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Reviews

Can we fix it?

Handbook of Low Energy Buildings and District Energy Systems
by L D Danny Harvey

Prof. Danny Harvey has spent half his life modelling climate and energy scenarios, writes Hywel Davies. So he was well versed in predictions of increasing global temperatures in the coming century, coupled to rising levels of atmospheric carbon dioxide, well before the latest IPCC report. He is also aware of the energy prospects facing us. His conclusion is that we have to cut carbon emissions, and energy use: far, fast, and now.

So begins the fascinating journey which unfolds within this book, as he sets out to discover whether we have the technology to keep atmospheric carbon dioxide levels below 450ppm. We need a fourfold reduction in intensity of energy use – in industry, travel, and most importantly for this study, in buildings.

Harvey sets out to answer questions. "Can we build new buildings that use a quarter of the energy (or less) of current new buildings?" "Can we refit existing buildings to reduce their energy use significantly?" "Do we have the technology and products?" Above all, what does a fourfold reduction in energy use entail, and are there real life examples that show it can be done now?

After a brief review of the evidence for climate change, and the need to cap atmospheric carbon dioxide levels, Harvey turns to the technology of buildings. Chapter 3 surveys thoroughly how buildings lose (and gain) heat, the thermal performance of building fabric, and what is currently widely used but also what higher performance products are now available. It shows what can be done to minimise building energy demands through design of the fabric and minimising the loads to be met by the plant, well before anyone gets to think about a fan coil unit, or any other kit.

The next chapters look at the energy-using systems in buildings, and provide a thorough treatment of many aspects of building technology. They are not for teaching specialists, but cover enough of the principles to enable building professionals from a range of backgrounds to understand the bigger picture of building energy performance.

This brings the reconnaissance to an end. In the last 100 pages of the book we arrive, and apply much of what was learned on the way. Chapters 13 to 15 present what is already being done, using best design, technology and products, to deliver new low-energy buildings, to retrofit existing buildings in an energy-efficient way, and to provide energy for buildings from communal systems. Nor is this review limited to North America, but takes in Europe, Japan and South East Asia; and it covers both dwellings and commercial buildings.

It is a curiosity that the title of the book refers to District Energy, when it only gets one chapter. There is doubtless good reason for this, but it isn't obvious, and is slightly misleading.

The journey concludes by summarising the key points, and includes two invaluable tables. One summarises the design features, technology and systems that can be used to deliver low-energy buildings. The other looks at how to enhance the performance of existing stock, with indications of payback. The final chapter also asks what non-technological barriers lie in the way.

This is a big book, and it tackles a big subject. On the whole, it does it well - it provides plenty of detail within the big picture, and it does engage with experience throughout America, Europe and Asia. The references are plentiful, and international. Some of the awareness of regulations outside North America is shaky, but given the speed with which they are changing, it is understandable. It is unfortunate for UK-based readers that the references to standards and industry publications are primarily North American, as there is recent and relevant material from the CIBSE, for example, that supports practitioners wanting to deliver low-energy buildings.

But these are small things. Professionals seriously working in the field of low-energy buildings ought to have a copy of this handbook, as I believe it will more than repay the cost.

"Can we fix it"? "Yes we can". But there's no time to lose!

Learn more:

- Handbook of Low Energy Buildings and District Energy Systems by L D Danny Harvey, [Earthscan Publications](#), 2006, Hardback £150.00, ISBN: 1844072436.
- Hywel Davies is an independent consultant specialising in energy efficiency and building services. He has been closely involved with the development of a number of guidance documents related to the Building Regulations in England and Wales.