



**United Nations
Development Programme**

Bureau for Development Policy

Energy and Atmosphere Programme

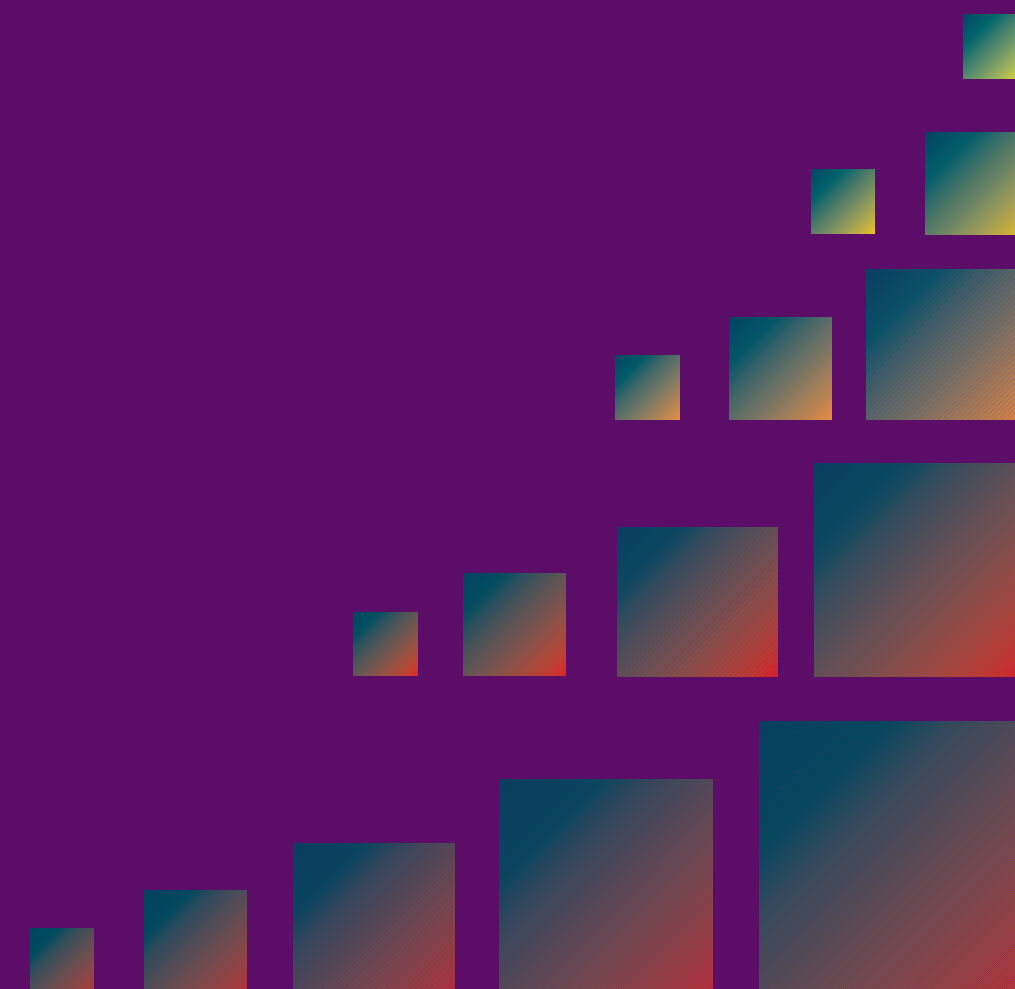
304 East 45th Street - New York, NY 10017
Phone: (212) 906-5030 Fax: (212) 906-5148
Website: <http://www.undp.org/seed/eap>

BIOENERGY PRIMER

MODERNISED BIOMASS ENERGY

FOR SUSTAINABLE

DEVELOPMENT



United Nations Publications

UN Sales number E.00.III.B.6
ISBN number 92-1-126127-9

Copyright © 2000 by the United Nations Development Programme
1 United Nations Plaza, New York, NY 10017, USA

BIOENERGY PRIMER

MODERNISED BIOMASS ENERGY
FOR SUSTAINABLE
DEVELOPMENT


United Nations Development Programme

with support from
the Government of Norway

Authors
Sivan Kartha **Eric D. Larson**



United Nations Development Programme



The views expressed in this volume are not necessarily shared by
UNDP, its Executive Board, or its Member States.

United Nations Publications

UN Sales number: E.00.III.B.6

ISBN number: 92-1-126127-9

Copyright © 2000 by the United Nations Development Programme
1 United Nations Plaza, New York, NY 10017, USA

Printed in Denmark by Phønix-Trykkeriet A/S, Århus.

TABLE OF CONTENTS

5 Acknowledgements

6 Notes on Authors

7 Foreword

9 Executive Summary

27 Introduction: Energy and Sustainable Human Development

Chapter 1

1.1. Promoting Sustainable Human Development through Bioenergy

1.2. Biomass Energy Today: Developing and Industrialised Countries

1.3. Modernising Biomass Energy

1.4. A Long Term Vision of Biomass Energy

1.5. A Roadmap for this Primer

References for Chapter 1

39 Bioenergy Sources

Chapter 2

2.1. Residues and Wastes

2.2. Purpose-Grown Energy Crops

References for Chapter 2

49 Socioeconomic Issues

Chapter 3

3.1. Meeting the Basic Needs of the Rural Poor

3.2. Creating Opportunities for Income Generation

3.3. Gender Impacts

3.4. Land Use Competition and Land Tenure

3.5. Socioeconomic Indicators for Evaluating a Project

65 Environmental Issues

Chapter 4

4.1. Soil Quality and Fertility

- 4.2. Biodiversity
 - 4.3. Energy Balances
 - 4.4. Carbon Emissions
 - 4.5. Hydrology
 - 4.6. Chemical Loading of Soil and Ground/Surface Water
 - 4.7. Restoring Degraded Land
 - 4.8. Environmental Indicators for Evaluating a Project
- References for Chapters 3 and 4

