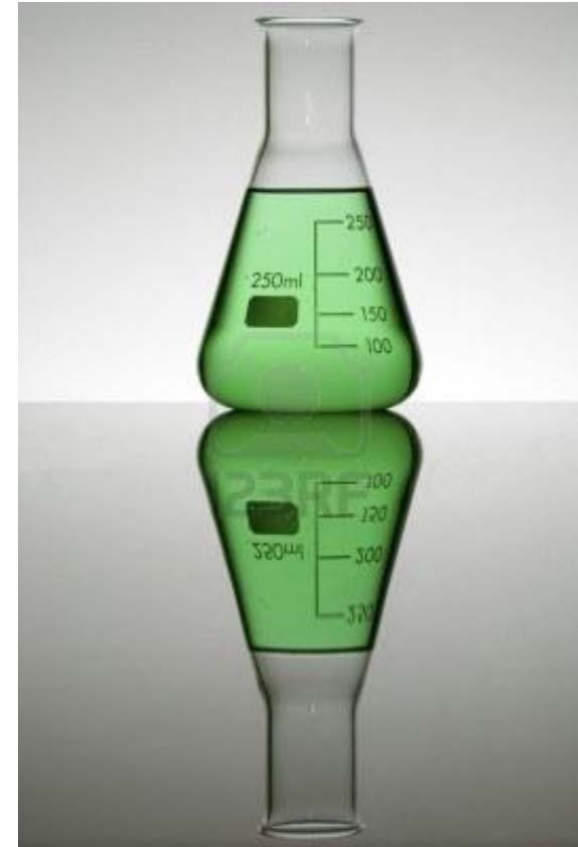


COMBUSTO Coal Saving

About product:

Combusto Coal is a clear green liquid catalyst. It is a combination between organic and non-organic substances. After dosing into coal, it helps to promote complete combustion of coal in a burning chamber. This can produce more energy for the same amount fuel, therefore it can reduce total consumption of coal and also reduces emission of toxic gases.(GHG)



Testing Place:

Integrated Palm Oil Refinery of ASEAN

Type of Boiler:

Water Tube Boiler, Traveling grate stoker
10 t/h, 16 Bar

Fuel Type:

Bituminous Coal





Combusto Coal Testing Procedure (CC)

1. Collecting Boiler Operating data before using CC for 1 month;
 - Consumed Coal (kg/day)
 - Produced Steam (m^3/day)
 - Ratio of Consumed Coal per 1 m^3 of Steam (kg/m^3)
 - Amount of Ash (kg)
 - Ash/Coal ratio (kg/kg).
2. Installing a CC dosing set.
3. Dosing CC at a rate of 2% w/w.
4. Collecting Boiler Operating data during using CC for 1 month.
5. Comparing result of Before and After using CC.
6. Summary of the test.



Boiler Operating data before using CC



Boiler Operating data before using CC were collected systematically throughout August 2013.

Date	Consumed Coal (Kg)	Consumed Steam (m ³)	Total Ash (kg)	Date	Consumed Coal (Kg)	Consumed Steam (m ³)	Total Ash (kg)
1/8/13	16,380	98.5	823	17/8/13	19,320	113.6	978
2/8/13	20,160	119.4	984	18/8/13	16,170	95.6	833
3/8/13	17,640	105.4	895	19/8/13	12,600	75.6	632
4/8/13	18,690	109.4	928	20/8/13	13,650	79.8	603
5/8/13	20,370	120.7	920	21/8/13	15,540	92.1	678
6/8/13	18,480	110.8	990	22/8/13	15,330	90.4	734
7/8/13	17,430	103.9	754	23/8/13	15,750	94.8	708
8/8/13	11,760	69.6	672	24/8/13	18,060	107.7	852
9/8/13	17,220	103.2	851	25/8/13	17,010	101.6	846
10/8/13	13,860	82.9	701	26/8/13	13,440	78.8	787
11/8/13	15,330	90.7	824	27/8/13	23,730	139.3	1,222
12/8/13	13,230	78	750	28/8/13	21,000	124	987
13/8/13	11,130	66.2	523	29/8/13	16,590	98.4	813
14/8/13	16,590	98.6	798	30/8/13	14,280	84.4	731
15/8/13	19,950	119.9	951	31/8/13	19,110	111.6	1,034
16/8/13	24,990	150.2	1,474	Total	524,790	3,115	26,276

