Essex Net Zero Policy

Energy Offsetting Tariff

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Project Office
Introba Consulting Ltd
150 Holborn
London
EC1N 2NS
+44(0) 20 3697 9300

Project Contact:
Zeina Krayim
zeina.krayim@introba.com

Yara Machnouk
Yara.Machnouk@introba.com

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1.0 Introduction

Introduction

The Climate and Planning Unit at Essex County Council (who are leading the collaborative work by the 15 Greater Essex local authorities on 'net zero' planning policy) have commissioned Introba and Currie & Brown to provide additional evidence to explain the methodology on which the recommended energy offsetting tariff is based in *Policy NZ1 'Net Zero Carbon Development (in operation)'*, published in November 2023 within the "Planning Policy Position for Net Zero Carbon Homes and Buildings in Greater Essex" document, which also supplements the evidence in the Essex Net Zero Policy Study (July 2023).

Policy NZ1 is being embedded into Local Plans and other planning documents across Greater Essex. The overarching policy and its requirements are listed in Figure 1.1.

To allow flexibility for circumstances where it is not technically feasible for development proposals to meet "*Requirement 4: On-site renewable energy generation*", the policy includes an offsetting mechanism. This is only acceptable as a last resort to meeting Net Zero in operation, where the applicant has proved that energy efficiency measures have been prioritised, and on-site renewable energy generation has been maximised. In this case, a financial payment secured through planning obligations will be required. The payment will be used to fund additional renewable energy generation capacity elsewhere in the plan area or County. Local authorities in Essex can direct the payment to the Essex County Council administered Essex Renewable Energy Offset Fund. This fund will be used to provide rooftop solar PV installations by eligible applicants, for example, on public amenity buildings. Further information is set out in the Renewable Energy Offsetting Framework (April 2025) published on the Essex Design Guide.

The Report 1: Essex Net Zero Policy – Technical Evidence Base published in 2023 recommended an energy offset price of £1.35/kWh to meet the shortfall in on-site renewable generation for all new-build developments in Essex. This report will explain the pricing methodology and review the recommended offset price to reflect Q2 2025 data and the latest advancements in PV technology.

Summary of Policy NZ1 – Net Zero Carbon Development (in operation)

All new buildings must be designed and built to be Net Zero Carbon in operation. They must be ultra-low energy buildings, be fossil fuel free, and generate renewable energy on-site to at least match annual energy use.

For further information on the policy requirements, refer to the Essex Net Zero Policy Study and the Planning Policy Position document .

Figure 1.1: Summary of Policy NZ1 – Net Zero Carbon Development (in operation) requirements.

2.0 Offsetting Mechanism

Offsetting (as last resort)

Policy NZ1 includes "Requirement 4: On-site renewable energy generation", which aims at maximizing renewable energy generation on-site. The policy sets out two routes for calculating the renewable energy generation, required from a development to be policy compliant. The renewable energy generation provision must meet the greater of either routes, to ensure maximum possible PV energy generation.

Requirement 4: The renewable energy generation provision must meet the greater of:

- **Route 1**: The amount of energy generated in a year should match or exceed the predicted annual energy use of the building, i.e. *Renewable energy generation (kWh/m^2/yr) = or > predicted annual energy use (kWh/m^2/yr).*
- **Route 2**: as a minimum, the amount of energy generated in a year must be:
  - at least 80 kWh/m$^2_{\text{building footprint}}$ per annum for all building types
  - at least 120 kWh/m$^2_{\text{building footprint}}$ per annum for industrial buildings

The evidence presented in "Report 1: Essex Net Zero Policy – Technical Evidence Base" showed that it is technically feasible at a reasonable cost for most building typologies to meet "Requirement 4"; which is to generate sufficient energy to match or exceed the predicted annual energy use of a building, thus achieve an operational energy balance on-site.

However, where "Requirement 4" is not technically possible and this is suitably justified, then offsetting the residual amount of energy needed to meet the energy balance on-site (i.e. calculated by Route 1) will be accepted as a last resort as long as the applicant meets the other policy requirements (as noted in Figure 2.1).

