ICH 2017 EPS

International Conference on High Voltage Engineering and Power Systems ICHVEPS 2017

2-5 October 2017
Inna Grand Bali Beach, Bali, Indonesia

The 72nd National Electricity Day 2017

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ICHVEPS 2017

International Conference on High Voltage Engineering and Power Systems ICHVEPS 2017

PROCEEDING

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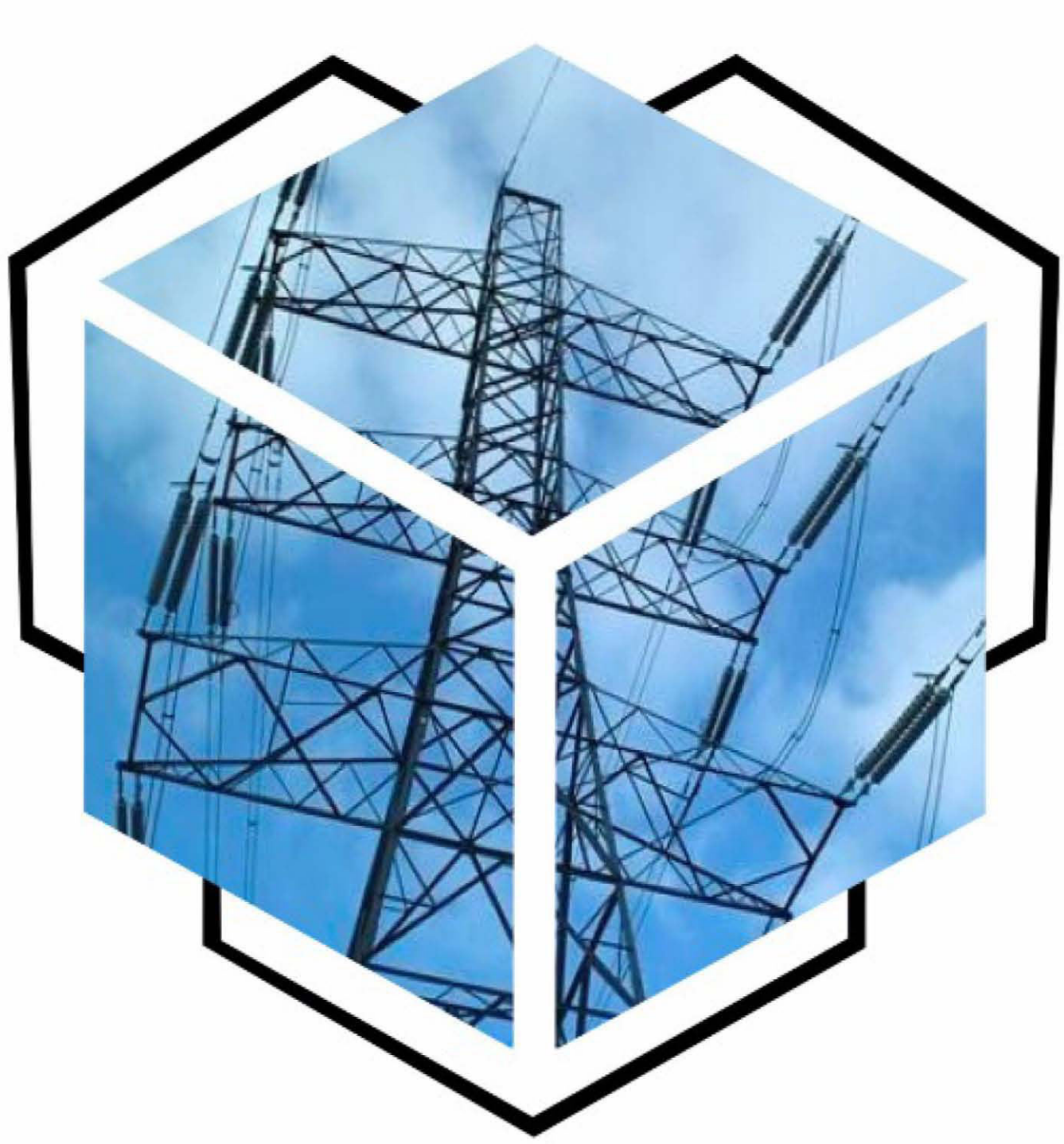
Inna Grand Bali Beach, Bali, Indonesia



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2017 International Conference on High Voltage Engineering and Power Systems (ICHVEPS 2017)

Denpasar, Bali, Indonesia
2-5 October 2017

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ICHVEPS 2017
October 2-5, 2017, Bali, Indonesia

Call for Paper

ICHVEPS 2017 cordially calls for your paper with the focus on the following issues from the field of high voltage engineering and power systems