- Average Coal consumption per unit of Steam is **168.47 (Kg/m³)**

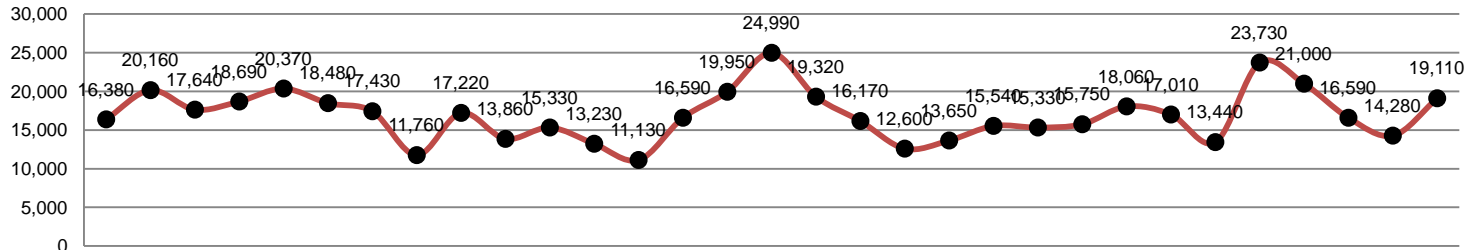
- Average %Ash (Ash/Coal) is **5.01%**

Boiler Operating data before using CC



August 2013

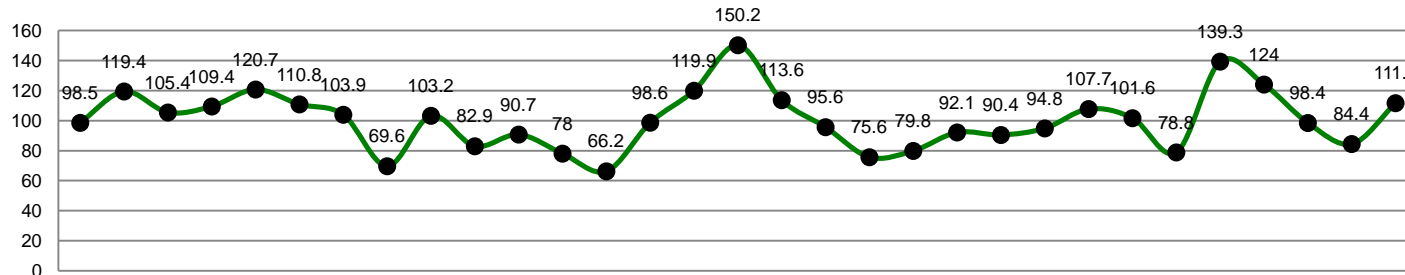
Consumed Coal (Kg)



