

Identifying Barriers to Compact Urban Growth in the Irish Housing Sector: Insights from Industry Experts

Rola Abu Hilal¹, Gillian Brady², Philip Crowe¹, Brian Crowley³

¹ University College Dublin

² Atlantic Technological University, Sligo

³ Irish Green Building Council

rola.abuhilal@ucd.ie

gillianbrady@gmail.com

philip.crowe@ucd.ie

brian@igbc.ie

Abstract

Low-rise, low-density housing continues to dominate Ireland's housing sector, despite policy ambitions and climate targets that promote compact urban growth (CUG). This study investigates the persistent gap between national planning goals and actual housing delivery. Using a qualitative approach, semi-structured interviews were conducted with developers, architects, and housing experts to examine barriers to implementing CUG. Key themes that emerged include typology viability, embodied carbon, and future housing trajectories. Findings highlight regulatory constraints, car-centric planning practices, and market preferences for low-density housing as key barriers. These insights reveal a critical misalignment between policy and practice, offering a foundation for more targeted interventions to support sustainable, low-rise, medium-density housing in Ireland.

Keywords: Compact urban growth, housing delivery, planning barriers, embodied carbon, Ireland

Introduction

Ireland is experiencing an ongoing housing crisis (Ibec, 2023), with a system that fails to meet the needs of its growing population. Despite sustained policy efforts, housing output continues to lag behind demographic demand (OECD, 2025). In 2022, Ireland's population surpassed five million for the first time since 1851 and is projected to reach seven million by 2057 (Central Statistics Office, 2022). National policy currently targets the delivery of 33,000 new homes annually over the next decade, though recent analysis suggests that this figure may need to rise (The Housing Commission, 2024). However, if these dwellings are provided using a 'business as usual' approach to embodied carbon and a 'target achieved' operational carbon reduction scenario, Ireland will fail to reach its carbon targets (O'Hegarty & Kinnane, 2023).

Currently, the most delivered housing typology is low-rise, low-density, often located on greenfield sites on the edge of urban areas (SCSI, 2023). This model generates roughly 30% more embodied carbon per unit compared to infill alternatives, due to the additional infrastructure required (Brady et al., 2024). Shifting toward low-rise, medium-density infill housing could significantly reduce emissions while making more efficient use of land (Brady et al., 2024).

Irish government policy strongly supports compact urban growth. The *National Planning Framework 2040* prioritises high-quality urban places and compact settlement, with 'Compact Growth' as the lead objective in the *National Development Plan 2021–2030*. Action 16 of *Town Centre First* promotes local TCF Plans aligned with this approach. The Sustainable Residential Development and Compact Settlements (SCSG): Guidelines for Planning Authorities (DHLGH, 2024) further support CUG through changes such as reduced back-to-back distances and lower parking requirements near public transport. Yet in practice, compact housing delivery remains limited: in 2022, 64% of homes were detached or semi-detached, while terraced homes—aligned with compact forms—accounted for just 19% (Central Statistics Office, 2022).

These patterns reflect Ireland's history of dispersed, low-density urban development (McCafferty, 2019), marked by segregated land use, car dependency, and weak coordination between housing, transport, and planning (McCafferty, 2019; O'Driscoll et al., 2023). Despite policy commitments, spatial practices shaped by historic norms and infrastructure continue to dominate (Rau, 2009).

This paper examines the barriers to implementing compact, low-rise, high-density housing in Ireland. Interviewees were asked to identify current obstacles to delivering such housing, defined here as approximately 80 dwellings per hectare over four storeys on appropriate sites (RIAI, 2022). Drawing on semi-structured interviews with planners, policymakers, developers, architects, and housing experts, the study highlights the regulatory, institutional, and market challenges that constrain delivery. It offers a practice-based, multi-stakeholder perspective that contributes to ongoing debates on sustainable urban development and climate-responsive housing.

Literature Review

Defining Compact Urban Growth

The OECD (2012) frames CUG as a model that promotes efficient land use while reducing energy consumption and car dependency. In the Irish context, the Royal Institute of the Architects of Ireland (RIAI) defines compact urban growth as a strategic approach to urban development that prioritises building within existing cities and towns, rather than expanding into low-density greenfield areas. This concept focuses on optimising land use, enhancing sustainability, and improving the quality of life for residents (RIAI, 2020).

Complementing this, the *Sustainable and Compact Settlements Guidelines for Planning Authorities* (2024) frame compact growth as a key policy objective aligned with the National Planning Framework. The guidelines aim to accommodate 50% of housing growth within the existing built-up footprint of Ireland's five main cities, and 30% in other settlements, primarily through infill and brownfield redevelopment. This supports the creation of integrated, connected, and liveable urban environments that efficiently utilise existing infrastructure and contribute to national climate (DHLGH, 2024). To facilitate this, the RIAI promotes a low-rise medium-density housing typology, defined as own-door homes delivered at densities of 35–80 dwellings per hectare, which supports sustainable urban consolidation while maintaining compatibility with existing suburban contexts (RIAI, 2022).

Impacts of Compact Urban Growth

Empirical studies demonstrate clear environmental and energy-related benefits of compact urban forms. Zeng et al. (2022) show that compact growth significantly reduces carbon emissions by clustering development near services and infrastructure. Gaur et al. (2024) reinforce these findings in the Irish context, noting that dense urban areas exhibit lower energy demands due to reduced reliance on private vehicles and individual heating systems. Literature also supports a correlation between increased building height and lower embodied carbon. Drewniok et al. (2022) found that buildings with 4–6 storeys strike the optimal balance in terms of material efficiency and embodied emissions. Increasing urban density can further support sustainable development by reducing travel needs, enabling resource efficiency, and preserving land for agriculture.

Studies across major European cities, including London, Paris, Berlin and Istanbul, confirm that compact or taller residential buildings consume less energy than low-density, detached housing forms (Ding et al., 2022; Iddon & Firth, 2013). In Chinese cities, Ding et al. (2022) show a similar trend, with CO₂ emissions decreasing in compact urban configurations, though moderated by specific density thresholds. Iddon & Firth (2013) also highlight that apartment buildings tend to have lower operational energy use, particularly in temperate climates, while detached homes offer better potential for renewable energy integration in warmer regions.

