ECONOMIC EVALUATION OF GRID-TIED PV TECHNOLOGY USED IN APPAREL MANUFACTURING INDUSTRY IN SRI LANKA

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ABSTRACT

Grid-Tied Photovoltaic (PV) technology is a globally accepted renewable technology used for built environment. Application of grid-tied PV system is a promising alternative and it's essential that clients know if the investments in such technologies are actually profitable. In Sri Lanka fewer studies were found on the economic evaluation of grid-tied PV technology. In particular, the economics of generating solar electricity has not been addressed appropriately for Sri Lanka's apparel manufacturing industry. Therefore, aim of this study is to evaluate the economic gain of grid-tied PV technology for apparel manufacturing industry in Sri Lanka to promote its application. The case study approach was adopted as the research strategy and four (04) apparel manufacturing facilities were selected. The data collection was done through semi-structured interviews and documentary reviews, whereas the analysis was conducted through manual content analysis and evaluation of economic indicators. Case study data revealed the key economic benefits of the system such as monthly revenue, low maintenance cost, reduce burden on local utility grid, etc. Key economic challenges were identified as high initial cost, high replacement costs, cost due to conflicts with suppliers, revenue depreciation with system losses and the like. Selecting energy service companies, promote bulk purchase and maintain stocks, enhance national solar energy demand, improve the process of renewable energy loan schemes, etc. are the proposed strategies to overcome those challenges. In addition, three (03) economic indicators were measured, such as levelized cost of electricity, net present value and simple payback period. The levelized cost of electricity resulted in a reasonable range for the cost of producing electricity using a solar PV system, ranging between Rs. 10 and Rs. 12 per kilowatt hour (kWh) and simple payback period and net present value showed a favorable condition, implying system's profitability for apparel manufacturing industry in Sri Lanka.

Key Words: Apparel Manufacturing Industry, Economic Evaluation, Grid-Tied PV Technology, Sri Lanka

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TABLE OF CONTENT

DECLARATION i
ABSTRACT ii
ACKNOWLEDGEMENT iii
TABLE OF CONTENT iv
LIST OF FIGURES vii
LIST OF TABLES viii
ABBREVIATIONS x
CHAPTER ONE 1
1 Introduction 1
1.1 Background 1
1.2 Problem Statement 4
1.3 Aim and Objectives 5
1.4 Research Methodology 6
1.5 Scope and Limitation 6
1.6 Chapter Breakdown 7
1.7 Chapter Summary 8
CHAPTER TWO 9
2 Literature Review 9
2.1 Introduction 9
2.2 Global Energy Consumption 9
2.3 Energy Consumption by Sectors 13
2.3.1 Transportation Sector 14
2.3.2 Building Sector 14
2.3.3 Industrial Sector 15
2.4 Sources of Energy 15
2.5 Renewable Energy Sources and Technologies 17
2.6 PV System as Renewable Energy Technology 18
2.6.1 Types of photovoltaic cells 19
2.6.2 Solar PV system configurations 20
2.7 Overview of Grid-Tied PV Technology 23
2.7.1 Mounting Options of Grid-Tied PV System 25

2.7.2 Benefits of Grid-Tied PV Technology 26
2.7.3 Economic Challenges of Grid-Tied PV System 27
2.7.4 Economic Strategies for implementing Grid-Tied PV System 29
2.8 Economic Gain of Grid-Tied PV Technology and Calculation Methods ... 32
2.9 Operation of Apparel Manufacturing Industry 37
2.9.1 Application of Grid-Tied PV for Apparel Manufacturing Industry 38
2.9.2 Economic Gain of Grid-Tied PV for Apparel Industry 38
2.10 Exploration of Research Gap 39
2.11 Chapter Summary 39
CHAPTER THREE 41
3 Research Methodology 41
3.1 Introduction 41
3.2 Research Process 41
3.3 Background Study 42
3.4 Literature Review 43
3.5 Research Approach Adopted in this Study 43
3.6 Research Strategy Adopted in this Study 44
3.6.1 Case study design 45
3.6.2 Data Collection Techniques 46
3.6.3 Data Analysis Techniques 47
3.6.4 Validation of Research Findings 48
3.7 Summary 48
CHAPTER FOUR 49
4 Data Analysis and Discussion 49
4.1 Introduction 49
4.2 Procedure adopted in analyzing case study data 49
4.2.1 Case study profile 49
4.2.2 Profile of Interviewees 50
4.2.3 Documents Reviewed 51
4.3 Research Findings 52
4.4 Economic Evaluation 53
4.4.1 Case A 53
4.4.2 Case B 64

4.4.3 Case C 73
4.4.4 Case D 82
4.5 Summary of the Economic Evaluation 91
4.6 Economic Benefits of Grid-Tied PV Technology 92
4.7 Economic Challenges of Grid-Tied PV Technology 96
4.8 Proposed Strategies to Overcome Economic Challenges of the System 99
4.9 Validation of Research Findings 101
4.9.1 Validation of Economic Evaluation 102
4.9.2 Validation of Economic Benefits, Challenges and Strategies 102
4.10 Chapter summary 103
CHAPTER FIVE 104
5 Conclusions and Recommendations 104
5.1 Introduction 104
5.2 Conclusions 104
5.3 Contributions to Knowledge 107
5.4 Limitation of the study 107
5.5 Recommendations 107
REFERENCES 109
Appendix A - Semi-Structured Data Collection Instrument 138
Appendix B - Semi-Structured Data Collection Instrument – Document Review 142
Appendix C – LCOE Calculation Table 147
Appendix D – Simulation Reports 151

