

Develop concept of net zero housing estates/developments (land and sea)

1. EXECUTIVE SUMMARY

- 1.1. Emissions from the residential sector accounted for 35% of total Green House Gas (GHG) emissions in the 2017 inventory. Therefore it is imperative that existing and proposed developments are part of reaching the goal of zero carbon by 2050.
- 1.2. Advancing net zero estates and developments for the Isle of Man will be very challenging. The challenge will be determining the definition of net zero carbon for the Island and the way in which buildings and developments demonstrate how a building has achieved net zero carbon status.
- 1.3. It is recognised that in most situations, net zero energy buildings and developments – i.e. buildings and developments that generate 100% of their energy needs onsite – are not feasible. Therefore, net zero carbon buildings that are energy efficient and supply energy needs from renewable sources onsite and/or offsite, are a more appropriate target for the mass scale action required to achieve the proposed reductions.
- 1.4. A decision needs to be made on what net zero development means for the Isle of Man and the required changes to the regulatory framework to achieve it.
- 1.5. There is the possibility for future requirements within Building Regulation and Planning Policy to drive energy efficiency and wider sustainability improvements for domestic new build and refurbishment, through the use of offsetting.

2. THE CHALLENGE

- 2.1. Net zero carbon is very challenging and needs attention to every aspect of a building's design, construction, and operation and the same for developments.
- 2.2. Emissions from the residential sector accounted for 35% of total GHG emissions in the 2017 inventory. The majority of emissions are from residential stationary combustion, the burning of fuels in homes, mainly for heating and cooking (Aether, 2019).

Background Data

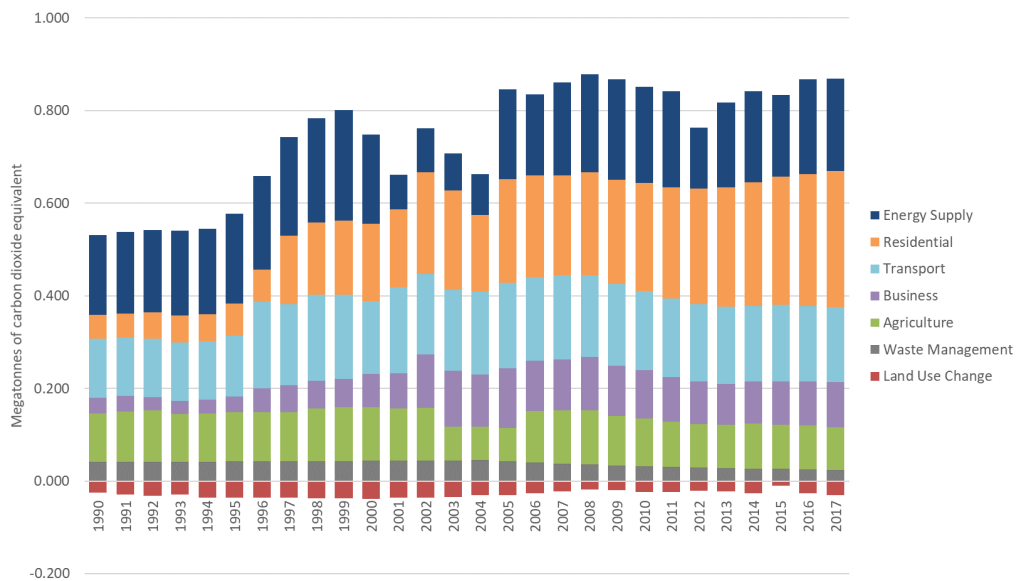


Figure 1: Isle of Man GHG emissions 1990-2017 by sector

2.3. New build is going to be only a small proportion of the building work undertaken going forwards, with the bulk being upgrades and refurbishment of existing building stock. This weft primarily focuses on options for new build, however a decision will need to be made on the existing stock which is set out as action below.

