

Net Zero Whole Life Carbon (WLC) Roadmap for the Built Environment in Ireland

The Chartered Institute of Building (CIOB) is the world's largest and most influential professional body for construction management and leadership. We have a Charter to promote the science and practice of building and construction for the benefit of society, and we've been doing that since 1834. Our members work throughout Ireland and worldwide in the development, conservation, and improvement of the built environment.

We accredit university degrees, educational courses and training in universities and colleges in Ireland. Our professional and vocational qualifications are a mark of the highest levels of competence and professionalism, providing assurance to clients and other professionals procuring built assets.

The CIOB also has a dedicated policy and research function for Ireland, whose expertise we have drawn on in the preparation of this response.

1. Do you agree in general with the roadmap?

Yes. We fully agree with having a holistic approach to achieving net zero that encompasses all aspects of the built environment. From planning to architecture and construction, and from the location of development to the process of building itself, all built environment professions have an impact on carbon emissions, and it is fitting that they are united under a single roadmap.

2. What would it take for you to approve this roadmap?

We approve of the roadmap, while having regard to points raised in this response.

3. Are there any specific recommendations that you disagree with? Or any key recommendations that are missing?

Additionality

We would like to see more focus on additionality¹ in domestic retrofit policy at a national level, and this roadmap provides an opportunity to encourage the Government to do so. At the moment, success or failure of domestic retrofit is measured with a blunt overall number of houses retrofit, without identifying the additionality within this number. A policy emphasis on additionality would encourage this, while also focussing on types of houses and households for which retrofitting measures can provide additionality. Typically, priority social groups achieve the highest level of additionality when it comes to retrofit,² and we would like to see this reflected in national policy.

Density and demolition

We agree with the need to reduce demand for new construction by prioritising reuse and preventing demolition. Indeed, we would like to see a culture change in the built environment toward reuse of existing buildings. However, this needs to be considered against the long-term emissions savings made from building highly dense buildings in central urban locations that are well served by existing infrastructure. We agree that, particularly in our cities, we need to move away from the current presumption in favour of demolition. However, the Roadmap should operate using a metric of the amount of carbon released by a development over the long term, not total number of demolitions,

¹ '...the additionality of a retrofit programme is the proportion of the retrofit measures, energy savings or overall retrofit investment that occur as a result of the programme and that would not have occurred in the programme's absence' per Kerr, N., & Winskel, M. (2020). Household investment in home energy retrofit: A review of the evidence on effective public policy design for privately owned homes

² See <https://www.climateexchange.org.uk/media/3127/cxc-epe-evidence-review-exec-summary-may-2018.pdf>

which, after all, is only objectionable based on how much carbon it emits. More intensive use of land in the form of density to share infrastructure and amenities between more people, means urban areas reduce the amount of carbon their inhabitants emit. On average the rural per capita carbon footprint is about 20% larger than the urban one.³

Nevertheless, urban areas do still account for a significant proportion of carbon emissions, so if Ireland is to get to net-zero by 2050, decarbonising our cities will be a big part of it. More climate-friendly urban living will be a key part of this mix – indeed, significant progress can be made to the 2050 target just with densification and related transport changes in cities.⁴ In a practical sense, many of the things that need to change are buildings. Carbon emissions from buildings, including homes and commercial property, have long been understood as a problem. Accordingly, various initiatives including heat pumps, district heating, and insulation to reduce emissions from buildings will be needed to help decarbonise Ireland’s cities.

Demolition has attracted ever more criticism as a source of carbon emissions. The issue is that the production of construction materials such as concrete and steel releases carbon dioxide into the atmosphere. Whole-lifecycle analysis of buildings often shows that this ‘embodied carbon’ from construction can be significant, and globally it accounts for 11% of greenhouse gas emissions.⁵ If the aim is to improve the quality of the space, then retrofitting the building with insulation, better seals, and new technology may be a cost-effective option, both for the climate and in terms of capital expenditure and energy costs.

