RENEWABLE ENERGY

A RESOURCE PACK FOR TERTIARY EDUCATION

RENEWABLE ENERGY

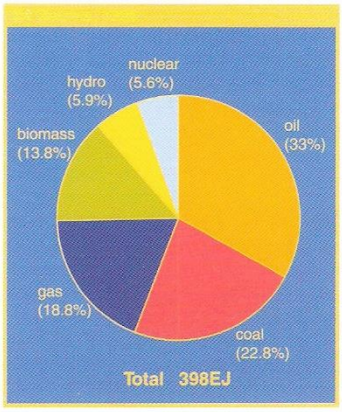
An increasingly important contributor to world energy supplies

Renewable energy sources – the sun, the wind, the flow of water, biomass, wastes and hot springs – have been harnessed for the benefit of humanity for thousands of years. Despite the enormous increase in use of fossil and nuclear fuels during the 20th century, renewables, in the form of hydroelectricity and traditional wood fuel, still meet between 16% and 20% of the world's primary energy requirements.

The potential for using renewables is enormous. For example, the sun continually supplies the earth with energy at a rate more than 15,000 times current consumption of conventional fossil and nuclear fuels. Currently, only a tiny fraction of this potential is harnessed.

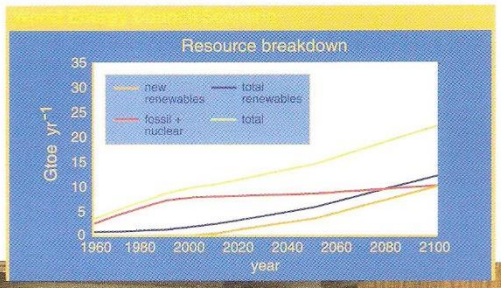
Renewables have long been recognised as clean, safe and non-depleting sources of energy. However, where alternative conventional energy sources have been available, the costs of renewable energy sources have generally not been competitive. But in recent years, as a result of technological developments, their cost-effectiveness has improved markedly. As recognition grows of the environmental and social costs associated with conventional energy sources, the renewables look increasingly attractive and viable. Most expert studies now predict that they will play an increasing role in contributing to the world's energy supplies during the remainder of the decade and into the 21st century.

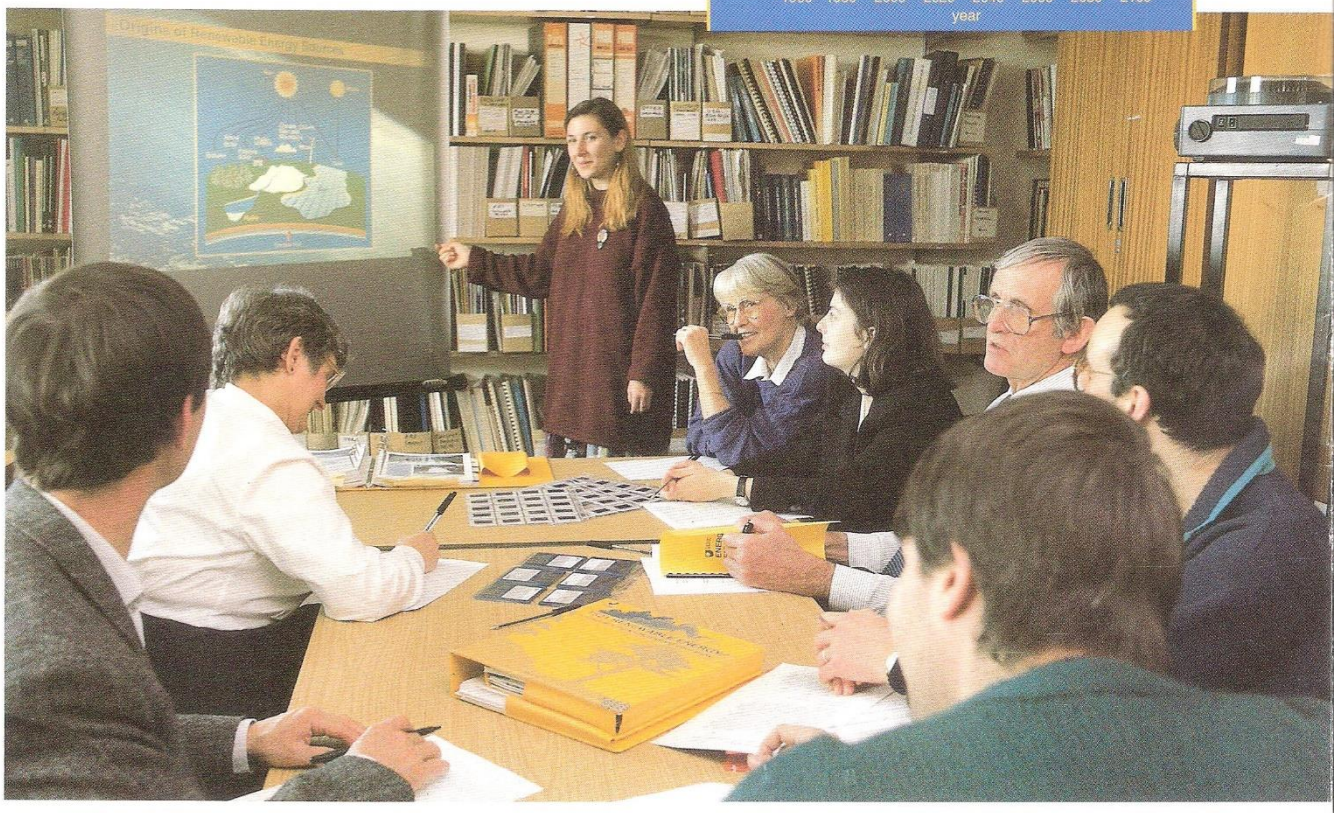
Estimated annual world primary energy consumption by source, 1992. The primary energy contributions of nuclear and hydro electricity are calculated on a fuel substitution basis.



