

THE ROLE OF PLTA AS A DECREASE OF SFC (SPECIFIC FUEL CONSUMPTION) IN PLN NORTH SUMATRA POWER GENERATION THAT HAS MAJOR IMPACT ON THE ENVIRONMENT

Hamdani¹, Solly Aryza²

Lecture Faculty Science and Technology, University Pembangunan Panca Budi Medan, Indonesia

Email - sollyaryzalubis@gmail.com

Abstract: Indonesia is a country that has very large renewable energy sources, such as wind energy. The installed capacity of Indonesian electricity generation is now 53,585 MW, where biomass energy potential is the largest renewable energy source owned by Indonesia. Windmills are designed to produce energy as engine fuel to generate electricity. However, the nature and characteristics of these flammable gases must meet engine characteristics because each machine has its own specific characteristics. In this study, in addition to using activated carbon, tar emptying was carried out using a wet scrubber system. The potential reduction in the value of greenhouse gas emissions is around 37 to 67%. Based on the analysis of financial calculations, gasification performance tests, and environmental impact analysis, the use of gasification systems can be used in power generation systems in isolated areas of national electricity companies in Indonesia.

Keywords : power generation. Consumers, Banyu Energy.

1. INTRODUCTION:

Power plants in the world continue to be developed and utilized as because until now electricity is one of the basic needs of human life. Not only as lighting, electricity is also widely used to run various electrical and electronic equipment such as traffic light (traffic light) [1], PC computers, industrial machines, radio and television transmitters, telephone exchange, BTS, and many more which uses a power source in order to operate even already many vehicles that start using electricity as a substitute of fuel oil (BBM) [2].

However, many power plants in use in Indonesia especially North Sumatra Generation is Fossil Fossil Generators such as petroleum, natural gas or coal and this will certainly cause problems in the future as the fuel supply in the bowels of the earth has diminished. The reserves of fossil-derived energy sources will only last up to 40 years for petroleum [3], 60 years for natural gas, and 200 years for coal. The condition of limited energy resources in the midst of increasing world energy demand from year to year, as well as demands to protect the earth from global warming / environmental pollution make it a challenge for Indonesia to immediately master the new technology of renewable energy sources [4].

Among the currently widely developed alternative energy sources in the world (such as nuclear power, wind, water, sea water waves, solar, geothermal power, hydrogen power, and bio-energy) [5], hydroelectric power (hydropower) is one of the power plants that can be developed in Indonesia for micro and mini scale to meet the needs of electricity in remote areas. For North Sumatra Power Generation one of the reliable hydroelectric power plants is the renun hydro power plant located in Dairi Regency [6].

2. METHODOLOGY:

The authors cite an explanation of the PLTA from the North Sumatra, Aceh and Riau Network Power Project book owned by PT PLN (Persero), based on the book of PLTA is a generation of electrical energy by converting potential energy of water into mechanical energy by the turbine and converted again into electrical energy by the generator by utilizing the altitude and speed of the water flow. Based on the output produced, hydroelectric power is differentiated above [4]:

- a) Large-hydro: more than 100 MW
- b) Medium-hydro: between 15 - 100 MW
- c) Small-hydro: between 1 - 15 MW
- d) Mini-hydro: Power over 100 kW, but below 1 MW
- e) Micro-hydro: between 5kW - 100 kW
- f) Pico-hydro: power released

In a hydropower system, water turbine is one of the main equipment besides generator. Water turbine is a tool to convert water energy into motion energy in the form of rotation [7].

Viewed from the position of the axis Turbine water is divided into two types:

1. Horizontal Turbine
2. Vertical Turbine

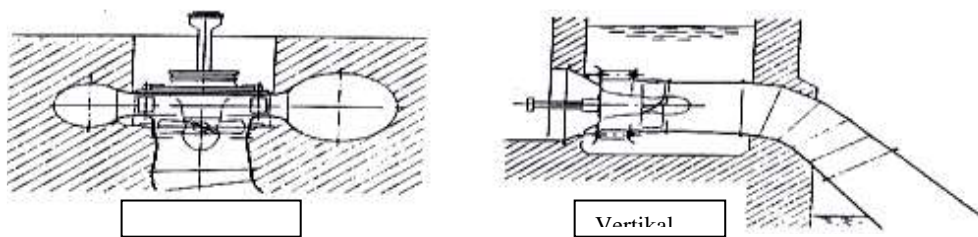
Viewed from the working fluid is divided into two types

1. Turbine Reaction

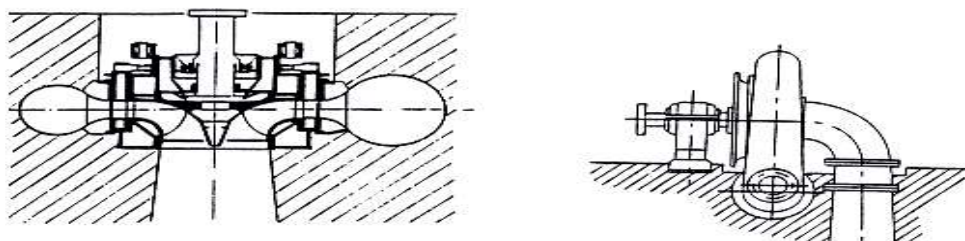
Turbine reactor is a turbine where water passing through the runner experiences a decrease in pressure both on the control blade and on the runner. Some types of Reaction Turbines are Francis Turbines, Turbine Propellers, and Kaplan Turbines [8].