83 Technologies To Convert Biomass Into Modern Energy

Chapter 5

- 5.1. Gasification
 - 5.2. Anaerobic Digestion
 - 5.3. Ethanol from Sugarcane
 - 5.4. Steam Turbine Combined Heat and Power
 - 5.5. Gas Turbine Combined Cycle CHP
- References for Chapter 5

113 Implementation and Replication

Chapter 6

- 6.1. Institutions
 - 6.2. Replicating a Bioenergy Project: Key Elements
- References for Chapter 6

119 Case Studies: Biomass Projects in Action

Chapter 7

- 7.1. Biogas-Based Electricity and Water Supply in Indian Villages
 - 7.2. Sustainable Transformation of Rural Areas in India
 - 7.3. Projects Using Producer-Gas/IC-Engine Technology in India
 - 7.4. Rural Energy Concessions: Pilot Programs
 - 7.5. Modernising Corn Stover Use in Rural Jilin Province, China
 - 7.6. Producing Ethanol from Sugarcane in Brazil
 - 7.7. Cogeneration of Heat and Power at Sugarcane Processing Facilities
 - 7.8. Biomass-Gasifier/Gas Turbine Power Generation in Northeast Brazil
 - 7.9. Farm Forestry in Rural Brazil
 - 7.10. Social Forestry in India
- References for Chapter 7

132 Information Sources

ACKNOWLEDGEMENTS

The Bioenergy Primer was prepared by the Energy and Atmosphere Programme (EAP), Bureau for Development Policy (BDP) of the United Nations Development Programme (UNDP). UNDP is greatly indebted to the authors, Drs. Sivan Kartha and Eric Larson, for their thorough and comprehensive contributions. Many thanks are also extended to all the reviewers, who provided insightful suggestions on the publication. In particular, the primer benefited from valuable comments by the following people: Christian Azar, Pal Borjesson, Suani Coelho, Andre Faaij, David Fazzino, Gerald Leach, Roberto Lenton, Peter Matlon, Susan McDade, Ellen Morris, Emmanuel Oladipo, Susanne Schmidt, Youba Sokona, Minoru Takada, Lori Ann Thrupp, and Samir S. Wanmali.

UNDP is also grateful to Rosemarie Philips and Barry Boehm, who undertook the editing and proof-reading of the publication. Special thanks are due to Dorothy Miller, for cover and page layout, and graphic design. This project was managed by Minoru Takada, Ellen Morris, Sean Clark and Susan McDade under the direction of Professor Thomas Johansson, Director, EAP.

UNDP wishes to thank the Government of Norway for their support towards the production of this Bioenergy Primer.

NOTES ON AUTHORS

Sivan Kartha is a Senior Scientist at the Boston office of the Stockholm Environment Institute. His interests relate to energy policy, climate change, and development. His research and publications pertain to the environmental and socioeconomic impacts of biomass energy in developing countries. He is also specialised in global policy instruments for responding to climate change and strategies for reducing greenhouse gas emissions, renewable energy technologies and technology transfer, and the links between energy and development. He earned his Ph.D in physics from Cornell University in 1993 and was a researcher at Princeton University's Center for Energy and Environmental Studies before taking his current position. *Email: skartha@seib.org. URL: www.tellus.org/seib*

Eric D. Larson is a Research Engineer at the Center for Energy and Environmental Studies, Princeton University. His research includes technical, economic, and policy-related assessments of a variety technologies and strategies for modernising the production and use of biomass for energy in developing and industrialised countries. He currently leads the biomass research program of the Center's Energy Technology Assessment/Energy Policy Analysis group. He is the author of 140 publications. He also teaches in the Mechanical and Aerospace Engineering Department. His Ph.D. is in mechanical engineering from the University of Minnesota. *Email: elarson@princeton.edu. URL: <http://www.princeton.edu/~cees/people/elarson.html>*

FOREWORD

There is an unmistakable link between energy and sustainable human development. Energy is not an end in itself, but an essential tool to facilitate social and economic activities. Thus, the lack of available energy services correlates closely with many challenges of sustainable development, such as poverty alleviation, the advancement of women, protection of the environment, and jobs creation. Emphasis on institution-building and enhanced policy dialogue is necessary to create the social, economic, and politically enabling conditions for a transition to a more sustainable future.

Most of those without access to modern energy services belong to the segment of the human population that lives in poverty. Although low energy consumption is not a cause of poverty, the lack of available energy services correlates closely with many poverty indicators. To date, poverty has received scant attention from an energy perspective.

This is particularly remarkable since energy is central to the satisfaction of basic nutrition and health needs, and energy services constitute a sizable share of total household expenditure among the poorest households in developing countries. Policies and programmes that aim to create opportunities for people living in poverty are needed. By making more efficient use of commercial and non-commercial energy and by shifting to higher quality energy carriers, it will be possible to simultaneously improve those people's standard of living, in both the short term and long term.

Biomass energy technologies are a promising option, with a potentially large impact for developing countries, where the current levels of energy services are low. Biomass accounts for about one third of all energy in developing countries as a whole, and nearly 90 percent in some of the least developed countries. Over 2 billion people continue to rely on biomass fuels and traditional technologies for cooking and heating and 1.5-2 billion people have no access to electricity.

预览已结束，完整报告链接和二维码

<https://www.yunbaogao.cn/report/index/report?reportl>