A projection of world energy demand to 2100, and the estimated contributions of renewables and conventional fuels.

World Energy Council (1993), Long-Range Ecologically Driven Scenario





A RESOURCE PACK FOR TERTIARY EDUCATION

This exciting new Pack on renewable energy from the Open University provides a *multi-media resource* for lecturers and professors in the tertiary education sector. It has been designed to support the *extension of existing teaching programmes to cover the topical and interesting subject of renewable energy.*

The Pack features:

- detailed user guides to all components
- 550 A4 pages of original text, fully illustrated in two colours
- 35 minute video
- 80 full-colour slides
- 6 disks of software and data
- 19 useful leaflets, booklets and brochures
- 40 reprints of articles and conference papers
- 100 pages of exercises, questions and answers, and seminar topics
- lists of useful addresses.

It is presented in a slip case containing two large ring binders.

The Pack is intended for use *across a wide range of academic disciplines* and can support teaching from *introductory to advanced level.* Renewable energy, as an inter-disciplinary topic, can be particularly valuable in *encouraging students to take a broader perspective of their chosen field of study.*

The Pack covers the principal renewable energy sources:

- wind
- hydro
- biomass
- solar thermal
- photovoltaics
- tidal
- wave
- geothermal.

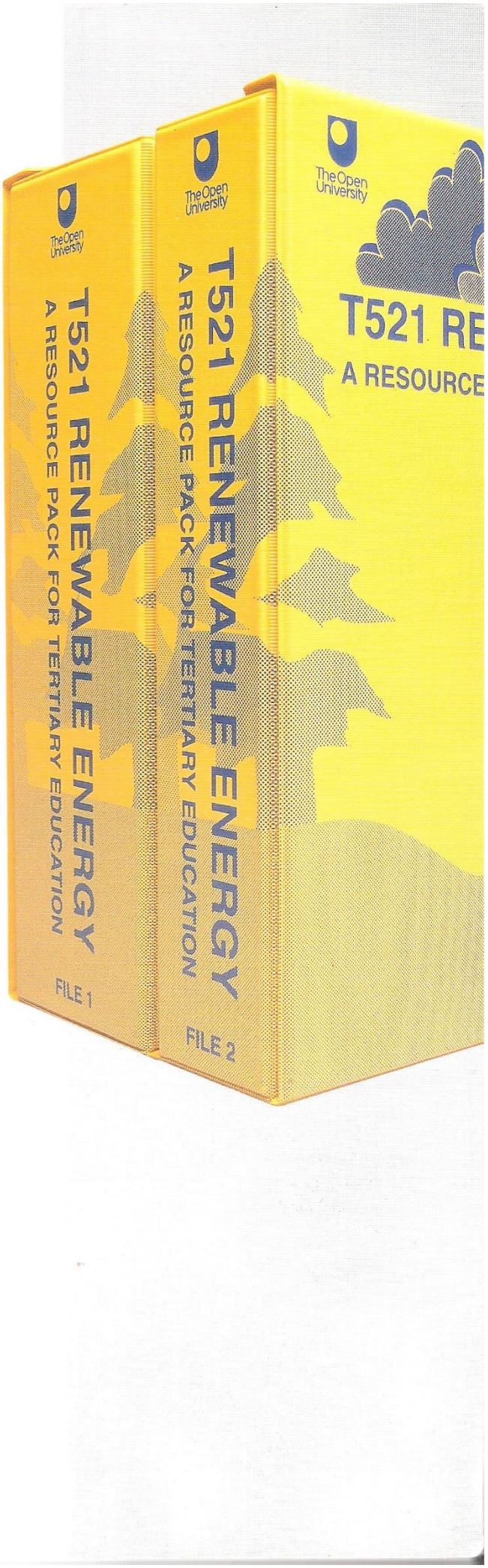
With the aid of more than 350 illustrations, it explains the *physical and engineering principles* underlying each source and discusses its *future prospects.* Also included are sections on *economics, resource assessment* and *integration,* a detailed *index,* and an extensive selection of *exercises* and *seminar topics.* The Pack focuses on deployment of renewables in the UK, but also covers developments in other parts of Europe and the rest of the world.

