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

| | | | | | |
|---|---|---|---|---|---|
| Judul Jurnal Ilmiah (Artikel) | : | An Overview : Resource Efficiency Potential In PTPN IX PG. Sragi To Achieve Green Proper | | | |
| Nama/ Jumlah Penulis | : | 3 Orang | | | |
| Status Pengusul | : | penulis ke-2 | | | |
| Identitas Jurnal Ilmiah | : | a. | Judul Prosiding | : | International Conference on Energy, Environmental and Information System |
| | | b. | ISBN/ISSN | : | eISSN: 2267-1242 |
| | | c. | Thn Terbit, Tempat Pelaks. | : | 2018, The 3rd International Conference on Energy, Environmental and Information System, |
| | | d. | Penerbit/Organiser | : | EDP Sciences |
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| | **Reviewer I** | **Reviewer II** | |
| a. Kelengkapan unsur isi prosiding (10%) | 2,5 | 2,3 | 2,4 |
| b. Ruang lingkup dan kedalaman pembahasan (30%) | 7,2 | 7,2 | 7,2 |
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| d. Kelengkapan unsur dan kualitas penerbit (30%) | 7,4 | 7,2 | 7,3 |
| **Total = (100%)** | | | 24,1 |
| **Nilai untuk Pengusul : (40% x 24,1)/2 = 4,82** | | | |

Semarang, 3 Oktober 2022

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Prof. Dr. Heri Sutanto, S.Si, M.Si
NIP. 197502151998021001
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Bidang Ilmu: Fisika

Reviewer 2

Prof. Dr. Rahmat Gernowo, M.Si
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Unit Kerja: FSM Universitas Diponegoro
Bidang Ilmu: Fisika

**LEMBAR**
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| b. Ruang lingkup dan kedalaman pembahasan (30%) | 7,50 | | 7,2 |
| c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%) | 7,50 | | 7,2 |
| d. Kelengkapan unsur dan kualitas terbitan /prosiding (30%) | 7,50 | | 7,4 |
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2. **Ruang lingkup dan kedalaman pembahasan:**
   Lingkup artikel terkait analisis potensi efisiensi sumber daya di PG PTPN IX. Data hasil penelitian yang berupa hasil pendekatan deskritif dan data sekunder sudah dibahas dengan baik namun belum mendalam. Pembahasan telah membandingkan dengan referensi lain.
3. **Kecukupan dan kemutakhiran data/informasi dan metodologi:**
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Semarang, 20 November 2022
Reviewer 1

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Bidang Ilmu: Fisika

**LEMBAR**
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| Komponen Yang Dinilai | Nilai Maksimal Prosiding | | Nilai Akhir Yang Diperoleh |
|---|---|---|---|
| | Internasional [√] | Nasional [ ] | |
| a. Kelengkapan unsur isi prosiding (10%) | 2,50 | | 2,3 |
| b. Ruang lingkup dan kedalaman pembahasan (30%) | 7,50 | | 7,2 |
| c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%) | 7,50 | | 7,2 |
| d. Kelengkapan unsur dan kualitas terbitan /prosiding (30%) | 7,50 | | 7,2 |
| **Total = (100%)** | 25,00 | | 23,9 |
| **Nilai Pengusul = (40% x 23,9 ) / 2 = 4,78** | | | |

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2. **Ruang lingkup dan kedalaman pembahasan:**
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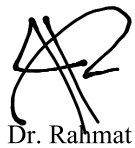
Semarang, 3 Oktober 2022
Reviewer 2



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# An Overview: Resource Efficiency Potential in PTPN IX PG. Sragi to achieve Green Proper

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Abstract

Author keywords

Indexed keywords

Sustainable Development Goals 2022

SciVal Topics

Metrics

## Abstract

Program for Pollution Control, Evaluation and Rating (Proper) is an instrument to assess company performance in environmental management. To gain a green Proper appreciation of environmental management, the company must comply the requirements beyond compliance. One of the requirements beyond compliance is resource efficiency. The purpose of this study is to know the potential of resource efficiency in PTPN IX PG. Sragi to achieve Green Proper. Resource efficiency potential will be analyze use Green Proper assessment criteria. The criteria are (1) energy efficiency efforts, (2) reduction of emissions, (3) implementation of reduce and reuse of hazardous and toxic waste, (4) implementation of 3R non-hazardous and toxic solid waste and (5) implementation of water conservation. It is expected that by analyzing those criteria, PTPN IX PG. Sragi will consider to take necessary effort in order to improve their enviromental performance to achieve Green Proper. 

