

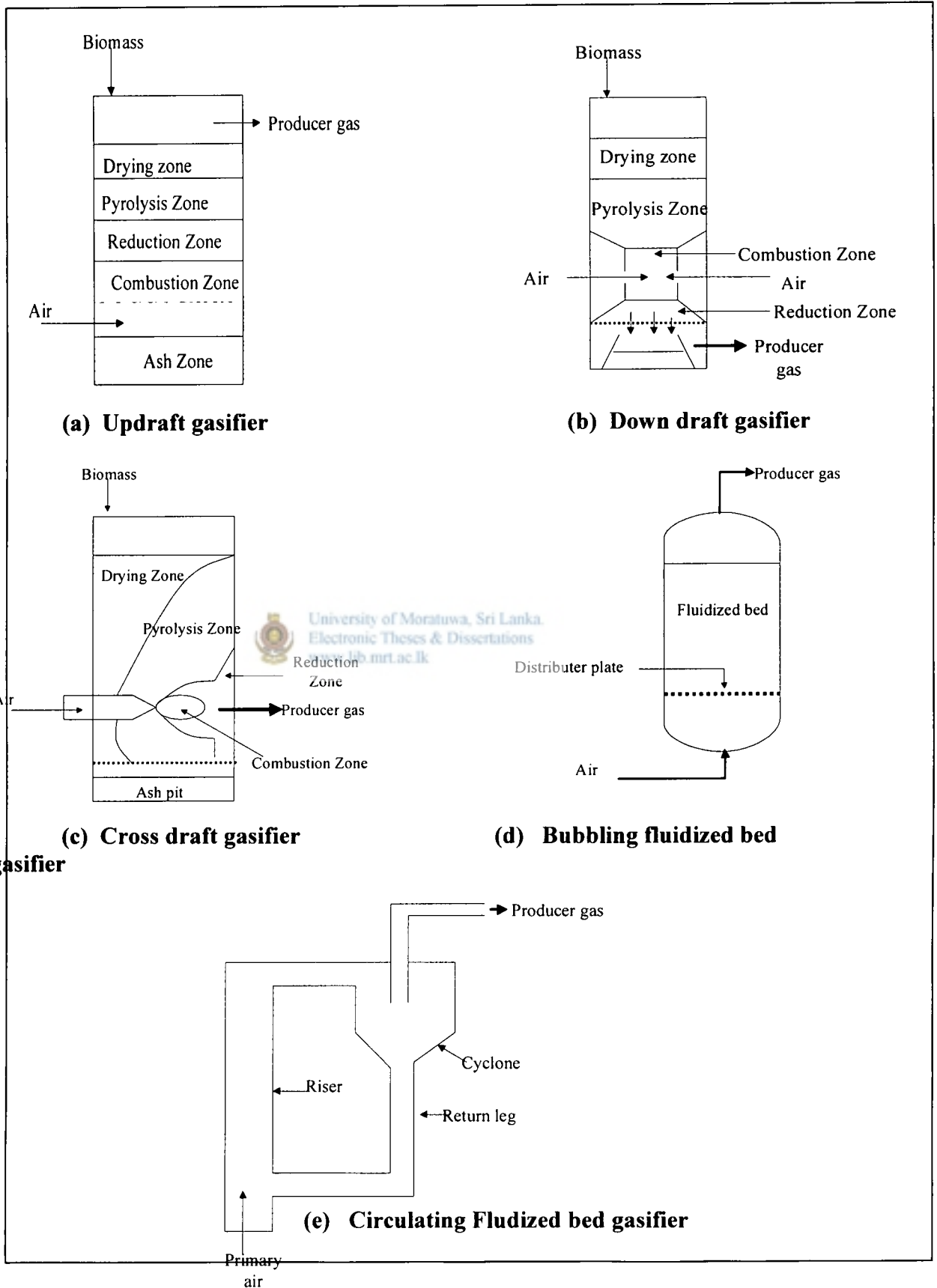
CHAPTER 8 CONCLUSION

Stove temperatures fluctuate due to the fuel batch feeding. Maximum temperature of 800C is recorded in-between chimney and the grate and it occurs during the middle of the batch feeding time. Charcoal formation and smoke can be observed when the batch size becoming large Even though there are temperature fluctuations, average stove temperature stays above 400 C. CO and CO₂ levels are increasing when there is less excess O₂ in the flue gas.