The Pack has been developed by a team of academics and support staff at the Open University Energy and Environment Research Unit, assisted by consultants and assessors from other UK universities. The coverage throughout is detailed, authoritative and up-to-date.

Funding for development of the Pack was provided by the UK Department of Trade and Industry through ETSU, a division of AEA Technology at Harwell, Oxfordshire.

Whether you already lecture in the area of renewable energy or are considering introducing teaching modules in this fast-developing field, we are confident that you will find ***Renewable Energy: A Resource Pack for Tertiary Education*** *extremely useful and exceptional value for money.*

Place your order now by completing the enclosed order form.



WHAT'S IN THE PACK?

User guides

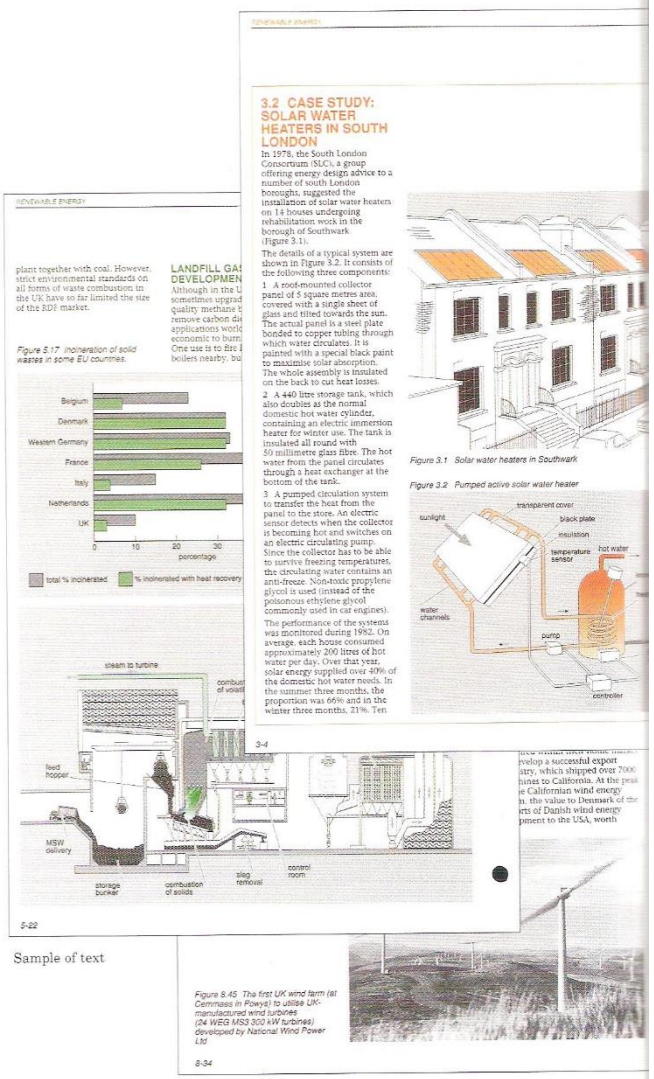
The teaching resources within the Pack can be used in many different ways. They can provide the basis for an entire course on renewable energy, or enable selected aspects of renewables to be covered within courses on a wide range of other subjects. To help lecturers make the most of the Pack's resources, *User Guides* have been provided for all components, outlining their contents and suggesting ways in which they can be used in teaching. The *User Guides* comprise:

- Guide to the Pack
- Guide to the Slides
- Guide to the Video
- Guide to the Software
- Guide to the Reprints
- Guide to the Leaflets
- Guide to the Exercises

The main text

550 pages of two-colour text with the following chapter headings:

- The Context of Renewable Energies
- Cost and Resource Assessment
- Solar Thermal Energy
- Solar Photovoltaics
- Energy from Biomass
- Hydroelectricity
- Tidal Power
- Wind Energy
- Wave Energy
- Geothermal Energy
- Integration of Renewable Energy Sources.



Sample of text

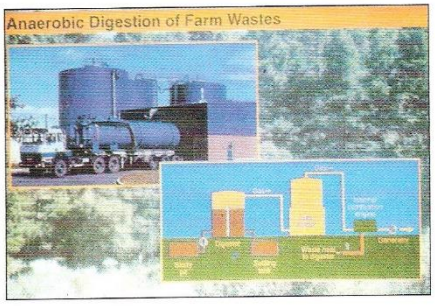
Fully illustrated, with 78 half-tones and 278 line diagrams. Comprehensive 17-page Index.

Printed in A4 format, with each section tabbed and 4-hole punched for filing in the easy-to-use ring binder provided.

Slides

A set of 80 full-colour 35mm slides covering all major renewable energy sources, plus cost and resource assessment, integration and future prospects. Most slides include multiple images – text, graphics and photographs.

Example of slide



Pack contents

Video

The Renewable Present, a 35-minute video covering:

- case studies of commercial projects: wind energy, biofuels and hydroelectricity
- animation sequence explaining the sun's role as the main source of renewable energy
- the developing renewables: solar thermal, photovoltaics, wave, tidal and geothermal
- overview of future prospects for renewables in the UK, Europe and the world.

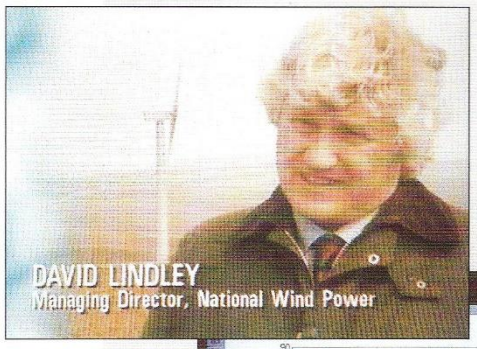
Software

Six 3.5" disks providing models and examples of renewable energy systems in spreadsheet format (Lotus 123). Also included are files of solar, wind, temperature and tidal data.

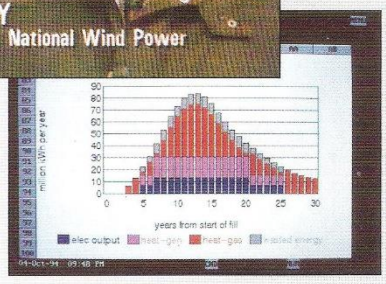
Reprints

A collection of 40 reprints of authoritative journal and conference papers, book extracts and shorter articles for classroom discussion, designed to complement the main text and packed in a convenient wallet.

Still from video



Software
PC display



Leaflets and useful addresses

An assembly of 19 manufacturers' brochures, posters, charts, magazines and booklets on the renewable energy sources, plus compilations of UK and world energy data, and a list of useful addresses from which further information can be obtained.

Exercises

More than 100 pages of short exercises, solutions, essay and seminar topics and role-playing exercises.

Short Exercises

The short exercises are mainly numerical and relate closely to each of the 11 main text sections. They involve calculations designed to give students a feeling for the quantities involved and to provide practice for those less used to numerical work.

Solutions to Exercises

Solutions to the numerical exercises, together with comments on their role in the development of each topic.

