



Essex is a pro - Growth County

Introduction by Graham Thomas Head of Planning and Sustainable Development

Net Zero Carbon New Homes

Central Government

Government could amend the Building Regulations to require Net Zero operational (regulated) carbon.

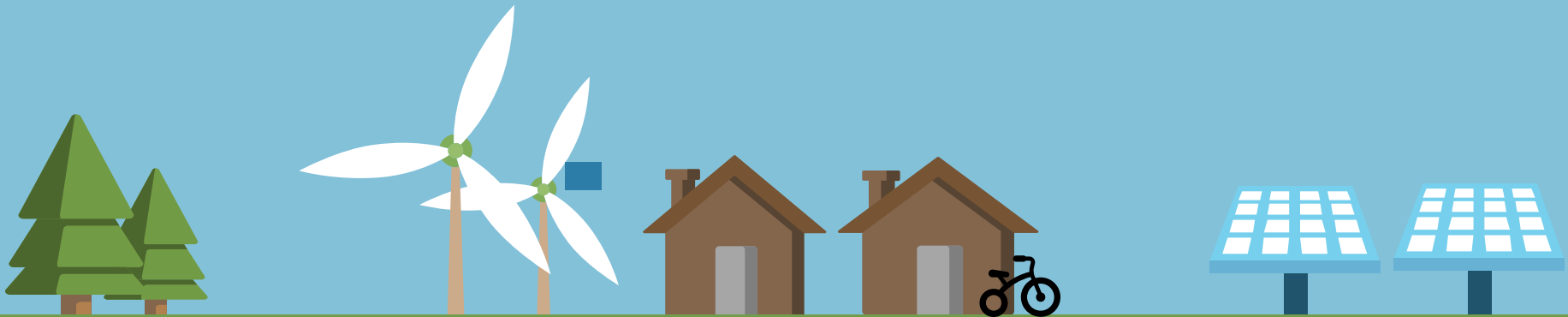
Local Government

Implement a series of changes locally pan- Essex to deliver Net Zero operational (regulated) carbon.

BUILT ENVIRONMENT WORKSTREAM: NET ZERO NEW BUILD

ESSEX CLIMATE ACTION COMMISSION (ECAC) – 14 NOV 2022

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NEW BUILD HEADLINE RECOMMENDATIONS: REMINDER



All New
Schools
commissioned
to be Carbon
Zero by 2022



All New Homes
Consented to
be Carbon Zero
by 2025



All New
Commercial
Buildings to be
Carbon Zero by
2025



All New
Schools
Commissioned
to be Carbon
Positive by
2030



All New Homes
and non-
domestics
buildings
Consented to
be Carbon
Positive by
2030



Delivering Net Zero Carbon New Homes – key elements



“We know that England’s homes produce more carbon each year than the average annual use of the country’s cars, so decarbonising social homes has a pivotal role to play in meeting the country’s net zero target”

Kate Henderson, Chief Executive of the National Housing Federation on the launch of wave 2 of the Social Housing Decarbonisation Fund

New Climate and Planning Unit

- Establishing new unit (CaPU) with ECAC funding
 - Lead Planning Officer – Nicola Melville
 - Principal Sustainability and Built Environment Specialist – *currently recruiting*
 - Senior Officer – *start recruitment soon*

2 main tasks

POLICY SUPPORT

To help local authorities develop consistent policy approach across Essex to net zero and other climate related policies, including establishing a robust, sound evidence base.

DM SUPPORT

To help local authorities on current planning applications to strive for higher standards aligned to net zero – mainly garden communities and other strategic sites but intend to expand offer as build capacity.

**Support for
LPAs**

**Consistent
Policy**

Net Zero Evidence Base

- To secure net zero policies into local plans is a challenging task. Underpinning success is a **robust, sound evidence base**.
- Significant work has been done elsewhere to build an evidence base. Several local authorities are progressing **strong net zero policies through the local plan process now**.
- In Essex, we are ambitious and **want to be part of these front runner authorities** – we need to be to deliver the ECAC target of net zero homes in 2025.
- The first 'Essex specific' evidence published is the **Net zero carbon viability Study** (by Three dragons). Commissioned with ECAC funding. Available here:

<https://www.essexdesignguide.co.uk/climate-change/net-zero-evidence>

- We have established a '**net zero evidence**' **webpage** on the Essex Design Guide
- Intend to link to evidence produced for other authorities to support net zero policy development - e.g. **Net Zero Hubs** (BEIS funded)
- Evidence commissioned so far focuses on **Operational carbon. Embodied Carbon to follow**.