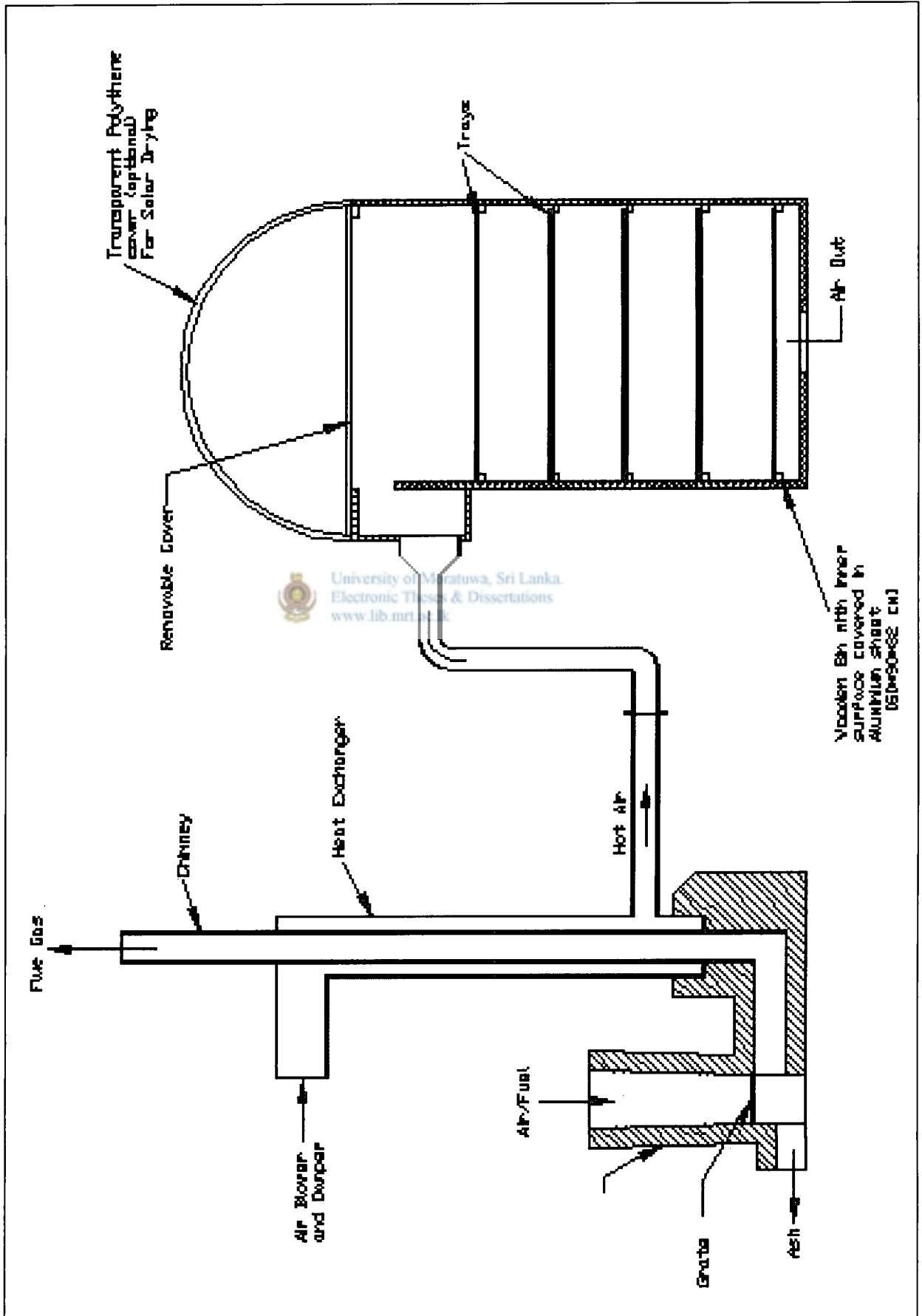
If the heat is extract for the chimney by using an air flow, the temperature fluctuation of the air can be regulate from the thermal inertia of the system. Bin temperature is almost steady during the experiment therefore stove and bin arrangement can be use for industrial applications.



