RESTRUCTURING OF ELECTRICITY SECTOR

K. K. A. Chandana Samarasinghe

B.Sc (Eng), PG Dip. EE, MBA, C.Eng, MIE(SL), MIEE(UK)

This thesis was submitted to the department of Electrical Engineering of the
University of Moratuwa in partial fulfillment of the requirements for the degree of
Master of Engineering

Department of Electrical Engineering
University of Moratuwa
Sri Lanka

February 2003

77707

ABSTRCT

Traditionally Electricity Generation, Transmission and Distribution activities were considered as one vertically integrated business in the past. But, by restructuring the system these three areas can be unbundled to three separate units. This will help to introduce increased competition of the supply and choice for the customers. In general, by introducing restructuring, it is expected to bring about lower energy price and lower capital expenditure for governments. Some countries have already achieved successful results by restructuring the electricity sector but some have come across various problems and difficulties. The aim this project is to study the restructuring process of the electricity sector in detail and to suggest a suitable model for Sri Lanka. In order to achieve this different industry structures have been analysed to study the different alternatives of restructuring. Also, legal and economic framework of restructuring, experiences in different countries and various other factors to be considered in restructuring have been discussed. By critically analysing the preset position in the electricity industry in Sri Lanka, important factors to be considered in the process of restructuring the electricity sector have been identified. Finally a suitable model for Sri Lanka has been suggested. This project has been conducted mainly using the published material and information accessible in the environment.

ACKNOWLEDGEMENT

There are so many who inspired and guided me in completing this thesis. I may not be able to thank every one of them individually in this acknowledgement. Therefore, while appreciating everybody's contribution, I would thank personnel who contributed most for this thesis.

Special appreciation goes to my supervisor, Professor Priyantha D.C. Wijethunge, for his valuable guidance and support, which was a major factor in completing this thesis.

Also, my sincere thanks are due to Professor Rohan Lucas, Head of the Department of Electrical Engineering, University of Moratuwa and the course coordinators of the Master of Engineering course for the year 2000/2001, Dr. Aruna Ranaweera, Dr. Jehan Peiris, Mrs. Anula Abegunawardane and Dr. Nalin Wickramarachchi for their valuable support in completing this thesis.

Thanks for all friends and colleagues in the CEB, LECO and Master of Engineering batch 2000/2001 at University of Moratuwa who have helped me in various ways for this thesis.

Finally my special thanks go to my wife Yamuna for her inspiring support given to me in following this Master of Engineering course.

TABLE OF CONTENTS

		Page Number
	ABSTRACT	i
	ACKNOWLEDGEMENT	ii
	TABLE OF CONTENTS	iii
	LIST OF FIGURES	vi
CHAI	PTER 1: INTRODUCTION	1
1.1	Background Transaction costs	1
1.2	Transaction costs	3
1.3	Movement to competition	-
1.4	Restructuring and Privatisation	6
1.5	Basic models of industry structure	8
1.6	The forms of ownership and management	9
1.7	Scope of study	11
CHAI	PTER 2 : REGULATORY AND LEGISLATIVE	
	FRAMEWORK	12
2.1	Introduction The Contract Cont	12
2.2	Economic regulation Economic regulation Economic regulation Economic regulation	12
2.3	Objectives of economic regulations & Dissertations	12
2.4	Functions and responsibilities of Regulatory Commission	14
2.5	Key characteristics of a Regulatory Commission	16
2.6	Legislative Framework	17
2.7	Conclusion	18
CHAI	PTER 3: INDUSTRY STRUCTURES	13
3.1	The four models	13
3.2	Implications for the structure of companies	21
3.3	Economic efficiency	22
3.4	Social policy obligations	23
3.5	Treatment of "Stranded Costs"	24
3.6	Pressures for change	24
CHA	OTED 4. MODEL 1. MONOPOLV	26
	PTER 4: MODEL 1 – MONOPOLY	26
4.1	Description of the model	26
4.2	Trading arrangements	27
4.3	Transmission access	27
4.4	Should the Distcos be separate?	28
4.5	Achieving efficiency	30
4.6	Social policy obligations	30
4.7	Implications for asset values and stranded costs	31
4.8	Pressure for change	32
4.9	Examples of model 1	33
24 1 (1	CORCIUSIONS	

