INDEX

CHAPTER 1			
SO	LID WASTE GENERATION	1	
1.	HUMAN AND INDUSTRIAL ACTIVITIES GENERATE WASTE	1	
2.	SOLID WASTE	2	
2.1	Municipal waste	2	
2.2	Assimilated municipal waste	2 3	
2.3	-	3	
2.4	Industrial waste	4	
2.5	Special waste and inerts	4	
3.	DIFFERENTIATED COLLECTION AND MEANS OF WASTE REDUCTION	5	
4.	REGULATIONS, LAWS AND CARBON TAX	6	
4.1	Carbon dioxide and global warming	7	
4.2	Carbon Tax	7	
5.	References	9	
CH	APTER 2	11	
WA	ASTE REDUCTION AND CHARACTERISATION	11	
1.	REDUCTION OF MUNICIPAL SOLID WASTE	11	
2.	BLOCK DIAGRAM OF CURRENT TREATMENT FLOWS	11	
3.	CHARACTERISATION OF MUNICIPAL WASTE	14	
4.	SCENARIO OF DIFFERENTIATED COLLECTION AND HEATING VALUES	18	
5.	Fluff	20	
6.	References	23	
СН	APTER 3	25	
TR	ADITIONAL INCINERATION	25	
1.	CONSIDERATIONS COMMON TO INCINERATION SYSTEMS	25	
2.	GRATE FURNACES	29	
	Air cooled grates	30	
	Water cooled grates	31	
3.	FLUIDISED BED FURNACES	31	
4.	ROTARY KILNS	33	
5.	References	35	

CE	IAPTER 4	37
AL	TERNATIVE THERMAL PROCESSES	37
1.	GASIFICATION	37
2.	Pyrolysis	38
3.	THERMOSELECT TM PROCESS	40
4.	COMPACT POWER®	40
5.	CMR TM "Continuous Melting Reactor"	41
6.	RCP TM "RECYCLED CLEAN PRODUCTS"	42
7.	References	43
CH	IAPTER 5	45
DI	OXINS, FURANS AND RELATED COMPOUNDS	45
1.	D/F FORMATION MECHANISMS	46
2.	DIOXINS CONTROL	47
3.	DIOXINS ANALYSIS	48
4.	References	49
<u>C</u> E	HAPTER 6	51
LC	DW PRESSURE CO2 PARTIAL ABSORPTION FROM FLUE GAS	51
1.	GENERAL CONSIDERATIONS AND SELECTION OF AMINE	52
2.	FLUE GAS FEED BASIS	54
3.	SELECTION OF THE PROCESS SIMULATOR AND OPERATING CONDITIONS	54
4.	PROCESS FLOW DIAGRAM DISCUSSION AND MATERIAL BALANCE	56
5.	PRIMARY EQUIPMENT LIST AND ESTIMATES	57
6.	INVESTMENT OFFSET	58
7.	ALTERNATIVE FOR CO_2 CONCENTRATION	59
8.	References	61
AP	PENDIX	63

