THE ECONOMICS OF CHOICE BETWEEN ENERGY SOURCES

Also edited by Douglas Hague:

ECONOMIC PROGRESS (with Léon Dupriez)

THE ECONOMICS OF RELATIVE PRICES
(with Béla Csikós-Nagy and Graham Hall)

STRUCTURAL ADJUSTMENT IN DEVELOPED OPEN ECONOMIES (with Karl Jungenfelt)

Also edited by Chris Rowland:

THE ECONOMICS OF NORTH SEA OIL TAXATION
(with Danny Hann)

The Economics of Choice between Energy Sources

Proceedings of a Conference held by the International Economic Association in Tokyo, Japan

Edited by

Pierre Maillet,
Douglas Hague
and
Chris Rowland

Palgrave Macmillan

ISBN 978-1-349-18626-6 ISBN 978-1-349-18624-2 (eBook)
DOI 10.1007/978-1-349-18624-2

First published in the United States of America in 1987

ISBN 978-0-312-23677-9

Library of Congress Cataloging-in-Publication Data
The Economics of choice between energy sources.
Includes index.
1. Energy policy—Congresses. I. Maillet, Pierre,
professeur de science économique. II. Hague, Douglas
Chalmers. III. Rowland, Chris. IV. International
Economic Association.
HD9502.A2E24 1987 333.79 86–13732
ISBN 978-0-312-23677-9

Contents

Foreword

Pierre Maillet

CHAIRMAN

The last decade has taught us two important lessons concerning energy economics and energy policy.

First, the era of world-wide concentration on one main source of energy has come to an end. After the dominance of wood, then of coal, and finally of oil, we are entering a period in which we will use a variety of sources of energy at the same time. Some are not renewable; the others renewable or very slowly exhaustible. The issue of defining the best mix of these alternative sources of energy comes to the forefront when defining an energy policy. If this problem is faced in different ways in different countries, it has to be solved in all of them, whether they are rich or poor in sources of energy.

Second, the impact of energy on the working of the national economy has become of vital importance. Surely we have known for a long time that a sufficient supply of energy is essential for the proper working of the economy, due to the ubiquitous role of this commodity. But we have realised more recently that the conditions of supply are also decisive for the functioning of the economy, through the impact on the balance of payments, on national investment and on employment, with the consequence that a good energy policy cannot be defined without taking into account very carefully the interrelations between the energy sphere and the economic sphere as a whole.

The first lesson has been learned, and most of the prospective studies about the balance between supply and demand for energy for the next few decades, either nationally or at world level, show quite clearly this process of diversification on the supply side. In addition, the possibilities of technical transformation from one primary source to many are being extensively studied in many laboratories, both private and public.

The second lesson, on the other hand, is penetrating the ways of thinking of the decision-makers much more slowly, and this delay is at the root of many misconceptions and failures in energy policies.

For this reason, the International Economic Association decided to organise one of its annual conferences around the theme of the economics of choice between energy sources, with the hope that papers and discussions might help the vast number of people interested in energy decisions, especially at the national or supranational levels, to accelerate the process of integrating in their reasoning various aspects of the interface between energy and the economy.

The conference held in Tokyo in October 1982 gathered together people from the academic world and people with much experience of energy policy (either in administration or as politicians), coming from fourteen countries all over the world and covering a wide spectrum of problems, different experiences and types of economies: five industrialised and market-oriented economies, three centrally-planned economies, six developing countries in Latin America and Asia.

The idea of holding such a conference was first expressed by Professor Shigeto Tsuru, former President of the Association, and was immediately endorsed by the Executive Committee. To both of them I express my sincere thanks. But Professor Tsuru should also be thanked very strongly for the ceaseless support he gave, as Co-chairman of the Programme Committee, for the organisation and the holding of the conference. In fact, without him this conference would never have taken place. Once more he has given distinguished service to the International Economic Association and to economic science.

Acknowledgements

The International Economic Association wishes first to express its great appreciation of the work done in the organisation of this conference by Professor Shigeto Tsuru. Not only did he participate in its scientific preparation and ensure that all the arrangements for it went smoothly; he also arranged finance from two Japanese organisations. We thank the Federation of Electric Industries and Japan City Gas Association for their very generous financial support which completely covered all aspects of the conference – its scientific preparation, local administrative costs and travel and accommodation for all participants.