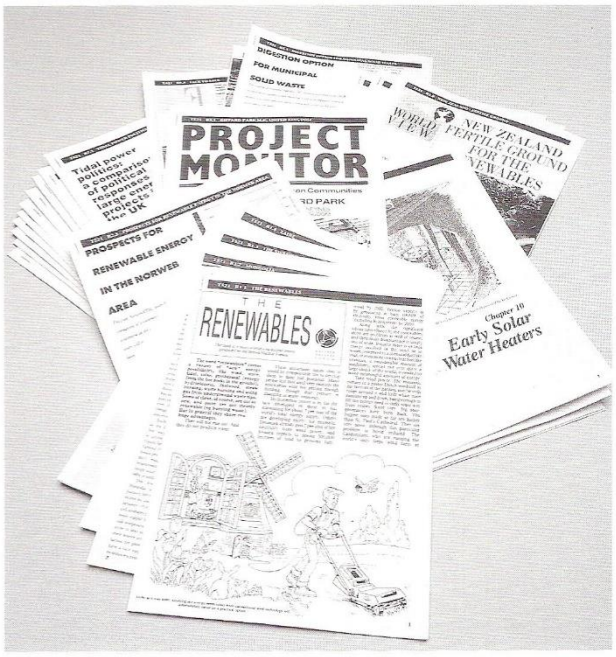
Essay and Seminar Topics

Suggestions for essays and seminars, ranging from simple essay titles to more detailed case study specifications.

Role-Playing Exercises

Explanatory material and documentation for three role-playing exercises, on wind farming, tidal energy and the use of renewables on an imaginary island.

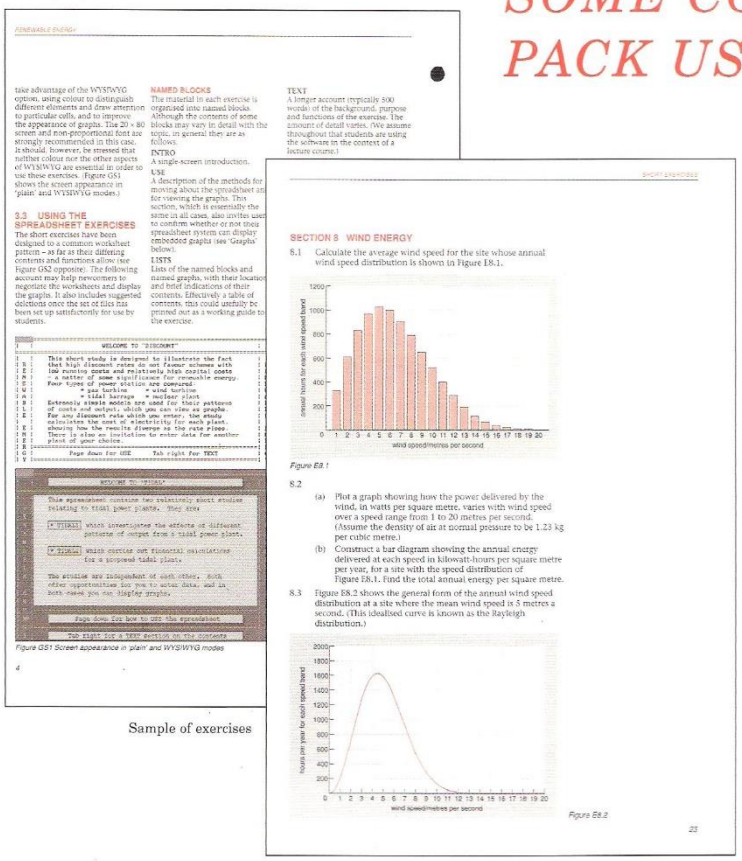
The full text of the exercises is also provided on one of the software disks described above, to allow lecturers to adapt the exercises for their own purposes.



Reprints

Leaflets

SOME COMMENTS FROM PACK USERS AND ASSESSORS:



Sample of exercises

"... an excellent product which presents a balanced view of renewable energy in all its forms, including their advantages and problems. The Team have successfully covered the material at the higher education level and I certainly will use it in my undergraduate 'Energy and Environment' course and probably also at the MSc level."

Prof. David Hall

King's College, London. External Assessor.

"The Open University Renewable Energy Pack will be a valuable resource for use in lecturing and tutoring to many groups of students ranging from architects and engineers to those with a less technical background. The range of materials included in the pack is excellent and will certainly be widely used at the University."

Dr Adrian Pitts

University of Sheffield.

