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Journal Name:	British Journal of Applied Science & Technology
Manuscript Number:	2014_BJAST_15466
Title of the Manuscript:	ANALYSIS OF STEAM POWER PLANT AT KADUNA REFINING AND PETROCHEMICAL COMPANY FROM EXERGETIC PERSPECTIVE
Type of the Article	

General guideline for Peer Review process:

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound.

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PART 1: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
<u>Compulsory</u> REVISION comments	1. A proper literature review about other researcher's studies regarding the exergy analysis of steam power plants is missing in the paper. This should be included in the paper, because numerous studies have been published about this topic. It is definitely not any new result that the largest exergy destruction rate occurs in the boiler. Authors mention that one of the paper's goals is to suggest solutions to reduce the destruction rate. Authors mention only lagging of the boiler. In general, I find it hard to believe that poor lagging is the main reason for large exergy destruction rate in the boiler. It is a well-known fact that a lot of chemical exergy is destroyed in combustion process in the boiler. In addition, heat transfer from the boiler to steam cycle destroys a lot of exergy. In summary, authors should justify their own study better because the exergy analysis of the steam power plant is a widely published topic (see e.g. papers published in journals like Applied Thermal Engineering, Applied Energy, Energy, Energy Conversion and Management, Exergy). For example, authors could discuss much more about possible solutions to reduce the exergy destruction rate of the entire power plant, not only the boiler. To be honest, the scientific contribution of the current version is pretty weak. 2. Section Material and Methods is not well-written.	1 Noted and corrected.



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	There should be ONE good figure of the flow sheet of the power plant (or schematic representation of the cycle) in the beginning of the section 2.1. All necessary process values could also be included in this figure. Fig. 2 shows some process values but it is impossible to know for example what the temperature 90°C means in the block “flue gas in-flue gas out”. Due to poor flow sheet it is very difficult to follow results in Tables 2 and 3. For example, the reader should know exactly what heaters 1 and 2 or Pri-S.H are in the figure where the power plant process is shown. In addition, all necessary input and output values of the streams must be shown somewhere in the paper. 3. Authors can also discuss the main units in text if they cannot include all necessary information in the figure of the power plant. They should also mention few words about the condenser if they are going to discuss other main units in the text. 4. As far as I know, there is always a feed-water tank in the Rankine-based steam power plant. I cannot find any feed-water tank in figures or tables. Is it really so that there is not any feed-water tank in the power plant? If so, authors must explain in the text why the process has not any feed-water tank. Personally, I am quite sure that there is a feed-water tank in the power plant, and this should be included in the study.	2. Figure 2. Shows all what is required. The temperature 900C in the block was an error. Economiser was supposed to be there, and has been corrected. More so the entire figure 2 has been corrected for better understanding 3- The main units have been discussed in section 2.1.1 and the turbine is a condensing type turbine. 4 The demineralization unit as shown in figure 2, encompasses the feed water tank in this power plant.
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Minor REVISION comments	1. Line 43. Chemical energy (i.e. energy contents of fuels) could also be mentioned in this connection. 2. Lines 50-51. I strongly disagree that energy analysis only serve a necessary tool for bookkeeping. Energy analysis is always needed when power plants are designed. It is also necessary to define the energy analysis of the power plant if the Second Law Analysis is going to be used. In general, power plant efficiencies based on the energy analysis are more common in real life than efficiencies based on the exergy analysis. 3. Lines 56-57. Authors could give few examples when the Second Law of Thermodynamics (or should this be the Second Law Analysis?) has proved to be an effective tool in the optimization of the complex systems. It is a useful tool to detect irreversibilities of the complex system but optimization?? 4. Line 59. I do not find the following reference (Reistad, 1975) in the list of references. 5. Pressures have been reported in units mmhg and kg/cm²g. All pressures should be given in the same unit which should be either bar or Pascal. The latter one is the official SI-unit. 6. Eqs. (2.1) and (2.2), temperature T should be T_o (e.g. environmental temperature or temperature of dead state) 7. Table 1. What does W_i mean in the connection of the condenser? In general, irreversibilities can be calculated using these definitions. Probably, a better-known method to calculate irreversibility rates is the Gouy-Stodola law (see e.g. some book of the exergy analysis written by Zargut). However, Equations in Table 1 can also be used. 8. Lines 224 and 252. The unit of the specific enthalpy is not correct (or the expression is really strange). It	1 Noted and corrected. 2 The statement has been referenced. 3 The statement is referenced. 4 (Reistad, 1975) work was cited and referenced by Saidur et al(2009) whose work we consulted and referenced. 5 No in this work all pressure cannot be in the same unit because the units of kg/cm²g and mmhg were the units given by CHIYODA Chemical Engineering and Construction co Ltd (1981) 6 Noted and corrected. 7 W_i was an error in Table 1 and it has been deleted. 8 Noted and corrected
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	should be kJ/kg or kJ/mol. 9. Table 2. What are the values in the second column (189771022.07, 63000...)? These must be mentioned in table 2.	9 The values are irrelevant and have been deleted.
<u>Optional/General</u> comments	1. Authors could discuss slightly more about their results. For example, they could compare their results to studies where steam power plants have been analysed using the Second Law Analysis. This is possible when they make a literature review. They could also discuss solutions to reduce the irreversibility rate of the entire power plant, not only the boiler.	1 Noted and corrected.