Compactness also supports shared infrastructure, reduces land take, and facilitates more efficient public transport (Ding et al., 2022; Iddon & Firth, 2013). Beyond environmental performance, compact urban growth can deliver social benefits such as improved access to amenities, equitable transit, and more inclusive communities (Ahlfeldt et al., 2018; Burton, 2001). These benefits, however, are contingent on high-quality spatial design and governance. Anderson (2015) shows that shared outdoor spaces can significantly enhance community interaction and liveability, provided they are thoughtfully integrated.

Economically, compact urban development supports productivity through agglomeration effects and reduces infrastructure costs. Research by Glaeser and Resseger (2010) and Litman (2015) shows that mixed-use, high-density environments increase land value, commercial activity, and tax revenue. In the Irish context, Wall & Crowe (2024) find that centrally located coworking spaces in compact towns stimulate local economies by boosting footfall and supporting service-based businesses, reinforcing the broader economic value of compact urban growth.

Barriers to Implementing Compact Urban Growth

While the benefits of CUG are well established, its implementation is consistently challenged by institutional, regulatory, and market constraints. Zu Ermgassen et al. (2022) warn that without a shift away from low-density development, emissions targets will remain out of reach. Barriers such as restrictive zoning, high land prices, and fragmented governance continue to favour suburban expansion, even where policy supports more compact forms (Farris, 2001; Rode, 2018).

Developers face increased costs and unclear sustainability expectations, while planning systems often prioritise high-rise, small-unit models over diverse, medium-density formats (Candel & Törnå, 2022; Parker et al., 2023). Suburban aspirations, outdated tools, and undervaluation of compact housing further reinforce low-density (Gilbert et al., 2020; Haarhoff et al., 2013). Suggested responses include zoning reform, pilot projects, and cross-sector collaboration to enable more responsive and viable housing strategies (Parker et al., 2023).

Parker et al. (2023), examining the case of Ontario, show that even where demand for mid-density, family-oriented housing exists, entrenched development practices and investor preferences sustain a high-rise-dominated model. Their findings highlight how institutional inertia and market logic can override both policy intentions and public needs. This evidence supports growing calls for more grounded, stakeholder-focused approaches to planning reform.

Despite strong policy backing for compact growth in Ireland, there is a notable gap in research on how those delivering housing experience its barriers. Most existing literature emphasises policy or spatial modelling, offering limited insight into real-world implementation. This study addresses that gap by exploring how planners, developers, architects, and policymakers in Ireland perceive and navigate the practical challenges to delivering compact, low-rise, medium-density housing.

Materials & Methods

Qualitative Research

This research employed a qualitative methodology, using semi-structured interviews to explore the research questions in depth. Semi-structured interviews occupy a middle ground between structured and unstructured formats, combining a predetermined set of questions with the flexibility to explore emerging themes based on participant responses (Robson & McCartan, 2016).

Study Design & Participants

Primary data was collected through ten semi-structured interviews carried out in May and June 2023. Interviewees included five home builder developers (private and semi-state), one approved housing body, two architecture practices, one estate agency and one quantity surveying practice. Participants were selected based on their membership of the Irish Green Building Council (IGBC) and Construct Innovate (CI), along with their experience in the delivery of housing at scale in Ireland (>100 unit developments). A full list of interviewees can be seen in Table 1.

All conversations were carried out online and lasted approximately 1 hour. They were recorded to enable verbatim transcription, and each participant was allocated a pseudonym. An academic peer review was carried out in advance to ensure ethical compliance.

Table 1: A List of Study Interviewees

Position	Type of Organisation
Quantity Surveyor, Director	Quantity Surveying Practice
Architect, Urban Design Team	Architecture Practice
Architect, Director	Architecture Practice
Head of Sustainability	National Developer
Managing Director	Estate Agent Company
Head of Design	Approved Housing Body
Architect, Director	Architecture Practice
Planner	National Developer
Architect, Design Manager	Semi-State Developer
Director of Design	National Developer

Interview Structure

To explore contemporary challenges in delivering compact urban growth in Ireland, a series of semi-structured interviews were conducted with housing industry professionals. The purpose of the interviews was to investigate three core themes: the viability of different housing typologies, strategies to reduce embodied carbon, and anticipated future trends in housing delivery. These themes were selected to align with national policy priorities and to understand practical barriers and opportunities from the perspective of practitioners.

A common set of guiding questions was developed (see Table 2), with additional prompts available to expand on specific responses. Each session began with a brief introduction to the research project and the interview team (a lead and a supporting interviewer), followed by a short self-introduction from the interviewee. This approach ensured consistency while allowing for flexibility to follow emerging insights in real time.

Table 2: Interview questions

Viability

1. What type(s) of housing developments do you find viable to build in Ireland within the regulations and density guidelines at present?

Barriers

2. What are the current barriers to building low-rise, medium-density housing of circa 80 dwellings per hectare over 4 storeys on these sites?

Embodied Carbon

3. Who is measuring carbon in the housing development industry at present in Ireland?
4. How can embodied carbon be reduced in the construction of housing developments in Ireland?
5. Are home-buyers concerned about carbon and/or Building Energy Rating (BER)?

The Future

6. How do you see these housing developments evolving by 2030?

Results

Interview Results & Discussion

This section presents the results of the interview process, followed by a discussion of key findings and methodological limitations. Interviews were conducted via Zoom and transcribed using Otter.ai. The transcripts were then imported into NVivo for coding and thematic analysis. The discussion is organised around the key themes that emerged during this process and is supported by direct quotations from participants. Particular emphasis is placed on Question 1, due to the strength and relevance of the responses it generated.

Part 1: Viability

The first question asked of participants was what type(s) of housing developments they find most viable to build in Ireland within the regulations and density guidelines at present? Nine out of ten respondents stated that single-family dwellings in semi-detached or terraced format on greenfield sites at a density of 30-40 dwellings per hectare (dph) are most viable.