List of requirements pre-offsetting

Reduced operational energy consumption	**Achieve a Space Heating Demand and an Energy Use Intensity (EUI) lower than the levels required in the Local Plan**	✓
Low carbon energy supply	**No gas connection or fossil fuel use on site** (or connection to heat networks using fossil fuels)	✓
On-site renewable energy generation	**Maximizes on-site renewable energy generation**	✓
Net Zero energy balance	**Annual balance of zero** for the whole development showing predicted energy use* and renewable energy generation on-site.	✗ (offset role)

Figure 2.1: List of requirements a development proposal would have to meet before being able to justify the use of offsetting as a planning compliance mechanism.

** The predicted energy use of a building covers all energy uses (regulated and unregulated): space heating, domestic hot water, ventilation, lighting, cooking and appliances. EV charging is excluded from the calculation.*

Offset Payment

As the basis of the energy offset is the shortfall between the renewable energy generated and the predicted annual energy use of the building, the offset tariff has been expressed in *£/kWh*.

The applicant must pay a sum of money, secured by a planning obligation, to the Local Authority. This may then be used via the Essex County Council (ECC) administered Renewable Energy Offset Fund to meet the shortfall in renewable energy generation. The Renewable Energy Offset Fund will be used to fund additional renewable energy generation capacity elsewhere in the local plan area or County but preferably as near as practicably possible to the initial development.

The offset payment is to be calculated using the formula below.

Offset Payment *= [predicted annual energy use (kWh) – predicted annual renewable energy generation (kWh)] x energy offset price (£/kWh)*

The Report 1: Essex Net Zero Policy – Technical Evidence Base published in 2023 recommended an energy offset price of £1.35/kWh to meet the shortfall in on-site renewable generation for all new-build developments. The following chapter will outline the methodology for setting the offsetting tariff and review the price to reflect Q2 2025 data and the latest advancements in renewable energy technology.

