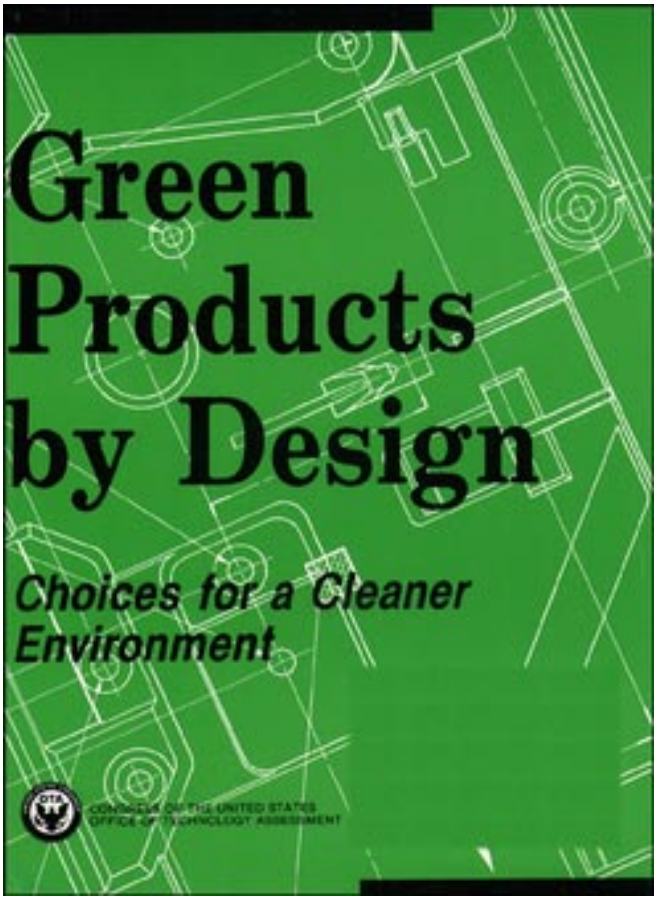
Green Products by Design: Choices for a Cleaner Environment

September 1992

OTA-E-541
NTIS order #PB93-101715
GPO stock #052-003-01303-7



Foreword

As the United States and other nations begin to get serious about an array of potentially significant environmental threats, from global climate change to local groundwater contamination, traditional formulas of environmental management are being reassessed. The remediation or ‘‘end-of-pipe’ strategies of the past 20 years are unlikely to provide satisfactory, cost-effective protection of ecosystems and human health in the future. Systematic change is needed.

Increasingly, product design is being viewed as a possible catalyst in transforming societal patterns of production and consumption. Product design is an important environmental focal point, because design decisions directly and indirectly determine levels of resource use and the composition of waste streams. By placing a greater emphasis on design, environmental problems can be addressed in a proactive manner.

In this report, OTA provides a conceptual overview of how designers might integrate environmental concerns with traditional design objectives, and how policymakers can best take advantage of such opportunities. Although the concept of “green” design is gathering momentum, a number of technical, behavioral, economic, and informational barriers need to be addressed. By relying solely on existing policies and industrial practices, the full potential of green design will not be realized.

Because product design encompasses the most crucial decisionmaking activities of companies, the consideration of environmental objectives by designers could have important competitive implications. Market opportunities for environmentally sensitive goods and services are expanding. Examples of “green’ products and “clean” technologies are beginning to appear across a wide spectrum of industries.

This study, requested by the House Committees on Science, Space, and Technology, and on Energy and Commerce, builds on previous OTA work dealing with U.S. hazardous waste and municipal solid waste policy. These previous studies acknowledged the importance of product design as a tool for reducing wastes and managing materials, but did not explore the idea in detail.

OTA appreciates the assistance provided by its contractors and the advisory panel, as well as the many reviewers whose comments helped to ensure the accuracy of the report.

JOHN H. GIBBONS
Director

Advisory Panel—Green Products by Design: Choices for a Cleaner Environment

Indira Nair, *Chairman*
Carnegie Mellon University

Frank van den Akker
Ministry of Housing, Physical Planning, and Environment

Harvey Alter
U.S. Chamber of Commerce

David Chittick
AT&T

Michael DeCata
GE Plastics

Michael A. Gallo
Robert Wood Johnson Medical School

Robert Garino
Institute of Scrap Recycling Industries

Gil Gavlin
Gavlin Associates, Inc.

Denis Hayes
Green Seal

Kenneth Hunnibell
Rhode Island School of Design

Richard L. Klimisch
General Motors Corp.

Michael H. Levin
Nixon, Hargrave, Devans & Doyle

Stewart Mosberg
Walter Dorwin Teague Associates, Inc.

Thomas Rattray
Procter and Gamble Co.

Cliff Russell
Vanderbilt Institute for Public Policy Studies

Mary T Sheil
New Jersey Department of Environmental Protection and Energy

T.S. Sudarshan
Materials Modifications, Inc.

Don Theissen
3M Co.

Jeanne Wirka
Consultant

Dennis A. Yao
Federal Trade Commission

NOTE: OTAappreciates and is grateful for the valuable assistance and thoughtful critiques provided by the advisory panel members. The panel does not, however, necessarily approve, disapprove, or endorse this report. OTA assumes full responsibility for the report and the accuracy of its contents.

OTA Project Staff—Green Products by Design: Choices for a Cleaner Environment

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

Peter D. Blair, *Energy and Materials Program Manager*

Project Staff

Gregory Eyring, *Project Director*

Matthew Weinberg, *Analyst*

David Jensen, *Analyst*

Joe Raguso, *Contractor*

Administrative Staff

Lillian Chapman, Office *Administrator*

Linda Long, *Administrative Secretary*

Tina Aikens, *Secretary*

Contractors

Jill Watz and Thomas Nunno
ChemCycle Corp.

Frank Field
FieldWorks

William Franklin and Robert Hunt
Franklin Associates

John KuSz
Independent Consultant

Robert Kerr and Lisa Lambrecht
Kerr and Associates, Inc.

Jill Shankleman and David Festa
Environmental Resources Limited

Outside Reviewers

Frank Ackerman
Tellus Institute

Braden A1lenby
National Academy of Engineering

John Atcheson
U.S. Environmental Protection Agency

Jesse Ausubel
Rockefeller University

Robert Ayres
Carnegie Mellon University

Charles Burnette
Philadelphia College of Art and Design

Richard Denisen
Environmental Defense Fund

Tom Donnelly
Council for Solid Waste Solutions

Pat Eagan
University of Wisconsin at Madison

John Ehrenfeld
Massachusetts Institute of Technology

Peter Eisenberger
Princeton University

Michael Fischer
Society of the Plastics Industries

Walter J. Foley
Coalition of Northeastern Governors

Ken Geiser
University of Massachusetts

Eun-Sook Goidel
U.S. Environmental Protection Agency

Paul Kaldjian
Montgomery Department of Environmental Protection

Greg Keoleian
University of Michigan

David Lennert
Procter and Gamble Co.

Howard Levenson
California Integrated Waste Management Board

Mark Mazur
Joint Tax Committee

James McCarthy
Congressional Research Service

D. Navin chandra
Carnegie Mellon University

Doug Nutter
GE Plastics

Winfred Phillips
University of Florida

David Ruller
City of Alexandria

Walter Shaub
Solid Waste Association of North America

Ann Speicher
American Society for Engineering Education

Ed Stana
Council on Plastics and Packaging in the Environment

Arthur J. Zadrozny
ARCO Chemical Co.