Author keywords

PG. Sragi; Proper; Resource Efficiency

Indexed keywords

Sustainable Development Goals 2022 New

SciVal Topics

Metrics

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Nihaya, I.; Magister Program of Environmental Science, School of Postgraduate Studies, Diponegoro University, Semarang, Indonesia; email:ifjikasantin@gmail.com

# Source details

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# Preface

This is the proceeding of the 3rd International Conference on Energy, Environmental and Information System **(ICENIS)** 2018. The theme of ICENIS 2018 is "Strengthening Planning and Implementation Energy, Environment, and Information System Toward Low Carbon Society. ICENIS 2018 discussing the sustainability of the natural system, i.e energy management and policy, energy conservation, environmental education and planning, environmental conservation, environmental technology, environmental health, pollution control, waste management, green infrastructure and resilience, system information of supply chain and decision support system. Moreover the ICENIS 2018 introducing discussion of social aspect in low carbon society such as economic perspective, government, public policy and international relation, formal informal worker, gender, media and culture development

ICENIS 2018 organized by school of Postgraduate Studies, Diponegoro University has been conducted 14-15th august 2018. The conference has successfully performing forum to transferring and discussing research result among the researcher, students, government, private sector or industries. More than 390 participants and presenters from several countries such as Indonesia, Malaysia, Germany, Sudan, Australia, Japan, Libya have attended the conference to share their significant contribution in research related to energy, environment and information system. This proceeding contains 334 selected paper from the conference.

We would like to express our gratitude to all authors and members of scientific committee, reviewers and also organizing committee for their contribution to the success of the conference.

Guest Editors

Prof. Hadiyanto

Dr. Eng. Maryono

Dr. Budi Warsito

ICENIS 2018
International Conference on Energy, Environment and Information System

# 3rd INTERNATIONAL CONFERENCE ON ENERGY, ENVIRONMENT AND INFORMATION SYSTEM 2018 (ICENIS 2018)

**Tuesday - Wednesday, August 14th - 15th, 2018**

**Theme:**
**"Strengthening Planning and Implementation on Energy, Environmental and Information System Toward Low Carbon Society"**

## Keynote Speakers

**Prof. Dr. Takayuki Shimaoka**
Kyushu University, Japan

**Prof. Dr. Nasrudin**
University of Malaya, Malaysia

**Prof. Ho Ching Siong**
Universiti Teknologi Malaysia, Malaysia

**Dr. Junichi Fujino**
IGES - Japan

**Dr. Kanawut Inkaew**
Rajamangala University of Technology Phra Nakhon, Thailand

**Dr.-Ing. Sudarno**
School of Postgraduate Studies Diponegoro University, Indonesia

## A Call for Participant

After Successful in the previous event with 200 selected paper, we invite for 3rd ICENIS 2018 on August 14th - 15th, 2018 at Santika Premier Hotel Semarang, with the theme "Strengthening Planning and Implementation on Energy, Environmental and Information System Toward Low Carbon Society"

## Topics of Conference

1. Energy
   - Energy Management and Policy
   - Energy Planning and Education
   - Energy Conservation and Efficiency
   - Energy Conversion Technology
   - Renewable Energy
   - Nonrenewable Energy / Fossil Energy
2. Environments
   - Environmental Conservation
   - Environmental Policy, Planning and Education
   - Environmental Technology
   - Environmental Health and Toxicology
   - Environmental Epidemiology
   - Pollution Control
   - Waste Management
   - Green Infrastructure and Resilience
3. Information System
   - Bussiness Intelligence
   - Supply Chain Information Systems
   - Industrial Information Systems
   - Decission Support Systems
   - Smart Information Systems
   - Health, Safety and Environment Information Systems
4. Societal Change, Culture and Low Carbon Development
   - Infrastructure Development and Low Carbon Society
   - Economic Perspective in Low Carbon Society
   - Government and International Relation
   - Public Policy
   - Labour and Formal-Informal Worker
   - Helath and Gender
   - Media
   - Culture and Development

## Publication

All accepted papers will published in **Scopus – indexed** E3S Web of Conferences Series.

