LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
KARYA ILMIAH : PROSIDING

Judul Karya Ilmiah	:	Economic analysis of planning for utilization of tabang hydro power plant		
Jumlah Penulis	:	6 Orang (**J Windarta**, S Saptadi, E Handoyo, L Machfudz, D Renaldo and M A Saintekha)		
Status Pengusul	:	Penulis ke – 1		
Identitas Prosiding	:	a. Judul Prosiding	:	The 9th International Seminar on New Paradigm and Innovation of Natural Sciences and its Application
		b. ISBN/ISSN	:	Online ISSN: 1742 – 6596, Print ISSN: 1742 – 6588
		c. Thn Terbit, Tempat Pelaks.	:	2019, Semarang, Indonesia
		d. Penerbit/Organiser	:	Institute of Physics Publishing
		e. Alamat Repository/Web	:	https://iopscience.iop.org/article/10.1088/1742-6596/1524/1/012091
		Alamat Artikel	:	https://iopscience.iop.org/article/10.1088/1742-6596/1524/1/012091/pdf
		f. Terindeks di (jika ada)	:	Scopus H Index : 70 SJR Index : 0,23

Kategori Publikasi Makalah (beri ✓pada kategori yang tepat) : [√] *Prosiding* Forum Ilmiah Internasional
[ ] *Prosiding* Forum Ilmiah Nasional

Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Reviewer		Nilai Rata-rata
	Reviewer I	Reviewer II	
a. Kelengkapan unsur isi prosiding (10%)	3	2,4	2,7
b. Ruang lingkup dan kedalaman pembahasan (30%)	9	7,3	8,15
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	8,75	7,3	8,025
d. Kelengkapan unsur dan kualitas terbitan/prosiding(30%)	8,5	8,5	8,5
Total = (100%)	**29,25**	**25,5**	**27,38**
Nilai Pengusul = (60% × 27,38) = 16,43			

Semarang,

Reviewer 2

Mochammad Facta, S.T., M.T., Ph.D.
NIP. 197106161999031003
Unit : Teknik Elektro FT UNDIP

Reviewer 1

Dr. Wahyudi, ST, MT
NIP. 196906121994031001
Unit : Teknik Elektro FT UNDIP

LEMBAR
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		Alamat Artikel	:	https://iopscience.iop.org/article/10.1088/1742-6596/1524/1/012091/pdf
		f. Terindeks di (jika ada)	:	Scopus H Index : 70 SJR Index : 0,23

Kategori Publikasi Makalah (beri ✓pada kategori yang tepat) : [√] *Prosiding* Forum Ilmiah Internasional
[ ] *Prosiding* Forum Ilmiah Nasional

Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Maksimal Prosiding		Nilai Akhir Yang Diperoleh
	Internasional [30]	Nasional [ ]	
a. Kelengkapan unsur isi prosiding (10%)	3,00		3
b. Ruang lingkup dan kedalaman pembahasan (30%)	9,00		9
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	9,00		8,75
d. Kelengkapan unsur dan kualitas terbitan/prosiding(30%)	9,00		8,5
Total = (100%)	**30,00**		**29,25**
Nilai Pengusul = (60% × 29,25) = 17,55			

Catatan Penilaian Paper oleh Reviewer :

1. **<u>Kesesuaian dan kelengkapan unsur isi paper:</u>**
   Isi paper : pendahuluan, metode, hasil dan diskusi, kesimpulan serta referensi lengkap.
2. **<u>Ruang lingkup dan kedalaman pembahasan:</u>**
   Kedalaman pembahasan cukup, terdiri atas potensial, biaya, utilitas serta analisis dan evaluasi, pembangkit listrik tenaga air.
3. **<u>Kecukupan dan kemutakhiran data/informasi dan metodologi:</u>**
   Kemutakahiran data cukup. Dari 12 referensi ada 9 yang terbit kurang dari 10 tahun.
4. **<u>Kelengkapan unsur dan kualitas terbitan:</u>**
   Kualitas terbitan cukup bagus. Namun, masih ada yang menggunakan koma sebagai tanda desimal (abstrak dan tabel 3,4)

