Greater Norwich Development Partnership

Greater Norwich Energy Study - Non Technical Summary

Zero Carbon development

For planning authorities to require zero carbon standards for new development in advance of national requirements in 2016, this must be based on evidence to show this is possible locally. The report examines the feasibility of zero carbon development and how it could be achieved locally to inform local policy making.

The study has undertaken a technical assessment of the renewable energy potential and has not considered the wider planning issues such as: cumulative landscape and nature conservation impacts; grid connection and shadow flicker. These issues would need to be addressed at the application stage and/or through a specific policy in Local Development Frameworks (LDFs).

The study states “Renewable energy resource within the GNDP area can amply meet the energy demands of the planned new development” and zero carbon requirement can be applied now for larger scale development. The technical potential was found to be 129% of the area’s current energy consumption and 177% of the GNDP area’s 2006 emissions could theoretically be abated through local renewable energy.

All housing development nationally will be required to be zero carbon by 2016 and all commercial development by 2019. It is essential the first phases of any development, before these dates, contribute to planned overall solutions in order to enable the later phases of the larger scale developments to be zero carbon.

The final national definition of what exactly constitutes a zero carbon home will be crucial to carbon standards required by LDFs. Off-site payments to improve energy efficiency in existing development may be used in areas such as infill development where zero carbon is extremely expensive to achieve. This would lead to a lower cost approach to delivering carbon reductions overall and would therefore enable greater carbon savings.

What type of renewable energy is suitable?

A balance of biomass Combined Heat and Power (CHP) and wind turbines are likely to be necessary to meet government requirements that a proportion of energy should be generated onsite. A scenario for such an combined approach to meet the area’s needs would require 7 large wind turbines and biomass from managed forestry or 2,300 hectares of farm land managed for energy crops (3% of total land available in the three districts). Microgeneration technologies (such as solar hot panels, solar electric cells and ground source heat pumps) are most suitable to serve smaller scale infill development (see below).

Costs and locations

Making a development more energy efficient should always be the first consideration before identifying appropriate renewable sources of energy. Long term planning from the earliest stage of new development is also key to ensure the most cost effective technologies are used to achieve zero carbon. All development above a threshold should therefore provide a detailed zero carbon energy strategy.

Larger developments (500 plus dwellings) are able to achieve significant carbon reductions more cost effectively than small developments. 70% of the new development will be large scale. The cheapest way of delivering a zero carbon development is to contractually link it with a large scale wind turbine in the local area. However, wider planning considerations will be critical in determining the actual number and location of any turbines. Any off-site generation must be additional capacity not already planned.

Biomass fuelled CHP is suitable for larger developments with higher density and scale, and a greater mix of building types. Development below 50 dwellings per hectare increases the cost of CHP per dwelling.

Smaller scale development will generally require microgeneration sources, which are expensive and make it very difficult to achieve zero carbon development onsite. Incorporating carbon offsetting measures, making payments to improve energy efficiency of existing buildings, as well as microgeneration is therefore the most cost effective approach for achieving very low or zero carbon emissions.

Table 1: General costs of achieving zero carbon development through different renewable energy technologies.

Technology	**Cost per dwelling (£1000)**	**Type of Location**	**Notes**
Wind turbines	5	On site or off site for large developments (1000 dwellings +) **New communities in Broadland and South Norfolk**	Dedicated supply, contractual link required
Biomass CHP	13.5	On site – high density areas (50 dph) of medium and large developments (500 dwellings +) **New communities in Broadland and South Norfolk**	Large buildings with a constant heat demand e.g. leisure centres, hospitals, provide effective anchors loads for CHP.
Microgeneration	30 to 40	On site on smaller urban or rural infill sites, possibly include offsetting **Norwich, smaller developments in Broadland and South Norfolk**	Photovoltaics (PV), Ground Source Heat Pumps, Micro wind turbines; Solar panels (domestic hot water DHW)

Policies and local leadership

The report recommends that on adoption, the Joint Core Strategy (JCS) should require a minimum on-site carbon standard of 44% reduction in CO2 emissions (Code for Sustainable Homes Level 4) across all developments compared to 2006 Building Regulations standards. This approach is better than requiring a percentage of energy from renewables as it encourages developers to consider energy efficiency of new development first.

The report states that if a zero carbon requirement is set through the JCS ahead of the government's 2016 timetable, developers should be encouraged to adopt the lowest cost solution, wind turbines.

The 44% carbon dioxide reduction target may be difficult to achieve for constrained urban and rural infill sites where CHP, biomass and ground source heat pumps may not be suitable. At these locations, a target of level 3 may be more appropriate. Higher on site standards can be set for those areas of a development with higher density and scale, and a greater mix of building types, enabling the use of CHP. Policies should therefore identify the low carbon energy systems that developments of particular scales, density and mix should use and encourage communal systems. Such density considerations do not apply to developments using wind power.

Local Authorities can oversee funds for off-setting measures where it is not possible to achieve the highest standards onsite and establish Energy Service Companies to finance and run large scale low carbon infrastructure to supply phased developments.