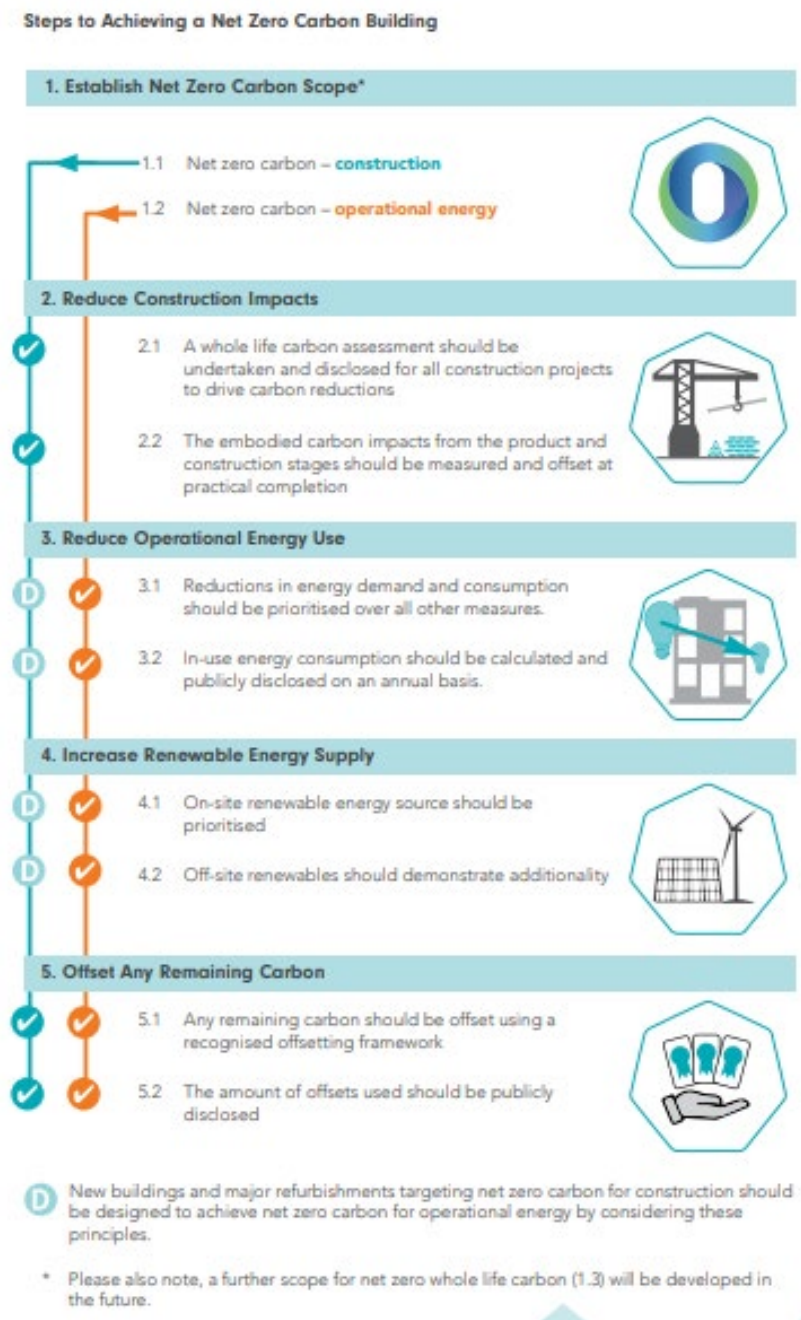
Zero Carbon Definitions

2.4. On 30 April 2019, the (UK Green Building Council, 2019) published Net Zero Carbon Buildings: A framework definition, a framework for the UK construction industry to transition new and existing buildings to net zero carbon emissions by 2050.

2.5. Two approaches to net zero carbon are set out:

- Net zero carbon – construction: the embodied emissions associated with products and construction are measured, reduced and offset.
- Net zero carbon – operational energy: The energy used by buildings in operation is reduced and where possible any demand required is met through renewable energy. Any remaining emissions are offset.

Figure 2: Framework to achieving Net Zero Carbon Building (UK Green Building Council, 2019)



Worldwide Definitions

- 2.6. In 2019 the World Green Building Council (WGBC) reported on Net Zero Carbon Buildings Schemes and comparisons around the world(World Green Building Council, 2019).
- 2.7. They looked at several countries, including UK, Canada, India, Netherlands and Brazil to see what programmes and initiatives are currently set out in advancing to net zero, some of these targets are set out below.