Semarang,

Reviewer 1

Dr. Wahyudi, ST, MT
NIP. 196906121994031001
Unit : Teknik Elektro FT UNDIP

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Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Maksimal Prosiding		Nilai Akhir Yang Diperoleh
	Internasional [30]	Nasional [ ]	
a. Kelengkapan unsur isi prosiding (10%)	3,00		2,4
b. Ruang lingkup dan kedalaman pembahasan (30%)	9,00		7,3
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	9,00		7,3
d. Kelengkapan unsur dan kualitas terbitan/prosiding(30%)	9,00		8,5
Total = (100%)	**30,00**		**25,5**
Nilai Pengusul = (60% ×25,5) = 15,3			

Catatan Penilaian Paper oleh Reviewer :

1. **Kesesuaian dan kelengkapan unsur isi paper:**
   Makalah telah ditulis sesuai dengan format dan kaidah ilmu yang berlaku secara umum untuk penulisan makalah prosiding internasional. Makalah ditulis secara lengkap dan sistematis yang mencangkup abstract, introduction, methods, result and discussion,conclusion dan reference tentang perencanaan PLTA di daerah tabang Kalimantan dengan memasukan kajian teknis dan ekonomis.
2. **Ruang lingkup dan kedalaman pembahasan:**
   Makalah yang ditulis sesuai dengan bidang penulis. Pembahasan makalah dilakukan secara mendalam dengan merujuk dari berbagai sumber yang sesuai diantaranya perencanaan pembangkitan energi listrik yang berasal dari perencanaan pembangkita tenaga listrik yang memanfaatkan aliran sungai di Kalimantan.
3. **Kecukupan dan kemutakhiran data/informasi dan metodologi:**
   Data dan informasi disajikan dengan sangat baik dengan merujuk 12 referensi. Jumlah dan tahun terbit paper-paper yang dijadikan sebagai acuan atau referensi pada paper ini cukup lengkap, demikian pula data dan informasi yang disajikan berdasar paper yang diterbitkan dalam publikasi jurnal dan prosiding konferensi tentang PLTA.
4. **Kelengkapan unsur dan kualitas terbitan:**
   The 9th International Seminar on New Paradigm and Innovation of Natural Sciences and its Application,ISSN: 1742-6596, Print ISSN: 1742-6588, 2019, https://iopscience.iop.org/article/10.1088/1742-6596/1524/1/012091/pdf, Terindex Scopus. Prosiding ini diterbitkan oleh publisher IoP conference series yang sering menghasilkan prosiding konferensi internasional yang telah dikenal dan tersitasi di SCOPUS yang secara konsisten menerbitkan setiap edisinya lengkap dan memiliki kualitas cetakan yang baik. Ukuran dan font tulisan dapat terbaca dengan jelas.

Semarang,

Reviewer 2

Mochammad Facta, S.T., M.T., Ph.D.
NIP. 197106161999031003
Unit : Teknik Elektro FT UNDIP

THE MINISTRY OF RESEARCH, TECHNOLOGY, AND HIGHER EDUCATION
THE REPUBLIC OF INDONESIA

DIPONEGORO UNIVERSITY
FACULTY OF SCIENCE AND MATHEMATICS

RECTOR'S DECREE NUMBER : 759/UN7.P/HK/2019

CERTIFICATE

THIS IS TO CERTIFY THAT

Jaka Windarta

as

PRESENTER

In the 9th International Seminar on New Paradigm and Innovation on Natural Science and Its Application (9th ISNPINSA)

Held on 22 October 2019 at Gets Hotel, Semarang, Indonesia
with paper entitled as follows:

Planing for the Utilization of Hydro Power in the Belayan River, East Kalimantan

DEAN OF FSM UNDIP

Prof. Dr. Widowati, S.Si, M.Si
NIP. 196902141994032002

9th ISNPINSA COMMITTEE
CHAIRMAN

Dr. Suryono, M.Si
NIP. 197306301998021001

Document details

Journal of Physics: Conference Series
Volume 1524, Issue 1, 22 June 2020, Article number 012091
9th International Seminar on New Paradigm and Innovation of Natural Sciences and Its Application, ISNPINSA 2019; Semarang, Central Java; Indonesia; 22 October 2019 through ; Code 161297

Economic analysis of planning for utilization of tabang hydro power plant (Conference Paper) (Open Access)

Windarta, J.[a], Windarta, J.[b], Saptadi, S.[a], Saptadi, S.[b], Handoyo, E.[b], MacHfudz, L.[a], Renaldo, D.[a], Saintekha, M.A.[a]

[a]Program of Diponegoro University, Semarang, Indonesia
[b]Department of Electrical Engineering of Diponegoro University, Semarang, Indonesia

Abstract

View references (12)

From the technical side, analyzing the hydropower design planning that matches the conditions of the Belayan River. From the economic side, analyzing the feasibility of hydropower projects through investment costs along with cash flow to the economic life of the project, using several methods, namely Net Present Value (NPV), Payback Period (PBP), Benefit Even Point (BEP), Benefit-Cost Ratio (B-CR), and Internal Rate of Return (IRR). The results of technical analysis with reliable discharge Q (10%) produce an output power of 439,4 MW with 4 generators, the power is then transmitted to the Melak Main Station with a distance of 100 km. Investment costs incurred in the planning of the construction of the Tabang hydro power plant (PLTA) in East Kalimantan is 3.673.356.951.235. The net present value (NPV) obtained is Rp.3.911.323.016.835 with a return on investment of 7.77 years and a break-even point for expenses and income in the 11,36 year. The ratio of project cost and benefit ratio is 1,32 and IRR (Internal Rate of Return) calculation is 19.53%. These results indicate that the plan to build a Tabang hydropower unit in East Kalimantan is economically feasible. © Published under licence by IOP Publishing Ltd.

SciVal Topic Prominence

Topic: Compressed Air Energy Storage | Electricity Storage | Arbitrage

Prominence percentile: 99.903

Indexed keywords

Engineering controlled terms: Cost benefit analysis, Costs, Earnings, Economic analysis, Hydroelectric power, Hydroelectric power plants

Engineering uncontrolled terms: Benefit cost ratios, Hydropower plants, Hydropower projects, Internal rate of return, Investment costs, Net present value, Technical analysis, The net present value (NPV)

Engineering main heading: Investments

Related documents

Analysis of planning for utilization of East Borneo hydro power with techno economy principle
Zakir, L.M. , Windarta, J. , Saptadi, S.
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Rai, A. , Joyce, D. , Monaghan, R.F.D.
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Wiratman & Associate

Saintekha, M.A.; Program of Diponegoro University, Semarang, Indonesia; email:muh.andaz@gmail.com

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The 9th International Seminar on New Paradigm and Innovation on Natural Science and Its Application

October 22, 2019

Semarang, Indonesia

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I. Keynote Speaker

No.	Name	Research Field	Institution	Country
1.	Prof. Emmanuel Cornillot	Biotechnology	Universite de' Monpellier	Perancis
2.	Prof. Dr. Baba Musta	Geochemistry	Faculty of Science, UMS	Malaysia
3.	Prof. Dr. Ir. Rokhmin Dahuri, MS.	Marine Resource and Environmental Studies	President of Indonesian Aquaculture Society; Proffesor in Marine Resource and Environmental Studies	Indonesia
4.	Sapto P. Putro, M.Si., Ph.D.	Marine Ecology and Aquaculture	Faculty of Science and Mathematics, Diponegoro University	Indonesia