Architect 1 stated, *"The developer's answer to this is going to be houses, houses all day long. They can be built in a timber frame system, can be rolled out quickly, can be completed in phases and sizes that suit them; they can sell them incrementally, which works with their funding model."*

Developer 5 echoed this sentiment, *"In an ideal world for us, it would be housing, pure traditional terraced housing... at the moment, because of interest rates and all the rest, the only thing that's viable is owner-occupied housing. Duplexes or apartments just aren't viable for the private market."*

However, in order to achieve densities dictated by policy, higher-density models are also built as part of these developments. Two of the nine noted that, given the availability of the State as a buyer, these higher-density models are equally viable at present.

Developer 2 noted, *"In terms of low density, [we've] no issue selling privately all day long but having said that, there are other routes to market, which are available at the moment, which means that the high density schemes are perfectly viable in the current political or economic climate...."*

What we're seeing now is that entire schemes or certainly entire blocks will be purchased by either the LDA [Land Development Agency] or an AHB [Approved Housing Body]."

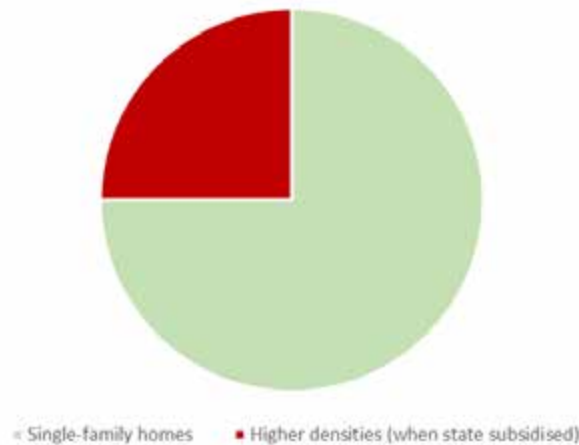


Figure 1: Industry Expert Responses to the Question: "What Is Currently Viable?"

Barriers

Interviewees were asked to identify the current barriers to delivering low-rise, medium-density housing, defined here as approximately 80 dwellings per hectare across four storeys on suitable sites. The two most commonly cited challenges were the difficulty of accommodating car-related infrastructure in line with stakeholder expectations identified earlier, and the increased costs associated with additional regulatory requirements. One underlying tension relates to the application of the Design Manual for Urban Roads and Streets (DMURS) — a national guidance document first published in 2013 and updated in 2019, which promotes street design that prioritises pedestrians, cyclists, and public transport within compact, walkable neighbourhoods (Government of Ireland, 2019). While DMURS supports reduced car dominance in urban areas, its principles are not always fully reflected in practice, where conventional standards around car access and parking continue to shape development layouts. This can limit the feasibility of delivering denser, low-rise housing formats on available urban sites.

Car-Related Infrastructure

The provision of, on average, two parking spaces per dwelling and associated roads limit achievable density. The reasons referenced for providing this quantum of parking, however, varied across interviewees; some attributed the issue to local authority requirements, while others related it to market preferences.

According to Architect 1, "developers are very comfortable in the shared surface space and with DMURS and the reduction of the percentage of site that is occupied by road infrastructure." Said architect noted the conflict between "many development plan standards and DMURS and the conservative attitude of particularly the engineering departments within those local authorities".

This sentiment was echoed by Developer 5, who stated, "Notwithstanding official policy, a lot of local authorities will still look for two parking spaces per house. We can live with one parking space per unit, but a lot of the time, they're looking for two. The planners will never override the role of engineers. The road engineers are still kind of the kings."

Similarly, AHB1 noted a "pushback from local authorities" with regard to a reduction in the quantum of parking. Developer 1 stated, "DMURS makes much more sense than the way we're forced to build roads around these estates. They are still predominantly car-focused rather than people." One particular local authority dictates that houses are only built upon one side of a road: "One of the issues we have from a density point of view is the requirement for roads that only have houses on one side."

On the contrary, several interviewees stated that market preferences are the driver behind the quantum and type of car parking provided.

Developer 2 noted, *"Generally, we put a relatively high figure against the parking."* For example, in relation to Strategic Development Zones where there is a cap on parking, they stated that their *"marketing team are having to work hard to get their heads around how we sell something which doesn't have a dedicated parking space with it."*

Meanwhile, Architect 1 relayed anecdotal evidence from a homebuyer: *"If I can't see the headlights of my car from the sitting room, I don't want the unit."* However, it was added that this attitude is changing in well-connected locations.

Similarly, Estate Agent 1 noted that attitudes are changing within the market. *"The last six months have been transformative in terms of how people think around sustainability and their footprint. Last October [2022], nearly every other sale was cancelled because people were saying 'we can't just deal with one car space', but there's an awareness now that it's the right thing to do, so it's less of an issue."* They also noted that *"Car charging is a much bigger issue now, so if you've off-curtilage parking, how do you charge your car?"*

Developer 3 described how these two issues of local authority requirements and market preferences are linked. *"The local authorities can say no. Fingal now wants 0.5 space for a 2-bed house. Now, that's all very well, in principle, but people are still going to buy two cars or at least a car, so it's going to be abandoned on the street, so your streetscape is going to be dire, there's no way of controlling that. Unless it's infrastructure-led, it just won't work."*

Costs

Respondents stated that higher density typologies (including duplexes and apartments) cost more to construct than houses and sell for less.

Developer 3 described the situation: *"A 2-bed apartment costs twice as much to build as a 2-bed house. A 2-bed apartment on average will cost €400,000 plus to build, a 2-bed house would be around €200,000/220,000."*

Estate Agent 1 echoed this sentiment: *"Typically, the guidance we're getting is that the duplex construction cost is somewhere between an apartment and a house. Then depending on where the policy supports are, the duplex will trade below a house"*.