The Essex Design Guide



Embodied Carbon : The carbon emissions emitted producing a building's materials, their transport and installation on site as well as their disposal at end of life.



Three Dragons: Net Zero Viability Study

- Three Dragons Consultancy (+ Qoda and Ward Williams Associates) commissioned to **assess cost and viability** of achieving net zero carbon development in Essex.
- In the study 'net zero carbon' buildings are defined in terms of 100% reduction in **operational** carbon emissions from **regulated energy** use only.
 - **Regulated energy:** *Energy consumed by a building, associated with fixed installations for heating, hot water, cooling, ventilation, and lighting systems.*
 - **Unregulated energy:** *Energy consumed by a building that is outside of the scope of Building Regulations, e.g. energy associated with equipment such as fridges, washing machines, TVs, computers, lifts, and cooking.*
- BRE and Passivhaus Trust – calculate unregulated energy to be **50%** of total energy use in buildings. To be truly net zero carbon in operation unregulated energy needs to be tackled too (*more on this later*)



Regulated loads:

- Heating
- Cooling
- Hot water
- Lighting
- Pumps and fans



Unregulated loads are plug loads such as:

- Cooking
- Appliances
- TVs
- Computers
- Any other electrical equipment

Three Dragons: Methodology

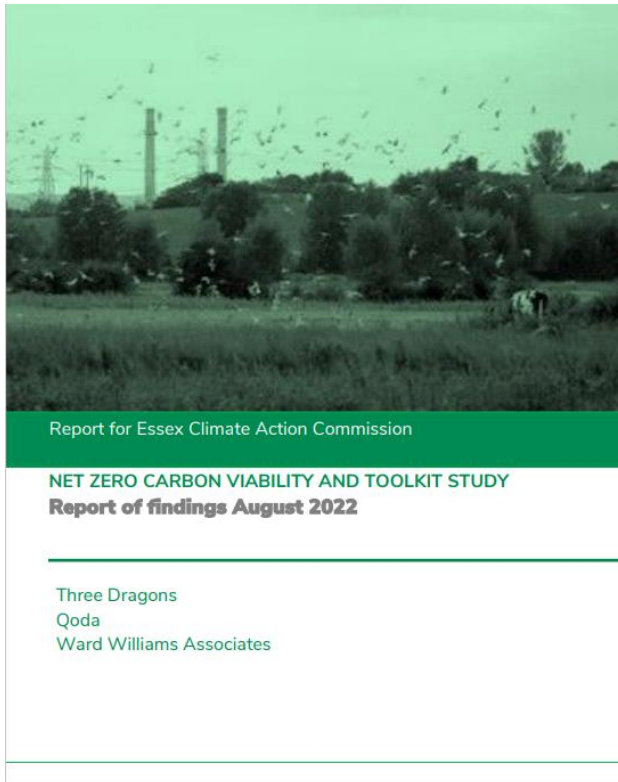
- Research undertaken included:
 - Interviews / workshop with development industry, planning officers
 - Review of existing guidance, toolkits, emerging policies etc
- Investigated a **'fabric first' approach** alongside a **range of technological solutions**, evaluating their impact in terms of:
 - Economic, social and environmental criteria, including carbon emissions, capital costs, total life costs and their performance against the energy hierarchy.
- Modelled **Passivhaus 'classic' fabric standards, with a heat pump, and some Solar PV** and compared this in terms of costs, carbon reduction and energy consumption to:
 - Building Regulations 2021 and
 - Building Regulations proposed Future Homes Standard (2025)
- The Study looked at a **range of development typologies**, and **over different geographies of Essex**.
 - Assumptions were made regarding development costs, other policy requirements and developers return.
 - Modelled the impact of different standards, and **tested the impact on scheme viability**.



Passivhaus - five design principles:

- High levels of thermal insulation;
- High performance windows;
- Mechanical ventilation that recovers heat;
- High levels of airtightness;
- Thermal bridge free design.

