Energy Use and the U.S. Economy

June 1990

OTA-BP-E-57 NTIS order #PB90-254145



Recommended Citation:

U.S. Congress, Office of Technology Assessment, *Energy Use and the U.S. Economy, OTA-BP-E-57* (Washington, DC: U.S. Government Printing Office, June 1990).

Library of Congress Catalog Card Number 89-600722

For sale by the Superintendent of Documents U.S. Government Printing Office, Washington, DC 20402-9325 (order form can be found in the back of this report)

Foreword

In 1988 the Office of Technology Assessment published *Technology and the American Economic Transition* outlining ways that new technologies have redefined options for stimulating economic growth. A centerpiece of that study was to trace how the structure of the U.S. economy had evolved by looking at how the demand for products and the processes used to produce those products (technology) had changed.

The Subcommittee on Energy and Power of the House Committee on Energy and Commerce asked OTA to use the experience gained in the economic transition study to provide a perspective on how patterns of energy use have changed with shifts in the economy. Instead of looking at specific technologies or individual economic sectors, this paper takes a broader perspective and looks at how the consumption of energy is affected by various macroeconomic factors such as international trade, technology, or mix of spending. By applying this analysis on the changes that occurred in the sixties, seventies, and eighties, the report offers some insights on the forces at work in the economy that could affect future trends in energy use.

In particular, we examine the period from 1972 to 1985, an era when the apparent link between energy use and economic growth became separated-a departure from the experience of most of the fifties and sixties. From 1972 to 1985, the average growth rate of the Gross Domestic Product (GDP) was 2.5 percent per year, but energy use increased at an annual rate of only 0.3 percent. We find that this leveling of energy use was due to large offsetting factors where increases in energy use associated with growth in the overall size of the economy were balanced by reductions in energy use associated with improved energy efficiency and changes in the structure of the U.S. economy.

The background paper extends the analysis of energy use into new areas by explicitly looking at how energy use has changed with the expansion of the service sector, the explosion of international trade, and greater complexity of the U.S. economy as the structure of businesses changed in response to new technologies and competitive challenges. The increasing sophistication of the U.S. economy means that the role of energy is less likely to be directly identified and is instead more likely to be an indirect factor that was added many steps before in the complex network that connects producer to consumer. This report explicitly separates direct from indirect energy use.

OTA acknowledges the generous help of the reviewers and contributors who gave their time to ensure the accuracy and completeness of this report. OTA, however, remains solely responsible for the contents of this background paper.

JOHN H. GIBBONS Director

¹U.S. Congress, Office of Technology Assessment, *Technology and the American Economic Transition: Choices for the Future*, OTA-TET-283 (Washington, DC: U.S. Government Printing Office, May 1988).

Reviewers and Contributors

Amy Able Congressional Research Service

Sam Baldwin Office of Technology Assessment

Gale A. Boyd Argonne National Laboratory

Alan Crane Office of Technology Assessment

G.R. Davis Shell International Petroleum Co.

Faye Duchin, Director Institute for Economic Analysis

Joy Dunkerley Office of Technology Assessment

Richard A. Hale U.S. Government Accounting Office

Bruce Hannon University of Illinois at Urbana-Champaign

Robert Herendeen University of Illinois at Urbana-Champaign

Richard Hilt Gas Research Institute

Bruce G. Humphrey Edison Electric Institute

Hillard G. Huntington Stanford University

Henry Kelly Office of Technology Assessment Paul Komor Office of Technology Assessment

Jonathan Lemco National Planning Association

Sheila Machodo Renew America

Mark Pastore Putnam, Hayes & Bartlett

Steven Plotkin Office of Technology Assessment

Adam Rose Pennsylvania State University

Marc Ross University of Michigan

Robin Roy Office of Technology Assessment

Maxine L. Savitz Garrett Engines

Lee Schipper Lawrence Berkeley Laboratory

Irv Snyder Dow Chemical Co.

Ronald Wishart Union Carbide Corp.

Francis Wood Applied Energy Services

NOTE: OTA is grateful for the valuable assistant and thoughtful critiques provided by the reviewers and contributors. The views expressed in this OTA background paper, however, are the sole responsibility of the Office of Technology Assessment.

Energy Use and the U.S. Economy OTA Project Staff

Lionel S. Johns, Assistant Director, OTA Energy, Materials, and International Security Division

Peter D. Blair, Energy and Materials Program Manager

Andrew W. Wyckoff, Project Director¹

Contributor Stephen D. Casler

Administrative Staff Lillian Q. Chapman Linda L. Long Phyllis Brumfield