

# Zero fossil Energy Farming feeding the future without fossil fuels

*'Everyone talks about the weather but nobody does anything about it'* Charles Dudley Warner

Talking about the weather is no longer a matter of small talk. It's no longer a small matter. Global warming and climate change have become headline news and topics of everyday conversation... and not just for the British with their legendary love of weather talk. Inextricably linked to the use of fossil fuels, global warming is a result of increased greenhouse gas emissions largely produced when fossil fuels are burnt. And the consequence of increased global warming is climate change. Although scientists have been debating this issue and predicting the consequences in earnest since the 1970s<sup>1</sup> it is only recently that it has become more widely discussed as local and global weather patterns become less predictable and as the local and global impact becomes more apparent.

Recent extremes in global weather patterns have caused heatwaves, flooding, drought, tropical storms and surges in sea level, each bringing its own disruption to life and to food production. According to Oxfam, a UK development agency, the number of weather-related disasters has quadrupled since the 1980s<sup>2</sup>. While many of these disasters may happen elsewhere in the world, global interconnections and interdependence mean that they will have an impact in the UK. For example, there is currently a worldwide shortage of wheat, with grain reserves at their lowest for 25 years. This shortage has been attributed in part to global weather patterns, particularly the severe droughts in Australia, South America and across the US wheat plains. In contrast, severe flooding in the UK destroyed acres of wheat crops in 2007. The shortage has caused global wheat prices to soar and is having an impact on farms and families worldwide. In some of the world's poorest countries the UN is being forced to ration food aid<sup>3</sup>, while across the world wheat is now being grown to produce biodiesel. There are similar stories for other food staples such as maize.

In addition to the issues of climate change, there is also the reality that fossil fuels are a finite resource. At the moment a staggering 95 per cent of all our food relies on oil to produce it.<sup>4</sup> Oil is used to make fertilisers, to fuel farm machinery, to transport ingredients, to process and package food and to preserve it in fridges and freezers. And there are similar figures for the oil fuelling our cars, trucks, trains, planes and boats, as well as the everyday items we buy in our shops. What will happen then when the oil runs out? Although people have different opinions on when this will happen, no-one questions that it will happen.

With such a huge demand on our fossil fuel reserves and the climatic consequences of their use there is an urgent need to reduce our use of fossil fuels.

Aware of these issues and recognising the significance of the food and farming system both as a user of fossil fuels and a contributor to greenhouse gas emissions, Commonwork is looking to the future with the question *'How can Commonwork rethink the way it produces and distributes food in order to achieve high quality, organic produce and at the same time bring about a significant reduction in environmental impact by reducing its dependence on fossil fuel?'*

**Commonwork** is a group of organisations working towards sustainable solutions in farming, the environment and education. It was set up in 1976 as an exploration of living and working sustainably, recognising the interconnectedness of everything and everyone.

Commonwork today is an organic dairy farm with 300 cows, a residential study centre and an education programme and hosts 10,000 visitors a year. Three decades later Commonwork recognises that now, more than ever, there is the urgent need to acknowledge these global interconnections and to work together to find solutions for a more sustainable way of living and working. In particular, there is the need for radical solutions to reduce our greenhouse gas emissions and to reduce the reliance on fossil fuels. There isn't one simple solution; there needs to be an integrated approach including a system of low environmental impact lifestyles and work practices, energy-efficient building design and materials, alongside an increase in sources of renewable energy.

**Organic farming** By becoming fully organic in 2000, Commonwork has already greatly reduced its greenhouse gas emissions. Nitrous oxide, given off by nitrogen fertilisers, is 310 times more potent a greenhouse gas than carbon dioxide. These fertilisers also require fossil fuels to produce them and to transport them from factory to farm. Commonwork grows a lot of the crops to feed the dairy herd, again reducing the need to transport food to the farm from around the world. But there is a lot more that we can do.

Since 2005, Commonwork has been working with a number of individuals and organisations to explore how it can reduce its environmental impact. It has worked with Bill Dunster and colleagues at Zedfactory, an eco-architect group responsible for the UK's first zero fossil energy housing development, BEDZED, run entirely on renewable energy. As a result, we have drawn up a ten-year plan to help tackle some of the issues and to become a Zero (fossil) Energy Farm (ZEF).