Three Dragons: Key Findings - headlines



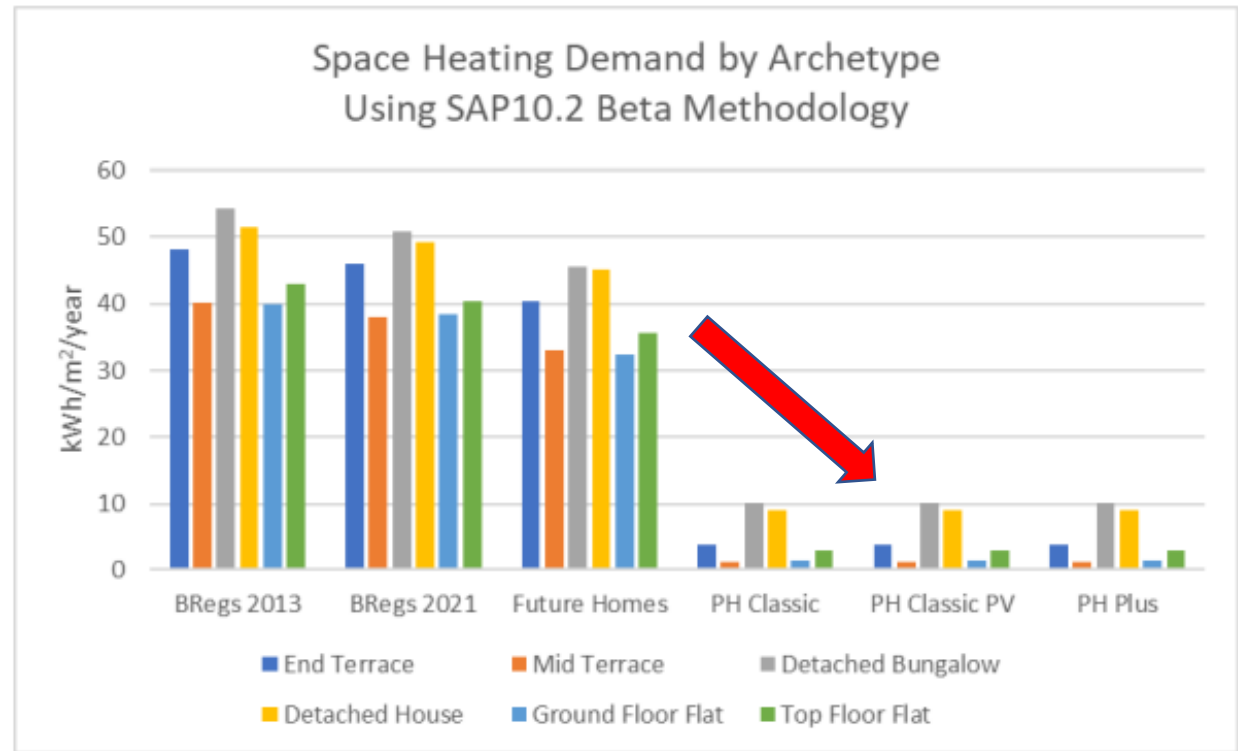
- Net zero (regulated) carbon in operation homes **are viable in most residential typologies and in most places in Essex.**
- **Building homes to Passivhaus ‘classic’ fabric standards, with a heat pump and solar pv is recommended as a basis for achieving net zero (regulated) carbon buildings now.**
- The difference between FHS (2025) and net zero (regulated) new build is **marginal (between £2,000-£3,000).**
- **Changes beyond the Building Regulations are needed** to deliver net zero development and align with local climate targets and UK legally binding climate targets.
 - Local authorities may **set targets in excess of national policy** provided these can be justified.

Why should policy go beyond the FHS?

Three Dragons evidence recommends policy goes beyond Future Homes Standard. There are many reasons, including:

- **Significant benefits – for occupiers, for UK and for climate:**
 - ❑ Future proofed homes – they won't have to be retrofitted in future at significant cost
 - ❑ Significantly reduced energy costs for occupiers, insulated from future energy price shocks
 - ❑ Improved comfort and well being of occupiers, including future proofed against further climate impacts.
 - ❑ Less pressure on national electricity grid, support grid decarbonisation and grid efficiency, increased supply of renewable energy, and energy security
 - ❑ Essential to align with UK (and local) climate targets
- Graph shows building to Passivhaus fabric standards **reduces space heating energy demand by over 70%** →
- **Costs are marginal** to move from Future Homes Standard to recommended approach.

Figure 9.6 Space heating demand by archetypes using SAP 10.2 method



Three Dragons: Policy Advice

1

- **Clear evidence** that a 'fabric first' approach should be the preferred method of achieving net zero homes
- Strongly recommend that the **Passivhaus Classic with heat pump and solar photovoltaics (at 2021 Building Regulations levels)** is put forward as the standard to be adopted.
- This **approach requires a series of performance indicators** that will help achieve net zero and provide cost savings and comfort for occupiers.