CF	IAPTER 7	<u>91</u>
PL	ASMA AND CO ₂ REFORMING POSSIBILITY TO	
GI	ENERATE SYNGAS	91
1.	TYPES OF PLASMA GENERATORS	92
2.	ADVANTAGES OF UTILISING A PLASMA PROCESS FOR TREATING	
	WASTE	93
3.	FEASIBILITY TO USE PLASMA FOR CO_2 CONVERSION	94
4.	PRELIMINARY ENERGY ASPECT FOR TREATING CO_2 and Waste	96
5.	PRELIMINARY THERMODYNAMIC ASPECT FOR CO ₂ Reforming	98
6.	VERIFICATION OF THE PRELIMINARY THERMODYNAMIC ANALYSIS	103
7.	References	104
<u>CI</u>	IAPTER 8	<u>105</u>
<u>C</u>	HAPTER 8	<u>105</u>
		<u>105</u>
AF	PROACH OF WASTE TO H ₂ AND CO IN A PLASMA	<u>105</u> 105
AF		105
AF RF	PROACH OF WASTE TO H ₂ AND CO IN A PLASMA CACTOR	
AF RF 1.	PROACH OF WASTE TO H2 AND CO IN A PLASMA CACTOR BACKGROUND AND OBJECTIVE COMBUSTION AND OXIDATION	105 105
AF RF 1. 2.	PROACH OF WASTE TO H2 AND CO IN A PLASMA CACTOR BACKGROUND AND OBJECTIVE	105 105
AF RF 1. 2.	PROACH OF WASTE TO H ₂ AND CO IN A PLASMA CACTOR BACKGROUND AND OBJECTIVE COMBUSTION AND OXIDATION COMPARATIVE MATERIAL AND HEAT BALANCE OF THE MODEL REACTION VIA PLASMA CONVERSION	105 105 107
AF RF 1. 2. 3.	PROACH OF WASTE TO H2 AND CO IN A PLASMA CACTOR BACKGROUND AND OBJECTIVE COMBUSTION AND OXIDATION COMPARATIVE MATERIAL AND HEAT BALANCE OF THE MODEL	105 105 107
AF RF 1. 2. 3.	PROACH OF WASTE TO H ₂ AND CO IN A PLASMA CACTOR BACKGROUND AND OBJECTIVE COMBUSTION AND OXIDATION COMPARATIVE MATERIAL AND HEAT BALANCE OF THE MODEL REACTION VIA PLASMA CONVERSION COMPARISON BETWEEN CONVENTIONAL INCINERATION AND	105 105 107 108
AF RF 1. 2. 3. 4.	PROACH OF WASTE TO H ₂ AND CO IN A PLASMA CACTOR BACKGROUND AND OBJECTIVE COMBUSTION AND OXIDATION COMPARATIVE MATERIAL AND HEAT BALANCE OF THE MODEL REACTION VIA PLASMA CONVERSION COMPARISON BETWEEN CONVENTIONAL INCINERATION AND ADDED PLASMA PLANT	105 105 107 108 109

CHAPTER 9

THERMOCHEMISTRY AND TEST PREPARATORY CALCULATIONS 1. INTRODUCTION 2. FLUFF, THE FEEDSTOCK OF THE PROCESS 3. THERMOCHEMICAL EVALUATION 4. HEAT LOSSES AND SENSIBLE HEAT COMPENSATION 5. THE ISSUE OF CARBON BLACK 6. TESTING OBJECTIVES AND SUMMARY OF TEST CONDITIONS 7. References APPENDICES

PILOT TEST REPORTING AND DISCUSSION OF RESULTS				
		159		
1.	INTRODUCTION	159		
2.	TEST APPARATUS DESCRIPTION	159		
3.	FLUFF FEED	160		
4.	PLASMA REACTOR	161		
4.	PLASMA REACTOR	162		
5.	TESTING PROCEDURE	164		
6.	ENERGY BALANCE	165		
7.	CHEMICAL ANALYSIS AND MATERIAL BALANCE OF INORGANICS	166		
8.	SYNGAS PRODUCED AND OPERATING INPUT	169		
9.	CARBON BALANCE AND CARBON BLACK	172		
10.	PSEUDO-ORDER AND RATE OF REACTION	174		
11.	CSTR SPACE TIME	176		
12.	ACTIVATION ENERGY OF THE PSEUDO-REACTION	177		
13.	Ash and Vitrified Material Discharge	178		
14.	References	181		
App	PENDICES	182		

CHAPTER 11

WRAPPING IT ALL UP: RESEARCH AND PROCESS DEVELOPMENT PLAN 1. RESEARCH FACILITY 1.1 Plasma pilot plant and laboratory 1.2 Laboratory services 1.3 Research funding through a foundation 2 DEMONSTRATION PLANT 2.1 Basis of design

2.1 Basis of design	207
2.2 Process description	207
2.3 Process Flow Diagram (PFD) and Equipment List	208
2.4 Plot Plan and layout	209
3. USES OF SYNGAS	209
4. PRELIMINARY ECONOMICS TO CONTINUE THE RESEARCH	210
4.1 Pyro Plasma Lab	210
4.2 Demonstration Plant	211
Appendices	