APPENDIX : MAIN GASIFIER DESIGNS



SOLAR ASSISTED BIOMASS DRYER DESIGN



Temperature variation according to the batch feeding time (500g batch)

Batch feeding Time	T1 (temperature under the grate)	T2 (Temperature between grate and chimney inlet	T3 (Temperature chimney inlet)	T4(Temperature chimney outlet)
0	527	511	353	245
5	486	630	369	181
10	455	445	330	115
15	455	546	340	197
20	474	464	337	168
25	449	650	340	213
30	342	388	294	158
35	289	283	237	166
40	619	511	347	177
45	648	572	398	234
50	521	581	370	283
55	509	652	498	240
57	607	765	515	326
60	712	757	569	341
65	540	631	603	317
70	723	781	646	322
73	706	780	573	373
75	658	829	663	246
80	649	671	519	300
85	661	702	530	286
90	761	781	600	348
95	825	811	686	320
100	715	784	607	327
105	699	702	584	308
110	631	766	591	376
115	758	699	570	345
120	574	596	486	211
125	689	801	622	389
130	578	655	539	277
135	649	744	640	395
140	632	601	516	308
145	549	679	548	384
150	644	649	542	346
155	670	811	668	462
160	624	766	573	409
165	630	774	632	430
170	644	731	578	377
175	669	779	617	401
180	667	736	573	373
185	512	658	537	391
190	491	656	510	387
195	597	795	669	426
200	656	720	604	384
205	636	722	576	381
210	705	680	563	345
215	552	748	570	376
220	632	701	628	377
225	718	748	666	444
230	656	733	646	350

235	613	785	708	436
240	646	833	703	459
245	648	839	723	416
250	614	719	627	407
255	722	801	663	392
260	750	798	663	470
265	654	803	705	458
270	651	702	595	358
275	573	757	640	425
280	553	594	548	398
285	606	687	641	421
290	629	646	567	445
295	652	740	688	498
300	561	601	531	322
305	589	722	626	467
310	523	565	472	329
315	536	665	581	413
320	547	661	600	411
325	577	788	690	433
330	574	604	528	418
335	541	552	479	409
340	598	671	567	419
345	634	732	613	460
350	743	757	639	484
355	731	769	690	458
360	688	804	702	452



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Fuel batch starts From the coloured line

Temperature variation according to the batch feeding time (750g batch)

Batch feeding Time	T1 (temperature under the grate)	T2 (Temperature between grate and chimney inlet	T3 (Temperature chimney inlet)	T4(Temperature chimney outlet)
0	431	545	348	213
5	535	557	400	231
10	543	594	438	250
15	353	446	329	213
20	537	606	403	258
25	632	608	532	283
30	603	494	405	251
35	694	807	614	312
40	708	764	636	320
45	582	583	462	277
50	770	785	609	325
55	775	742	617	325
60	687	656	536	304
65	655	636	545	321
67	635	749	587	328
70	736	761	664	332
75	624	619	512	296
78	699	797	622	330
80	769	795	645	344
85	781	794	676	345
90	756	773	677	348
95	648	659	523	311
100	631	718	560	311
103	697	800	679	332
105	671	774	604	335
110	735	849	692	346
115	716	832	704	358
120	829	838	660	367
125	762	855	695	355
130	837	860	721	368
135	587	574	484	300
140	642	786	567	333
142	717	799	685	352
145	805	806	618	341
150	677	732	608	334
155	606	845	626	356
160	796	788	636	359
165	762	768	679	352
170	712	780	639	340
175	754	670	581	324
180	792	850	727	364
185	743	818	660	355
190	817	841	732	366
195	696	811	681	347
200	691	693	569	326
205	733	752	626	333
210	748	817	646	340
215	777	776	611	333

