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Journal Name:	British Journal of Applied Science & Technology
Manuscript Number:	Ms_BJAST_23935
Title of the Manuscript:	THE INTERFACE BETWEEN HYDROPOWER GENERATION AND OTHER WATER USES IN THE PIABANHA RIVER BASIN, BRAZIL
Type of the Article	Method 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)
Compulsory REVISION comments	1. Method Article Is this an application or not? 2. a mathematical model called System for Simulation of Power Plants with Consumptive Water Uses SisUCA mathematical model Detailed information should be given if possible. Hora (2011) can not be found. If this is the authors study related with this paper, the details should be presented. 3. The sentences should be checked by English Check tools such as http://www.gingersoftware.com/grammarcheck#.Vov8I49OKMo http://www.reverso.net/spell-checker/english-spelling-grammar/ http://www.onlinecorrection.com/ https://www.grammarly.com/1 https://languagetool.org/ 4. Check all the sentences' tense. Use present. When necessary prefer past. I missed some time related things during reading because of the tenses of the sentences. 5. To estimate future losses of generation capacity in function of growing use of water resources, we applied a mathematical model called System for Simulation of Power Plants with Consumptive Water Uses (Sis-UCA in the Portuguese abbreviation), considering both the existing power plant cascade and the likely future configuration with the inclusion of new projects under construction and in the planning phase, along with projections for future water demand by other users.	1. This is an application of the model SisUCA, created by Hora. The model was for the first time applied in a small basin with SHPs. 2. The bibliography was changed. Available in https://globaljournals.org/GJRE_Volume15/5-Water-Resource-Conflict.pdf 3. Sentences were checked. 4. 5.



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	Rewrite this sentence. Express with several sentences, not only one. 6. There was some difficulty obtaining data about the basin, but this did not impair validation of the model, which converged to results that provide support for shared management of multiple water uses. Rewrite this sentence. Express with several sentences, not only one. 7. Among the results attained, it is possible to state that 75% of the maximum usable water is already being utilized, leading to the conclusion of likely water conflicts in the near future. Rewrite this sentence. Express with several sentences, not only one. 8. Hydroelectric generation. Think about this keyword. Prefer hydropower and electricity generation. 9. Estimation of growth in total water demands relies on our understanding of the underlying social, economic, and environmental drivers to changes in sectoral water demands (Hejazi et al. 2014) Rewrite this sentence. 10. When changes in water rights lead to changes in access some users will also experience scarcity and water users who once had adequate water for their needs, no longer have access to quantities and quality of water which they need. Rewrite this sentence. 11. The watershed analyzed here is that of the Piabanha River. Rewrite this sentence. 12. It is relevant since together with the Paraibuna River it provides the initial contribution to the flow of the Paraíba do Sul River after transposition, by pumping, from Santa Cecília Reservoir, which reduces the net flows in the downstream segment starting in the municipality of Barra do Piraí (CEIVAP, 2006). Rewrite this sentence. Express with several sentences, not only one. 13. There are several small hydroelectric plants (abbreviation: PCHs) along the Piabanha River and its tributaries, some in operation for over a century, and new	6. 7. 8. The key word was changed. 9. The sentence was modified. 10. 11. 12. 13. All abbreviations were changed for SHP.
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	ones are either under construction or in the planning stage. Add how this abbreviation is related with PCHs. small hydroelectric plants, small → S, hydroelectric → H, plant → P, SHPs. Why not SHPs but PCHs. Rewrite this sentence. Express with several sentences, not only one. • 14. Global electricity demand has grown by a factor of four since 1970, and international agencies and integrated assessment models anticipate continued growth into the future, driven in large part by increasing population and per-capita income. (Davies et al, 2013) This is related with global issues, not Brazil. Instead of this sentences, Brazilian info will be nice to see or remove from text. • 15. More than 82% of Brazil's electricity is hydropower, despite efforts to diversify supply by building thermal plants and wind farms, making the country highly dependent on this energy source (EPE, 2012). Rewrite this sentence. Express with several sentences, not only one. • 16. However, COSTA et al. (2011) mention that only 30% of Brazil's potential is explored, converging with IEA (2011), which reveals that the global hydropower potential is 2-3 times higher than the current generation, with the greatest potential to be developed in Africa, Asia and Latin America. Presentation of South America and Brazil will be sufficient and nice to see. Rewrite this sentence. Express with several sentences, not only one. • 17. Figure 1: Piabanha River Basin with it tributaries and municipalities. Source: (De Paula, 2011). Should be improved. High resolution should be presented. • 18. This population of these municipalities was 635 thousand in 2010, according to the latest census conducted by the Brazilian Institute of Geography and Statistics (IBGE, 2010), with 72% of the people concentrated in Petrópolis and Teresópolis. Rewrite this sentence. Express with several sentences, not only one.	14. - 15. 16. 17. Figure 1 was improved and translated 18. Increase tax rate was added.