## Important Dates

| | | |
|---|---|---|
| Abstract Submission | : | before July 05th, 2018 |
| Full Paper Submission | : | before July 15th, 2018 |
| Early Registration Payment | : | before July 10th, 2018 |

## Registration Fee

| Before July 10th, 2018 | |
|---|---|
| Indonesian Presenter | IDR 2.500.000,00/paper |
| International Presenter | USD 250/paper |
| Student Presenter | IDR 2.000.000,00/paper |
| Indonesian Participant | IDR 1.000.000,00 |
| International Participant | USD 150 |

| After July 10th, 2018 | |
|---|---|
| Indonesian Presenter | IDR 2.750.000,00/paper |
| International Presenter | USD 300/paper |
| Student Presenter | IDR 2.500.000,00/paper |
| Indonesian Participant | IDR 1.250.000,00 |
| International Participant | USD 200 |

## Venue / Place

Santika Premiere Hotel – Semarang
Pandanaran Street, Number 116-120, Semarang, Central Java - Indonesia

Phone / Fax: +62 24 8413115 / +62 24 8413113

## More Information

Conference Website:
**www.icenis.org**

e-mail:
**icenis2018@live.undip.ac.id**

Secretariat :
School of Postgraduate Studies Diponegoro University
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Contact Person:

| | | |
|---|---|---|
| Dr. Budi Warsito, S.Si., M.Si. | : | 0812 2691 363 |
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| Rahayu | : | 0878 3091 7461 |
| Eko Pujiyanto | : | 0813 9085 6514 |

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## Volume 73 (2018)

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**Semarang, Indonesia, August 14-15, 2018**

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Ifsantin Nihaya, Dwi P Sasongko and Haryono Setiyo Huboyo
Published online: 21 December 2018
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# Reducing Economic Disparity in the Outermost and Border Regions: Assessing Barriers and Opportunities in the Electricity Sector

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[2] MBA Program of Energy Management, Technische Universität Berlin – Germany

**Abstract.** Economic disparity is still a major problem threatening Indonesia's future prosperity. Spatial inequality between rural and urban areas remain to exist and is driven by unequal access to and unaffordable cost of the traditional electricity infrastructures. The national electrification ratio reached 91.16 % in 2016. This paper evaluates the feasibility of reforming existing regulations for Indonesia's electricity sector in its light to reduce economic disparities between-regions and intra-regions in Indonesia. A systematic review of the literature on the publications and research reports is used to provide inputs for revising the regulations of the electricity sector to address more focused mission-oriented objectives. Empirical models are discussed and established to predict the cost-saving from the reduction of $CO_2$ emission by applying the technological solutions for renewable energy and energy efficiency. This study finds a cost-saving of Rp. 135 trillion per 40.000 hours-use for the whole electricity consumers in Indonesia that can be converted into financial instruments to support the development of electricity infrastructure in the disadvantaged regions. In the end, the study concludes that there is a clear financial benefit, in the form of opportunity cost, for reforming narration of the electricity policy and further transforming the institutional arrangement.

Keywords: **economic disparity; renewable energy; energy efficiency; $CO_2$ emission reduction**

## 1 Electricity Access in Economic Equality

Indonesia has a considerable potency to grow its economy given its growing population and abundant reserves of natural resources. With the predicted population reaching 295 million in 2030, Indonesia will be the fourth largest country in the world [1]. The strong level of economic growth will land the country as the fifth powerful economy in the world in term of GDP - leading its neighbours at the Southeast Asia regions. PWC estimates that Indonesian GDP in 2030 will yield 5.424 trillion USD shadowing Japan in the fourth position [2]. However, economic disparity is still a major problem in Indonesia where four Indonesians hold more wealth than the poorest one hundred million [3]. The expanding middle class in the urban areas of Indonesia isn't followed by the income growth of the lower class in the rural areas, i.e. Eastern Indonesia. Pachauri and Spreng revealed that the economic inequality closely mirrored the energy inequality at a global level (see Fig. 1). The poorest 40 % of the world's population only disposes of some 10 % of the global income, hence consumes some 10 % of the final energy use [4]. The lack of infrastructure development for electricity in the outermost and border regions widen the income gap between the rich and the poor in Indonesia.

