

Zero-carbon Britain: looking to the future?

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'But geography specialises in doing something no other academic subject does so well – it looks forward' (Dorling and Lee, 2016)

In what way then does *your* teaching help students think critically and creatively about their possible futures? We stand at an historical crossroads, where making wrong choices will have dangerous consequences. Rex Walford (1984) warned us, some thirty years ago, that geographers should not walk backwards into the future. 'Walking backwards' into the future is like reversing down a road to avoid urgent hazards ahead. Yet this is what many educators are doing in relation to climate change. 'Walking forwards' into the future is to be forewarned and prepared for what is to come (Sheppard, 2012). I wonder what your students have learnt, or not learnt? What do they *need* to learn?

Facing the future

The future looks difficult for many reasons, well charted by Randers (2012) in his review of global trends over the next forty years. After fifty years of research into climate change the data are clear. The average global temperature each year is hotter than the previous one; atmospheric carbon dioxide has passed the dangerous 400 ppm mark; sea levels are rising more quickly than expected and extreme weather – floods, drought, storms and bush/forest fires are becoming the 'new normal'. None of this is particularly good news, which raises the question 'What should the role of geography be in such troubled times?' (Hicks, 2012, 2014).

Educators today, especially geographers, should see themselves as scouts going ahead to gain knowledge of terrain yet to be traversed and choose a safe route. We do this as parents and grandparents because we are the protectors of the young. Our task is to keep them out of danger and prepare them as best we can for the hazards that lie ahead. Every generation bears this responsibility and what would geography be if it did not feel an equal responsibility for this task?

While we can no longer halt climate change we can all learn how to mitigate its effects, through reduction of our carbon footprint and knowing how to adapt to the changes it will bring to everyday life (Randall and Brown, 2015). One idea I find helpful in this context is the notion of cultural narratives or stories, those we learn by osmosis in childhood, which societies use to explain their history and achievements. In the context of climate change we're faced with two competing narratives – the old high-carbon story and a new zero-carbon story. One looks back to the past, to a society addicted to fossil fuels, which brought great material progress but also

global warming and climate change. The other looks forward to the future, a society based on clean and safe renewable energy, leading to the possibility of a more humane and sustainable future (Hicks, 2016).

A zero-carbon Britain

Currently terminology varies – low-, zero- or post-carbon. Low-carbon could mean a lot lower or just a little; zero-carbon is quite specific; post-carbon is what might come after that. One of the most authoritative studies, drawn on here, is *Zero Carbon Britain: Rethinking the Future* (CAT, 2013). The authors stress that while the science is clear and the technology already exists, in the face of accelerating global warming change is not happening fast enough. Their detailed scenario illustrates how UK greenhouse gas emissions can be reduced to zero by 2030.

'There is simply no precedent for the scale of the challenge we currently face ... We offer a robust scenario that integrates cutting-edge knowledge and experience from a wide range of disciplines. It is a scenario showing that Britain can be a zero-carbon society and gain benefits to health and wellbeing along with it.' (CAT, 2013)

Renewable energies

The scenario is based on technologies which demonstrably work and which together can supply 100% of the necessary renewable energy. This requires both a 'powering down' and a 'powering up'. Powering down involves reducing our energy use through more efficient technologies and making changes in the way we live. Powering up requires rapidly developing our available zero-carbon energy sources (on- and offshore wind, solar PV and thermal, wave and

David examines the scenario for a zero-carbon Britain and how changes in energy use, building, farming and transport can contribute to this.



Figure 1: Whitelee wind farm, Scotland. Photo: © Ian Dick.

tidal, hydropower and biomass) together with appropriate forms of storage and the matching of demand to supply (Boyle, 2012). Where are the nearest examples to you? What follows is an outline of some key features in a zero-carbon landscape. They are all inextricably interrelated and lie at the heart of a new cultural narrative.

Homes and buildings

High energy efficiency standards for all new buildings and retrofitting of existing housing stock can reduce UK energy demand for heating by 50%. The goal is a minimal carbon footprint, in both construction materials and energy usage. In the face of more varied and extreme weather conditions, all buildings need to be able to survive storm, flood, rising sea level and drought. Many individuals, families and businesses are already taking responsibility for limiting their energy consumption through the use of loft and wall insulation, solar PV, energy saving appliances and switching to green electricity suppliers (Hicks, 2016). Support from local, regional and national authorities is vital in this endeavour and should not be limited by political blindness to the new risks we face. One of the best-known energy-efficient building designs is the Passivhaus (2017), which uses 90% less energy for space heating than the average UK house. An increasing number of schools are being built to this standard and are becoming a lived-in experience for students as part of their 'new' normal. Where are the nearest examples in your community of such new and retrofitted homes and buildings?