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	Add historical data and figure. 19. The total authorized flow captured is 25.275 m³/s, of which the user holding the largest allotment is Poço Fundo Energia S/A, the company that has the concession to build and operate the Poço Fundo PCH, with a non-seasonal permit to draw 22.550 m³/s. Rewrite this sentence. 20. Since hydropower generation does not consume water, it can be inferred that the overall official figure does not reflect the consumptive uses in the basin, which are on the order of 2.725 m³/s. Besides this, the numbers do not include the water drawn by the municipalities that are not within the Piabanha River Basin, in the total amount of 0.170 m³/s. Therefore, we assumed the consumptive uses represent a flow of 2.555 m³/s. Rewrite this sentence. Express with several sentences, not only one. 21. Besides the Poço Fundo PCH, which is still under construction, the basin has three other small hydropower installations: Piabanha PCH, in operation since 1908, located at the confluence with the Preto River; Morro Grande or Areal PCH, located on the Preto River near where it flows into the Piabanha River, in operation since 1949; and Coronel Fagundes PCH, located along the final segment of the Fagundes River, operating since 1924. Besides these, plans call for building three more PCHs on the Piabanha River (Posse, Monte Alegre and São Sebastião); one on the Preto River (Providência, besides Poço Fundo); and one on the Capim River (Capim PCH), which is a tributary on the right margin of the Preto River. Rewrite this sentence. Express with several sentences, not only one. Add installed power information, if possible. 22. Figure 2: Topology with the power plants in operation and future undertakings. Add installed power, discharge of low info too, if possible.	19. 20. 21. The installed power information was added in Figure 2. 22. Figure 2 was improved with installed power.
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	23. To assess the hydropower generation in the basin and its harmonization with other growing water uses, we applied the SisUCA mathematical model, developed by Hora (2015), which employs the formulation developed in the MSUI (Model for Simulation of Individualized Power Plants), in turn developed by Eletrobrás, with the introduction of a new variable corresponding to the water diverted, with the total withdrawals being limited by the maximum licensable flow (vazão máxima outorgável, or VMO). Rewrite in other words. 24. d duration, in days Be more specific. 25. With respect to the physical and hydraulic characteristics of the power plants, for the yield of the turbine-generator set of those without available data (Providencia, Coronel Fagundes and Morro Grande/Areal), we adopted the value of 0.90, which corresponds to the product of the individual yields of the turbine (0.93) and generator (0.97) (Eletrobrás, 2007). Should be explained in detail. 26. Eletrobrás (2007): ELETROBRAS. Centrais Elétricas Brasileiras S.A. "Manual for Hydropower Inventory Studies of River Basins – 2007 Edition". Ministry of Mines and Energy. Available for download at http://www.cepel.br I can not find this document on the website. I can not check the equation. I do not understand why they go from installed power to maximum turbinable flow. This should be checked. If possible during revision add the document also for the review studies. 27. With respect to water losses, Eletrobrás (2007) recommends adoption of a value of 2% of the respective gross hydrostatic heads. This sentence should be rethink. Should be rewritten.. 28. The gross head is the difference between the normal maximum water level in the reservoir and the normal maximum water level downstream of the dam at the	23. 24. The equations were simplified without this constant. 25. The sentence was corrected. There was a translation error. 26. The link was corrected. 27. 28. It's also a definition in Eletrobras, 2007
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	turbine outlet. Present by figure and citation. • 29. The reference head is calculated, in the case of PCHs, by the difference between the gross head and the water losses. Present by citation. • 30. The evaporation values were calculated by using the spreadsheet developed by Noronha (2011). Present as an enclosed online supplementary file, if possible. • 31. To assess the power generation losses due to growing water consumption by other users in the Piabanha River Basin, we defined two scenarios: the first with the current arrangement of the power plants in operation (Piabanha, Morro Grande/Areal and Coronel Fagundes), called the current one, and the second also including the plants