Developer 2 noted, *"If we had our way, we probably wouldn't want to build duplex blocks. They have a lower value than a house, and they're more complicated to build, so therefore, the return on them is lower than on the house."* The key factors contributing to the higher construction cost for denser typologies are outlined below in order of frequency mentioned.

a) **Building regulations/Technical Guidance Documents (TGD)**

According to respondents, when units are stacked to increase density, compliance with the building regulations becomes more complex. For example, accessibility requirements (TGD M) mean larger staircases and the introduction of lifts, while additional fireproofing between dwellings dictates a change to floor build-ups (TGD B).

Developer 2 stated, *"The regulations will dictate that we deliver a really high quality product. It makes them very expensive to build, and there's no getting away from that. If you had a four storey walk-up and you didn't have to put in lifts and so on and so forth, is that going to bring the price down? Yes, of course it is."*

Architect 2 backed this up *"What we're advocating for is that we make allowances to keep the existing provisions of Part M, to allow a duplex with an apartment on top or an apartment on the bottom with a duplex on top or duplexes stacked and also allow up to four floors with a Part M residential type staircase in the centre, which allows you to go 1800mm between breaks of landings, with two apartments per floor. That would really open up a much more economical way of doing housing with a provision to put a lift in at a later date if required."*

Architect 1 noted, albeit with an acknowledgement of the importance of the regulations, *"Over the last 10 years, nearly every aspect of the Building Regulations has become more onerous... the cumulative effect of all those things does make things more expensive. What would be useful is if there were percentages where there could be latitude. If you had, for example, 20% of units in a scheme that had a lower level of Part M accessibility, you will begin to see a different pattern emerging."*

The method of construction for houses is familiar and quick. Much of the construction can take place off-site and is not reliant on specialist subcontractors or external design teams. Many respondents noted complexities associated with achieving compliance with TGDs when constructing duplexes and apartments using a timber frame system but stated that they are currently trialling solutions.

Developer 5 stated: *"Traditionally, for housing for a long time, we've been doing timber frame, but that's more of a cost decision rather than a green decision....I think it's challenging to do duplexes with timber frames. If we could do three and four-storey buildings in timber frame, I think that'd be a useful thing."*

Developer 2 stated, *"We have trialled a model of using a fully timber-framed duplex unit."*

Developer 1 noted, *"We'd like to go down the mass timber route for some of those [higher density schemes], but then we fall into the fire regulation limitations on that. That's something that is definitely holding back that side because we can find a business case for building with mass timber from the cost point of view, but it's something that just isn't as feasible at the moment with those fire regs."*

b) Space standards

Back-to-back distances and garden sizes were noted by 40% of respondents as a barrier to compact urban growth. These interviews occurred during the summer of 2023, in the period when the Sustainable Residential Development and Compact Settlements (SCSG): Guidelines for Planning Authorities (DHLGH, 2024) released in January 2024 remained in draft (known then as the Sustainable Compact Settlement Guidelines). Discussions acknowledge the reductions in garden sizes and back-to-back distances proposed by the draft document.

Developer 4, who had examined the changes proposed by the draft SCSG noted, *"When we looked at it, it resulted in wider houses, your garden is shorter because they've reduced the back to back, but in order to get the minimum area, you end up building wider houses.... You end up losing out in the other dimension in terms of the density."*

Developer 2 noted, *"At the moment, for a house, you have to [have] over 45 square metres of private open space etc. Whereas, for an apartment, you only need 7 square metres of balcony. Is there something that can happen there?"* They also stated the impact of these guidelines on typologies. *"Typically, to get over 35 or 40dph, you would have had to build some duplex blocks. With the compact growth [proposed SCSG guidelines], you may no longer need to build a duplex block; you could potentially do a scheme of all housing, quite compact housing onto a site now, just over 35dph."*

Equally, regarding the internal layout of dwellings (and storage in particular), respondents noted the multiple standards and differing criteria depending upon whether a dwelling is classified as a house or an apartment. For example, as outlined in the *'Design Manual for Quality Housing'* and consistent with the 2022 *'Sustainable Urban Housing: Design Standards for New Apartments, 2022'*, a 3-bed/5P House requires internal storage of 5 square metres while an equivalently sized apartment requires 9 square metres.

As Architect 1 noted, *"If you're providing a three-bedroom duplex, and you have to provide nine metres squared of storage internally within that unit, then it ends up being bigger than a house."*

Developer 3 stated, *"The fact is, we have our minimum house area, but then we have about eight other sub-standards, minimum living room area, minimum living room width, and they don't relate to each other. So to deliver all those sub-standards, we have to inflate our house by 20% above the minimum."*

With regards to apartments, Developer 4 has addressed this issue through the exclusion of en-suites. *"The way the areas have been set for apartments is if you don't have an ensuite, largely they're achievable. If you have an ensuite, it can be quite challenging to get down to the minimum areas."*

c) **Financing**

The manner in which the construction of lower-density houses is financed usually differs from that of multi-unit apartment or duplex developments. Houses can be built in small numbers and sold off incrementally to finance subsequent phases, whereas developers are often reliant on external sources of financing for longer periods of time when constructing higher-density typologies.

When referring to apartment schemes Architect 2 noted, *"All of those schemes depended on international funding, largely because you had to build the entire scheme out, and you have to finish the whole damn thing and pay the interest costs on borrowings etc, until the whole scheme is finished."*

While Developer 3 stated, again with reference to apartment schemes, *"So a lot of developers have to carry or forward fund that for up to two years before you get any profit, whereas, in a housing development, you can subdivide it and release sections."*

With regards to traditional low-density, low-rise houses, QS 1 noted, *"They can build 10, sell 10, build 10, they can self-fund."*

d) **Planning risk**

Due to the lengthy timescales associated with achieving planning permission, respondents were reluctant to take any risks in this area.