The ratio of electrification in Indonesia reaches 94.9 % in 2017 summing up to 10.4 million people who live in the dark [5]. Most of the outermost and border regions have poor access to the electricity [6]. The failure to powering the households in the underdeveloped regions may hamper the national target of 97 % electrification ratio in 2019.

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# The Design Of Grain Drying Oven Using Residual Exhaust Gas From Diesel Engine With Heat Transfer Analysis

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**ABSTRACT**. The drying process plays an important role in the preservation of agricultural products. To this day, the drying process of rice grains harvested by the farmers in Semangga District, Merauke Regency, has always used sunlight. However, during rainy season, the farmers cannot dry their grains, and if such thing happens for a long time, it will cause decayed grains. The drying characteristics of a material are necessary in designing the dryers in use. The method used in this research was the design of grain dryers, which took the form of heating oven, by utilizing heat from the residual exhaust gas of diesel engine. The exhaust gas coming out of the *exhaust manifold* would be flowed through the heating pipe in the oven heating chamber, then through the convective heat transfer process, followed by conductive heat transfer, and then the heat flow conduction would be transmitted to the drying chamber. The objective of this research was to design grain dryers by using Diesel engine's residual exhaust gas, and to calculate the efficiency of grain dryer using heat transfer analysis. The bulk gas temperature in the exhaust gas section for hot fluid in the pipe is 371.55 K at a motor rotation of 2400 rpm, with the flow rate of the incoming exhaust gas heat mass of 0.01798031 kJ/s. The velocity of incoming exhaust gas mass is 36.75 kg/s, with the comprehensive heat transfer coefficient on the inlets of 92.7334404 W/ $m^2$.oC. The heat transfer in the air section/ fluid section in the inner pipe is 351.1351 K, while the convective heat transfer coefficient in exit pipe is 8.010580984 W/$m^2$.ºC, thus obtaining Comprehensive heat transfer of 40.2312698 W/ $m^2$.ºC. The logarithmic mean temperature difference (LMTD) in the evaporator is 35.69590751ºC with total heat transfer area of 084178 $m^2$. With 2400 rpm motor rotation, the total heat transfer at the heat exchanger, which is the usable maximum heat, is equal to 0.226296111 kW; while the effectiveness of heat exchanger is at 60.95%. The energy used to evaporate the water and the amount of convective heat transfer from dry air to the product are 0.03696 kW, while the amount of air energy used is 0.05150 kW, obtaining the efficiency of the drying machine at 71%.

**Keywords**. Grain, Exhaust Gas, Oven

## INTRODUCTION

Agricultural products, including grains or cereal crops, such as corn, grain/ rice, beans, coffee, etc. require more serious attention, especially in the preservation process. The drying process plays an important role in the preservation of agricultural products. The drying characteristics of a material are necessary in designing and operating the dryers in use.

Drying process of grains is generally done by using solar energy. Nevertheless, this method highly depends on the season, drying time, large number of workers, and extensive place. The drying process of high-moisture grain can be conducted in two ways: long period of drying process at low temperature, or shorter period of drying process at higher temperature. However, if the drying process done to a material takes too much time at low temperature, the microorganism activity happens very quickly, for instance the growing molds or spoilage. On the contrary, drying process at excessively high temperature may cause damage to the components of materials being dried, both physically and chemically. Therefore, it is necessary to choose an effective and efficient drying method to avoid damage in agricultural products.

The drying process of agricultural products done by farmers in Indonesia, especially in Merauke Regency, Semangga District, still utilizes solar energy as its drying power. Still, during the rainy season, they have difficulty to dry agricultural produce due to the lack of sunlight with adequate intensity as a source of heat. If the agricultural products are not drained properly up to certain moisture content, they will germinate, or even become decayed from microorganism's metabolic activity, downgrading their quality. As an alternative solution to this problem, it is necessary to conduct a study to design a drying tool capable of assisting the farmers to dry their agricultural products, especially grains. The drying tool to be examined for its drying characteristics is a tray dryer, which uses remaining exhaust gas from Diesel motor as a drying medium. The tool is expected to dry the agricultural products with evenly-distributed dryness level (moisture content) on the materials.

