Table Of Contents

Contents	Page No.
Certificate	ii-iv
Acknowledgement	
Table of Contents	
List of Figures	
List of Tables	xii
List of Abbreviations	
Nomenclature	
Abstract	xvii-xx
1. Introduction	1-8
1.1 Background	1
1.1.1 Reactions	3
1.1.2 Gasification Process	3
1.1.3 Need For Biomass Gasification	4
1.1.4 Organic Rankine Cycle Utilization	5
1.1.5 Combined Cooling, Heat and Power System	5
1.2 Motivation For Present Work	6
2. Literature Review	9-21
2.1 Integration of Biomass Gasification with CHP	9
2.2 Merging with Combined Cooling, Heat and Power Sys	stem 11
2.3 Integration of Solar Assisted Biomass Gasification Sys	stem 14
2.4 Inclusion of Solid Oxide Electrolytic Cell (SOEC)	
2.5 Biomass Selection	
2.6 Key objectives	20
3. Design and proposal of a novel biomass based syngas production	
system integrated with combined heat and power gener	ration 22-42
3.1 Proposed System Layout	23
3.2 Modeling and Simulation	26
3.3 Results and Discussion	31
A Parformance Assessment of Nevel Riemoss Cosification	n

4. Performance Assessment of Novel Biomass Gasification

	Based CO	43-76	
	4.1 Mode	43	
	4.2 Mathe	56	
	4.3 Result	64	
	4.3.1	Effects of gasification temperature and WBR at	65
		constant TMF, boiler pressure and refrigerant flow rate	
	4.3.2	Effects of gasification temperature and total biomass-water	66
		mass flow rate at fixed water-biomass ratio, boiler pressure	
		and refrigerant flow rate	
	4.3.3	Effects of Boiler Pressure, refrigerant flow rate and	67
		gasification temperature at constant TMF (160 kg/h)	
		and WBR (0.4)	
	4.3.4	Comparison of various output parameters obtained	67
		from Leather waste and Paper Mill Sludge Cake	
		at optimum gasification temperature	
5.	5. Development of a Biomass gasification integrated Solar-wind Driven Hybrid System		
	using Organic Rankine Cycle for Combined Electricity generation and Hydrogen		
	Production	o n	77-94
	5.1 Model Layout		77
	5.2 Mathematical Model		81
	5.3 Result	ts and Discussion	85
6.	6. Conclusions and Future Scope of Work		95-99
	6.1 Concl	usions	95
	6.2 Future Scope Of Work		99
-	۸		100

7. Appendix

109