Food and farming

The food we eat and how it's grown will change in order to reduce CO₂ emissions from the global food chain and to adapt to new extremes of weather. Some crops are likely to become ungrowable which will create spaces for new alternatives. In the early 90s the UK was 87% self-sufficient in food but that is now dropping towards 50%. In terms of food-security the UK will need to become much more self-reliant (Farming Futures, 2017). Food grown and sold more locally means lower food miles and less CO₂. Two significant greenhouse gases here are nitrous oxide, released in the manufacture of fertilisers, which has 300 times the impact of CO₂, while methane from the digestive systems of cattle and sheep, manure and slurry, has 25 times the impact. Less meat and fewer dairy products equals less methane. Anaerobic digesters can convert much of this waste into biogas to generate electricity and heat. The mix of different foods in our diets affects the types of land needed for agriculture. Land used for grazing livestock becomes less dependent on oil-based fertilisers. There is a growing interest in food-growing skills and community land-share projects, often with an organic slant as an antidote to the impact of industrialised farming on soil health, land use and ecology. Where are the nearest examples to you?

Travel and transport

In 2010, transport accounted for nearly 40% of UK energy use and generated 25% of our greenhouse gas emissions. Walking, cycling and



Figure 2: A solar settlement, Freiburg, Germany. Photo: © SoSie+SoSchiff Ansicht CC.

using more efficient public transport reduce demand for energy, and most transport in the next decade is expected to be electric. Living closer to where we work and play will reduce our transport needs, and infrastructure is improving in our towns and cities, with cycle lanes and paths for pedestrians. Freight will also be reduced as more of our food and all our energy will come from within the UK. The Netherlands has long been extolled for its stress on cycling as a norm rather than for the few. Newcastle's 'Go Zero' campaign aims to reduce the city's carbon footprint by encouraging residents to travel in more sustainable ways. There are over eighty charging points for electric vehicles (EVs) across the city in recognition of a growing demand for greener travel. A useful website for advice on low-carbon driving is Next Green Car (2017). Where are the nearest examples to you?

Consuming and wasting

The deeper problem that underlies a high-carbon lifestyle is the addiction to material wealth and the unsustainable consumerism it has fostered. Earth Overshoot Day (2017) is the day in the year when our activities become unsustainable: the rest of the year represents our dangerous carbon emissions and surplus wastes. If we lived in balance with the planet's carrying capacity, i.e. sustainably, this day would occur on 31 December. In 2011 it was 21 September, in 2013 20 August and in 2016 8 August. One way of reversing the trend, whether at home, school, work or in the community, is to understand that this commits us to much more than just recycling. The full mantra has three vital steps before leaping to recycling – *reusing* many more things than we do, *reducing* the number of things we use, *refusing*

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Online resources

The download accompanying this article is a copy of the author's book *A Climate Change Companion: For family, school and community* (2016). Available as a paperback and at: www.teaching4abetterworld.co.uk/books/download24.pdf A review of this book can be found on page 77.

McKay, J. and Dickson, B. (eds) (2016) *A dream of a low carbon future*. Leeds: University of Leeds. Available at: <https://cdt.engineering.leeds.ac.uk/dtc-low-carbon-technologies/research/documents/ADreamofaLowCarbonFuture.pdf> (All websites last accessed March 2017.)

anything that might contribute to overshoot and, only finally, *recycling*. In a zero-carbon sustainable society this will need to apply to every aspect of life. Where are the nearest examples to you?

Rethinking the future

So why might we decide, collectively, to do all of this and more? The old high-carbon cultural story which brought us wealth, but carnage to the biosphere, has been found wanting. Addicted to the use of fossil fuels, we stand now at a historical turning point as 'wicked' as any society has faced. If we continue to promote this story, commentators say we face decline and maybe collapse in the face of increasingly dangerous climate change (Monbiot, 2016). Are you prepared to face this risk? The new zero-carbon story may feel too big an ask: too impossible, too demanding, more than I can manage. As a geographer, however, you cannot bypass this global collision of stories here in our space-time (Morgen, 2016; Porritt, 2013). To do nothing is to assent to the high-carbon status quo. What your students urgently need is:

- the ability to *imagine* a zero-carbon future
- the opportunity to *visit* zero-carbon initiatives
- the time to *learn more* about such ventures
- the space to *reflect on* their importance
- your *support* in developing their sense of agency.

To understand what needs to be done in this great transition is to offer hope to your own children (born or unborn) and the students you teach, giving them the tools they will need to face the future and rethink the world they find themselves living in. | **TG**

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