



MOUNTAIN INFRASTRUCTURE AND TECHNOLOGY

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**ENERGY PLANNING AND MANAGEMENT IN MOUNTAIN DISTRICTS OF BHUTAN**

A CASE STUDY

**Dzongkhag Administration**

*MIT Series No. 1*

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INTERNATIONAL CENTRE FOR INTEGRATED MOUNTAIN DEVELOPMENT

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**Dzongkhag Administration: Thimphu  
Royal Government of Bhutan**

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**International Centre for Integrated Mountain Development (ICIMOD)**

**Kathmandu, Nepal**

## PREFACE

A programme on 'Strengthening Rural Energy Planning and Management in the Mountain Districts of the Hindu Kush-Himalayan Region' was organised during the time course of January 1987 to November 1988, funded by the European Economic Community. Various activities were implemented under this programme. Six case studies, relating to 'Energy Management and Planning', covering five regional countries (Bhutan, China, India-2, Nepal, and Pakistan) were also conducted. It is hoped that the ultimate use of these case studies will be to develop energy management and to plan guidelines that could be used for training district level officers working in the field of energy-related issues. Dr. Ganesh Bahadur Thapa, a consultant, reviewed and improved the presentation of these six case studies.

This study is one among these six cases studies, and was conducted in Thimphu District, lying in the catchment of the Thimphu River. It attempts to document the energy use pattern in Thimphu District and suggests ways to improve the rural energy supply.

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# INTRODUCTION

## Background

The Government of Bhutan are draft power for farming and husbandry for the country and have been using wood in accessible areas, mostly for lighting. Non-commercial woodlots are also used in some extent. Biogas, are also being promoted in the country. This report presents the findings of a case study on energy planning and management in the Thimphu District of Bhutan.

## Objectives

The major objectives of the study were to assess the energy situation in the Thimphu District and to suggest ways to improve the energy supply and demand in the district.

### List of Abbreviations

- Gewog = Sub-district/Block
- Dzongkhag = District
- Sokshing/Jashing = Private woodlots owned by villagers

### Energy Content and Conversion Factors

	Natural Units	kcal ('000)	TCE	TOE	Others
<u>Non-commercial</u>					
Fuelwood	ton	4,000	0.57	0.39	1.43 m <sup>3</sup>
	m <sup>3</sup>	2,800	0.40	0.27	700 kg
Dried Dungcake	ton	2,600	0.37	0.25	--
Agricultural Residues	ton	3,000	0.43	0.29	--
<u>Commercial Fuels</u>					
Diesel	kl	9,080	1.29	0.88	0.826 ton
	ton	10,960	1.57	1.07	1,210 litre
Light Diesel Oil	kl	9,350	1.34	0.91	0.853 ton
	ton	10,960	1.57	1.07	1,172 litre
Petrol	kl	8,000	1.14	0.78	0.709 ton
	ton	11,290	1.61	1.10	1,411 litre
Kerosene	kl	8,660	1.24	0.84	0.778 ton
	ton	11,130	1.59	1.08	1,285 litre
Liquefied Petroleum Gas	ton	11,760	1.68	1.14	--
Coal	ton	6,000	0.86	0.59	--
Electricity	MWh	860	0.12286	0.083576	--

### Other Conversion Factors

1 TCE	1.00	0.680272
1 TOE	1.47	1.00

### Heat Content of Different Fuel Types

- 1 kg wood = 15 Megajoules (MJ)
- 1 kg coal = 26.5 MJ
- 1 litre of kerosene = 43.6 MJ
- 1 kWh of electricity = 3.57 MJ