List of Figures

Figure 3.1 Map of Potential Industrial/Energy Plantation Forest	21
Figure 3.2 MEMR Feedstock and Offtake Plans	23
Figure 3.3 Biomass Use in Oil Palm Industry	24
Figure 4.1 Approved Capacity under the FIT Scheme	30
Figure 4.2 Operating Capacity under the FIT Scheme	31
Figure 4.3 Major Power Utilities' Coal-fired Power Plants Co-firing with Biomass (FY2019)	32
Figure 4.4 Biomass Capacity under the FIT Scheme and the 2030 Target	32
Figure 4.5 Breakdown of Biomass Power Generation Fuel in Japan	38
Figure 4.6 Input Biomass Fuel for Each Type of Biomass Power Generation	39
Figure 4.7 Wood Pellets Import	39
Figure 4.8 Domestic Wood Pellets Production	40
Figure 4.9 Average Cost, Insurance and Freight (CIF) Prices of Wood Pellets and Wood Chips	40
Figure 4.10 Installed Capacity of Biomass Power Generation at Present (September 2020) and in 2030	41
Figure 4.11 Needed Wood Pellets Import in the Future	41
Figure 4.12 Cost Breakdown of Woody Biomass Power Plant in Japan	42
Figure 5.1 Operating Cost Structure by the three Department of A company	50
Figure 5.2 Operating Cost Structure by the cost items of A company	50
Figure 5.3 Overall Cost Structure of A company	51
Figure 5.4 Capital Cost Structure of the Three Departments	52
Figure 5.5 Accumulated Cash Flows for ROI and ROE	53
Figure 5.6 Cash Flow of IRROI and IRROE of the Case Study	56
Figure 3.1 Map of Potential Industrial/Energy Plantation Forest	21
Figure 3.2 MEMR Feedstock and Offtake Plans	23

Figure 3.3 Biomass Use in Oil Palm Industry	24
Figure 4.1 Approved Capacity under the FIT Scheme	30
Figure 4.2 Operating Capacity under the FIT Scheme	31
Figure 4.3 Major Power Utilities' Coal-fired Power Plants Co-firing with Biomass (FY2019)	32
Figure 4.4 Biomass Capacity under the FIT Scheme and the 2030 Target	32
Figure 4.5 Breakdown of Biomass Power Generation Fuel in Japan	38
Figure 4.6 Input Biomass Fuel for Each Type of Biomass Power	
Generation	39
Figure 4.7 Wood Pellets Import	39
Figure 4.8 Domestic Wood Pellets Production	40
Figure 4.9 Average Cost, Insurance and Freight (CIF) Prices of Wood Pellets and Wood Chips	40
Figure 4.10 Installed Capacity of Biomass Power Generation at Present (September 2020) and in 2030	41
Figure 4.11 Needed Wood Pellets Import in the Future	41
Figure 4.12 Cost Breakdown of Woody Biomass Power Plant in Japan	42
Figure 5.1 Operating Cost Structure by the three Department of A company	50
Figure 5.2 Operating Cost Structure by the cost items of A company	50
Figure 5.3 Overall Cost Structure of A company	51
Figure 5.4 Capital Cost Structure of the Three Departments	52
Figure 5.5 Accumulated Cash Flows for ROI and ROE	53
Figure 5.6 Cash Flow of IRROI and IRROE of the Case Study	56

List of Tables

Table 2.1 Demand of Power Generation by Type of Fuel (Kton)	5
Table 2.2 Biomass Energy Potential for Electricity (Unit: MW)	6
Table 2.3 Biomass Co-firing Tests on Existing CFPPs by the PLN	7
Table 2.4 Fossil Fuel Demand of Power Generation by Type of Fuel (Mtoe)	8
Table 2.5 Forecasted Demand for woodchip to meet biomass and coal combustion (Kton) in 2025	8
Table 2.6 Forecasted Demand for woodchip to meet biomass and coal combustion (Kton) in 2040.	9
Table 2.7 Potential of 2nd generation bioethanol production from the different feedstock in Indonesia	10
Table 2.8 Pure Diesel Supply and Demand Balance (million kilolitres)	12
Table 2.9 Total diesel fuel needed for road transport sector use in Indonesia in term of energy and volume unit	13
Table 2.10 FAME (pure biodiesel) needed for road transport sector use in Indonesia in B30 and B40 mandates in term of energy and volume unit	13
Table 2.11 CPO needed in road transport sector B30 and B40 mandates (million tonnes)	14
Table 2.12 Gasoline Supply and Demand Balance (million kilolitres)	15
Table 2.13 Total diesel fuel needed for road transport sector use in Indonesia in term of energy and volume unit	16
Table 2.14 Gasoline consumption in East Java and Java Island and bioethanol needed in scenarios (million kilolitres)	17
Table 2.15 Needed molasses in scenarios (million tonnes)	17
Table 3.1 Biomass Energy Annual Potential (million tonnes)	21
Table 3.2 Estimation of Estates Crops Waste Potency	22
Table 3.3 Harvesting Areas, Productions and Waste Potency of Some Food Crop Products	22
Table 3.4 Area and Production of Crude Palm Oil (CPO): 2015 - 2021	25
Table 3.5 Area and Production of Crude Palm Oil (CPO): 2040	25

Table 3.6 Sugarcane production, and potential production of molasses and bioethanol in Indonesia, 2040	27
Table 3.7 Development of sugarcane harvested area, production and productivity in 2040	27
Table 3.8 Potential Ethanol Production (2nd G) from Different Feedstock	28
Table 4.1 The Biomass Power Target of the Long-term Energy Demand and Supply Outlook 2015	29
Table 4.2 The Biomass Outlook	33
Table 4.3. The FIT Tariff Rates	34
Table 4-4 Auction Result	36
Table 4.5 Examples of Subsidy for Biomass Energy	37
Table 4.6 Forest and Forestry Basic Plan (draft)	43
Table 5.1 Forecasted Income Statement of A company (\$1,000)	49
Table 5.2 Forecasted Cash Balance Tables of A Company (\$1,000)	52
Table 5.3 Income Statement of the Case Study	54
Table 5.4 Cash Balance Statement of the Case Study	55