

## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY .....</b>	<b>ix</b>
<b>LIST OF DIAGRAMS.....</b>	<b>xix</b>
<b>LIST OF TABLES.....</b>	<b>xx</b>
<b>LIST OF FIGURES .....</b>	<b>xxiii</b>
<b>LIST OF EXHIBITS.....</b>	<b>xxiv</b>
<b>LIST OF ABBREVIATIONS .....</b>	<b>xxv</b>
<b>CHAPTER 1.....</b>	<b>1</b>
OVERVIEW AND CONTEXT SETTING .....	1
1.1    INTRODUCTION.....	1
1.2    OVERVIEW OF ELECTRICITY SECTOR OF INDIA.....	1
1.2.1    Societal objective of providing electricity to poor consumers .....	1
1.2.2    High level of subsidy and cross-subsidy in tariff structure and legal background.....	2
1.2.3    Indian power sector – financial perspective .....	7
1.2.4    Indian power sector – inefficiencies and welfare issues.....	8
1.3    CONTEXT: BUSINESS PROBLEM.....	9
1.4    MOTIVATION FOR RESEARCH .....	9
1.5    STRUCTURE OF THESIS .....	10
1.6    CHAPTER SUMMARY.....	13
<b>CHAPTER 2.....</b>	<b>14</b>
LITERATURE REVIEW .....	14
2.1    INTRODUCTION.....	14
2.2    CONTEXT: REFORM OF THE ELECTRICITY SECTOR – EFFECTS AND ISSUES.....	14
2.2.1    Literature search process .....	15
2.2.2    Selection of key words .....	19
2.3    THEMATIC REVIEW OF LITERATURE.....	20
2.4    BASIC TENETS OF REFORM AND REFORM EXPECTATIONS.....	20

2.4.1	Requirement of cost alignment as the first step of reform in a standard reform model.....	20
2.4.2	Limited scope of above-market costs in a competitive model: Social policy objectives not implementable through competitive electricity pricing.....	21
2.4.3	Power consumption, income level and country-specific features constitute significant determinants of electricity price-cost margins and cross-subsidy levels.....	21
2.4.4	Reform expectation: erosion of cross-subsidy: Political and welfare implications including support to low income consumers. ....	22
2.5	CROSS-SUBSIDY IN ELECTRICITY TARIFF .....	23
2.5.1	Discouragement of cross-subsidy in electricity tariff.....	23
2.5.2	International scenario: specifically approved cross-subsidies in the tariff structure to address socio-political needs, with minimal impact on electricity prices of customers in the productive sectors.....	24
2.6	REFORM IMPACT ON SMALL CONSUMERS .....	24
2.6.1	Regulation need for protection of small consumers .....	24
2.6.2	Analysis of benefit to residential and small consumers post-reform.....	25
2.6.3	Progression of price regulation mechanism – from marginal costing to social welfare maximisation.....	26
2.7	GLOBAL UNDERSTANDING: COUNTRY EXPERIENCES .....	27
2.7.1	Chile .....	27
2.7.2	Argentina.....	29
2.7.3	Philippines.....	31
2.7.4	Nigeria.....	34
2.7.5	United Kingdom (U.K.).....	36
2.7.6	Demographic profile of the selected countries.....	38
2.8	INDIAN SCENARIO.....	39
2.8.1	Tariff of residential and small consumers in India.....	39
2.8.2	Cross-subsidy criticism and subsidy leakage in India.....	41
2.8.3	Criticism of policy of encouragement of consumer flight without addressing cross-subsidy issues.....	43
2.9	CROSS-SUBSIDY VALUATION.....	44
2.9.1	Cross-subsidy definition and measurement are usually based on cost allocation.....	44
2.9.2	Cross-subsidy valuation: the significance of peak load pricing .....	48