LIST OF FIGURES

Figure 2.1: Annual Change in Global Primary Energy Demand 2011 – 2018 10
Figure 2.2: Electricity Coverage of Sri Lanka 12
Figure 2.3: Primary Energy Supply in Sri Lanka 13
Figure 2.4: Sector Energy Consumption in the Year 2016 15
Figure 2.5: World Electricity Generation by Energy Source 16
Figure 2.6: Solar PV Power Generation in the Sustainable Development Scenario .. 19
Figure 2.7: Block Diagram of Grid-Tied PV System without Batteries 23
Figure 2.8: Block Diagram of Grid-Tied PV System with Batteries 24
Figure 2.9: Grid-Tied Solar PV System 24
Figure 2.10: Literature Mapping 40
Figure 3.1: Research Process 42
Figure 3.2: Unit of Analysis and Case Boundary 46
Figure 4.1: Roof-Mounted Grid-Tied PV System at Case A 53
Figure 4.2: Roof-Mounted Grid-Tied PV System of Case B 64
Figure 4.3: Roof-Mounted Grid-Tied PV System at Case C 73
Figure 4.4: Roof-Mounted Grid-Tied PV System of Case D 82

LIST OF TABLES

Table 2.1: Global Electricity Generation by Source 10
Table 2.2: Economic Challenges of Solar PV System 28
Table 2.3: Financial Strategies Available for Grid-Tied PV System in European Countries 30
Table 2.4: Studies Conducted on Economics of Grid-Tied PV System 33
Table 4.1: Case Study Profile 50
Table 4.2: Profile of the Interviewees 51
Table 4.3: Documents Reviewed 52
Table 4.4: Grid-Tied PV System Information of Case A 54
Table 4.5: Initial Cost of PV System in Case A 55
Table 4.6: Yearly Rated Energy Output and Standard Rated Energy output of Case A 57
Table 4.7: Variables of LCOE Formula in Case A 58
Table 4.8: Produced Energy of Case A 59
Table 4.9: Net Present Value of Case A 61
Table 4.10: Simple Payback Period of Case A 62
Table 4.11: Summary of Economic Evaluation of Case A 63
Table 4.12: Grid-Tied PV System Information of Case B 64
Table 4.13: Initial Cost of PV system in Case B 65
Table 4.14: Yearly Rated Energy Output and Standard Rated Energy output of Case B 67
Table 4.15: Variables of LCOE Formula in Case B 68
Table 4.16: Produced Energy of Case B 69
Table 4.17: Net Present Value of Case B 70
Table 4.18: Simple Payback Period of Case B 71
Table 4.19: Summary of Economic Evaluation of Case B 72
Table 4.20: Grid-Tied PV System Information of Case C 74
Table 4.21: Initial Cost of PV System in Case C 75
Table 4.22: Yearly Rated Energy Output and Standard Rated Energy output of Case C 76

Table 4.23: Variables of LCOE Formula of Case C 77
Table 4.24: Produced Energy of Case C 78
Table 4.25: Net Present Value of Case C 79
Table 4.26: Simple Payback Period of Case C 80
Table 4.27: Summary of Economic Evaluation of Case C 82
Table 4.28: Grid-Tied PV System Information of Case D 83
Table 4.29: Initial Cost of PV System in Case D 84
Table 4.30: Yearly Rated Energy Output and Standard Rated Energy output of Case D 85
Table 4.31: Variables of LCOE Formula of Case D 86
Table 4.32: Produced Energy of Case D 87
Table 4.33: Net Present Value of Case D 88
Table 4.34: Simple Payback Period of Case D 89
Table 4.35: Summary of Economic Evaluation of Case D 91
Table 4.36: Summary of Economic Evaluation 91
Table 4.37: Profit Generated per kWh by Using Grid-Tied PV System 92
Table 4.38: Summary of Economic Benefits across Cases 95
Table 4.39: Summary of Economic Challenges across Cases 98
Table 4.40: Summary of Proposed Strategies across Cases 101
Table 4.41: Profile of Experts 101

ABBREVIATIONS

Abbreviation	Description
AC	Alternative Current
BIPV	Building Integrated Photovoltaic
CEB	Ceylon Electricity Board
DC	Direct Current
EIA	Energy Information Administration
EU	European Union
FIT	Feed-In Tariff
GHG	Greenhouse Gas
IRR	Internal Rate of Return
LCOE	Levelized Cost of Electricity
MOPRE	Ministry of Power and Renewable Energy
NPV	Net Present Value
PV	Photovoltaic
SLSEA	Sri Lanka Sustainable Energy Authority
SPBP	Simple Payback Period