Retrofit may well be the right choice for many sites but, in keeping with the principle of subsidiarity, this is a decision best made according to local circumstances, rather than a blanket national policy. We should not create a policy environment in which it is difficult or controversial to build brand new buildings in urban areas and some buildings will still need to be demolished as part of a Net Zero strategy. Urban environments built out to appropriate density can create positive behavioural changes, thereby reducing emissions.

There is a particular opportunity in Ireland in this context given the widespread inefficient use of land in our cities, their relatively low density, accompanying urban sprawl, and the emissions intensive behaviours and negative health and environmental outcomes this causes.⁶ For example, the peripheral development that has become the norm for new housing in Ireland bakes in car-dependency and congestion, makes public transport, schools, and doctors’ surgeries unviable, hollows out nearby towns and – from a mental- and physical-health perspective – encourage isolation and sedentary lifestyles. In short, instead of meeting housing need where it exists, peripheral development creates extra societal burdens. Densifying central urban locations with additional housing will help to address this.

Urban buildings are located within cities, and the decisions we make about them have spatial effects on individual people and the national economy. Demolishing structures at the end of their lifespan in cities to build at higher density can make it more viable for more people to use climate-friendly transport, as it makes the national economy more urban.

³ See <https://www.anthropocenemagazine.org/2020/02/the-unexpected-drivers-of-carbon-footprints/#:~:text=Overall%2C%20the%20rural%20carbon%20footprint,to%20transportation%20and%20home%20heating.>

⁴ See <https://www.centreforcities.org/reader/net-zero-decarbonising-the-city/>

⁵ See <https://spot.ul.com/blog/embodied-vs-operational-carbon/>

⁶ See <https://dublininquirer.com/2021/02/10/joseph-where-are-we-building-homes-these-days>

The climate benefits from increased density within cities are particularly important for Ireland. While 66% of people in big European cities can travel into their city centre by public transport within 30 minutes, Ireland's public transport – particularly rail – coverage, capacity, and frequency is comparatively lacking. The reason is Irish cities are much less dense than their European counterparts, and our preponderance of low-rise housing means people tend to live far from public transport and rely on cars. Infill development between existing houses will help address this and achieve higher densities, but on certain sites densification can only be achieved at scale with some demolition.

Even electric cars with low operational emissions do not eliminate this trade-off, because cars themselves release embodied carbon when they are manufactured. If an old building near a railway station is demolished and rebuilt with more homes at a higher density, every household that chooses to buy one fewer car, even if electric, as a result saves at least 20 tonnes of CO₂.⁷ When some pure retrofit schemes are saving just 1.5 tonnes of carbon per dwelling,⁸ replacing old homes with brand new, energy-efficient ones will be the climate-friendly option. Unfortunately, whole lifecycle analysis of buildings in urban areas rarely considers the whole lifestyle effects of urban density on transport emissions. If the Roadmap tries to minimise the total number of demolitions rather than the amount of carbon we release, we risk the unintended consequence of increasing emissions and making Net Zero harder to achieve.

Cities have lower carbon emissions per capita than rural or suburban areas because they operate on the principle of density. Agglomeration economies thrive because housing, amenities, commerce, and infrastructure are close together, thereby reducing land use and transport requirements. Over the centuries, their residents have been able to build, demolish, and rebuild to achieve more efficient use of their resources, especially people and land. The wealth that urban economies create due to this efficiency and growth will be crucial for financing the path to Net Zero and the mitigation of climate change.

But to fully decarbonise, cities will need to demolish some buildings. Urban areas will need more builders, architects, developers, and engineers to do so, and they in turn will need new innovations and technical skills to decarbonise construction. But if cities are to change to the degree tackling climate change requires, then some of their buildings will need to change too. While Ireland's built environment sector needs to move away from a presumption in favour of demolition, we should be looking to minimise the net amount of carbon released, and in some places, this will mean demolishing to rebuild at higher densities.