Figure 3: Extract from (World Green Building Council, 2019)

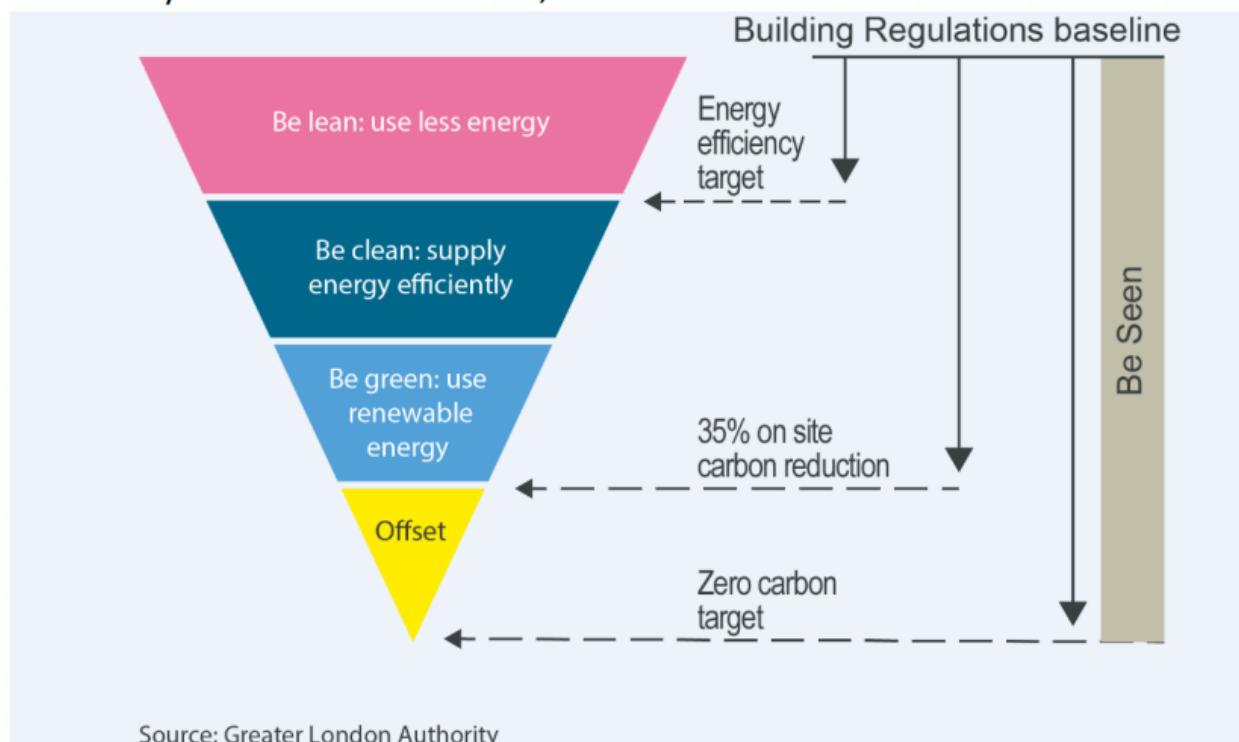
GBC	Alliance HQE-GBC	DutchGBC	CaGBC	GBC Brasil
COUNTRY	France	Netherlands	Canada	Brazil
SCHEME	E+C- (new buildings)	Paris Proof concept	Zero Carbon Standard	Zero Energy Standard
	Based on full lifecycle carbon analysis (LCA)	Annual verified consumption data	Annual verified zero carbon operational emissions balance	Annual verified net zero energy balance
	Between 5-40% minimum energy reduction, dependent on building type and 2012 French thermal regulation	66% energy consumption reduction compared to the 2015 sector energy intensity averages	Heating energy efficiency targets set (Thermal Energy Demand Intensity) for each climate zone Report Energy Use Intensity; report peak demand	If 100% onsite renewable energy, no additional requirements If using offsite renewable energy, energy efficiency requirements set beyond ASHRAE
	Onsite renewable energy requirements for levels Energy 3 >100% energy demand for Energy 4	Onsite renewables included in net-consumption data Offsite renewables to account for remaining 33% demand	At least 5% of energy demand met by onsite renewable energy; offsite allowed with specific eligibility requirements Offsets not permitted	Onsite allowed, commercial buildings can use RECs for maximum 10% of energy demand Offsets not permitted
	Certification is based on LCA covering embodied carbon and construction processes in addition to building energy and water	Future revision to include embodied carbon	Report on embodied CO ₂ of structural and envelope building materials	Future revision to include embodied carbon