2

- **Performance indicators for homes recommended** are:
Space Heating/Cooling Demand ≤ 15 kWh/m²GIA/year
Total Energy Consumption ≤ 35 kWh/m²GIA/year
(based on LETI)
- Also recommend that:
 - an **air testing regime is instigated** to ensure the target is achieved and certified.
 - the **use of PHPP software to accurately model building energy performance.**

3

- **Keep under review policy approaches emerging elsewhere**, particularly those backed at public examination e.g **Cornwall & Bath and North East Somerset Councils**
- Explore energy-based approach to net zero policy. This **includes**:
 - **emissions from unregulated energy use in net zero definition and**
 - **requires operational energy balance to be achieved on-site** – delivers 'true' net zero carbon in operation.

Emerging policies under review

- **Three Dragons Study:** Recognising that issues around energy use and carbon emissions is a fast changing area of policy development, **it is critical that ECAC and the Essex planning authorities**, keep under review approaches emerging elsewhere, particularly those backed at public examination.

Cornwall Council and Bath & North East Somerset Council framed policy on 'net zero carbon in operation' by:

- Limiting total energy use in buildings (both regulated and unregulated energy) through setting **space heating and energy use intensity targets**. *(this drives high fabric standards and energy efficient systems)*
- Requiring **low carbon heating**. *(so no fossil fuels)*
- Requiring **renewable energy to be maximised** to at least match the annual energy demand of the development thereby achieving **operational energy balance on site**. *(benefits occupiers, & essential for UK scale climate targets)*
- **Offsetting residual energy demand only allowed as a last resort** if on-site generation has been maximised. *(deliver new, additional renewable energy generation capacity)*

This approach aligns with the trajectory to achieve national climate targets, includes both regulated and unregulated energy use and is largely based on LETI

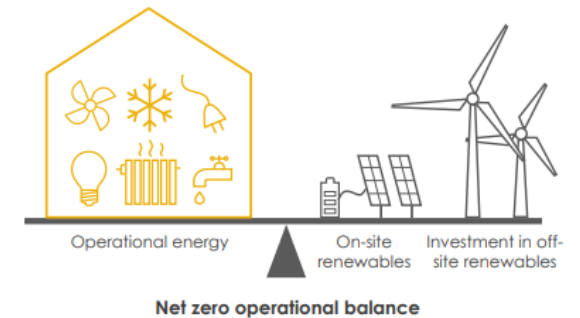


Figure 0.3 - Net zero operational balance - at the building scale

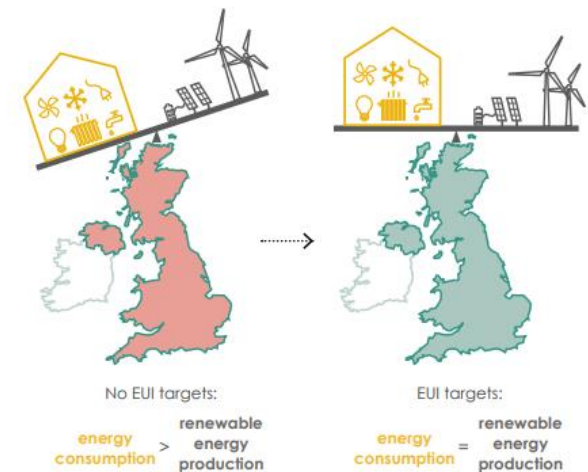
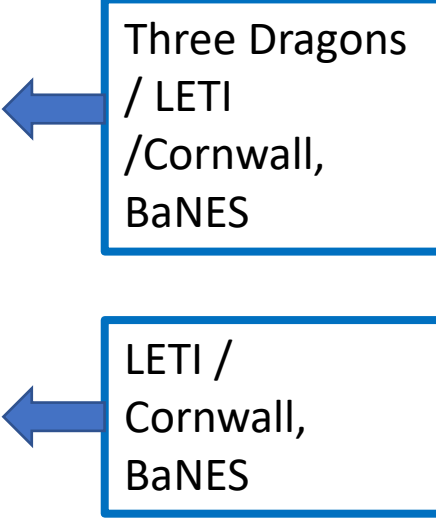


Figure 0.4 - Net zero operational balance - at UK scale

Policy Implications for Essex

- Evidence (from Three Dragons, LETI, and other authorities) supports common key policy principles
- There are 3 key steps to achieve net zero carbon homes in operation:
 1. High fabric efficiency – e.g. Passivhaus levels of efficiency
 2. Use low carbon heat source – e.g. air source heat pump
 3. Integrate renewables on site – e.g. roof top solar PV
 - a. On-site renewables should be maximised, and **at least match residual energy demand** (regulated and unregulated) where possible
 - b. If not possible on-site, then remaining residual energy should be offset through new, additional renewable energy installations off-site. But this is a last resort.