CHA	PTER 5: MODEL 2 – PURCHASING AGENCY	35
5.1	Description of the model	35
5.2	Transition mechanisms	36
5.3	Trading arrangements	36
5.4	Transmission access	37
5.5	Should the purchasing agency be separate?	38
5.6	Achieving efficiency	39
5.7	Social policy obligations	41
5.8	Implications for asset values and stranded costs	41
5.9	Pressure for change	42
5.10	Examples of model 2	43
5.11	Conclusions	44
CHAI	PTER 6: MODEL 3 – WHOLESALE COMPETITION	47
6.1	Description of the model	47
6.2	Trading arrangements	48
6.3	Transmission access	49
6.4	Implications for the structure of companies	50
6.5	Achieving efficiency	54
6.6	Social policy obligations	55
6.7	Implications for asset values and stranded costs	55
6.8	Pressure for change	56
6.9	Examples of model 3 niversity of Moratuwa, Sri Lanka.	57
6.10	Conclusions Electronic Theses & Dissertations	57
	PTER 7: MODEL 4 - RETAIL COMPETITION	60
		60
7.1	Description of the model	60
7.2	Trading arrangements	61
7.3	Implications for the structure of companies	62
7.4	Achieving efficiency	64
7.5	Social policy obligations	67
7.6	Implications for asset values and stranded costs	68
7.7	Nethack Pricing	70
7.8	Examples of model 4	71
7.9	Conclusions	71
CHA	PTER 8: WHICH MODEL TO BE SELECTED?	73
8.1	Final thoughts on the structure question	73
СНА	PTER 9 : EXPERIENCE IN DIFFERENT COUNTRIES	78
9.1	Introduction	78
9.2	England and Wales	78
9.3	India 4	79
9.4	Chile	81
9.5	Argentina	82
9.6	Philippines	83
9.7	Malaysia	84
9.8	General discussion	84

CHAP	TER 10: DIFFERENT SITUATINS TO BE CONSIDERED	87	
10.1	Introduction	87	
10.2	Relevance to small systems	87	
10.3	Costs and benefits of privatisation	88	
10.4	Costs and benefits of vertical separation	90	
10.5	Costs and benefits of horizontal separation in generation	91	
10.6	Current situation in the world	93	
CHAPTER 11: RESTRUCTURING OF ELECTRICITY SECTOR			
CHAI	IN SRI LANKA	100	
11.1	Introduction	100	
11.2	The state of the s	101	
11.3	Government's vision for the power sector The structure of the power sector in Sri Lanka	101	
11.3	The structure of the power sector in Sri Lanka	102	
11.5	The present status of the Sri Lankan power sector	104	
11.6	Regulatory frame work	106	
11.7	Problems faced by Sri Lankan power sector	106	
11.7	Reasons for the problems in the power sector	112	
11.9	Why do we need restructuring in the power sector	119	
11.10	Suggested option for restructuring in the Sri Lankan power sector	119	
11.10	Structure and number of SBUs	121	
	Recommendations for a Regulatory Commission	125	
11.12		127	
11.13	Conclusion University of Moratuwa, Sri Lanka. Electronic Theses & Dissertations	12.	
	BIBLIOGRAPHYwww.lib.mrt.ac.lk	128	



LIST OF FIGURES

	Page Numbers
FIGURE 1: MODEL 1 – MONOPOLY	25
FIGURE 2 : MODEL 2 – PURCHASING AGENCY	34
FIGURE 3 : MODEL 3 – WHOLESALE COMPETITION	46
FIGURE 4: MODEL 4 – RETAIL COMPETITION	59