"... wonderful pack, logical, well laid out, just the right degree of environmental, technical and economic content."

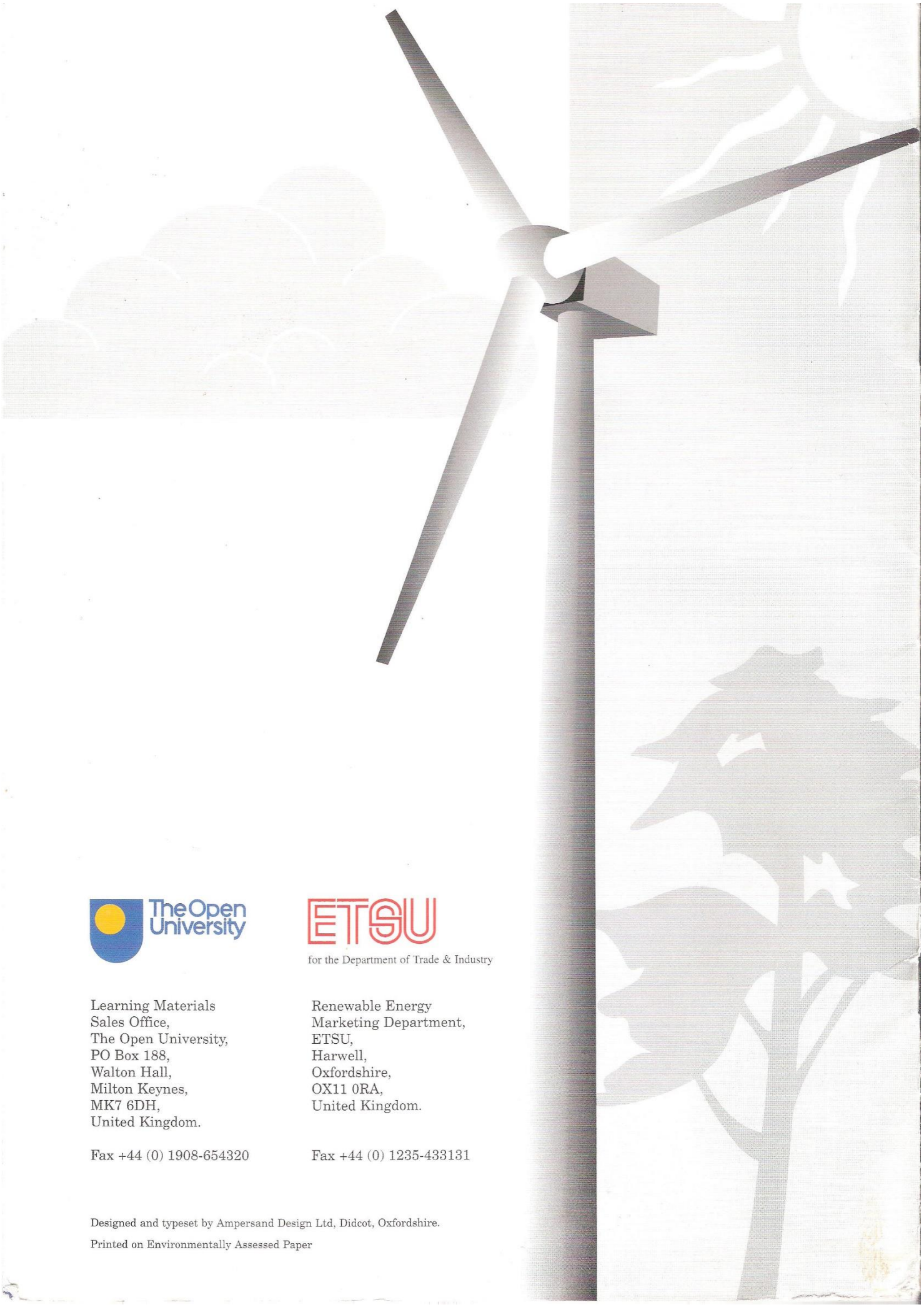
Dr Kathy Langley

Nene College, Northampton.

"... I greatly welcome the production of the Renewable Energy Resource Pack for Tertiary Education. It will help meet a real need. ... It should be of value not only for those engaged in education but for all concerned with future energy policy."

Sir Crispin Tickell

Warden of Green College, Oxford University and former UK Ambassador to the United Nations



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