II. Invited Speaker

No.	Name	Department	Institution	Country
1.	Dinar Mutiara Kusumo Nugraheni, S.T., M.InfoTech.(Comp).	Computer Science	FSM UNDIP	Indonesia
2.	Dr. Eng. Ali Khumaeni, S.Si., MS	Physics	FSM UNDIP	Indonesia
3.	Dr. M. Cholid Djunaidi, M.Si.	Chemistry	FSM UNDIP	Indonesia
4.	Dr. Lilih Khotimperwati, S.Si., M.Si.	Biology	FSM UNDIP	Indonesia
5.	Dr. Tarno, M.Si.	Chemistry	FSM UNDIP	Indonesia
6.	Farikhin, M.Sc. Ph.D.	Mathematics	FSM UNDIP	Indonesia

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Sapto P. Putro, M.Si., Ph.D.

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Papers

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A Bagaskara, Q M B Soesanto, H Sugito and A Khumaeni

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G Maslebu, E S D Kusrini and A Setiawan

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Characterization of the radiosensitization effect of pulsed laser ablated-gadolinium

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Low-temperature process for green tea drying using zeolite adsorption integrated fluidized bed dryer

S U Handayani, V Paramita, M E Yulianto and A P Siswanto

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Energy and exergy analysis economic of continuous vibrating fluidized bed drying on celery drying

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E Fachriyah, P J Wibawa and A Awaliyah

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The potency of B-G31 isolate associating with valanganigricornis as a probiotic candidate to digest cellulose

R Abdullah, F D Imtiyaz, Wijanarka and Nurhayati

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Isolation and identification of rare actinomycete-like bacteria from soil-based on 16S ribosomal RNA gene sequences

Y Eshananda, F Ningsih, Y Sakai, A Yokota, S Yabe and W Sjamsuridzal

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The potential of mixed epibiotic (binahong leaves, *anrederacordifolia*, and garlic, *allium sativum*, extracts) as a feed additive to combat *aeromonashydrophila*infection on catfish (*clariasgariepinus*)

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Synthesis of derivatives azomethine compounds bonded to alkoxylated benzene and their antibacterial activity tests

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Economic analysis of planning for utilization of tabang hydro power plant

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Economic analysis of planning for utilization of tabang hydro power plant

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Abstract. From the technical side, analyzing the hydropower design planning that matches the conditions of the Belayan River. From the economic side, analyzing the feasibility of hydropower projects through investment costs along with cash flow to the economic life of the project, using several methods, namely Net Present Value (NPV), Payback Period (PBP), Benefit Even Point (BEP), Benefit-Cost Ratio (B-CR), and Internal Rate of Return (IRR). The results of technical analysis with reliable discharge Q (10%) produce an output power of 439,4 MW with 4 generators, the power is then transmitted to the Melak Main Station with a distance of ± 100 km. Investment costs incurred in the planning of the construction of the Tabang hydro power plant (PLTA) in East Kalimantan is 3.673.356.951.235. The net present value (NPV) obtained is Rp.3.911.323.016.835 with a return on investment of 7.77 years and a break-even point for expenses and income in the 11,36 year. The ratio of project cost and benefit ratio is 1,32 and IRR (Internal Rate of Return) calculation is 19.53%. These results indicate that the plan to build a Tabang hydropower unit in East Kalimantan is economically feasible.

1. Introduction

Many alternative energy can reduce the greenhouse effect or global warming. One of alternative energy which has the potential in Indonesia is hydropower. Based on the results of the research that has been done before, Indonesia will be efficient when implementing alternative energy for hydropower [1]. One of them is in the province of East Kalimantan which has the potential of water energy because it is supported by the many river channels with a fairly large discharge. According to data that published by the government's RUEN (National Energy General Plan) stated that East Kalimantan, South Kalimantan and Central Kalimantan have a water energy potential around 16,844 MW. However, a number of that size is also a question, could this potential be realized as a hydropower plant in Kalimantan rivers. Considering that to utilize the potential of hydropower, in general it requires a large investment cost. Even though the operation cost of hydropower is relatively very low [2], the factor of the high investment cost and the length of development causes the relatively low utilization of hydropower in Indonesia.

