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Edited by Stephen Dovers

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SUSTAINABLE ENERGY SYSTEMS

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Dovers *Sustainable Energy Systems*

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| 5 Beverages and tobacco | 19 Water |
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| 8 Paper products, printing, publishing | 22 Transport, storage, communication |
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FUNDAMENTAL QUESTIONS PROGRAM

This book is published as an outcome of the Fundamental Questions Program of the Centre for Resource and Environmental Studies, The Australian National University. The Program began in 1988, focussing interdisciplinary research efforts on the problem of achieving ecological sustainability. Energy was one of the original theme areas.

The Program promoted research and systematic discussion on the implications of this fact for the future of human society. The design of the Program reflected appreciation of the fact that the biosphere, as a system capable of supporting humankind, will not tolerate indefinitely the pattern of resource and energy use characteristic of present-day society. An aim of the Program was to present the research outcomes to a wider audience. This book seeks to fulfil this aim in the area of sustainable energy.

Information about the Fundamental Questions Program and publications arising from it can be obtained from the Centre for Resource and Environmental Studies, Australian National University, ACT 0200.

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Pathways for Australian Energy Reform

Edited by

STEPHEN DOVERS

*Centre for Resource and Environmental Studies,
The Australian National University*



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CAMBRIDGE UNIVERSITY PRESS
 Cambridge, New York, Melbourne, Madrid, Cape Town,
 Singapore, São Paulo, Delhi, Tokyo, Mexico City

Cambridge University Press
 The Edinburgh Building, Cambridge CB2 8RU, UK

Published in the United States of America by Cambridge University Press, New York

www.cambridge.org
 Information on this title: www.cambridge.org/9780521477574

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First published 1994
 Re-issued 2011

A catalogue record for this publication is available from the British Library

Library of Congress Cataloguing in Publication Data

Sustainable energy systems: pathways for Australian energy reform/
 edited by Stephen Dovers.

Includes index.

1. Power resources - Australia. 2. Energy policy - Australia.
3. Renewable energy sources. I. Dovers, Stephen.

TJ163.25.A8S87 1994

333.79'094-dc20

94-14986
 CIP

ISBN 978-0-521-43099-9 Hardback

ISBN 978-0-521-47757-4 Paperback

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Units and conversions

In this volume, the units used are joules (J) and Watts (W), or multiples thereof. These units are defined in Chapter 1. The multiples used are as follows:

kilo (k)	$\times 10^3$	kJ, kW, kWh
mega (M)	$\times 10^6$	MJ, MW, MWh
giga (G)	$\times 10^9$	GJ
peta (P)	$\times 10^{15}$	PJ

The following allows for conversion between commonly used energy units:

1 calorie = 4.2 joules

1 million tonnes oil equivalent (MTOE) = 41.9 petajoules (PJ)

1 million tonnes coal equivalent (MTCE) = 28.8 petajoules (PJ)

1 British Thermal Unit (BTU) = 1.055 kilojoules (kJ)

1 kilowatt-hour (kWh) = 3.6 megajoules (MJ)

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Preface

This book addresses the very urgent imperative of creating energy systems that are both ecologically sustainable and humanly desirable. The intention has been to integrate a number of views of energy: the historical context; a systemic view of energy across society; longer-term visions of what might be possible; pragmatic analyses of what can be achieved in a practical sense; and considerations of appropriate policies. The emphasis is both on surveying available technologies, and on identification of the non-technical barriers which influence their adoption or avoidance. Another aim has been to communicate the material in a manner accessible to a wider readership. The primary focus here is on Australia, but much of what is discussed can be applied more widely. While the coverage is not complete, the pathways of energy reform described here offer substantial opportunities if society is prepared to follow them.

The book is unapologetically reformist. Not too much space is devoted to discussing the basis of the problem – the great human and ecological dangers of continuing with our present energy systems are well enough established. After some fundamentals are covered in the first two chapters, the book moves on to what we can do. Part 2 deals with conserving energy and using it more efficiently. Part 3 describes renewable energy options. Part 4 considers the policy measures available to us.

Some acknowledgements are required. To a large degree, I became convener of the energy theme in the Fundamental Questions Program and thus editor of this book, by default and with little grounding in, but none the less a broad enthusiasm for, the complex area of energy. The help and support of other people has been needed and appreciated. The research program was enabled only through the direction and inspiration of Stephen Boyden, whose comments on the manuscript

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were greatly appreciated. The support of the Director of CRES, Henry Nix, was crucial. The contributors to this volume provide it with its substance, and all have done this in the face of many other pressing responsibilities. The figures were drawn by Kevin Cowan of The Australian National University.

S. DOVERS