under construction/expansion or planned for the coming years (expanded Piabanha, Posse, Monte Alegre, São Sebastião, Morro Grande/Areal, Capim, Poço Fundo, Providência and Coronel Fagundes), called the future scenario. Present in other way. Easy to see, easy to read, easy to understand. • 32. The evaluation of energy generation and losses associated with growing water consumption by other users was defined starting by comparing the average and firm power generation of each plant individually and of the entire set (cascade), considering the average monthly series corresponding to the period from January 1931 to December 1999. Present average and firm power generation equations. Annual presentation as table or figure. • 33. 4 RESULTS Rewrite this section. Figures should be improved. • 34. 5 CONCLUSIONS Rewrite this section. • 35. REFERENCES Rewrite this section. Check the references. I can not some of them. • 36. If any tools is used during the study, please mention them with citations and screenviews, if possible.	29. It's also a definition in Eletrobras, 2007 30. Noronha 2011 was linked in the biography. 31. The Figure 2 is illustrative for this point. 32. The average and firm power generation equations were added. 33. - 34. A final paragraph was added. 35. The section was totally reviewed. 36. None
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	37. Please how you generate the figures. Which tools you use. Ethical issues: According to my quick search, I could not find anything in this respect. In the next review this should be recheck and check more in detail.	37. The Figure 2 was created in MS PowerPoint. The figures 3 and 4 were generated in MS Excel.
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<u>Minor</u> REVISION comments	1. THE INTERFACE BETWEEN HYDROPOWER GENERATION AND OTHER WATER USES IN THE PIABANHA RIVER BASIN, BRAZIL. My recommendation: INTERFACE BETWEEN HYDROPOWER GENERATION AND OTHER WATER USES IN THE PIABANHA RIVER BASIN IN BRAZIL 2. There is an increasing need in the field of water resources management to study ways to harmonize multiple demands by users. My recommendation: multiple user demands 3. The present study investigates the interface among the various users of the Piabanha River Basin in Rio de Janeiro state, in particular the implications on the electricity sector of increasing upstream consumption by other water users. My recommendation: This study, the various users (delete the). 4. Water scarcity challenges existing property rights systems which were able to allocate water under conditions of surplus. (Meizen-Dick and Jackson,1996) Rewrite this sentence. 5. "In Brazil, Federal Law 9,433/1997, known as the Water Law, establishes the basic 43 framework for water resource allocation, determining that the management of water 44 resources must promote multiple uses in decentralized form, with participation of all 45 stakeholders" If possible, add web site for this law. 6. River basin inventory studies are considered strategic since they constitute the 51 first stage of a hydropower project planning cycle of (PIRES, 2008). Rewrite this sentence. 7. we defined these series based on the flows observed at the gauging stations located on the same river and/or the flow series from the nearest power plants. Therefore, for the Morro Grande/Areal and Providência PCHs Present	1 – The title was changed. 2. The recommendation was accepted and the text was changed. 3. The recommendations were accepted and text was changed. 4. I can't rewrite this sentence. It's a reference from another authors and text was exactly copied. 5. The website for this law was added. 6. I can't rewrite this sentence. It's a reference from another authors and text was exactly copied. 7. -
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	data and figure. Scilab, R, MS Excel or Open Office Calc can be used for this presentation with ease. To understand the figure better, if possible the data should be also presented by an electronic supplementary file. The figure should be presented in any case whether the data can not be presented or not for any reason,	
<u>Optional/General</u> comments	8. Piabanha PCH, in operation since 1908, located at the confluence with the Preto River; Morro Grande or Areal PCH, located on the Preto River near where it flows into the Piabanha River, in operation since 1949; and Coronel Fagundes PCH, located along the final segment of the Fagundes River, operating since 1924. Presentation by photos will be very nice to see. 9. Brazilian and regional electricity consumption and generation can be presented by data and figure.	8. Six photos were added showing the three actual SHPs in construction years and nowadays. 9. -