The exhaust heat generated by Diesel Engine still contains plenty of usable heat/ thermal energy, because 34 - 40% of energy from the combustion in motor is wasted through exhaust gas. Such energy can be utilized as a source of heat energy for the grain drying process, through the process of heat removal from a closed container to the dryer. It is expected that this research can provide a good and useful contribution in the utilization of wasted energy for agricultural product drying process.

Alternative technology is designed in the form of dryer oven using residual exhaust gas from Diesel motor.

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# The Study of Rice Husk as Co-Digestion Together with Cow Dung is Biogas Production of Anaerobic Digester

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**Abstract.** One of alternative waste-to-energy technologies to treat organic waste is anaerobic digestion. This study conducted by three stage of experiments using the laboratory scale biogas production from cow dung and rice husk as co-digestion. Based on the first stage experiments, TS 10% gave the highest accumulation of biogas 458 ml and 506,95 ml. In the second stage of the experiments, 10 ml media in TS 20% gave the highest accumulation of biogas production (743.1 ml). The last stage of experiments showed that Blank TS 30% with 5 ml media gave the highest accumulation of biogas production (922.2 ml). From the last stage we can conclude that the presented of rice husk as a co-digestion didn't give the significant effect to increase biogas production in anaerobic digestion, at least at room temperature. This caused by the high lignin and cellulose concentration in the rice husk that might resist or inhibit the production of biogas production. This is contrast situation when TS 40% occured, the existing of rice husk in AD will give positive impact to biogas produce.

Keywords: **anaerobic digestion; cow dung; rice husk ; co-digestion.**

## 1 Introduction

Anaerobic digestion performance is heavily influence by the characteristic of organic material such as food waste, manure, sewage sludge, organic fraction of municipal solid waste, and energy corps, and others [1]. The popularity of the technology is due to its ability to turn organic waste into energy [2].

In Indonesia, cow dung volumes are increasing annually and most of them are disposed without any treatment. Anaerobic digestion could be an alternative option to treat the cow dung and thus reducing the cost of disposal and produce biogas for energy recovery. Methane and carbon dioxide which is mainly contained in biogas production, can be used as renewable energy sources [3].

Other type of organic waste that is abundant in rural area is agricultural waste, such as properly such as rice husk, rice residues and rice straw from the drying process. The waste is abundant particularly during harvest and is mostly burnt in the field causing air pollutant. As a matter of fact, these wastes have high carbon content which can be used as for biogas production through anaerobic digestion process. However as the rice residues are to optimize anaerobic digestion performance and obtaining energy by considering digestion of rice residues are difficult to degrade, the parameters of the anaerobic digestion should be set properly [4].

**Table 1** Characteristic of Rice Husk Reported in Literatures

| Parameters | Pillaier, 1988 | Bronzeoak, 2003 | Kumar, P.Senthil, 2010 |
|---|---|---|---|
| Crude protein, % | 1.7 - 2.6 | - | - |
| Crude fiber, % | 31.71 - 49.92 | - | - |
| Mineral Ash, % | - | - | 13.87 |
| Pentasans, % | 16.94 - 21.95 | - | - |
| Crude fat, % | 0.38 | - | - |
| Nitrogen free extract, % | 24.7 - 38.79 | - | - |
| Cellulose, % | 34.34 - 43.80 | - | 31.12 |
| Ash, % | 13.16 - 29.04 | 22.0-29.0 | - |
| Hemicellulose, % | - | - | 22.48 |
| Lignin, % | 21.40 - 46.97 | - | 22.34 |
| Bulk Density (kg/m3) | - | 96-160 | - |
| Nitrogen, % | - | 0.23 - 0.32 | - |
| Carbon, % | - | ≈35.0 | - |
| Moisture, % | - | 8.0 - 9.0 | - |
| Hydrogen, % | - | 4.0-5.0 | - |

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