

ENERGY AUDIT REPORT
PT. INDAH KIAT PULP & PAPER
PERAWANG MILL
MB 11 AND TG 12

Audit Date : 2 Feb – 6 Feb 2015
Report No. EnAR IO6 1303207115



PT. INDAH KIAT PULP AND PAPER-PERAWANG MILL

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EXECUTIVE SUMMARY

TUV Rheinland Indonesia has been entrusted with the task of conducting an energy audit by PT. Indah Kiat Pulp & Paper Tbk – Perawang Mill. The objective of the audit was to verify the energy consumption and also to ascertain implementation of Energy Management system and to conclude with the observations and recommendations for the improvement in performance.

The audit was based on:

- Directive PM ESDM Nomor 14 Tahun 2012
- ASME PTC 4.1 – Performance Test Boiler
- Quality management system basic requirements

The audit scope and boundary is limited to Energy Audit Level 2 in Boiler MB 11, and turbine TG 12, in PT. PT Indah Kiat Pulp and Paper, Plant Perawang. The audit was conducted during 2-6 Feb 2015.

Statement about Conformance to Standards

The following table contains a listing of the important individual assessment for fulfilling the requirements of the standards.

Section	Assessment/ Comments				Assessment *)
Part 1: System specific part					
Organisation for energy management	<ul style="list-style-type: none"> • Energy Management Team is yet to be formed • Energy manager is yet to be appointed and trained 				2 (1)
Energy consumption in 2014 MB11 & TG 12	Item Energy Source	Unit	Total in units	Total in GJ	1
	WOOD	Ton	215,174	2,326,752	
	COAL	Ton	13,347	268,237	
	OIL	KL	754	30,496	
	OTHER(CPO)	Ton	2,407	37,198	
	Total Energy Input			2,662,683	

Procedures & work instructions	<ul style="list-style-type: none"> • Sufficiency • Clarity 	1
Record	<ul style="list-style-type: none"> • Availability & retrieval 	1
Skill & competences of operational personnel	<ul style="list-style-type: none"> • Qualification • Experience • Specific for knowledge 	2 (2)
Part 2: Site inspection	<ul style="list-style-type: none"> • Safety • Lighting • Building maintenance & maintenance process House keeping 	2 (3)
Legend: *) 1 = Fulfilled, 2 = Fulfilled with scope for improvement, 3 = Not Fulfilled		

Table 1. Listing of the important individual assessments as to the requirements of the standards.

Management System

Energy Management system is still in planning stage. Policy and Objectives is yet to be formulated. Energy Manager is yet to be appointed. and the Energy team is yet to be formed.

However, energy saving program has been adopted from 2012 .Required data collection and monitoring of energy savings projects is implemented and the results are compiled and reviewed periodically.

Energy Review :

Energy used in the pulp and paper plant is from a number of energy sources, in view of the Multifuel Boilers operation. Notable deviation from normal practice is that there is no external electric source for electric power supply, the plant is fully self-sufficient electric power needs. For the purpose of monitoring and prioritizing, the consumption of various energy used is grouped and the consumption is also expressed in GJ units. See table below.

**Energy Consumption
Perawang Pulp and Paper Plant**

Energy Input 2014 - MB11			
Energy Source	UNIT	Consumption 2014 base Unit	Consumption 2014 GJ
Diesel oil	KL	179	7,633
Heavy oil	KL	575	22,864
TOTAL OIL		754	30,496
Coal	Ton	13,347	268,237
Bark	Ton	215,174	2,326,752
CPO	KL	2,407	37,198
TOTAL			2,662,683

Table 2. Energy Consumption of MB 11 IKPP Perawang Mill

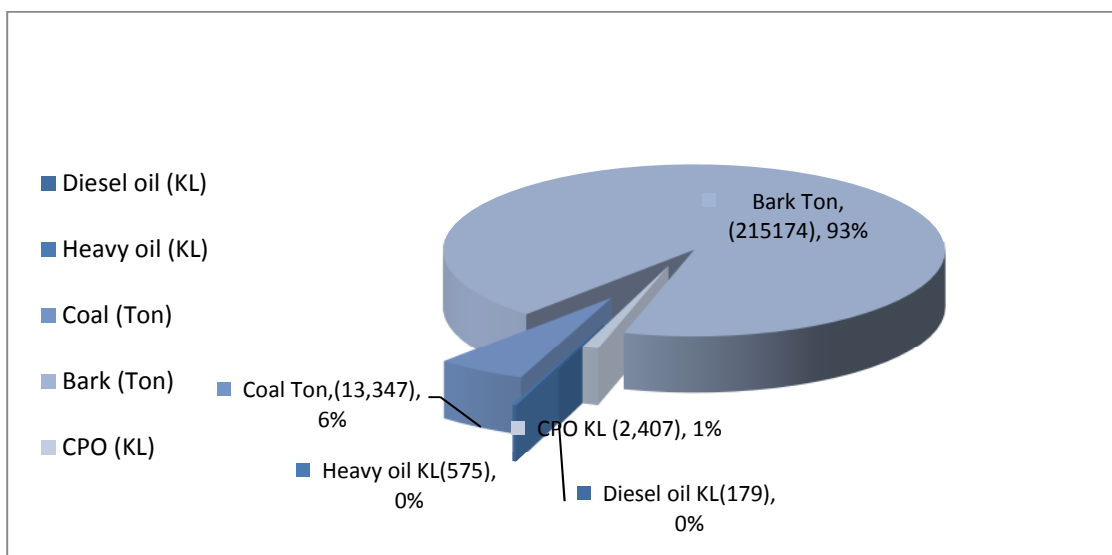


Figure 1. Energy Input MB 11 2014 – Indah Kiat Pulp and Paper Perawang Mill

It is evident from the above data that both Coal and Other sources of energy are significant. The other sources of energy includes Black Liquor, by product is included. In fact 90% of the other sources are black liquor.