Defining the zero carbon destination

2.8. The scope of net zero carbon has been enshrined in UK planning policy for some years, with much of the Development system generally following the carbon reduction model below. With carbon offsetting operating as part of planning policies that require a reduction in carbon emissions beyond that required by Building Regulations. The offset payments pay for carbon saving projects to go ahead elsewhere, to make up for the carbon savings not achieved within developments.

Figure 4: Energy hierarchy and associated targets (Greater London Authority, 2017)

- Policy 5.2 current London Plan, SI2 draft new London Plan



2.9. Generally it is recognised that in most situations, net zero energy buildings – ie buildings that generate 100% of their energy needs onsite – are not feasible. Therefore, net zero carbon buildings that are energy efficient and supply energy needs from renewable sources onsite and/or offsite, are a more appropriate target for the mass scale action required to achieve the proposed reductions.

Other Jurisdictions

- 2.10. The UK has legislated for net zero carbon emissions by 2050 through an amendment to the Climate Change Act. This makes it the first member of the G7 group of industrialised nations to legislate for net zero emissions. They aim to tackle emissions by reducing emissions and using off-sets in the case of unavoidable emissions.
- 2.11. Scotland aims for net zero carbon by 2045 and has set out a journey of 70% by 2030 and 90% reduction by 2040. The most ambitious statutory targets in the world for these years. Scotland has more potential sites for carbon capture and a greater landmass for tree planting than rest of the UK. To achieve the goal, a fifth of agricultural land needs to shift to alternative uses, that support emissions reductions, such as forestry or biomass production. Carbon capture and storage are crucial, as is investment in renewable energy and energy-efficiency measures, and decarbonised buildings and vehicles.

3. THE OPPORTUNITY

Works Already underway

3.1. Building Regulations:

- There are changes to building regulations already under with the introduction of the Standard Assessment Procedure(SAP) with target SAP values for a new building that is a dwelling (Isle of Man Government, 2019), being reduced over time, from 80 in 2020 to 97 from 2027 onwards.

3.2. Planning Policy:

- A review of the Strategic Plan (2016) is proposed in 2020 as part of the Planning Action Plan (Isle of Man Government, 2018) which could include standards and targets similar to that of neighbouring jurisdictions, including carbon offset.

3.3. Summary Points:

- Potential future requirements within Building Regulation and Planning Policy to drive energy efficiency and wider sustainability improvements for domestic new build and refurbishment.
- Opportunities are there to build on the existing foundations to prepare for a net-zero target.
- Similar principles could be transposed to existing developments, however this would require further analysis.
- Allowable Solutions / Carbon Offsetting is used elsewhere in the, particularly in the UK, as an integral component of their carbon reduction planning policies. It allows carbon emission reductions that cannot be achieved cost-effectively on-site to be tackled through offsite measures

4. THE ACTIONS

4.1. This weft is concerned with developing the concept of net zero housing estates/developments (land and sea), in particular where developments balance carbon cost with tree planting and other neighbourhood wide measures. At this stage only necessary actions have been identified to develop this concept and see how it would work on the Island. Further work would be required to set targets and develop ways of achieving the standard.

Necessary Ambition

4.2. General:

- Set a target in line with other climate leaders.
- Define net zero carbon development for the Isle of Man.

4.3. Existing Buildings /Development:

- Identify suite of policy measures needed to improve energy efficiency in buildings, such as energy performance certificates.
- Model energy efficiency measures to look at existing developments and estates and develop scenarios for achieving a zero carbon energy system to 2050.
- Provide the regulatory framework and financial support for energy efficiency.
- Allocate funds to tackle harder, more expensive measures, for example, solid wall insulation.