Isolation and identification of rare actinomycete-like bacteria from soil-based on 16S ribosomal RNA gene sequences

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Abstract. The rare actinomycete-like bacteria are mycelium-forming bacteria other than phylum *Actinobacteria* that difficult to isolate and cultivate. This group of bacteria was recently speculated by many scientists as a potential new microbial resource for the discovery of novel compounds, as a substitute for actinomycetes. In this study, we isolate and identify rare actinomycete-like bacteria from forest soil collected under bamboo trees, near the CisolokGeysers, Sukabumi, Indonesia. The isolation of bacteria was performed using Reasoner's 2A (1:10 dilution) medium with 2% gellan gum instead of agar and incubated at 30 °C for three weeks. The 16S rRNA gene sequences of the isolates were examined to determine their taxonomic position. Four isolates designated K17-1, K17-2, K42, and K44 showed pale oranges colonies and formed mycelia were obtained. The results of 16S rRNA gene sequences of these isolates showed high similarity to members of the genus *Dictyobacter* in the family *Dictyobacteraceae* of the class *Ktedonobacteria* of the phylum *Chlorofexi*, with values 97.16-98.02%, and most closely related to the species *Dictyobacteraurantiacus* S-27^{T} (97.16-98.02% similarities). This result suggested that the member of the class *Ktedonobacteria*, which considered as rare actinomycete-like bacteria, such as *Dictyobacter* could be found in the forest soil of the geothermal area.

1. Introduction

Actinobacteria are gram-positive bacteria that have a high percentage of guanine and cytosine in their genome [1]. This group morphologically comprises unicellular organisms to mycelium-forming bacteria which called Actinomycetes [1,2]. However, bacteria that have filamentous appearance also could be found in the phylum *Chlorofexi*. The member of this phylum which has actinomycete-like morphology is present in the four different class namely *Chlorofexi*, *Anaerolineae*, *Caldilineae*and *Ktedonobacteria* [3]. Among these class, *Ktedonobacteria* has some obvious morphological features which distinguish themselves from others. The member of *Ktedonobacteria*are aerobic organism and forming branched mycelia with spores like actinomycetes [3,4]. Moreover, most validly published strains of *Ktedonobacteria*budding their multiple spores per cell on the aerial mycelium which unique among bacteria [5]. All of*Ktedonobacteria*identified as gram-positive bacteria while almost of the member in phylum *Chlorofexi* were gram-negative [3,6]. Based on these exceptional characters, class *Ktedonobacteria* could be included as the rare actinomycete-like bacteria.

Rare actinomycete-like bacteria could provide an alternative for the discovery of new compounds derived from microorganisms because spore formation usually would be followed by the production of secondary metabolites [7,8]. Further analysis of the genomic of nine members of rare actinomycete-like bacteria

Finding parameters relationship for disinfectant gas production

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Abstract. Water purifying is an important process to get fresh water for human needs. Several treatments such as advanced filtering using activated carbon and chlorine have been done to get clean water. However, most of the previous treatments required complex maintenance and left a by product. The choice for disinfectant gas is going to ozone gas because it has a minor harmful impact on the environment. This work is to find related parameters and to formulate those parameters in the equation to predict disinfectant gas production in the silent discharge process. The theoretical analysis provides a general approach for the equation models and experimental results complete the required data for the regression technique to determine constants and terms in equation model at the saturated region. Finally, a proposed equation model has successfully produced a prediction curve that is matched with experimental results.