220	801	741	644	337
225	691	745	594	321
230	792	821	701	349
235	854	795	709	356
240	770	801	624	345
245	671	762	659	349
250	749	797	685	360
255	665	635	568	337
260	899	805	681	349
261	922	810	698	356
265	819	832	676	342
270	578	595	489	290
275	784	730	649	318
277	776	794	684	339
280	744	776	656	345
285	660	663	516	309
290	855	858	721	355
292	823	837	717	355
295	836	790	711	358
300	742	790	601	325
305	865	800	696	347
310	893	828	700	344
315	784	810	660	384
320	784	879	729	357
325	827	851	730	350
327	922	875	730	362
330	822	819	659	332
335	741	801	658	343
340	784	718	650	332
343	769	830	672	350
345	787	854	699	360
350	712	819	672	354
355	702	778	631	334
360	788	812	671	342

fuel batch starts from the coloured line

Temperature variation according to the batch feeding time (300g batch)

Batch feeding Time	T1 (temperature under the grate)	T2 (Temperature between grate and chimney inlet	T3 (Temperature chimney inlet)	T4(Temperature chimney outlet)
0	529	521	450	342
5	575	521	373	249
8	697	673	490	285
10	679	691	452	284
13	614	811	465	308
15	550	620	442	287
18	630	726	458	290
20	619	610	447	296
23	694	722	444	303
25	740	751	499	316
28	655	582	437	268
30	489	494	393	259
33	417	471	361	238
35	510	491	360	242
38	621	631	471	280
40	650	701	544	300
43	649	693	523	296
45	662	605	535	300
60	600	584	406	249
63	533	626	387	249
65	420	493	340	225
68	604	519	364	240
70	591	706	395	250
73	720	674	469	271
75	690	656	444	266
78	790	760	528	287
80	652	761	479	289
83	625	707	442	270
95	662	695	472	329
98	745	774	480	342
100	600	778	504	342
103	642	691	447	313
105	768	648	502	329
108	644	589	506	329
110	697	715	508	315
113	694	733	551	318
115	678	719	516	328
118	596	597	479	294
120	758	718	560	310
123	653	756	513	299
125	640	737	443	321
128	713	746	555	357
130	722	737	546	285
133	578	590	471	265
135	630	753	501	327
138	634	783	488	313

140	624	785	454	292
142	706	730	453	301
145	667	765	458	320
155	484	460	335	289
158	563	549	375	296
160	625	744	491	380
163	600	650	451	356
165	518	503	423	300
168	754	779	591	415
170	573	640	471	356
173	448	458	366	304
175	800	750	495	376
178	744	752	495	372
180	627	742	464	379
183	777	792	513	409
185	824	779	574	393
188	522	506	413	297
190	832	781	629	425
193	804	754	564	404
195	538	504	425	320
198	639	806	517	396
200	795	646	527	320
203	670	591	454	336
205	734	730	589	400
208	744	748	614	445
210	563	566	423	312
213	678	695	557	397
215	716	709	578	382
218	606	674	407	310
220	646	773	590	382
223	597	621	439	323
225	513	594	441	314
228	755	776	609	404
230	746	717	552	381
233	517	485	389	271
235	745	777	564	380
238	697	787	594	369
240	693	750	490	387
243	788	789	586	418
245	769	742	518	363
248	484	496	374	283
250	747	722	555	399
253	679	626	440	325
255	570	526	394	292
258	701	703	452	348
260	680	692	530	341
263	738	564	499	318
265	752	741	560	387
268	751	774	621	349
270	616	561	422	310
273	729	706	555	383
275	724	744	586	402
278	765	642	470	320
280	843	729	575	365


283	840	693	538	363
285	737	743	616	380
288	740	720	611	379
290	744	735	624	377


fuel batch feeding starts form the coloured line



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