Preserving and improving our existing built environment is a critical component of meeting our sustainability targets, fuelling our economy, creating good jobs and preserving our heritage. However, centralised policy making rarely maps neatly to local circumstances. In some cases, demolition and rebuilding will be the right choice economically, environmentally, and socially. Establishing when this is the appropriate course of action, however, is challenging. Like many other areas of the construction industry, there is a role to be played by suitably qualified property professionals in assessing and charting the most sustainable and practical course of action at the potential end of a building's life.

Two processes may offer solutions to these practical challenges. The first is to engage pre-demolition assessments to establish an unbiased, qualified appraisal of a building's viability, presenting the environmental and economic case for its repair or replacement. These assessments would support a

⁷ See <https://www.iea.org/data-and-statistics/charts/comparative-life-cycle-greenhouse-gas-emissions-of-a-mid-size-bev-and-ice-vehicle>

⁸ See <https://www.ucl.ac.uk/engineering-exchange/sites/engineering-exchange/files/fact-sheet-embodied-carbon-social-housing.pdf>

transition to prioritising retrofit while remaining practically minded and responsive to each construction project's individual needs and unique characteristics. The flexibility of the built environment should be prioritised so that buildings can reach their full life expectancy through being repurposed (see Q5). It is nonetheless imperative to recognise that, in some cases, this will not be practical or possible.

In cases where demolition is an appropriate course of action, waste audits conducted by external auditors ahead of demolition could further support the mitigation of Construction & Development Waste (CDW). Research has demonstrated that pre-demolition audits are an 'effective tool for enhancing CDW management practices'.⁹ In some cases, an internal version of these audits is already in use. However, the practice has not been widely adopted. Further, concerns have been raised regarding self-regulation. Considering these limitations there is a need for mandatory auditing systems that don't rely upon the industry's self-policing but rather engage with specialised staff with the necessary training to provide objective assessments and oversee waste management practices.

Implementing these assessment and auditing systems could further support redressing the imbalance between replacing and repairing buildings in Ireland¹⁰ and support transitioning to the principles of the circular economy. However, these systems will require upskilling industry professionals to understand better CDW practices and the recycling and reuse of materials (see Q6).

4. Do you believe that the proposed timelines are feasible?

Yes.

5. Do you believe that the proposed recommendations and timelines will be sufficient to meet Ireland's decarbonisation targets?

We commend the aim to reduce future demand for new construction through design that supports adaptability, repair, and maintenance, in line with the indicators of the EU Framework for sustainable Buildings, Levels. The most significant environmental impacts of constructing a building relate to its structure and facade. If the useful life of the building, and therefore also its structure, can be extended, there can be significant environmental benefits.¹¹

We support the idea laid out in the Framework of scoring a building's adaptability to change of use, and propose that this be germane to the decision to grant planning permission. While an adaptability requirement this may be overly onerous on smaller developments in peripheral locations, implementing an adaptability score is particularly important in central urban locations, where changes in demands for building types are frequent.¹²

As per the European Commission's 'Level(s) indicator 2.3: Design for adaptability and renovation guide' a building's adaptability score can provide a semi-quantitative assessment of the extent to which the design of a building could facilitate future adaptation to changing occupier needs and market conditions. It can therefore provide a proxy for the capacity of a building to continue fulfilling its function and to extend the useful service life into the future.

⁹ See

<https://upcommons.upc.edu/bitstream/handle/2117/361629/TLALR1de1.pdf;jsessionid=B2075B910917F734FE4DE082F89DA8D1?sequence=1>

¹⁰ See <https://passivehouseplus.ie/articles/design-approaches/deconstruct-ireland>

¹¹ Eu Levels: Adaptability

¹² See <https://www.sustrans.org.uk/our-blog/opinion/2020/june/the-role-of-construction-in-delivering-sustainable-transport-post-covid-19>

This adaptability score could be embedded in planning decisions, as part of a new development's Environmental Impact Assessment, for instance. While the Roadmap document recommends the introduction of the 'Level(s) indicator 2.3: Design for adaptability and renovation' via Green Public Procurement for all publicly procured buildings, we recommend that this scoring mechanism be introduced for all new buildings in central urban locations. The framework for such a spatially sensitive policy is already in place in national planning guidelines, which, for instance, recommend that the quantum of car parking or requirement for such provision should depend on the location of development. In central urban locations, according to Planning Guideline 28,¹³ parking provision should be minimised or eliminated, whereas in peripheral locations restrictions can be relaxed.