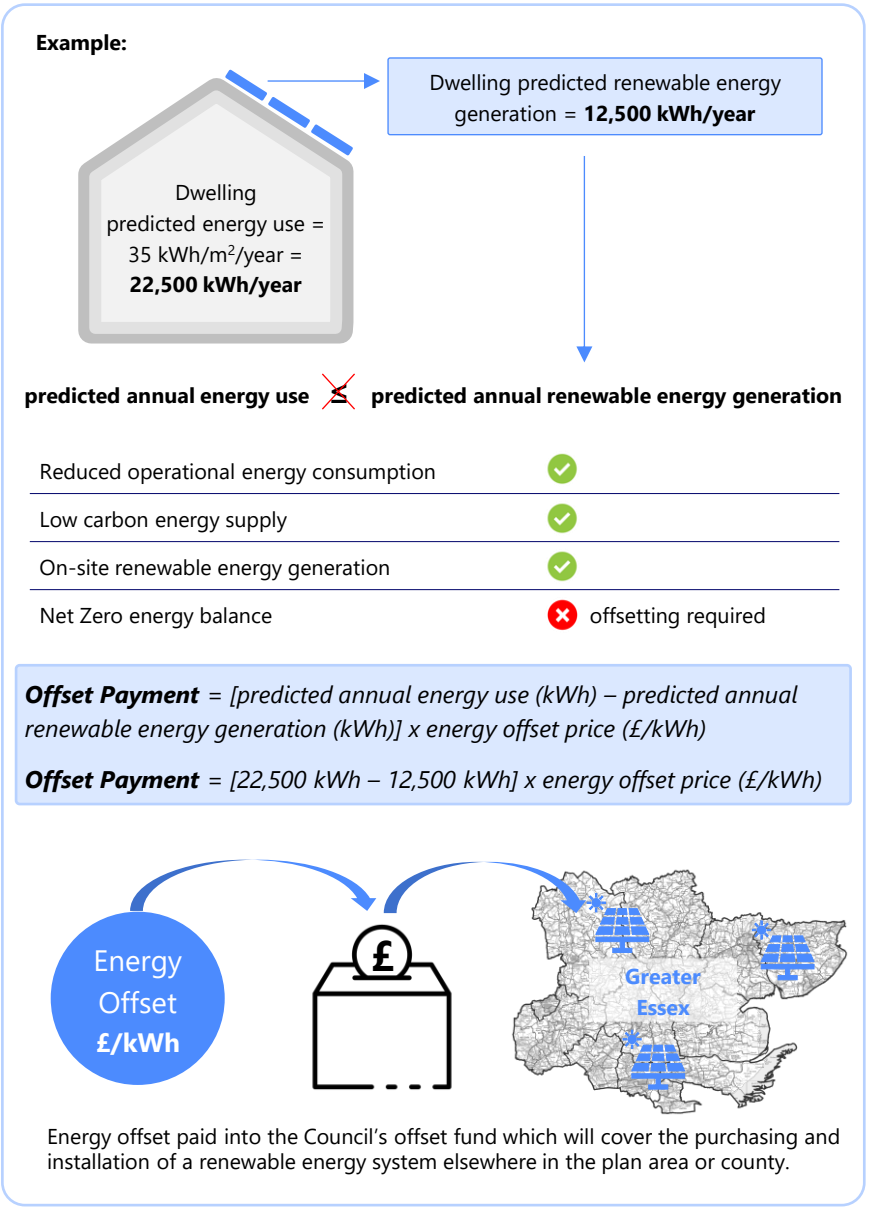

Figure 2.2: Offset payment methodology and example

3.0 Setting the Offsetting Tariff

Offsetting Tariff Pricing Methodology

Currently, the most suitable technology for renewable energy generation is photovoltaic panels (PVs), as they are space efficient, cost effective and adaptable. Therefore this report focuses on the installation of PV arrays within Essex.

The energy offsetting price has been based on the deployment of medium sized PV arrays (10-50 kW), as this size is considered the most suitable for installation on public buildings and blocks of flats. The projected costs include the annual PV installation cost based on the most recent government solar photovoltaic (PV) cost data, and other maintenance and admin costs.

Assumptions:

1. Annual installation cost

The capital cost per kWp of installing PVs has been based on the government solar photovoltaic (PV) cost data (May 2024), which provides information on the cost of small scale solar PV technology sourced from the Microgeneration Certificate Scheme (MCS), and includes the cost of solar PV generation equipment, cost of installing and connecting to the electricity supply and VAT where applicable. The calculations have been based on the median 10-50 kW installation cost of **£1,376/kW** for the year 2023/2024 and was later adjusted for Q2 2025.

2. Generation per kWp

The PV generation levels per 1 kWp have been taken from the Photovoltaic Geographical Information System (PVGIS) which provides information on solar radiation and photovoltaic system performance for any location in the world. The calculations have been based on a generation level of **850 kWh/kWp** as a reasonably conservative approach for the Essex area.

3. Management cost

The management cost for administering and managing the funding process has been assumed to be **10%** of capital cost as typical practice.

4. Adjustment for inflation

A **2.3%** uplift has been assumed as an adjustment for inflation, based on the difference between the Tender Price Index (TPI) index for Q2 of 2024 and Q2 of 2025.

Table 3.1: *Assumptions Summary*

Assumptions	Value	Unit
Annual installation cost 2023/24 (Median cost for 10-50 kW array)	1,376	£/kW
Generation per kWp	850.0	kWh
Management overhead	10%	of capital cost
TPI index Q2 2024	392.0	index
TPI index Q2 2025	401.0	index
Adjust for Q2 2025	102.3%	% of Q2 2024 cost

Table 3.2: *Energy Offset Tariff*

Component	Unit	Price
Capital cost per kWp	£/kWp	1,376
Capital cost per kWh generation *(capital cost per kWp / generation per kWp)*	£/kWh	1.62
Management cost *(10% of capital cost per kWh)*	£/kWh	0.162
Total cost (pre inflation adjustment) *(Sum of capital cost per kWh generation and management cost)*	£/kWh	1.78
Total cost (adjusted to Q2 2025) *(includes 2.3% cost uplift adjusted for inflation)*	£/kWh	**1.82**

4.0 Worked Example

Worked Example

Offsetting (as a last resort)

Worked example of the offset calculation

Step 1: Calculate building predicted annual energy use (kWh)

= EUI x GIA

= 35 kWh/m^2/year X 3,200 m^2 = 112,000 kWh/year

Installed PV system will have to generate 112,000 kWh/year.