Average

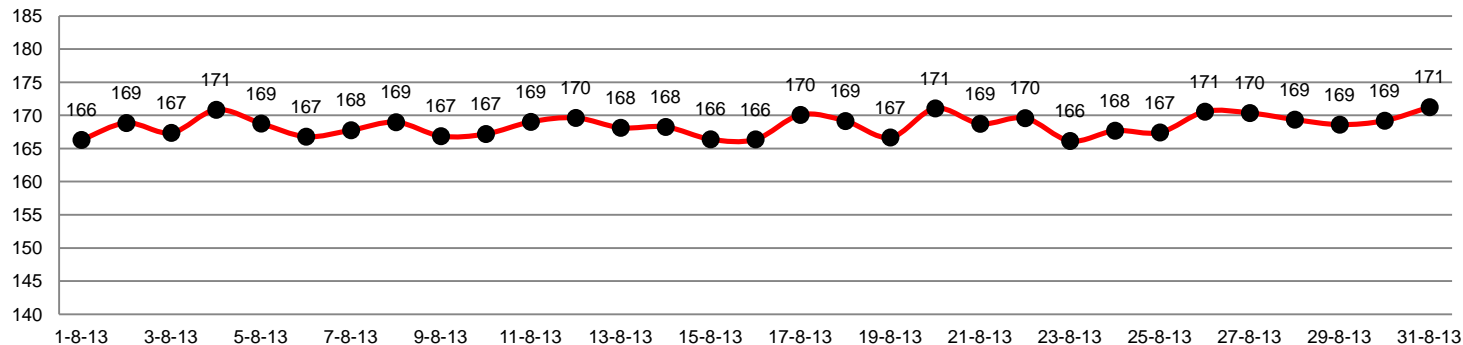
16,929
kg/day

Consumed Steam (m³)



100.49
m³/day

Coal/Steam ratio (Kg/m³)



168.47
kg/m³

Installing a CSC Dosing Set



Dosing pump and tank



Spray Nozzle



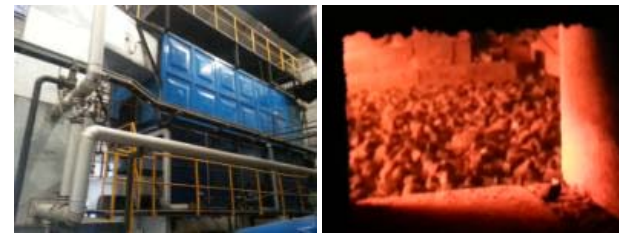
Dosing CSC at a rate of 2% w/w.

A dosing pump is interlocked with a coal feeding motor. CSC is sprayed at the same time as coal is fed in.



Boiler Operating data during using CSC

CSC was used throughout September 2013.



Date	Consumed Coal (Kg)	Consumed Steam (m ³)	Total Ash (kg)	Date	Consumed Coal (Kg)	Consumed Steam (m ³)	Total Ash (kg)
1/9/13	17,640	111.3	643	17/9/13	14,910	98.2	478
2/9/13	16,380	108.7	584	18/9/13	22,260	146.7	863
3/9/13	17,640	114.9	695	19/9/13	17,010	111.9	733
4/9/13	17,430	115.5	628	20/9/13	15,540	104.2	603
5/9/13	16,380	112.5	620	21/9/13	16,800	112.2	678
6/9/13	16,170	109.6	450	22/9/13	21,630	146.4	784
7/9/13	19,530	129.1	554	23/9/13	20,370	134.9	708
8/9/13	15,750	104.8	572	24/9/13	17,430	116.8	710
9/9/13	21,210	139.5	551	25/9/13	15,330	102.2	746
10/9/13	18,270	122.1	601	26/9/13	19,530	127.4	817
11/9/13	10,920	71.9	464	27/9/13	16,800	112.2	622
12/9/13	12,180	81.9	450	28/9/13	14,910	96.9	647
13/9/13	18,480	121.1	613	29/9/13	17,220	112.6	763
14/9/13	14,700	99	578	30/9/13	18,060	119.6	831
15/9/13	16,380	106.1	651				
16/9/13	19,530	129.2	794	Total	516,390	3,419	19,431