Architect 1 stated, *"At the moment, what our clients are saying to us is that it takes them multiple times longer to get planning permission than it does to build something. They can build a scheme in six months or a year, but it might take them two or three years to get to the point where they have planning permission, and that's a real problem."*

Developer 5 reflected this position: *"We know what the mix is, what the market is looking for, we know the local authorities, we have a relationship with individuals within local authorities, and we know what they look for."*

Developer 2 stated, *"We need to have a better agile planning system to give us more transparency in terms of timelines and more guarantees as well."*

Developer 2 noted, *"Do we just stick to what we know? There is a certain element of that, and there is a risk associated with bringing something new to market... It'd be safe to say that we don't take on planning risk very lightly."*

Architect 1 elaborated upon the relevant complexities within the planning system. Although these points were not raised in this manner by others interviewed, it is recognised that they are key regulatory drivers of issues noted by others, and as such, the information is included here.

A recurring theme among interviewees was the disconnect between national policy and local implementation, with local development plans often taking a more conservative stance driven by local objectives. As one interviewee noted, *"One of the benefits of the SHD (Strategic Housing Development) system was that when you were sitting in a tripartite meeting with the board and the Local Authority, the board was very, very clear that national policy was the primary legislation."*

In contrast, planning mechanisms such as Strategic Development Zones (SDZs) were viewed positively by developers for offering greater certainty and predictability in the planning process. One developer observed, *"I think the SDZ might be the favourite form of development model for a lot of developers. It gave them such security, making the planning process timely and predictable."*

Similarly, there was early enthusiasm for Urban Development Zones (UDZs), though some uncertainty remains about their implementation: *"There was genuine excitement from developers when the idea of the UDZ first came out."*

However, uncertainty around the release of updated planning guidance and standards is having a chilling effect on development. Several interviewees described how this lack of clarity is leading developers to delay or scale down projects. As one architect explained, *"Do we not think at scale until such a time as we have a new set of standards and some clarity on what has been achieved before 2030 in terms of sustainability and decarbonising?"* Finally, participants emphasised the need for a more agile mechanism for making small amendments to planning applications, arguing that the current process is overly bureaucratic and time-consuming. As one developer put it, *"So instead of a six-week turnaround on a quick change, which might be the trigger to releasing your project, it just doesn't happen at all because nobody has the appetite to go through that process for small changes."*

e) Market preferences

A reluctance amongst home-buyers to purchase higher density own-door typologies such as duplexes or maisonettes beyond metropolitan centres was stated by almost all respondents as a barrier to compact urban growth. Respondents noted that semi-detached dwellings are seen as 'premium products'; end-of-terrace units sell for more than mid-terrace; and duplex units sell for less than houses. These market preferences influence site layouts and dictate terrace lengths.

Although duplex units or small apartment blocks are built as part of these developments to achieve densities dictated by planning regulations, developers' business model relies upon these units being sold back to the state for use as social and affordable housing due to a lack of appetite within the private market.

Developer 3 described this process: *"At the moment, with the current development standards, own door housing maxes out at about 31 units per hectare, so that falls short of the minimum 35 for Celbridge or Lexlip. You always have to introduce the apartments and duplexes to bring it up. Now, it's alright. We can offload a portion as social housing, but again, there is less demand for that."*

Architect 2 elaborated upon the reason these typologies [duplexes and apartments] are favoured neither by estate agents nor the market. *"There is a predisposition in house builders against duplexes....Estate agents don't like them because basically, you've got quite a nice unit just upstairs, but the problem is you only get balconies, so you've effectively got an apartment over two floors with balcony accommodation."*

Developer 5 stated, *"Traditionally, we haven't liked duplexes, I think largely because the ones that were built in the 90s and the naughties weren't very sophisticated. They were pretty ugly, looking very basic. We steered away from them, but we can't avoid it now. So we are looking at different ways of doing it. We are looking at things like perhaps a shared garden area at the back, rather than traditional back gardens of 60 square metres; that you would have courtyards that would be shared by families. That could address a lot of the bin store and bike store problems...."*

AHB 1 noted issues in accessibility associated with duplex units: *"...the problem with duplexes is my client is very different to what the private sector client is; there might be two or three young kids. If we have a ground floor unit for an elderly person and we have a 2/3 bed duplex above that, I'm asking someone to drag a buggy, or their shopping, up two or three flights of stairs potentially."*

Of the private developer home builders interviewed, all relied upon a combination of in-house team expertise (customer research teams) and Estate Agents' knowledge to inform typologies. Developer 1 described this process, *"I have arguments with them [Estate Agents] about whether we should have heat recovery ventilation in a house. They say oh no, people would prefer an extra toilet."*

While Estate Agent 1 noted the lack of built examples of compact urban growth available to inform home buyers of possibilities. *"We've been advocates of low rise medium density, we've been in Cambridge a couple of times, but we can't bring all the buyers to Cambridge to show them it."*

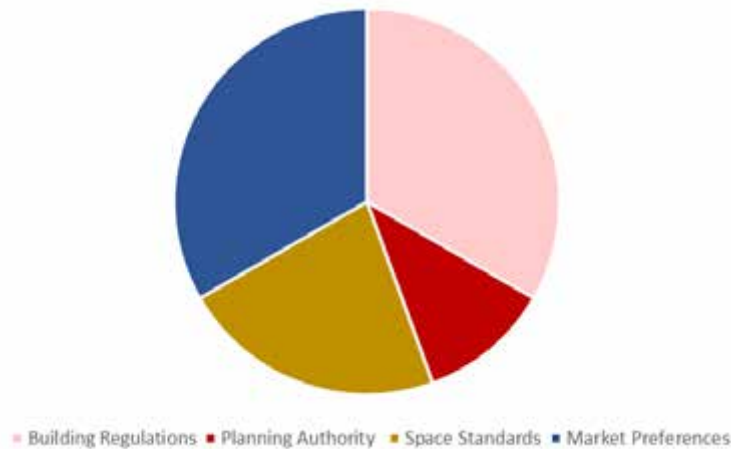


Figure 2: Industry expert responses to the question of what are the barriers to Compact Urban Growth?

Part 2: Embodied carbon

Interviewees were then asked three questions on the extent to which the stages of whole life carbon assessment influence design and construction decisions for these housing developments.