A similar spatial criterion could be used to implement adaptability scoring in the assessment of a planning application. New buildings in central urban locations, where demand for space changes – between office and residential, for example – could be required to achieve a certain adaptability score and this could be a factor in the decision as to whether to grant a development planning permission. This would be in keeping with national planning policy, which prioritises dense, mixed-use development, as well as offsetting the need to repeatedly reproduce the most significant environment impacts of construction – the structure and façade of a new building. By providing a score for adaptability, developers, local planning authorities and communities will be presented with clear options to take a longer view on the design aspects and decisions that may influence the building's service life.

6. What would you see as the major barriers to achieving our targets?

The location of development

Ireland's continued propensity towards peripheral development is a major barrier to achieving the Roadmap's targets. While 'Housing for All' and the National Development Plan both mention the importance of location, the data suggests that these national strategies are not trickling down to impact where new housing is being delivered. This policy blind spot has allowed a spatial crisis to emerge. Taking Dublin and its periphery as an exemplar of a wider national trend, the location of new housing completions is alarming when compared to where the need for housing is greatest.

The most extreme housing need and population growth is in Dublin city, but the location of new housing development belies this truth. Instead of producing housing where need is greatest, our housing system is producing – by a multiple of three – development on the periphery of settlements.

This problematic trend is most acute for Dublin. According to CSO data, since 2017 there have been 7,024 housing completions on the periphery of Dublin, and 2,458 in Dublin city. Nearly three times the rate. More worrying still is that the houses being built on the periphery of Dublin, typically to serve Dublin, are themselves being built on the periphery of settlements. New housing developments in Naas, Navan, Dunshaughlin, Celbridge and Bray are being built a few kilometres outside these towns. Regionally balanced growth is a good thing, but new housing developments on the edges of towns to serve an urbanised Dublin-based workforce is not.

As per question 3, this peripheral development creates a range of societal burdens, not least environmental.

¹³ See <https://www.opr.ie/wp-content/uploads/2019/08/2018-Design-Standards-for-New-Apartments-1.pdf>

Skills

The Roadmap rightly flags the lack of focus on decarbonisation skills, other than renewable energy and retrofitting. Furthermore, the Roadmap correctly cites a role for professional bodies in ensuring Whole Life Carbon (WLC) and circularity are embedded into construction and built environment degrees. The CIOB has recently supported several new HE courses in Ireland covering various aspects of sustainability in the built environment, while also offering a range of sustainability courses through the CIOB academy. Nevertheless, we agree that sustainability requirements should be connected to accreditation going forward.

From an industry perspective, perpetual volatility in demand for construction has led firms, particularly SMEs, to curb capital and education investment, because spending on research and development (R&D) brings high fixed costs that are difficult to cut in an economic downturn. Accordingly, lack of available finance is a major stumbling block for SMEs investing in tools and skills that could help to decarbonise work practices. Creating a Green Skills Fund to channel low cost, long-term loans to SMEs specifically for investment in formal, sustainability focussed R&D would address this, and lead to sector wide improvements in sustainable practices. A similar fund exists in Holland, where the MKB+ (Innovation Fund for SMEs) gives construction firms access to finance to embed innovative new products, services, and processes in their business

7. What would you see as the main drivers towards achieving our targets?

N/A

8. Do you have any comments on the modelling underlying assumptions?

No.

Read more about these in the companion report on the carbon modelling undertaken by UCD

9. Do you agree with the proposed definitions (3.1)?

Yes.

10. Do you have anything else you would like to add?

CIOB stands ready to help with the implementation of recommendations made within this response.