2. Turbine Impulse

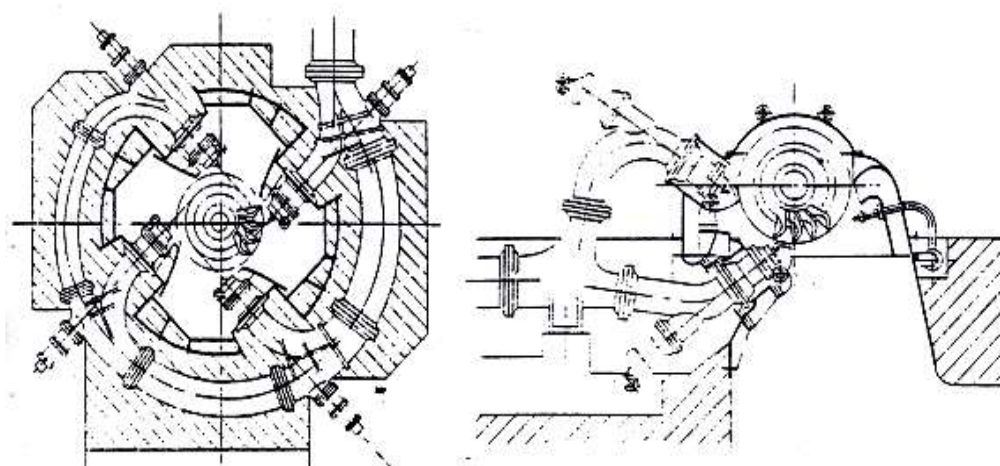
Turbine implus is Turbine where the process of decreasing the water pressure especially happened inside the atributor / nozelnya and not happened at the blade of the way. One type of Implus Turbine is the Pelton Turbine.



Turbin Kaplan
Figure 1. Turbin Impulse



Turbin Francis
Figure 2. Turbin Francis



TurbinPelton
Figures 3. Turbin Pelton

3. ANALYSA AND RESULTS:

The research was conducted at the unit of PLTA power plant Renun Silalahi Pandan Transportation Sector and PLTG Paya Pasir Marelان Sector Pembangkitan Medan

1. Time of Research

The study time is done within \pm 2 weeks.

2. Objects discussed

- a. Emission of PLTG Paya Pasir
- b. Production cost of PLTG Paya Pasir

3. Quantitative / qualitative methodology

Air Quality Emission Chimney

Monitoring Locations

GPP-7: Chimney Emissions Unit 7 (N 003 o 42'54.12 "E 098o39'58.44 ")

Monitoring Frequency 3 (three) months

Monitoring results in the field:

Tables 1. Monitoring result system

No	Parameter	Satuan	Hasil Analisa		Baku Mutu	Keterangan
			-	GPP-7		
1	SO ₂	mg/m ³	-	76	1000	tdk melebihi
2	NO ₂	mg/m ³	-	79	800	tdk melebihi
3	CO	mg/m ³	-	52,1	600	tdk melebihi
4	Partikulat	mg/m ³	-	165	150	tdk melebihi
5	Opasitas	%	-	16	20	tdk melebihi

4. CONCLUSION:

Whereas from the distribution of fuel consumption, the power generation sector consumes the greatest amount of fuel that causes more air pollutants.

- 1 Health and environmental balance will be disrupted if the air pollutant elements are left at high concentrations.
2. With more frequent hydropower operations it can reduce emissions from Thermal generators
3. Urban development that is not environmentally friendly also contributes to the increase of air pollution.
4. The government and the relevant agencies should consistently implement legislation to prevent the worsening of air quality.

REFERENCES:

1. A. I. Solly Aryza, Hermansyah, Muhammad Irwanto, Zulkarnain Lubis, "a Novelty of Quality Fertilizer Dryer Based on Solar Cell and Ann," *Scopus*, pp. 1–5, 2017.
2. M. Induction, "Efficient Procedure for In vitro Microrhizome Induction in Curcuma longa L. (Zingiberaceae) – A Medicinal Plant of Tropical Asia," *Plant Tissue Cult.*, vol. 14, no. 2, pp. 123–134, 2004.
3. A. Ikhwan and R. Rahim, "Implementation of Modified Median Filtering Algorithm for Salt & Pepper Noise Reduction on Image," *Int. J. Sci. Technoledge*, vol. 4, no. 11, pp. 2321–919, 2016.
4. M. A. Magzoub, N. B. Saad, and R. B. Ibrahim, "Efficiency Improvement of Induction Motor Variable Speed Drive Using a Hybrid Fuzzy-fuzzy Controller," in *Energy Procedia*, 2015, vol. 75, pp. 1529–1535.
5. Y. H. Kee, I. Chaturvedi, C. K. J. Wang, and L. H. Chen, "The Power of Now: Brief Mindfulness Induction Led to Increased Randomness of Clicking Sequence," *Motor Control*, vol. 17, no. 3, pp. 238–255, 2013.
6. S. Aryza, M. Irwanto, Z. Lubis, A. Putera, and U. Siahaan, "A Novelty Stability Of Electrical System Single Machine Based Runge Kutta Orde 4 Method," *IOSR J. Electr. Electron. Eng. Ver. II*, vol. 12, no. 4, pp. 2278–1676, 2017.
7. A. Markey, A. Chin, E. M. Vanepps, and G. Loewenstein, "Identifying a Reliable Boredom Induction," *Percept. Mot. Skills*, vol. 119, no. 1, pp. 237–253, 2014.
8. R. B. Purba, "Village Financial Management To Realize Transparent and Accountable Apbdes in During Villages," *Cyber Crime Viewed from Var. Perspect. Sci. Semin. Result Res. Community Serv.*, 2018.