2.10	OTHER PERTINENT ASPECTS OF REFORM, SUBSIDY AND CROSS-SUBSIDY .....	50
2.11	COST OF SUPPLY .....	52
2.11.1	Assessment of prevalent situation through studies and reports: voltage-wise / category-wise details.....	52
2.11.2	Cost-of-supply studies.....	53
2.12	REVIEW ANALYSIS .....	55
2.13	CHAPTER SUMMARY.....	56
<b>CHAPTER 3.....</b>		<b>58</b>
RESEARCH METHODOLOGY .....		58
3.1	INTRODUCTION.....	58
3.2	RESEARCH GAP .....	58
3.3	RESEARCH FOCUS.....	59
3.4	RESEARCH PROBLEM.....	59
3.5	RATIONALE OF STUDY .....	60
3.6	RESEARCH QUESTIONS .....	60
3.7	RESEARCH OBJECTIVES.....	60
3.8	SCOPE OF RESEARCH AND PARADIGM .....	61
3.8.1	Scope of Research.....	61
3.8.2	Paradigm.....	61
3.9	RESEARCH METHODOLOGY.....	62
3.9.1	Methodology for addressing first objective.....	62
3.9.2	Methodology for addressing second objective.....	63
3.9.3	Methodology for addressing third objective.....	65
3.10	FRAMEWORK FOR RESEARCH DESIGN .....	68
3.10.1	Research design framework for first objective.....	68
3.10.2	Research design framework for second objective .....	73
3.10.3	Research design framework for third objective.....	79
3.11	CHAPTER SUMMARY.....	84
<b>CHAPTER 4.....</b>		<b>85</b>
DISCUSSION AND ANALYSIS .....		85
4.1	INTRODUCTION.....	85
4.2	EVALUATION OF THE AVAILABLE APPROACHES ON CROSS-SUBSIDY MEASUREMENT: OBJECTIVE 1.....	85
4.2.1	Discussion on legal position on cross-subsidy and cost of supply.....	85
4.2.2	Protection of vulnerable consumers in Indian policy instruments.....	92

4.2.3	Global learnings in the context of cost-of-supply attainment and protection of vulnerable consumers.....	94
4.2.4	Principles of cost-of-supply determination .....	97
4.3	ASSESSMENT OF CROSS-SUBSIDY WITH REFERENCE TO AVERAGE COST-OF-SUPPLY PREVAILING FOR INDIAN REGULATED TARIFF FRAMEWORKS: OBJECTIVE 2.....	104
4.4	ASSESSMENT OF COST-OF-SUPPLY THROUGH DEVELOPMENT OF A MODEL AND ESTIMATION OF REALISTIC CROSS-SUBSIDY WITH A SUGGESTIVE APPROACH ON ADDRESSING THE WELFARE ISSUES OF SERVING THE VULNERABLE SEGMENTS: OBJECTIVE 3.....	124
4.4.1	Cost-of-Supply Model.....	124
4.4.2	Vulnerable consumers – an assessment of subsidy need.....	161
4.5	CHAPTER SUMMARY.....	171
<b>CHAPTER 5.....</b>		<b>175</b>
CONCLUSION.....		175
5.1	INTRODUCTION.....	175
5.2	CONCLUSION AND RECOMMENDATIONS OF THE STUDY.....	175
5.3	CHAPTER SUMMARY.....	188
<b>CHAPTER 6.....</b>		<b>190</b>
CONTRIBUTION TO LITERATURE.....		190
6.1	INTRODUCTION.....	190
6.2	CONTRIBUTION .....	190
6.3	CHAPTER SUMMARY.....	193
<b>CHAPTER 7.....</b>		<b>194</b>
SCOPE FOR FUTURE RESEARCH / LIMITATIONS .....		194
7.1	INTRODUCTION.....	194
7.2	SCOPE FOR FUTURE RESEARCH.....	194
7.3	LIMITATIONS.....	195
7.4	CHAPTER SUMMARY.....	196
<b>References.....</b>		<b>197</b>
<b>EXHIBITS 1 TO 7 (List of Exhibits in Page xxiv).....</b>		<b>211</b>
<b>BRIEF BIO-DATA OF AUTHOR.....</b>		<b>293</b>