Blackmoor Estate Carbon Footprint and Concept Orchard Design

Breakthrough Research, Practical Results

Blackmoor Estate, a leading supplier of premium English apples to Marks & Spencer's and Sainsbury's asked 383ppm to calculate the carbon dioxide emissions associated with apple production at Blackmoor, design a low carbon concept orchard and prepare an integrated farm energy strategy that exploits the availability of renewable energy sources on the estate.

383ppm adopted a three stage approach to the assignment:

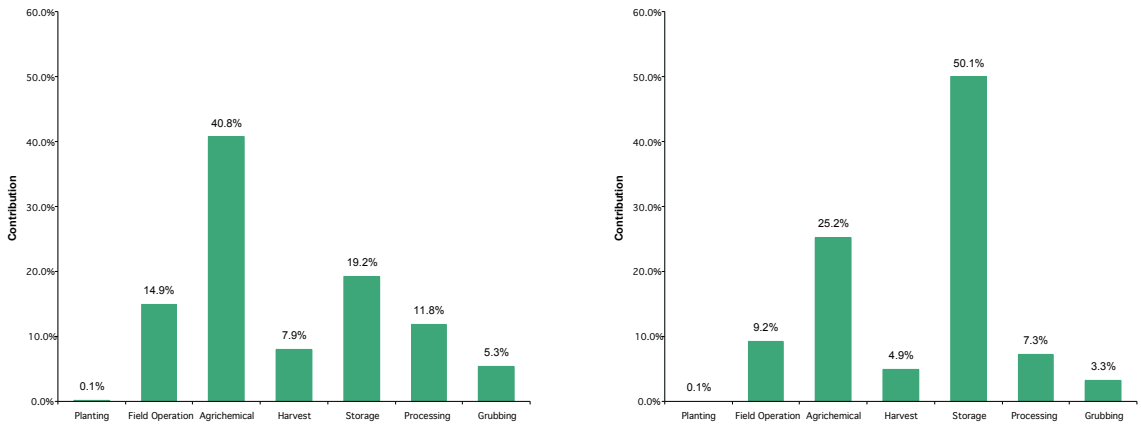
- data collection and modelling of CO2 emissions and energy usage by individual process stage
- identification of processes which contribute significantly to the overall footprint
- development of abatement options which either reduce energy usage or involve the use of more sustainable technology

Data Collection and Modelling of CO2 emissions and Energy Usage

By spending time on the farm, the production process and all the associated inputs were observed closely, enabling a detailed process map to be drawn up and for primary data to be collected. This helped to establish a clear boundary for measuring the footprint, up to the 'farm gate' and provided the data to allow the analysis to be completed. Direct and indirect carbon emissions due to fuel and agrichemical usage were modelled, employing a methodology based upon that proposed by the Carbon Trust and tailored for the agricultural industry by 383ppm.

Identification of Processes Contributing Significantly to the Overall Footprint

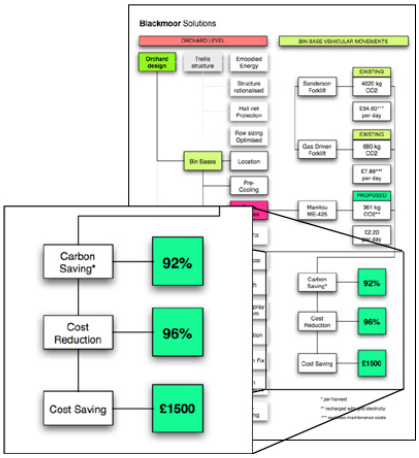
On completion of the analysis, the top three areas of energy usage and emissions were found to be agrichemical application, storage and field operations. Within each of these there were also sub processes which contributed significantly e.g. field heat removal and chilled despatch.



Contribution to CO_2 emissions by Process Stage for apples sold a) immediately and b) after six months

Research and Development of Abatement Options

383ppm explored ways to reduce energy usage and carbon emissions by changing farm processes, by using alternative technologies and horticultural techniques or by exploiting the potential for renewable micro generation on the farm.



Several criteria were used to evaluate every abatement option including carbon and cost reduction, feasibility and return on investment. These options were then grouped into a number of abatement strategies, based upon the synergies between them and were presented to the client.

383ppm and Blackmoor are currently evaluating each strategy and investigating ways in which to implement one in order to create an exemplar sustainable farm.

The Client's View

William Wolmer, Managing Director of Blackmoor, feels they will benefit in a number of ways from the work and says "We have the belief, shared by 383, that reducing our carbon impact is not only good for the environment but if done creatively and intelligently can improve our bottom line," he says. "This is borne out by the analysis which has identified areas where we can reduce our energy bills and operational costs by modifying some of our existing business practices and in the future, we have the opportunity to produce all of our energy, by taking advantage of some of the renewable energy sources available on the estate.

There were several things that the work has uncovered which were quite unexpected, Wolmer admits, and he picks out three for special mention:

• "The amount of embedded carbon in the agrichemicals and their overall contribution to the footprint;
• "How parts of the process are large users of energy even though they form only a small part of the overall process. The removal of field heat from harvested apples or the holding of apples for despatch and how the energy used by these processes can be reduced by minor modifications to them;
• "Recently, we've been converting our traditional orchards to a more productive trellis based system giving increased yields per hectare. We've learnt these orchards have a reduced carbon footprint as well as reduced production costs, which seems to be a recurring theme throughout this, quite often reducing your carbon footprint does lead to a reduction in operational costs."

On working with 383, he concludes: "It's always helpful for an outsider to review something that you do day to day and to look for ways to improve it. Quite often, familiarity with your work makes that a difficult thing to do. 383 brought a fresh, and refreshing, new perspective."

Business, Sustainability and Engineering Expertise

383ppm is a specialised team of consultants with backgrounds in environmental engineering, sustainable construction, agriculture and management consultancy. Working alongside Blackmoor these skills enabled 383ppm to evaluate GHG emissions, design solutions and implement them.

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