Firstly, when asked "Who is measuring carbon in the housing development industry at present in Ireland?", all developers, both private and public, responded that they are currently calculating the carbon associated with their developments; however, in most cases, this information has not yet started to inform any changes. Of the two architects interviewed, both stated that they are not currently calculating carbon, while the quantity surveyor we spoke to suggested that their profession is best placed to calculate embodied carbon.

Architect 1 referred to a first principles approach: "We smuggled in a lot of thinking around this kind of stuff because it wasn't really on anybody's agenda." They noted, "Developers, from my point of view, are not really there yet. They're not forced to be there. Compliance with all the regulatory regimes is still very much their preoccupation."

Architect 2 stated, "Disappointingly no. We'd love to, but we haven't because we're mostly working in the private sector and haven't been asked to do it."

Developer 4 stated "We're asking our design teams to provide some analysis under embodied and operational carbon. We're still in the data collection stage of it.... we'd obviously see an alignment between reduced carbon and reduced cost in that sense."

QS1 noted, "Last year, we developed a tool to do the upfront embodied carbon calculation...We're now rapidly developing a tool to model the whole life because the conversations have changed so quickly from just the upfront embodied to the whole life assessment. It will be part of our remit, as QSs, anything that needs measuring and quantifying should sit with us."

Secondly, when asked "How can embodied carbon be reduced in the construction of housing developments in Ireland?", the majority of respondents stated that they had not commenced addressing this issue but suggested solutions.

Developer 2 noted, "I think it has to be legislation. If not, carbon tax. That'd be another big stick to threaten people with." Similarly, developer 5 noted, "I think the general assumption is that there's going to be a carbon tax, which is going to impact the cost of concrete. We're trying to move away from concrete."

All developers interviewed stated that they were looking at solutions relating to the embodied carbon of the dwellings alone. Developer 3 noted, "Infrastructure is going to be a challenge because that's where we haemorrhage a lot of our money and a lot of our carbon, below the ground. We're looking at solutions for the house at the

moment but we need to come up with solutions for the infrastructure.... We're focusing on the units themselves and the houses and getting our typologies right so we can enhance our pre-manufacture value on those."

Three out of the four private developers interviewed cited Modern Methods of Construction as a means of reducing carbon associated with these developments. Developer 3 noted, "We are removing the brick outer leaf because it is a high carbon offender. We want to go with a lightweight product" in this with a synthetic product to mimic brick in order to "bring the consumer on the journey."

Architect 1 noted, "Our clients from the private side are more aware of it now, but the decarbonising of transport as a solution is their main interest."

Finally, when asked "Are home-buyers concerned about carbon and/or Building Energy Rating (BER)?", Estate Agent 1 summarised "Of course, we want to buy organic if you could afford it, but if you can't, you can't." implying that a higher cost is associated with a lower carbon home. In terms of their marketing strategy, they noted, "It is less carbon footprint and more around community, diversity and biodiversity. There's a total acknowledgement in terms of the climate crisis, but we're not selling houses on the basis of the climate crisis."

On the matter of BER ratings, Estate Agent 1 discussed the low impact from a cost perspective of different A ratings. "When BER came in, there was a differentiation, and we'd be asked, and we're still asked, the difference between an A3 and an A1 or an A1 and an NZEB. To achieve those levels is really, really hard. It's nice to have, but it doesn't drive the value."

This question was not discussed with other interviewees in any detail; however, developer 3 noted that "millennials are very much invested in sustainable development and a reduction of carbon."

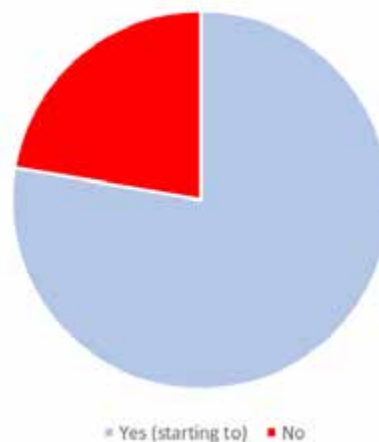


Figure 3: Industry expert responses to whether embodied carbon associated with developments is currently counted?

Part 3: The Future

Respondents were asked how they see these housing developments evolving by 2030.

The use of more modern methods of construction (MMC) was the most noted response to this question. Reasons noted for employing MMC included a diminishing labour force and the streamlining of the construction process. The ability to measure carbon was a secondary benefit of this approach. On MMC, QS 1 stated, "I think the catalyst of carbon, the greater accuracy, and the reduction in waste.... It brings a cost benefit as well because of the efficiency, so it's a win-win. Higher quality, lower carbon, lower cost, quicker. It needs the economies of scale." Developer 4 stated, "We are trying to get our standardisation in place and then the next element of that would be to pursue a lot more MMC, which will hopefully improve the embodied carbon within the projects as well."

Issues with the certification of new materials (such as more natural insulation or alternatives to brick cladding) are limiting options for innovation. Developers 1 and 3 spoke of the lengthy timelines and high costs involved in this process. Developer 1 noted that "The certification process is so slow and so costly, we're looking at 18 months

to get something approved, and then it is going to cost €60-70,000. So people decide to just keep going as we are... it is a big restriction on how much innovation we can actually put into the homes." Likewise, developer 3 stated, "certification could take you three to five years, it's quite constrained at the moment just to get one material certified in Ireland through the NSAI certification process."

Developer 3 also noted the need to increase density. "We need to increase density. At the moment it's 30 to 50, now that's changing to 40 to 80. I'd be cautious about going up to the 80. ... You can't have a low density housing scheme and then a very high density scheme right beside it in an area where there's no public transport." Developer 1 referred to a reduction in dwelling sizes, "It's also about reducing the size of our homes because the size of our homes in Ireland is crazy compared to the rest of Europe. So if we can reduce that, then we're reducing materials but yet giving people the same functionality in the home."

Developer 2 focused on operational carbon, stating that energy efficiency is where they see the largest impact, "the biggest dial turner that I can see now, based on what we know today, is energy efficiency." Developer 5 also noted their attempt at addressing this issue: "We have been unable to do anything in terms of district heating to date, not for the lack of asking the question on our side." Developer 1 noted, "We are definitely looking at more terraced houses because you can have more energy-efficient homes as they don't have as many exposed facades to lose heat through; that's something we're actively looking at."