Programme Committee

Pierre Maillet, Shigeto Tsuru } Co-chairmen
A. Adelman
Oleg Bogomolov
Joe Stanislaw
Miguel S. Wionczek

List of Contributors and Participants

Mr N. Amaya, Adviser to the Japan Industrial Policy Research Institute, Tokyo, Japan.
Professor Lars Bergman, Stockholm School of Economics, Sweden.
Professor Antonio Barros de Castro, University of Rio de Janeiro, Brazil.
Professor Istvan Dobozi, Institute for World Economy, Budapest, Hungary.
Mr Lucien Gouni, Electricité de France, Paris, France.
Professor Sir Douglas Hague, Oxford Centre for Management Studies, Oxford, UK.
Professor Gerhard Hüber, Akademie der Wissenschaften der DDR, Berlin.
Mr Toyoaki Ikuta, Institute of Energy Economics, Tokyo, Japan.
Professor V. S. Mahajan, Department of Economics, Punjab University, Chandigarh, India.
Professor Pierre Maillet, University of Lille, France.
Professor K. G. Mäler, Stockholm School of Economics, Sweden.
Professor Tasuku Noguchi, Keio University, Tokyo, Japan.
Mr Michael Posner, Social Science Research Council, London, UK.
Professor Kamta Prasad, Indian Institute of Public Administration, New Delhi, India.
Dr S. Ramesh, Ministry of Energy, New Delhi, India.
Dr Chris Rowland, Farnham, UK.
Professor E. S. Rubin, Department of Mechanical Engineering, Carnegie-Mellon University, Pittsburgh, USA.
Professor M. Sadli, Djakarta, Indonesia.
Professor Wolfgang Sassin, International Institute for Applied Systems Analysis, Laxenburg, Austria.
Professor Hans-Karl Schneider, Institut an der Universität Köln, German Federal Republic.
Dr Walter Schulz, Institut an der Universität Köln, German Federal Republic.

Professor V. A. Shelest, Academy of Sciences, Moscow, USSR.
Professor Joe Stanislaw, International Energy Agency, Paris, France.
Professor G. Szegö, University of Rome, Italy.
Professor Shigeto Tsuru, Editorial Adviser, Asahi-Shimbun, Tokyo, Japan.
Professor Victor L. Urquidi, Presidente, El Colegio de Mexico, Mexico.
Dr José Miguel Uzcategui, Presidente, Federacion de Colegios de Economistas de Venezuela, Caracas, Venezuela.
Professor M. S. Wionczek, El Colegio de Mexico, Mexico.
Professor Zheng Guanglin, Institute of Scientific and Technical Information of China, Beijing, China.

Abbreviations and Acronyms

ASEAN	Association of South East Asian Nations (Indonesia, Malaysia, Philippines, Singapore, Thailand)
atm	standard atmosphere pressure
bbl	barrel
b/d	barrels a day
boe	barrels oil equivalent
BS	British Standards
Btu	British thermal units
CES	constant elasticity of substitution
cfd	cubic feet a day
CHP	combined heat and power
cif	cost, insurance and freight
cm	centimetre
CMEA	Council for Mutual Economic Assistance
CPE	centrally planned economies
cu	cubic
DC	Developing Country
DDR	Deutsches Demokratisches Republik
DH	district heating
EDF	Electricité de France
EEC	European Economic Community
EPA	Environmental Protection Agency (USA)
ESP	electrostatic precipitator
fob	free on board
G	Giga/10^9
GDP	gross domestic product
GDR	German Democratic Republic
GNI	gross national income
GWh	Giga watt hours
ha	hectare
HMSO	Her Majesty's Stationery Office

hp	horse-power
IEA	International Energy Agency
IIASA	International Institute for Applied Systems Analysis
ISIC	International Standard Industrial Classification
K	kilo
kcal	kilo calories
kW	kilowatt
kWh	kilowatt hours
LDC	less developed countries
LNG	liquefied natural gas
LPG	liquid propane gas
m	metre
M	mega/million/10^6
M b/d	million barrels a day
mm	millimetre
Mtoe	million tons oil equivalent
mW	megawatt
NGL	natural gas liquids
OECD	Organisation for Economic Co-operation and Development
OPEC	Organisation of Petroleum Exporting Countries
PFBC	pressurised fluid bed combustion
QJE	*Quarterly Journal of Economics*
R & D	research and development
SCR	selective catalytic reduction
SIC	Standard Industrial Classification
t	tons
T	Tera/10^{12}
th	thousand
toe	tons oil equivalent
TPE	total primary energy
TSP	electric precipitator for particulates
TW	terawatt
TWh	terawatt hours