1. Executive Summary

This report outlines work undertaken for the North Devon Biosphere Reserve to develop a carbon footprint and subsequent carbon reduction plan for Winkleigh Village Parish in Torridge District, North Devon that meets government carbon reduction targets of 34% and 40% by 2020. Utilising the CRed carbon footprinting tool developed at the University of East Anglia, 61 households in Winkleigh completed questionnaires and provided information on a variety of household related energy consumption and travel habits.

Average CO2 emissions per household surveyed were **13.07 tonnes**, the largest proportion being heating and hot water at 63%, followed by private vehicles at 24% and air and train transport at 8%. Emissions from refrigeration, entertainment and other electrical appliances such as lighting made up less than 5% of emissions surveyed.

Five key factors are contributing to carbon emissions from housing in Winkleigh:

1. high rates of heat loss through lack of building fabric insulation
2. high usage of fuel oil which has a high carbon intensity
3. the fact that inefficient boilersare still very commonplace
4. high use of energy hungry Aga and Rayburn cookers
5. a high proportion of inefficient tungsten filament and halogen lightbulbs still in use

Using a "whole house" approach, which considers not only the key factors driving emissions in the home but also their interactions, a number of "packages" of measures are recommended to be implemented in different homes in the village. The key measures, their carbon savings and costs are as follows:

- a programme of cavity wall insulation and installation of air source heat pumps in 260 homes. Total capital cost of £2.27M with carbon savings of 863 tonnes CO2/year
- a programme of loft insulation, draught proofing and installation of condensing boilers in 84 solid wall homes . Total capital cost of £695,000 with carbon savings of 565 tonnes CO2/year
- the replacement of inefficient boilers with heat pumps in 199 homes. Total capital cost £1.71M with carbon savings of 955 tonnes CO2/year
- the replacement of inefficient boilers with condensing boilers in 139 homes. Total capital cost £222,400, with carbon savings of 212 tonnes CO2/year

In total, the strategy proposed generates annual **CO2 savings of 40.25% by 2020** and has a total **capital cost of£5,058,000**. Its total net cost is **£426,000 or £56/household/year** for ten years.

The report concludes with animplementation plan and community engagement strategy recommending a phased roll out of measures between 2010 and 2020 as well as setting up a Winkleigh Green Team to drive forward initiatives. Given the high capital costs of householders installing some of these measures, but the low net costs after energy savings are accounted for, it is recommended that the use of financing vehicles such as an Energy Services Company (ESCo) for Winkleigh or the wider North Devon Biosphere is now explored.

Reductions in carbon emissions from private vehicles are assumed to happen at no cost to this strategy because of:

- improvements to the fuel efficiency of the vehicle fleet as citizens replace their existing cars with new or new second-hand vehicles. The average CO2

emissions of the overall Winkleigh vehicle fleet is assumed to have reduced to 133g/km in 2020, compared to the national average of 233g/km today, following the introduction of the EU vehicle emission performance directive.

- an annual 1% reduction in private vehicle mileage (10% reduction by 2020) is assumed because of the high likelihood that fuel prices will increase because of further increases in the price of carbon through schemes such as the EU Emissions Trading Scheme.

These two likely changes are assumed to provide an annual saving of 1102 tonnes of CO2 from private vehicles by 2020.

A 10% reduction in air travel from current levels is assumed by 2020 because of the high likelihood that the cost of air travel will increase quite markedly because of the inclusion of aviation in the EU Emissions Trading Scheme. This reduction in travel is assumed to provide an annual saving of 139 tonnes of carbon.