## **The ten-year plan**

Although ambitious, Commonwork believes that the plan is achievable.

- 1 Undertake detailed audits on energy, waste and greenhouse gas emissions.
- 2 Run farm machinery on carbon neutral biodiesel.
- 3 Reduce greenhouse gas emissions (methane) from the dairy herd.
- 4 Generate remaining onsite electrical demands from renewable energy sources.
- 5 Generate all heat requirements from renewable energy sources and increase energy and water efficiency across the site (wood/solar thermal/photovoltaics)
- 6 Research and set up ZEF-ZED food provision link with web-based ordering schedules and contracts with urban local communities, enabling a regular income and reducing food miles.
- 7 Convert the Middle Yard as the trust's food and education centre.
- 8 Extend and integrate the study centre kitchen into the Middle Yard.
- 9 Add rural ZED homes as demonstration eco-homes for visitors and study centre users.

### **1 Energy, waste and greenhouse gas emissions**

These audits have been carried out and changes made to reduce our impact. For example, where possible, all lights use low energy lightbulbs; food waste is composted or fed to the chickens; and our electricity supplies have been switched to green energy tariffs.

### **2 Run farm machinery on carbon neutral biodiesel**

We have installed a biodiesel plant that converts waste vegetable oil to diesel that can be used in a number of farm and staff vehicles and machines. The waste oil is collected from three local chip shops.

### **3 Reduce greenhouse gas emissions (methane) from the dairy herd**

Mark Measures, a Commonwork Trustee, is working with the *Energy, Emissions and Agricultural Systems Integration* project at the Organic Research Centre, Elm Farm, developing benchmarking and practical solutions to reducing the climate change impact of producing food and supporting biodiversity. This work will inform Commonwork Farm's policy and practice.

Recognising that a large herd will produce large quantities of methane, Commonwork is rethinking the sort of farming it carries out in order to reduce our contribution to the greenhouse gases. The

plan is to reduce the dairy herd and to introduce a variety of animals, including sheep, pigs and poultry. We are also investigating the possibility of agroforestry.

In addition, Commonwork is looking at the latest in methane digester technology. In the early 1980s Commonwork installed one of the first methane digesters in the UK. It used methane from the dairy herd's slurry to produce heat and electricity. Although innovative at the time, the methane digester was not as efficient as hoped and had ceased working by early 2000s. Since then methane digester research and development has advanced and we are hoping to find a new methane digester that will suit our circumstances and be affordable.

#### **4 Generate remaining onsite electrical demands from renewable energy sources (wind)**

We have carried out surveys and feasibility studies to find the best site for a wind turbine. We have also held open evenings for neighbours to find out more and to comment on our plans. We are in the process of applying for planning permission to install two 15kw turbines, while at the same time keeping up with the latest advice and information on the suitability of these turbines.

#### **5 Generate all heat requirements from renewable energy sources and increase energy and water efficiency across the site (wood/solar thermal/photovoltaics)**

We have installed a woodchip boiler to replace the oil fuel used to heat Bore Place House. To start with, the boiler will use woodchip from a local source but the long-term aim is use the wood from our own woodlands.

#### **6 Research and set up a ZEF-ZED food link with web-based ordering schedules and contracts with urban local communities to help reduce food miles**

One of the biggest contributors to transport emissions is through food. Vast quantities of food are transported across the country as well as around the globe. We would like to help to reduce this by setting up local food links between Commonwork and a number of hubs where people can collect food deliveries. Our first trial will be with the BEDZED community in south London. We will work with local producers to co-ordinate a catalogue of provisions and a web-based ordering system. One of the first steps towards this is Commonwork's new dairy. We are now pasteurising our herd's organic milk on site and selling organic milk and cream to small, local shops. We plan to develop this so that it forms the core product range in our food links programme.

## **7 Convert the Middle Yard as the trust's food and education hub**

A vital part of working towards sustainable solutions is involving other people and sharing ideas and experience. To do this more effectively and efficiently we need to have a dedicated space for both young people and adults that can be used as classroom, workshop and exhibition / resource space. We would like to convert half of the existing Middle Yard into a large learning space. The conversion would be carried out using energy-efficient design and materials. It would also be in keeping with the vision and ethos of Commonwork.