Key Findings and Their Implications

This study identifies a significant gap between Ireland's policy ambitions for CUG and the realities of housing delivery. Interviewees consistently pointed to low-rise, low-density, single-family homes on greenfield sites as the most viable option under current market and regulatory conditions. This preference is shaped by developers' funding models, construction efficiencies, and market demand for housing types that can be built and sold incrementally. While higher-density models are occasionally feasible, particularly when state bodies act as buyers, these remain exceptions.

Two principal barriers constrain CUG implementation: car-related infrastructure and regulatory costs. Although the DMURS promotes pedestrian-friendly, low-car environments, dominant expectations around car access and parking continue to shape planning and development practices. This car-centric approach inflates land and infrastructure costs, reducing the financial viability of medium-density schemes.

The regulatory environment also poses challenges. High compliance costs and vague sustainability requirements introduce uncertainty for developers. Fragmented governance and institutional inertia further reinforce traditional low-density development, stalling innovation. These findings echo international research pointing to zoning, land costs, and market preferences as persistent obstacles to compact growth.

Broader Context and Contribution

This research offers a grounded, practice-based perspective on sustainable urban development in Ireland. While existing literature outlines the benefits of compact growth, such as reduced emissions, infrastructure efficiency, and improved liveability, this study highlights the enduring gap between policy frameworks and implementation. It reveals how legacy planning practices, car dependency, and market dynamics continue to drive low-density outcomes despite national goals.

Achieving Ireland's housing and climate targets requires more than strategic plans. Addressing practical barriers is essential. This includes reforming parking and road standards to align with DMURS, streamlining regulatory processes, and fostering collaboration across sectors to encourage viable medium-density development.

Limitations

The study's small sample size of ten participants limits the generalisability of findings. Developers made up half the respondents, which may have biased the results. Future research should involve a broader range of stakeholders, including Approved Housing Bodies, planners, architects, and local authority staff. Additionally, the qualitative approach carries the risk of bias, both from interviewees and interviewers, all of whom were trained architects. Despite efforts to maintain neutrality, this shared background may have influenced how responses were interpreted.

Nonetheless, the study provides valuable insight into the barriers to compact urban growth and offers a foundation for further research.

Conclusion

This paper outlines the regulatory, infrastructural, and market challenges that hinder compact urban growth in Ireland. It demonstrates how car-centric planning standards, regulatory complexity, and entrenched preferences for low-density housing continue to shape development patterns, despite policy commitments to more sustainable urban forms.

Although frameworks like the National Planning Framework and Town Centre First advocate compact, climate-responsive development, fragmented governance and policy-practice disconnects impede implementation. Addressing these issues requires coordinated action to reform planning norms, clarify regulatory expectations, and shift market dynamics.

With targeted interventions, Ireland can foster low-rise, medium-density housing that aligns with climate targets and urban liveability goals. Further research should evaluate the impact of recent policy changes, incorporate a wider range of stakeholder views, and examine the long-term implications of CUG strategies to inform evidence-based reforms.

Acknowledgement

This work was funded by the Sustainable Energy Authority of Ireland (SEAI) under the Research, Development and Demonstration (RDD) funding scheme 2022, project number 850. The RE-CUGI (Reducing Emissions through Compact Urban Growth in Ireland) project is a collaboration between University College Dublin (UCD) and the Irish Green Building Council (IGBC).

References

- Ahlfeldt, G., Pietrostefani, E., Schumann, A., & Matsumoto, T. (2018). *Demystifying compact urban growth: Evidence from 300 studies from across the world*. <https://doi.org/10.1787/bbea8b78-en>
- Anderson, J. E., Wulfhorst, G., & Lang, W. (2015). Expanding the use of life-cycle assessment to capture induced impacts in the built environment. *Building and Environment*, 94, 403–416. <https://doi.org/10.1016/j.buildenv.2015.08.008>
- Brady, G., Comerford, P., Reddy, C., Crowe, P., Kinnane, O., Barry, P., Crowley, B., & Varghese, J. (2024). *Viable Homes- Practical guidance for planners and developers on carbon optimisation of housing developments Document Number*. www.constructinnovate.ie
- Burton, E. (2001). *The Compact City and Social Justice*.
- Candel, M., & Törnå, N. (2022). Housing developers' perceived barriers to implementing municipal sustainability requirements in Swedish sustainability-profiled districts. *Journal of Housing and the Built Environment*, 37(4), 1693–1721. <https://doi.org/10.1007/s10901-021-09923-z>
- Central Statistics Office. (2022). *CSO Census Data*. <https://www.cso.ie/en/census/censusinteractivemaps/>
- Ding, G., Guo, J., Pueppke, S. G., Yi, J., Ou, M., Ou, W., & Tao, Y. (2022). The influence of urban form compactness on CO2 emissions and its threshold effect: Evidence from cities in China. *Journal of Environmental Management*, 322. <https://doi.org/10.1016/j.jenvman.2022.116032>
- Farris, J. T. (2001). The barriers to using urban infill development to achieve smart growth. *Housing Policy Debate*, 12(1), 1–30. <https://doi.org/10.1080/10511482.2001.9521395>
- Gaur, A., McGuire, J., O'Riordan, V., Curtis, J., & Daly, H. (2024). Dispersed settlement patterns can hinder the net-zero transition: Evidence from Ireland. *Energy Strategy Reviews*, 51. <https://doi.org/10.1016/j.esr.2024.101296>

Gilbert, C., Rowley, S., Gurran, N., Leishman, C., Mouritz, M., Raynor, K., & Cornell, C. (2020). Urban regulation and diverse housing supply: An investigative panel. In *AHURI Final Report* (Issue 349, pp. 1–96). Australian Housing and Urban Research Institute. <https://doi.org/10.18408/AHURI7321501>

Glaeser, E. L., & Resseger, M. G. (2010). The complementarity between cities and skills. *Journal of Regional Science*, 50(1), 221–244. <https://doi.org/10.1111/j.1467-9787.2009.00635.x>

Government of Ireland. (2019). *Design Manual for Urban Roads and Streets (DMURS)*.