Step 2: Calculate if required PV system can fit on the development.

Assuming that a single PV panel generates 450 kWh/panel/year and each panel has an area of 2.0 m^2, meeting the building annual energy consumption would require a total PV area of 498 m^2

Assuming that the mid-rise block of flats has limited roof space for PVs (due to orientation, plant area, etc), the roof area cannot accommodate all the required PVs to meet annual energy consumption (can only accommodate 421.2m^2 of PVs, which is equivalent to 94,950 kWh/year of renewable generation)

Step 3: Calculate the shortfall in renewable energy generation to match the building's annual energy consumption

The shortfall is *[predicted annual energy use (kWh) – predicted annual renewable energy generation (kWh)]* = 112,000 – 94,950 = **17,050 kWh/year** .

Step 4: Calculate the one-off offset contribution based on an offset price of £1.82/kWh

Offset Payment *= [predicted annual energy use (kWh) – predicted annual renewable energy generation (kWh)] x energy offset price (£/kWh)*

= 17,050 kWh X £1.82/kWh

= £31,031

Worked example building specifications:

Use type	Residential - mid rise block of flat (5 storeys)
Gross Internal Area - GIA (m^2)	3,200 m^2
Area of PV that fits on the roof (m^2)	421.2 m^2 (assuming 40% reduction in available roof area)
Energy Use Intensity - EUI (kWh/m^2/year)	35 kWh/m^2/year
Offset price (£/kWh)	**£1.82/kWh**

5.0 Conclusion

Conclusion

The Climate and Planning Unit at Essex County Council (who are leading the collaborative work by the 15 Greater Essex local authorities on 'net zero' planning policy) have commissioned Introba and Currie & Brown to provide additional evidence to explain the methodology on which the recommended energy offsetting tariff is based in *Policy NZ1 'Net Zero Carbon Development (in operation)'*.

This report set out the methodology followed for recommending the energy offset price that would be sufficient to meet the shortfall in on-site renewable energy generation and has reviewed the recommended offset price in the Report 1: Essex Net Zero Policy – Technical Evidence Base published in 2023 to reflect Q2 2025 data and the latest advancements in PV technology.

An energy offset tariff of **£1.82/kWh** has been recommended to fund the installation of medium sized arrays on public buildings and blocks of flats within Essex. This tariff should be reviewed at least every 3 years.

The offset payment can be calculated using the formula below.

Offset Payment *= [predicted annual energy use (kWh) – predicted annual renewable energy generation (kWh)] x energy offset price (£/kWh)*

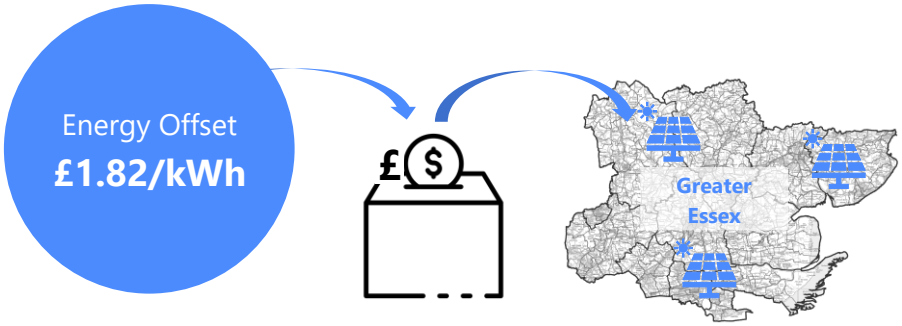

Figure 5.1: Recommended energy offset tariff (Quarter 2, 2025) for Essex County Council