CONTENTS

Candidate's Declaration i
Guide Certificate ii
Acknowledgements iii
Abstract v
Contents xiii
List of Tables xviii
List of Figures xx

CHAPTER 1. INTRODUCTION
1.1 PREAMBLE 1
1.2 MICRO, SMALL, AND MEDIUM ENTERPRISES (MSMEs): AN OVERVIEW 5
  1.2.1 Micro, Small, and Medium Enterprises 5
  1.2.2 MSME Clusters in India 8
1.3 DEFINITIONS AND CONCEPTS 9
  1.3.1 Energy Consumption, Energy Efficiency and Its Significance to MSMEs 9
1.4 NEED FOR THE CURRENT STUDY 10
  1.4.1 Indian Brick Sector 12
1.5 CHAPTER SCHEMATA 17

CHAPTER 2. LITERATURE REVIEW
2.1 INTRODUCTION 18
2.2 NEED FOR ENERGY EFFICIENCY IN INDUSTRIES 18
2.3 ENERGY CONSUMPTION AND EFFICIENCY ISSUES IN MSMEs 22
2.4 SMALL INDUSTRY CLUSTERS ENVIRONMENTAL POLLUTION 24
2.5 ENERGY AND ENVIRONMENTAL ISSUES IN BRICK INDUSTRY 26
2.6 FACTORS INFLUENCING ENERGY EFFICIENCY AND MSMEs SUCCESS 29
2.7 BARRIERS AND DRIVERS TO ENERGY EFFICIENCY 31
2.8 SOME RESEARCH GAPS 33

CHAPTER 3. OBJECTIVES, SCOPE AND METHODOLOGY
3.1 INTRODUCTION 35
3.2 OBJECTIVES 35
3.3 SCOPE OF THE STUDY 35
3.4 SAMPLING PROCEDURE ADOPTED 37
3.5 DATA COLLECTION 38
3.6 METHODOLOGY ADOPTED 38
   3.6.1 Energy Consumption and its Environmental Implications 38
   3.6.2 Energy Conservation Potential 39
   3.6.3 Factors Influencing Energy Efficiency in the Clusters 40
   3.6.4 Barriers and Drivers in Enhancing Energy Efficiency 41

CHAPTER 4. BACKGROUND OF BRICK INDUSTRY CLUSTERS SELECTED
4.1 INTRODUCTION 43
4.2 BACKGROUND OF BRICK INDUSTRY 43
   4.2.1 Brick Manufacturing Process 44
   4.2.2 Brick Making Technologies 47
   4.2.2.1 Rural Clamps or Brick Clamps 47
   4.2.2.2 Intermittent Downdraught Kiln (IDK) 48
   4.2.2.3 Bull’s Trench Kiln (BTK) 49
   4.2.2.4 Vertical Shaft Brick Kiln (VSBK) 50
4.3 BRICK INDUSTRY CLUSTERS UNDER STUDY
4.3.1 Malur Brick Industry Cluster in Karnataka
4.3.2 Tiruvallur Brick Industry Cluster in Tamil Nadu
4.3.3 Krishna Brick Industry Cluster in Andhra Pradesh

4.4 BASIC CHARACTERISTICS OF ENTERPRISES IN THE THREE CLUSTERS
4.4.1 General Characteristics
4.4.2 Size Characteristics
4.4.3 Functional characteristics
4.4.4 Characteristics Relating to Interaction and Awareness

4.5 SUMMARY

CHAPTER 5. ANALYSIS OF ENERGY CONSUMPTION AND CONSERVATION
5.1 INTRODUCTION
5.2 ENERGY CONSUMPTION PATTERN IN THE CLUSTERS
5.2.1 The Brick Cluster of Malur
5.2.2 The Brick Cluster of Tiruvallur
5.2.3 The Brick Cluster of Krishna
5.3 Environmental Impact With Energy Use in the Clusters
5.3.1 The Emission Estimation Procedure
5.3.2 Air Pollution Due to Energy use in the Brick Clusters
5.3.3 Other Environmental Pollutions in the study Clusters
5.4 PREVAILING ENERGY EFFICIENCY IN THE CLUSTERS
5.5 ENERGY CONSERVATION POTENTIAL IN THE CLUSTERS
5.6 SIGNIFICANCE OF ENERGY INPUT IN THE CLUSTERS
5.6.1 Share of Energy Cost in TVC (Total Variable Cost) and Value of Output
5.6.2 The Production Function Analysis in the Clusters
5.6.2.1 Energy as a Factor of Production
5.6.2.2 The Form of Production Function Employed
5.6.2.3 Estimation of Production Function in the Clusters
CHAPTER 6. FACTORS INFLUENCING ENERGY EFFICIENCY

6.1 INTRODUCTION

6.2 FACTORS INFLUENCING ENERGY EFFICIENCY STUDIES

6.3 ANALYSIS OF FACTORS INFLUENCING ENERGY EFFICIENCY

6.3.1 Factors Influencing Energy Efficiency

6.3.1.1 The Brick Clusters Under Study

6.3.2 Factors Influencing Energy Efficiency – Multiple Regression Analysis

6.3.2.1 The Multiple Regression of Brick Clusters Under Study

6.4 SUMMARY

CHAPTER 7. BARRIERS AND DRIVERS TO ENERGY EFFICIENCY

7.1 INTRODUCTION

7.2 BARRIERS AND DRIVERS INFLUENCING ENERGY EFFICIENCY – AN OVERVIEW

7.3 ANALYSIS OF BARRIERS

7.4 RESULTS OF BARRIER ANALYSIS IN THE STUDY CLUSTERS

7.4.1 Factor Analysis Result in Malur Brick Cluster

7.4.2 Factor Analysis Result in Tiruvallur Brick Cluster

7.4.3 Factor Analysis Result in Krishna Brick Cluster

7.5 DRIVERS TO ENERGY EFFICIENCY IN THE STUDY CLUSTERS

7.5.1 Methodology of Analysis of Drivers

7.6 RESULTS OF DRIVERS ANALYSIS IN THE STUDY CLUSTERS

7.7 SUMMARY

CHAPTER 8. COMPARISON OF ENERGY AND ENVIRONMENTAL PERFORMANCE IN THE BRICK CLUSTERS

8.1 INTRODUCTION

8.2 COMPARISON OF ENERGY PERFORMANCE IN THE STUDY CLUSTERS

8.3 ENVIRONMENTAL PERFORMANCE
8.4 COMPARISON OF OVERALL BARRIER AND DRIVER RANKING
IN THE BRICK CLUSTERS

8.4.1 Ranking of Drivers Influencing Energy Efficiency Based on
Weighted Average Scores

8.5 SUMMARY

CHAPTER 9. SUMMARY AND CONCLUSION

9.1 INTRODUCTION

9.2 ENERGY AND ENVIRONMENTAL RELATED STUDIES IN
MSMEs

9.3 SUMMARY OF RESEARCH FINDINGS

9.4 MAJOR CONTRIBUTIONS OF THE THESIS

9.5 POLICY RECOMMENDATIONS

9.6 SCOPE FOR FURTHER WORK

9.7 CONCLUSION

ANNEXURE – I

ANNEXURE – II

ANNEXURE – III

BIBLIOGRAPHY

LIST OF PUBLICATIONS