish Government approved the introduction of the [Housing Assistance Payment \(HAP\)](#), ‘a form of social housing support for people who have a long-term housing need’, which will replace long-term Rent Supplement. The HAP scheme aims to allow all social housing supports to be accessed through the local authority and to enable people to take up full-time employment and keep their housing support. To be eligible for HAP, households must be on the local authority’s housing list.

Under the scheme, households must find their own private rented accommodation and pay a weekly HAP rent contribution to the local authority, which in turn pays the landlord directly. In general, the rent must be within the prescribed HAP rent limits for the household size and the area. However, flexibility of up to 20% may be provided, on a case-by-case basis, where a household cannot find suitable accommodation within these limits. There is also specific flexibility, on a case-by-case basis, for eligible homeless households in the Dublin region. HAP has been rolled out gradually and, from 1 March 2017, is available in all local authority areas.

In the period to 2021, it is anticipated that a substantial proportion of ‘social housing’ provision will be through the HAP scheme, with a total of almost 84,000 HAP tenancies (including transfer from Rent Supplement) projected between 2016 and 2021 and 47,000 social dwellings to be provided through construction, acquisition or leasing over the same period. At October 2016, around two fifths (42%; 20,840) of the households still in receipt of Rent Supplement were living in the Dublin region and, of these, more than 2,400 had been awarded a Rent Supplement uplift because they had been assessed as being at risk of homelessness. Given that the private rented sector has a dual role as both one of the *challenges* in the wider housing market (in terms of rental affordability) and a potential *solution* to housing need (through Rent Supplement and the Housing Assistance Payment), it is therefore important to have a clear understanding of the dynamics within the sector and the possible consequences of various policy approaches.

Dublin City Council uses a GIS-based housing monitoring tool to analyse key data including information on Rent Supplement and rental asking prices across the Dublin region. In this way, the Council can track changes in different parts of the region using indicators such as:

- the number of households receiving Rent Supplement;
- total expenditure on Rent Supplement and average payment per recipient;
- breakdown of claimants by age group and duration of claim;
- average rental asking price by size of property; and
- changes in the average rental asking price over a specified time period.

In three case study areas within Dublin Region (Blanchardstown, Clondalkin and Tallaght), the average rental asking price for a three bedroom house increased by more than 50% between 2011 and 2016; this increase in rental prices was driven by lack of supply of private and social housing units, which has left low income families particularly vulnerable to becoming homeless. The local level data available through this form of analysis enables a targeted response to homeless prevention and intervention in local areas; thus, for example, rent supplement limits in Dublin were increased by 29% in July 2016.

With clear evidence that the inter-tenural dynamics of housing exclusion in Dublin’s metropolitan housing market are broadening the experience of housing exclusion and homelessness, Dr Downey concluded by noting that the Council also plans to use housing intelligence and data mapping to monitor changes in residential use and costs, and develop a local area Housing Stress Index to measure affordability.

## Discussion

A number of points were raised during subsequent questions and discussion.

- It is not uncommon for households in Dublin to act as landlords on a property they own while renting a cheaper property to live in. Many households living in the private rented sector are very vulnerable, as are many landlords; both tenants and landlords would be **vulnerable to shocks** and there are instances where buy-to-let landlords are in extensive forbearance with lenders, and distressed landlords are being pressured to sell their properties.
- The parts of the country where rents are highest and rising and where households have greatest difficulties in finding accommodation they can afford have recently been designated as [Rent Pressure Zones](#). Rents in these areas can only rise according to a prescribed formula by a maximum of 4% annually. The measure was first introduced in Dublin and Cork city, but was extended to a number of other areas across the Republic of Ireland from late January 2017. There has been some scepticism as to whether this move will have any significant impact, and whether it can be enforced.

- As in Northern Ireland, there are differing views in the Republic of Ireland on the actual number of **vacant properties** and what policy approach, if any, should be adopted on this issue. The results of the (Irish) [2016 Census](#) will be very important in gaining an up-to-date picture of residential vacancy rates. One of the main difficulties is that many of the empty homes are in rural areas, and supply and demand are therefore not easily matched. Some of the formerly-vacant apartment blocks in the Dublin region have now been acquired, but will be privately rented and are unlikely to meet the need for *affordable* accommodation. Councils in England have adopted various measures to address the problem of 'invest to leave', including increased Council Tax levies; while some stakeholders have expressed concern that this might discourage 'investment' in localities, in some cases property owners have simply been willing to pay the additional tax, and thus the property remains empty. It is possible to distinguish between what could be termed 'benign' and 'exploitative' vacancy; particularly in the social sector, it may at times be necessary to keep properties empty for specific purposes such as decanting.
- It was noted that [Spatial NI](#) is the key Northern Ireland portal for Geographic Information. The portal was initially developed by Land & Property Services (LPS) in order to comply with the EU INSPIRE Directive and allow ease of access to LPS base mapping and NI Geographic Information for the public sector and the general public. Spatial NI has been designed so that it can be used by both technical and non-technical users who wish to avail of the full potential of Geographic Information within their own business areas. Some of the key features of Spatial NI are that:
  - it is a central location for the majority of NI's public sector location datasets;
  - its maps are the most up-to-date and accurate for Northern Ireland; and
  - it enables maps to be displayed on mobile devices.