Since the energy management system is still in initial stages, though that energy sources in the operations has been identified at gross level, energy Review is yet to be done. It is recommended to collect data and compile energy use boilerwise, and identify significant energy users, so as to link activity Plan (energy saving program) and the projects to 'review and monitor' Progress.⁽¹⁾

Energy manager yet to be nominated and the team are yet to be formed.

It is recommended to impart the training on energy management to the energy team to carry out the energy management functions,⁽²⁾

Subsequent steps of finalizing Baseline, streamlining Measuring Monitoring process and controlling the Energy performance Index and internal energy audit process are yet to be implemented.

Safety:

Many unsafe conditions observed in 'working' area...⁽³⁾ For Eg.,

- Insufficient lighting in pathways, staircases
- Checker plates on Boiler platforms corroded, about to give way.

Boiler systems

As per the scope of energy audit in limited to MB11, and hence the boiler performance test and the audit was performed in boiler MB11. However, the observations may be applicable to the other boilers too. IKPP Perawang is recommended to check for these observations elsewhere too, where applicable.

- Results of performance test:

Boiler efficiency Ref: ASME PTC 4.1

By Direct method 86.84 %

By Indirect Method 72.3 %

Losses :

Dry Flue gas 11.81%

Moisture in Fuel 8.676

Moisture in Air 6.26

Observations:

- A systematic and well-designed Steam Trap maintenance program is in place.
 - Recommend to provide Infrared Thermograph (like 568 ir, make Fluke) to detect steam traps that are about to fail.
 - Also Suggest to provide Ultrasonic leak detector (eg CS 530, make CSITEC) to detect minor leaks in flanges and Packing of valve fittings.
- Reduction of 10% steam and power consumption in Pulp and power div.
 - Recommend to extend the program to paper and Tissue divisions, where such reduction is not evident
- Suggest to include the 'actual realization ' data in the compilation of energy (steam and Power) periodic status report. Currently power production capacity is in excess of demand. Explore alternates to utilize the excess capacity
- Inconsistencies in measurement and accounting of steam is observed. Total steam produced (T/H)does not tally with the total consumption of steam at various supply points .
Suggest investigating the 'unaccounted' – Leak OR measurement inaccuracies, and taking corrective action.
- Consider installing Preheating of Bark before feeding to boiler, if viable
- Observe that actual fuel consumption data is not readily available. Suggest installing online weighing equipment for fuel supply.
- Recommend to add testing facility for ultimate analysis of fuel. Currently only proximate analysis capability exist.
- Improve the Lab facility for ash analysis - measure unburnt carbon
- Recommend to carryout Performance efficiency of boiler (s), at least once every six months.
- Consider blowdown steam recovery
- Explore use of reusable insulation for fittings in particular

Energy management

Energy Management system is still in planning stage. Policy and Objectives is yet to be formulated.

- Energy Manager and Energy team is yet to be formed.
 - Required data collection and monitoring of Energy performance including energy saving projects are in place.
- Suggest to appoint the energy Manager and the team,
- Provide training in Energy Management System related functions, including Internal Energy auditing.
- Suggest to include the data of 'actual Realization' in the periodic compilation and reporting of Energy saving projects.
- Many unsafe conditions observed in 'working' area.
 - Egg: Insufficient lighting in pathways, staircases
 - Checker plates on Boiler platforms corroded, about to give way.
- Scope for improvement in certain pockets of 'Data Availability'. and quick retrieval
 - Egg ; Calibration status record of measuring instruments
 - Inventory list of lighting fixtures, (AHU) Air Handling Units and (FCU) Fan Coil Units

Motor

Need more study in survey and monitor's working hour and energy consumption periodically to get real percentage of load and energy profile.

- Motors that operated for extended periods under 50% load, consider making modifications. Sometimes motors are oversized because they must accommodate peak conditions. Options available to meet peak condition needs include two-speed motors, adjustable-speed drives, and management strategies that maintain motor loads within the design range.
- Motors that are significantly oversized, that operates above 115% (many motors have service factors of 1.15) – replace with more efficient and properly sized models at the next opportunity, such as scheduled plant downtime.

Pump

- It is recommended to monitor pump work by installing pressure gauge on discharge side and suction side of the pump.
- Do investigation regarding condition of impeller on Cooling Tower Pump (IP854 UE422). Based on measurement data it is known that actual working point is closer to impeller size Ø380 than impeller size Ø404.
- Do investigation related to the AC Pump usage, whether is it possible using only one AC Pump, with due regard to the needs of the cold water supply to the AC system.
- It is recommended to apply VSD (Variable Speed Drive) to control motor speed of Boiler Feed Water Pump .

Air Compressor

It is recommended to re-evaluate the pressure discharge setting of air compressor, and eliminate air leakage on auto drain system of air dryer and air storage.

Decreasing pressure discharge of 0.1 bar can reduce power consumption by 0.6 – 1 %.. (*confederation of India industry*).

Air Conditioning

It is recommended to improve air conditioning maintenance program and monitor pressure periodically by installing pressure gauge on inlet and outlet of water pipe.

Some steps can be done to increase AHU and FCU performance, as follows :

- Clean the air filter and cooling coil to maximize heat dissipation and replace damaged air filter.
- Maintain oil level of chiller 2
- Replace FCU fan of FCU 2 RTG-12

Lighting System

Lighting system needs review. Huge scope to replace with appropriate and energy efficient lighting such as replace inductive ballast with electronic ballast, and replace mercury lamp with HDK Industry LED