- Average Coal consumption per unit of Steam is **151.03 (Kg/m³)**

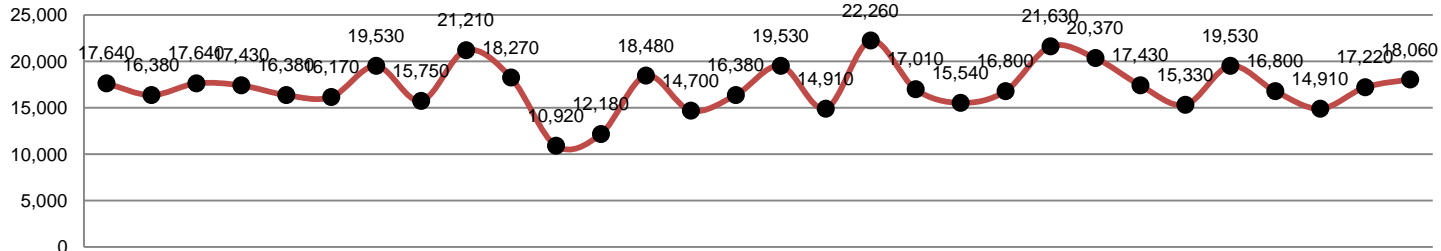
- Average %Ash (Ash/Coal) is **3.76%**

Boiler Operating data after using CC



September 2013

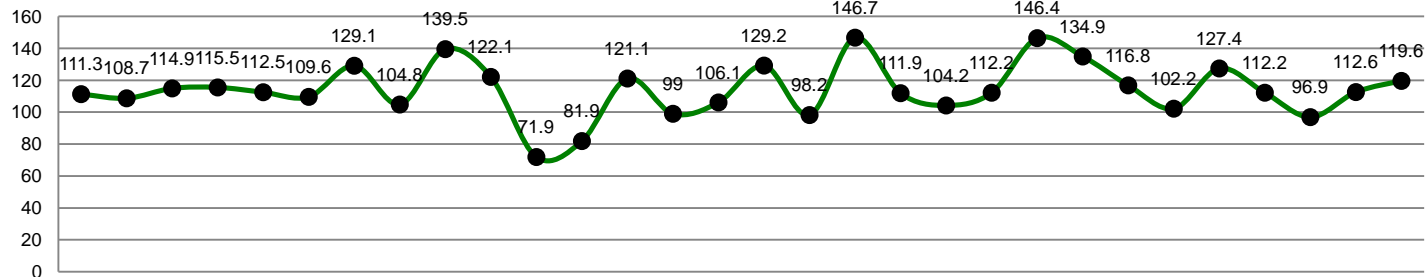
Consumed Coal (Kg)



Average

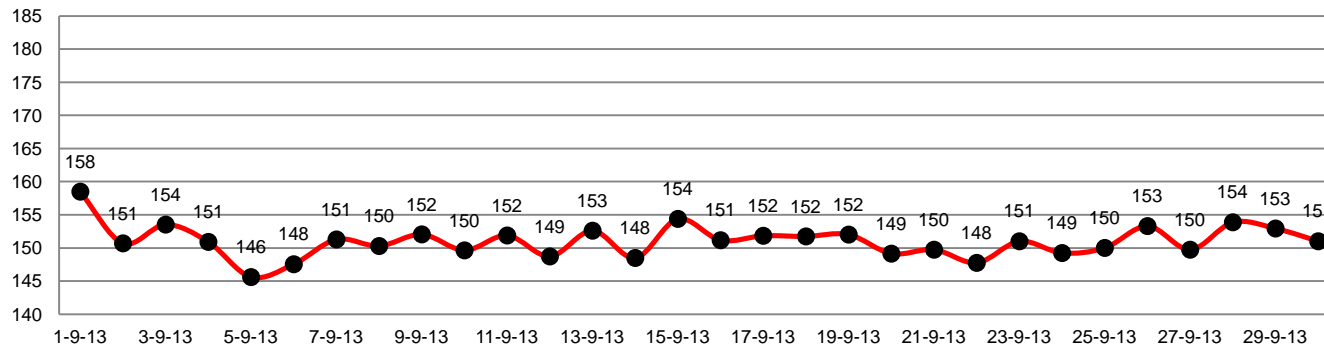
17,213
kg/day

Consumed Steam (m³)



113.98
m³/day

Coal/Steam ratio (Kg/m³)