## **8 Extend and integrate the study centre kitchen into the Middle Yard**

Food and nurturing are an important part of Commonwork's ethos. With over 5,000 meals to prepare and cook each year, the existing study centre kitchen is no longer sufficient. We are also offering more hands-on cooking activities for both young people and adults as a way of encouraging healthy attitudes to food and the myriad food issues. We would like to convert the other half of the Middle Yard into a larger kitchen and dining area to be used by study centre visitors, students and staff alike. This would bring the nurturing heart of Commonwork into the physical centre of its space and a chance for all who use Bore Place to mix

## **9 Add two rural ZED homes as demonstration eco-homes for visitors and centre users.**

As part of a demonstration of how people can make changes to reduce greenhouse gas emissions and to reduce dependence on fossil fuels, we are planning to build two low-cost ecohouses, designed by Bill Dunster Architects, for visitors to experience how low-impact living can be achieved without a loss of quality of life.

## **Conclusion**

This ten-year plan will help to reduce our greenhouse gas emissions and reduce our use of and reliance on fossil fuels. This, however, is not our only aim. We would also like to demonstrate that these actions and results can be achieved by others; whether in a rural agricultural context or at the level of a domestic family dwelling. And that the outcomes are of a high quality, whether quality of life or, in the case of farming, the production of a high quality product that outperforms conventional fossil fuel approaches while at the same time stimulating rural regeneration.

By taking organic farming principles further, Commonwork can re-think UK agriculture using ZEF methods to create viable, practical solutions. The results will increase the quality of life for ordinary people, reduce dependency on fossil fuels and contribute to a more stable, democratic, and peaceful society, both at a local and a global level. We do not intend to work in isolation, however. We have made, and will continue to make use of the latest relevant research and experience. Through such collaboration we are fulfilling Commonwork's ethos and vision of interdependence and of working together.

Our ten-year plan builds on the excellent work already achieved at Commonwork to date, and will mean that Commonwork is able to meet most of the UN suggestions for business and industry, while providing a mechanism to help the UK government meet its carbon reduction targets for 2050 by 2015.

The total cost of the ZEF project is likely to be around £1 million, excluding Commonwork staff time. The costs could be spread over a ten year period, with an average annual spend of around £100,000/annum. Considerable detail is required to produce a sensible implementation plan, however experience from other complex renovation projects indicate these approximate costs to be a reasonable value.

There is no attempt to justify these costs commercially, as this is a pilot project and would bear research and pioneering costs. However it would aim to deliver a working model, which would operate with a sustainable triple bottom line (social, environmental and financial), and would share the learning and demonstrate farming systems and practices for replication through the industry.

ZEDfactory, Best Foot Forward, Commonwork and their partners are working together in partnership with enthusiasm, expertise and appropriate experience to see this proposal become a working reality.

**If you can help in any way** or would like to stay in touch with our progress, please contact Jacqueline Leach, Commonwork director, [jacquelinel@commonwork.org](mailto:jacquelinel@commonwork.org)

## **What we can all do**

Alongside the large-scale actions in Commonwork's ten-year plan, are the everyday actions that everyone can and should be taking. Through our education programme and through our own day-to-day actions, we aim to encourage young people and adults alike to consider their own environmental impact and the steps they can take to reduce it. The following are just a few of the many small steps we can all take that add up to a large impact.

- Switch off lights
- Turn down thermostats
- Apply for grants for cavity wall and loft insulation (include sources for further info)
- Share transport wherever possible
- Where possible replace short car journeys with cycling or public transport
- Buy more local and organic food
- Reduce the amount of packaging
- Choose reusable shopping bags instead of plastic ones
- Switching to green energy suppliers, etc, etc

## **References**

- 1 Henson, R. 2006. *The Rough Guide to Climate Change* p236 Publ Rough Guides
- 2 World Services News Broadcast, Nov 2007 (or see Oxfam's website)
- 3 Julian Borger, *The Guardian* 26 February 2008
- 4 Jeremy Leggett 2007 *The Peak Oil Problem* from *One Planet Agriculture The Case for Action* publ Soil Association

## **Useful additional references**

Organic Farming and Climate Change, International Trade Centre UNCTAD/WTO  
[www.intracen.org/organics](http://www.intracen.org/organics)