1. Introduction

Water is an important substance for humankind. Many efforts are carried out to get fresh and clean water taken from any resources. The membrane bioreactor removed the only heavy organic component. Advanced filtering has given impact to eliminate soft and silky organics and components i.e. bacteria and viruses less than 1 – 5 μm. The implementation of activated carbon was reported to implement, but short life and frequent replacement become the burden of using activated carbon. Oxidation treatment for water was also reported by using chlorine and chloride oxide, but they produce a by product in the form of unpleasant taste and smell. The choice for disinfectant gas is going to ozone gas because it has a minor harmful impact on the environment. The most economical technique of ozone generation is a silent discharge [1,2] and the mechanism of discharge has been investigated [3]. The production of ozone as disinfectant gas is interesting work by determining the related parameters and then to formulate them in a mathematical model properly. Previous models in the pulse streamer discharge process have been developed for ozone generation [4,5]. It is also recorded for double dielectric carrier discharge the relationship parameters was revealed as the function of current and voltage during generation [6,7]. However, no record is found for the silent discharge process in production ozone as a disinfectant gas.

2. Theoretical and experimental analysis

There are a number of parameters that significantly influence on disinfectant production in the form of ozone concentration. Based on the evidence available in the literature [1-6], the most significant factors influencing the ozone concentration are the applied voltage V, the feed gas flow rate fr, the power needed W, the pressure P, and the applied frequency f. In the high frequency silent discharge

Energy and exergy analysis economic of continuous vibrating fluidized bed drying on celery drying

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Abstract. This paper present the experimental work of celery drying using continuous vibrating fluidized bed drying. Fresh celery leaves dried at 50ºC, 60ºC and 70ºC in continuous vibrating fluidized bed dryer with a dimension of 2350 mm x 300 mm. Energy and exergy analysis was conducted to determine the performance of the system, among others, energy utilization, energy efficiency, and efficiency of the exergy so it can be known potential energy savings can be obtained. From the calculation results can be concluded that the increase in drying temperature will increase energy utilization and energy utilization ratio and decrease the efficiency of the exergy. Average energy utilization ratio at 50ºC is 0.0768, at 60ºC is 0.1199 and at 70ºC is 0.1682. Exergy efficiencies decrease with increasing temperature. Average exergy efficiencies are 0.19, 0,16 and 0.17 for 50º, 60º and 70ºC drying temperature respectively. The main factor that causes thermodynamic inefficiency is the exergy that leaves the system, exergy destruction and loss of exergy to the surrounding air.

1. Introduction

Indonesia as a tropical country and large population has great potential to develop agriculture and food-based industries. One of the important processes in the agricultural and food industries is the drying process, therefore the development of drying technology is very important.

The vibrating fluidized bed (VFB) of solid particles is a modification of the conventional (bubbling) fluidized bed (BFB) where vibration energy is used to transfer the bed of particles from packed to fluidized state. VFB has reported has many advantages like shorter residence time, the intensity of mixing and heat and mass transfer properties are controllable in VFB by changing amplitude and/or frequency of vibration, and better processing for sticky and moist particle [1]. Research on vibrating fluidized dryer has been carried out on cassava starch [2], solid containing multicomponent moisture [3], barley grain [4], binary nanoparticle mixture [5], carrot cube [6], etc.

The drying process requires a large amount of energy. Planning an effective and efficient drying process will reduce overall production costs. Optimum energy consumption and energy consumption management method are very important because of the high prices of energy, environmental concerns, increasing world population and decreasing fossil fuel resources [7].

Thermodynamic analysis consisting of energy and exergy analysis is an important analysis in the design, evaluation, and optimization of thermal systems [8]. Exergy is defined as the maximum amount of work produced by heat and vapor in an equilibrium state. Energy is the maximum amount without calculating friction so it can be called the absolute amount of energy. Energy analysis aims to estimate the ratio of energy use and the amount of energy produced. Exergy is the maximum work obtained as a