151.03
kg/m³

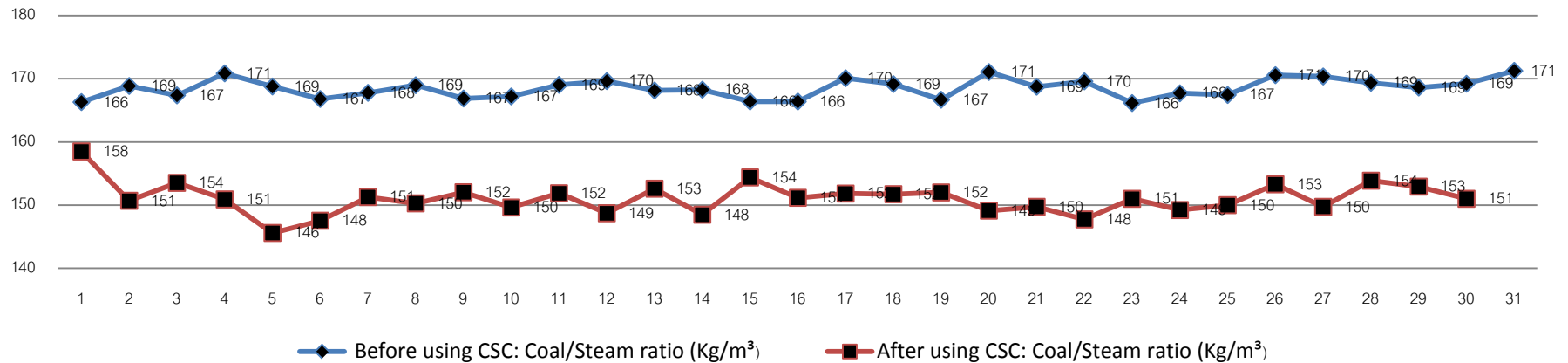
Before and After using CC Comparison

	Before (August 2013)		After (September 2013)	
	Total	Average	Total	Average
Consumed Coal	524,790 (Kg)	16,928 (Kg/day)	516,390 (Kg)	17,213 (Kg/day)
Consumed Steam	3,115 (m ³)	100.49 (m ³ /day)	3,419 (m ³)	113.98 (m ³ /day)
Ash	26,276 (Kg)	847.61 (Kg/day)	19,430 (Kg)	647.69 (Kg/day)
Coal/Steam ratio	168.47 (Kg/m³)		151.03 (Kg/m³)	
%Ash (Ash/Coal)	5.01%		3.76%	



Before and After using CC Comparison

Comparison Before and After using CC



	Before	After	Different	%Different
Coal consumption per unit of Steam (Kg/m ³)	168.47 (Kg/m ³)	151.03 (Kg/m ³)	- 17.43 (Kg/m ³)	Reduced 10.36%
%Ash (Ash/Coal)	5.01%	3.76%	-1.24%	Reduced 24.85%

Summary of the test of Combusto Coal

Result of using CC in the Water Tube Boiler of **Integrated Palm Oil Refinery of Asean**, during the test period of one month shows that;

- Combustion **EFFICIENCY** of coal in the boiler was **INCREASED & ENHANCED**
- Steam Pressure reached its set point **MUCH FASTER.**
- Coal consumption per unit of Steam (Kg/m^3) was **REDUCED 10.23%**
- Ash to coal ratio was **REDUCED 24.85%**



CAP <450ppm CO2 @<2deg.C

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- By Ron Tan +65-9145-9147
- combusto@gmail.com
- Attn: All Policy Makers
- Energy, Environment, Water, Health,
- Hon. HE Head of members of UN
- <http://edition.cnn.com/> (impact of emission)

A green rectangular sign with rounded corners and a white border is mounted on two wooden posts. The sign features the words "Thank You" in a large, white, sans-serif font. The background is a bright blue sky filled with scattered white, fluffy clouds.

Thank You