Three Dragons
/ LETI
/ Cornwall,
BaNES

LETI /
Cornwall,
BaNES

To deliver the above, key performance indicators for **Space Heating Demand** and **Total Energy Consumption** need to be set in policy too.

Next Steps: Evidence for Net Zero Policy

- Response to Recommendations of Three Dragons Study - prioritising 'Net Zero carbon in operation' evidence and policy
- Successfully secured ECAC funding for following pieces of work:



Net Zero in operation policy 'top up' evidence - to further develop policy guidance to deliver net-zero development. It will review emerging policy approaches elsewhere, evaluate the very latest definition of net zero aligned with climate targets, and identify the policy steps required to achieve net zero supported by detailed costs and calculations.



Legal Advice – to give districts confidence to go beyond Building Regulations in setting local plan policy and understand the level of evidence required, and to also establish the opportunities that may exist to require higher standards from developments prior to the adoption of a local plan policy.

Next Steps: Policy development and implementation

Established **Climate planning policy support group** for Essex authorities

- Review, develop and interpret evidence
- Work on model policy / common key principles
- Broaden scope – climate related policies



Policy implementation – ideas for **potential Essex-wide initiatives**:

- Offsetting fund for energy / wider Decarbonisation Fund?
- Advice service for Development Management process?
- Monitoring system to check developments once built?
- Local Plan examination support?



Other measures to support LPAs

- Survey evidence in 2021 identified huge demand for **climate change training** for town planners.
- Support **needed for policy development**.
- Support needed at **planning appeals**.
- **Demand for best practice guidance.**



Good progress has been made with the **Essex Design Guide**, including:

Climate Change Compendium – completed

Guidance on **Solar Gain (& overheating)** – completed

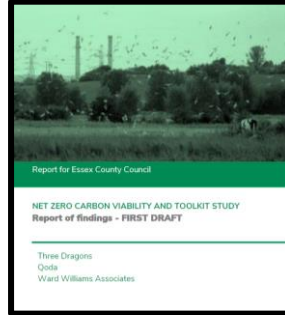
Guidance on **Historical Buildings** – near completion

Walkable Neighbourhoods' Part 1 – final stages

Working with the Construction Sector

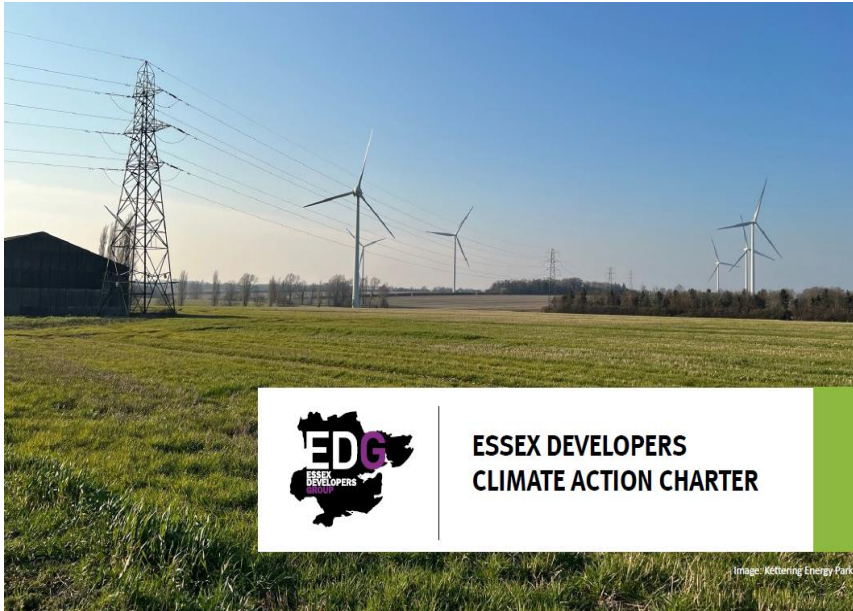
We have worked closely with the Essex Developers Group

- To Commission research -



Knowledge & talking the same language

- To initiate positive action – including Essex Developers Climate Action Charter



Developers Charter Climate Action Plan.

This Charter has identified a series of joint actions with developers including:

- A Directory of Case Studies
- Net Zero show homes
- Sponsorship of Apprenticeships in Design and Green Construction Skills
- Essex Housing Awards starting in 2022 introducing NZ categories.

Next Step: Survey issued to the Essex Developers' Group relating to the Action Plan to understand any barriers to implementing net-zero and what help/support would be beneficial

THANK YOU FOR YOUR TIME

ANY QUESTIONS