## Other recent research findings

### 2016 Northern Ireland House Condition Survey: Preliminary Report

The Northern Ireland Housing Executive has a statutory responsibility to carry out regular House Condition Surveys, which examine the condition and energy efficiency of homes in the owner occupied, private rented and social sectors. The results are used to guide priorities for housing expenditure and the most recent survey – the first since 2011 – was carried out in 2016.

The [Preliminary Report](#) on the 2016 survey, which sets out findings at Northern Ireland level on tenure, dwelling age, dwelling location and dwelling unfitness, was published in late March 2017 and indicated that there had been little change in the tenure breakdown of the Northern Ireland dwelling stock since 2011. As can be seen from Table 1, the main change between 2011 and 2016 was a fall in the number and proportion of vacant properties. This may be linked to a decrease in the overall stock level during the period, which is partly the result of quality assurance work to remove non-domestic and non-eligible properties from the domestic address database from which the sample was drawn (for more information see the full preliminary report).

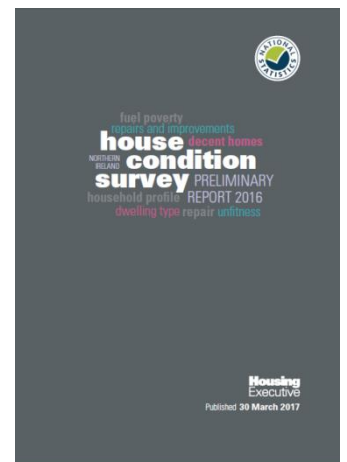


Table 1: Housing stock by tenure, 2006-2016

	2006		2009		2011		2016	
	No.	%	No.	%	No.	%	No.	%
Owner Occupied	468,900	66.5	461,800	62.4	469,100	61.7	464,740	62.8
Private Rented and Others	80,900	11.5	124,600	16.8	125,500	16.5	128,120	17.3
Housing Executive	93,400	13.3	85,650	11.6	85,900	11.3	85,570	11.6
Housing Association	21,500	3.1	24,550	3.3	24,800	3.3	34,650	4.7
Vacant	40,300	5.7	43,400	5.9	54,700	7.2	26,920	3.6
<b>Total</b>	<b>705,000</b>	<b>100.0</b>	<b>740,000</b>	<b>100.0</b>	<b>760,000</b>	<b>100.0</b>	<b>740,000</b>	<b>100.0</b>



## The Efficiency and Effectiveness of the Housing First Support Service piloted by DePaul in Belfast

'Housing First' is a tried and tested approach to providing permanent housing for homeless people, who are dependent on alcohol and drugs, or who have mental health issues, with the support, social care and health services they need provided to them in their own homes or locally in their community. The intention is that housing should be available even if a homeless person refuses treatment for their substance misuse or mental health issues. [Depaul](#) has been providing a Housing First service – funded through the Supporting People programme – in Belfast since 2013. The Housing Executive commissioned an evaluation to calculate the Social Return on the Investment (SROI) from the Supporting People programme and from Depaul in the Housing First service (based on 2014), comparing this with costs in other accommodation-based and floating support services for homelessness people in Northern Ireland.

Some of the main findings of the [evaluation](#) were that:

- the cost of the Housing First service per service user per week in 2014 was more expensive than some other *floating support* services intended for this client group, but not all of them;
- in comparison with the cost of *accommodation-based* services into which vulnerable homeless people would normally be allocated accommodation, and given the outcomes achieved by Housing First in comparison with most accommodation-based services, the Housing First service appears to represent good value for money;
- of the 24 service users during the period of the evaluation, 79% were still in their tenancy at the end of the year. The same proportion reported having improved self care and living skills, self confidence and motivation, and better use of time, and 63% had significantly or moderately reduced their use of alcohol and drugs; and
- the social return ratio for the analysis was 15.06:1; i.e. for every pound invested by the Housing Executive and Depaul in the Housing First service in Belfast during 2014, a social value of £15.06 was created.

## House Price Index

The most recent [Quarterly House Price Index](#) report was published by Ulster University in association with the Housing Executive and Progressive Building Society in February 2017 and indicated that the average price of homes in Northern Ireland during the final quarter of 2016 was £150,778. After a period of growth during the second and third quarters of the year, this fourth quarter average represented the first annual weighted price decrease (-1.3%) since the final quarter of 2013, as well as a weighted fall of 2.6% by comparison with the previous quarter. However, despite some variation between quarters, the overall average price during 2016 (£154,028) was higher than in 2015 (£149,449), continuing the trend of more gradual and sustainable house price growth that has emerged since the housing market bottomed out in 2013.

## Insight themes

Quality services

Better homes

Transforming lives

Identifying housing requirements

Sustainable neighbourhoods

Innovation and international good practice

## Organisations represented at the GIS and Housing Insight exchange included:

All Island Research Observatory	Housing Executive
CIH	Housing Rights
Clanmil	ICLRD
Co-Ownership	LPS
Department for Communities	NHBC
Disability Action	NIFHA
Dublin City Council	NI Water
Dublin Region Homeless Executive	Queen's University
ESRI Ireland	RF Associates
First Housing	Supporting Communities
First Trust	Ulster University

If you would like to attend future *Insight* events, or have any comments or questions about the Housing Executive's research programme, you can contact us on 02895 982562 or [research.bulletin@nihe.gov.uk](mailto:research.bulletin@nihe.gov.uk)