

DRAFT CARLOW COUNTY DEVELOPMENT PLAN 2022-2028 - PUBLIC CONSULTATION

3CEA COMMENT & FEEDBACK

Chapter 3: Housing, achieve low carbon and affordable nZEB/ZEB

We need to build better than required, because the current regulations are not adapted to the necessary measures to mitigate climate change. Political framework conditions for energy-efficient and climate-friendly building must be stricter. This is also shown by requirements for Nearly Zero Energy Buildings (nZEB). Often, a building in the passive house standard, using low carbon material and construction types saves four times more energy and emit less CO₂e emissions than the respective new national specifications. Builders and renovators are urged to go well beyond the statutory provisions in terms of climate protection and healthy living.

Methodology to reduce upfront embodied CO₂ emissions

Using low carbon structures, low carbon products, compact shape, slim slabs, avoid parking structures, flexible space elements, avoid low value elements, choose long lived products, combine measures. This needs to be approached in the initial design process and manifest them for example within the specification and tender documents. Identifying Carbon Hotspots first and mitigate them to achieve the main CO₂e emission savings by Substitutions of construction types and materials. Focus on Using Low Carbon building methods, Low Carbon, and Recycled Material and to get a clear picture of further real savings a Preliminary Life Cycle Assessment (Pre-LCA) method is to be used as well to define the CO₂eq impact from Cradle to Practical Completion of the chosen construction type and materials. This Methodology is to evaluate early design decisions for saving CO₂ emissions which impact on and influence the later design stages and end result.

General requirements within the initial design phase:

- Using the Fabric First approach and set benchmarks to manifest the reduction of energy demand of the proposed building.
- Identify and mitigate Carbon Hotspots, if necessary, with the help of a pre LCA.
- Preferring to specify non fossil based products as much as possible to reduce upfront embodied CO₂e Emissions.
- Employ renewable energy generation.
- Using the H4.0E platform for Planning, Design & Engineering, and Construction with the principles of Design for Manufacture, Assembly, Disassembly, Reuse and Recycle.

Fabric First Approach

Evaluate **early design decisions** which impact on and **influence** the later design stages and end **result**.

- The main component of this approach is **reducing the heat loss** through the fabric of the building envelop **before considering the building supply** for heat, DHW, and ventilation. This can be achieved by **Substitution of standard building methods and products to offset the environmental impact of construction** by using low carbon building methods, Low carbon and renewable building products, and Recycled material.

- A first step to reduce CO₂e emission is **identifying Carbon Hotspots** and **mitigate** or eliminate them. Big impacts are key for saving embodied CO₂e emissions. Carbon Hotspots are much used building materials with high carbon impact like the cement production, aggregate sourcing, and fossil-based building material - concrete, steel.
- A further step is to **define a low carbon construction type and undertake to use low carbon material** in the initial design process of a building at early project stages. Here benchmarks can be set for the further development and design. **Timber Frame, Massive timber solution or ICF are suitable construction methods**. The quality can be increased cost-effectively by using digitalised prefabrication methods and offsite manufacturing of building elements.
- Focus is on low **carbon building material**, a **continuous external insulation layer** and **air/wind tightness**, set benchmarks for all openings in the thermal envelop like windows, doors and ventilation.

Substitution

Substitution describes a mitigation measure to **exchange high carbon material** and construction types with low carbon. For example, increasing the ratio of GGBS in cement composites like concrete mixes or using structural massive timber solution like CLT instead of structural concrete/steel structures.

Sequestration

Create CO₂ sinks: Another way to reduce upfront embodied CO₂ emission is to increase the CO₂ sequestration capacity of the used material and **take out CO₂ of the current atmosphere**. That means, prefer to use renewable products like wood products and avoid fossil-based products as far as possible. That will increase the thermal capacity of the construction as well and will help to stabilise the temperature attitude and increase the drying reserve.

LCA

In terms of LCA and relevant EPDs, the figures A1-A5 correspond to a Cradle to Practical Completion assessment, a Pre-LCA. With such a calculation ca. 50-80% of the embodied CO₂e emissions can get identified.

Define Building supply systems

The **Passive House Principles** can be a **guide** to achieve nZEB of ZEB Building. A **Pre BER** will give guide for the energy demand as well as a **professional conducted heat loss calculation and ventilation strategies**. Care should be taken not to overdesign the energy demand and building supply systems. (Efficiency is the first renewable energy)

Goals

Reducing the U-Value and thermal bridges of the components and materials of the building envelope, as well as build in effective airtightness and ventilation strategies.

Benefits

Reduction of CO₂e emissions. Less energy requirement to heat and cool compared to a standard building. Therefore reducing the running costs, saving energy. Reducing the cost for building supply infrastructure. Lower maintenance and replacement costs.

Rationale

- General requirements within the initial design phase:
 - o Using the Fabric First approach and set benchmarks to manifest the reduction of energy demand of the proposed building.
 - o Identify and mitigate Carbon Hotspots, if necessary, with the help of a pre LCA.
 - o Preferring to specify non fossil based products as much as possible to reduce upfront embodied CO₂e Emissions.

- o Employ renewable energy generation.
- Use the opportunity to encourage the building industry to adopt new techniques in Ireland.
- Stimulate the modular building industry in Ireland.
- It is possible to build modular houses in 8-12 weeks. Traditional build 6-8 months. The labour element/requirement is significantly less for the modular build.
- Prefabricated modular homes optionally designed using the H4.OE platform could be more affordable than conventional ones
- It would improve Ireland's greenhouse emission issue in terms of both construction activity, embodied energy and energy use.

Chapter 7: Climate action and Energy

Climate Alliance

Carlow County Council has recently joined the European Climate Alliance (in September, 2020), which among other things commits the Council to reduce CO₂ emissions by 10 percent every 5 years, equivalent to the halving of per capita emissions by 2030 (from a 1990 baseline.)

Being a Climate Alliance member means being part of a city network dedicated to climate action, teaming with like-minded local authorities. Opportunities to inspire and be inspired abound. It also means making your voice heard at the national, European and international levels, where Climate Alliance's European Secretariat support for the interests of our members in the climate change arena. In addition to the softer benefits, Climate Alliance places an emphasis on working directly with the administrative and technical level of municipal structures, providing valuable support for those actually implementing climate action plans on the ground. Climate Alliance further support members in their activities by developing CO₂ monitoring instruments, running campaigns on topics such as sustainable mobility and consumption, organising opportunities for exchange and carrying out projects both with and for member cities.

Appendix 6:

1.4 Existing Energy Profile

There is an issue with units used regarding national and county consumption. All the figures in GWh should be in TWh.

5. Energy efficiency and conservation

Ireland has a target of 20% energy savings through efficiency by 2020 and a more ambitious target of 33% in the public sector alone.

Or

Ireland has a target of 32.5% energy savings through efficiency by 2030 and a more ambitious target of 50% in the public sector alone.

5.2 County Context

The Plan4Irish application wasn't successful, however it is planned to submit a new application Plan4Europe.

Table 7-2:

Climate Change: CO₂ target has been updated for the public sector. Reduce CO₂ equivalent emissions from public sector by 50%

Renewable Electricity: 130W capacity of wind farm and solar would produce up to 178GWh of electricity which only represents 42% of the current electricity demand, it is not enough to reach the 2030 target of 70%.