4.4. New Buildings/Development:

- Establish framework and use carbon offset funds from new developments to drive carbon reductions.
- Bring in Minimum Energy Efficiency standard regulations for all buildings and remove loopholes from existing regulations.
- Increase renewable energy supply - requirements for a minimum percentage of renewable energy on-site (Merton Rule) (bre, n.d.).

High Ambition

4.5. All of the Necessary Ambition plus higher targets than those established under necessary ambition.

5. THE IMPACTS AND MITIGATIONS FOR THEM

5.1. It is highly likely that there are many impacts associated with bring forward zero net development on the Island, such as the following:

Impacts	Mitigation
Increase in capital costs for development, which may lead to a reduction in development coming forward	Set out a road map to zero carbon so that developers know what is coming
Skills shortage in delivering	a long-term commitment to increasing energy efficiency would support the supply chain, and skills
Supply chain	
Materials will need to be shipped over – will affect life cycle analysis of carbon from a development	Be clear defining the concept of Zero Carbon Developments Isle of Man
Mortgage frameworks may not support zero carbon homes or loans for work	Work with major mortgage providers to incentivise preferential lending rates for low carbon homes and loan rates
Increased cost could be passed onto purchaser	

6. THE COSTS AND RETURNS

- 6.1. There are significant co-benefits in terms of overall improvement to development and the communities that live in them.
- 6.2. A recent report by the (Energy and Climate Intelligence Unit, 2019) found that had the UK Zero Carbon Policy not been cancelled, occupants of new homes built since 2016 would be saving more than £200 per year on their energy bills, close to triple the average saving intended to result from the Government's recently-introduced energy price cap.
- 6.3. This is a missed opportunity as those houses built since 2016 would be using less energy and already be assisting in reaching zero emissions, now they are part of the challenge.
- 6.4. It is mostly likely that most prolific observation about such a policy would be the increase in costs to developers. While historically, particularly in the UK, there has been a significant amount of information regarding costings for zero carbon development, more recently a report by (Centre for Sustainable Energy, 2018) looked at the 'Cost of carbon reduction in new buildings' based on the UK commitment to reduce carbon emissions by 80% by 2050.
- 6.5. Analysis suggests that it is possible to achieve net zero regulated carbon emissions from a combination of energy efficiency on site carbon reductions and allowable solutions for an additional capital cost of between 5-7% for homes and non-domestic buildings. Achieving net zero regulated and unregulated emission is likely to result in a cost impact of 7-11% for homes (Centre for Sustainable Energy, 2018).
- 6.6. However more research would need to be done on this topic to validate those figures for the Isle of Man.

7. THE RISKS

- 7.1. The following assessing the risk level of the proposed actions, in terms of deliverability and costing, some of the actions with an identified high risk are because deliverability and costing is uncertain at this stage and would in part be linked to some of the earlier required actions.
- 7.2. There is also the risk if the concept is not developed then the Isle of Man will fall behind the rest of the world and become a less attractive place to locate businesses and to live and work.

Table 1: Risk Matrix for Proposed Actions

Costs not known		Policy Measures and regulatory framework, incCarbon Offsetting Policy	Funding for initiatives (existing buildings)
Costs known better than to 100%			
Costs known better than to 50%	Set a target in line with other climate leaders.	Define net zero carbon development for the Isle of Man	
	Little chance of failure	Less than 30% chance of failure	May fail

Risk	Action
High Risk (H)	High risk, enumerated as 6 or 9
Medium Risk (M)	Moderate risk, enumerated as 3 or 4
Low Risk (L)	Low risk, enumerated as 1 or 2

8. THE CO-BENEFITS (THE POSITIVE BENEFITS ASSOCIATED WITH THE CLIMATE ACTION)

8.1. Co-benefits include:

- Local resilience – buildings, heating and power.
- Wider sustainability benefits e.g. reduced impact from flooding, recycling, waste management, reduced water consumption/better management .
- Reduction in fuel poverty (Centre for Alternative Technology, 2017).
- Could stimulate local economy.
- Reducing cold related illness.
- Strengthen Energy security (Centre for Alternative Technology, 2017).

9. CONCLUSION

9.1. Embedding zero carbon concepts in developments is a challenging but will be a crucial element of reducing our carbon emissions and contributing towards net zero carbon emissions by 2050.

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