Haarhoff, E., Beattie, L., Dixon, J., Dupuis, A., Lysnar, P., & Murphy, L. (2013). Future Intensive: Obstacles and opportunities to achieving compact urban form in Auckland.

Government of Ireland (2000) *Planning and Development Act 2000*. Dublin: The Stationery Office. Available at: <https://www.irishstatutebook.ie/eli/2000/act/30/enacted/en/html> (Accessed: 7 June 2025).

Government of Ireland (2016) *Planning and Development (Housing) and Residential Tenancies Act 2016*. Dublin: The Stationery Office. Available at: <https://www.irishstatutebook.ie/eli/2016/act/17/enacted/en/html> (Accessed: 7 June 2025).

Government of Ireland (2023) *Planning and Development Bill 2023*. Dublin: Department of Housing, Local Government and Heritage. Available at: <https://www.irishstatutebook.ie/eli/2023/bill/1/enacted/en/html> (Accessed: 7 June 2025).
Iddon, C. R., & Firth, S. K. (2013). Embodied and operational energy for new-build housing: A case study of construction methods in the UK. *Energy and Buildings*, 67, 479–488. <https://doi.org/10.1016/j.enbuild.2013.08.041>

Litman, T. (2015). *Evaluating Transportation Land Use Impacts*. <https://www.researchgate.net/publication/255632796>
Ibec (2023) *Better housing, better business*. Dublin: Ibec. Available at: <https://www.ibec.ie/-/media/documents/media-press-release/ibec-better-housing-better-business-report--january-2023.pdf>

McCafferty, D. (2019). Fifty years of urbanisation in Ireland: Structural and spatial evolution of the urban hierarchy since Buchanan. *Administration*, 67(3), 65–89. <https://doi.org/10.2478/admin-2019-0021>

O'Driscoll, C., Crowley, F., Doran, J., & McCarthy, N. (2023). Land-use mixing in Irish cities: Implications for sustainable development. *Land Use Policy*, 128, 106615. <https://doi.org/10.1016/J.LANDUSEPOL.2023.106615>

OECD. (2012). *Compact City Policies: A Comparative Assessment* (OECD Green Growth Studies). OECD. <https://doi.org/10.1787/9789264167865-en>

OECD. (2025). *OECD Economic Surveys: Ireland 2025* (OECD, Ed.; OECD Economic Surveys: Ireland, Vol. 2025). OECD Publishing. <https://doi.org/10.1787/9a368560-en>

O'Hegarty, R. O., & Kinnane, O. (2023). A whole life carbon analysis of the Irish residential sector - past, present and future. *Energy and Climate Change*, 4. <https://doi.org/10.1016/j.egycc.2023.100101>

Parker, D. C., Valaei Sharif, S., & Webber, K. (2023). Why Did the “Missing Middle” Miss the Train? An Actors-In-Systems Exploration of Barriers to Intensified Family Housing in Waterloo Region, Canada. *Land*, 12(2). <https://doi.org/10.3390/land12020434>

Rau, H. (2009). Introduction: Contested Landscapes—Space, Place, and Identity in Contemporary Ireland. *Nature and Culture*, 4(1), 17–34. <https://doi.org/10.3167/NC.2009.040102>

RIAI (2020) *Urban Sprawl to Compact Growth: Making Cities Affordable*. Presentation to Dublin City Council Housing Committee, October 2020. Dublin: Royal Institute of the Architects of Ireland. Available at: <https://www.riai.ie/uploads/files/News/riai-presentation-compact-growth.pdf> (Accessed: 28 May 2025).

- RIAI (2022) *Removing Barriers to a New Irish Housing Typology: Low-Rise Medium-Density Housing*. Dublin: Royal Institute of the Architects of Ireland. Available at: <https://www.riai.ie/whats-on/news/riai-research-identifies-new-low-rise-medium-density-housing-model-capable-of-more-than-doubling-own-door-dwellings-per-hectare> (Accessed: 28 May 2025).
- Robson, C. and McCartan, K. (2016) *Real World Research*. 4th edn. Wiley. Available at: <https://www.perlego.com/book/1485149/real-world-research-pdf> (Accessed: 14 October 2022).
- Rode, P. (2018). *Governing Compact Cities: How to Connect Planning, Design and Transport*. <https://api.semanticscholar.org/CorpusID:169253809>
- SCSI. (2023). *The Real Cost of New Housing Delivery 2023: National Analysis of Real Market Data to Evaluate the Viability and Affordability of New Housing Development*.
- The Housing Commission. (2024). *Report of The Housing Commission*.
- Wall, S., & Crowe, P. R. (2024). Identifying the Social, Urban, and Environmental Co-Benefits of Coworking Spaces in Irish Towns. *Sustainability (Switzerland)*, 16(1). <https://doi.org/10.3390/su16010175>
- Yu, X., Wu, Z., Zheng, H., Li, M., & Tan, T. (2020). How urban agglomeration improve the emission efficiency? A spatial econometric analysis of the Yangtze River Delta urban agglomeration in China. *Journal of Environmental Management*, 260. <https://doi.org/10.1016/j.jenvman.2019.110061>
- Zeng, C., Wu, S., Zhou, H., & Cheng, M. (2022). The Impact of Urbanization Growth Patterns on Carbon Dioxide Emissions: Evidence from Guizhou, West of China. *Land*, 11(8). <https://doi.org/10.3390/land11081211>
- zu Ermgassen, S. O. S. E., Drewniok, M. P., Bull, J. W., Corlet Walker, C. M., Mancini, M., Ryan-Collins, J., & Cabrera Serrenho, A. (2022). A home for all within planetary boundaries: Pathways for meeting England's housing needs without transgressing national climate and biodiversity goals. *Ecological Economics*, 201. <https://doi.org/10.1016/j.ecolecon.2022.107562>