1. High Voltage Generation, Measurement, and Instrumentation
2. High Voltage Insulation System
3. Condition monitoring and diagnosis for power equipments and power systems
4. Dielectric materials and their aging mechanisms
5. New and environmental friendly materials for high voltage application
6. Application of high voltage in industry
7. Degradation assessment for power equipment
8. Transients Phenomena
9. Outdoor Insulation: Insulator, Environmental Effects
10. High Voltage Insulation for UHV AC and HVDC System
11. High Voltage Apparatus: Reliability and Maintenance
12. Grounding system
13. Power Quality
14. Electromagnetic Compatibility
15. Smart Grid Technology
16. High Voltage Engineering Education
17. Power system planning, operation and control
18. Power system stability
19. FACTS
20. Renewable energy and microgrid

You are invited to submit your abstract(s) through the abstract submission system that can be reached from the conference web site EasyChair

Abstract can be received by text only, no figures or graphs, with length of around 300 words. Detail of abstract submission can be seen in the conference web site on menu Important Dates.

Authors are invited to submit original technical papers in standard IEEE Conference

format. Please use IEEE PDF eXpress to generate pdf files or to verify that the PDF files are compatible with the IEEE Xplore format. All submissions should be written in English.

All presented paper will be submitted to IEEExplore and indexed in SCOPUS. The selected papers will be considered to be published in ITB Journal on Science and Technology as well as International Journal on Electrical Engineering and Informatics.

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Invitation

International Conference on High Voltage Engineering and Power Systems 2017 (ICHVEPS 2017) will be held in Sanur-Denpasar, Bali, Indonesia on October 2-5, 2017. The Organizing Committee of ICHVEPS 2017 cordially invites you to participate in the conference.

About Bali

Bali lies between the islands of Java and Lombok and is one of more than 17,000 islands that makes up the Indonesian Archipelago. Lying just 8° south of the Equator, Bali boasts a tropical climate with just two seasons, wet and dry, a year and an average annual temperature of around 28° C.

The Balinese people have strong spiritual roots and despite the large influx of tourists over the years, their culture is still very much alive inspired by stories from the Ramayana and other Hindu epics. With a reputation as being one of the most beautiful and diverse tourist spots in the world, Bali attracts more than 4.5 million visitors a year, from all around the world.

Conference venue of ICHVEPS 2017 is Inna Grand Bali Beach Hotel. It is located on a wide stretch and white sand of Sanur beach, the most complete and competitive resort in Bali. Only 12 miles from Denpasar Ngurah Rai International Airport.

ICHVEPS 2017

International Conference on High Voltage Engineering and Power Systems 2017

October 2-5, 2017
Bali, Indonesia

CALL FOR PAPERS

Organized by:
School of Electrical Engineering and Informatics
Bandung Institute of Technology, Indonesia

Technically Sponsored by:
Power and Energy Society Chapter
IEEE Indonesia Section

Cultural tour

Cultural tour will be arranged for conference participants and spouses. The tour will be done after the closure of the conference. The places and attractions to be seen during the cultural tour and its registration will be announced later via the conference web site.

Sightseeing tours

Bali Island is famous with variety of sightseeing spots. During the conference there will be a desk to help to arrange sightseeing tours participated by participants and or spouses/family. Details of this sightseeing tours will be released on the conference web site later.

Language

The working language of the symposium is English. All printed matter will appear in English.

Registration Fee

	Registration Fee
IEEE Member	USD 300
Non Member	USD 350
Student	USD 250
Local Academia	IDR 2,500,000

The registration fee includes conference kit, conference proceedings, admission to all sessions, welcoming reception, banquet, lunches, and coffee breaks.

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E-mail : **secretary@ichveps.org** or **suwarno@ieee.org**
Website : **http://www.ichveps.org/**

Main Topics

1. High Voltage Generation, Measurement, and Instrumentation
2. High Voltage Insulation System
3. Condition monitoring and diagnosis for power equipments and power systems
4. Dielectric materials and their aging mechanisms
5. New and environmental friendly materials for high voltage application
6. Application of high voltage in industry
7. Degradation assessment for power equipment
8. Transients Phenomena
9. Outdoor Insulation: Insulator, Environmental Effects
10. High Voltage Insulation for UHV AC and HVDC System
11. High Voltage Apparatus: Reliability and Maintenance
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Important Dates

Abstract Submission: **July 1, 2017**
Notification **July 5, 2017**
Final Manuscript Submission: **Aug 15, 2017**

CONFERENCE DAYS: **October 2-5, 2017**

IEEE 978-1-5386-0944-6

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WELCOMING MESSAGES

Distinguish participants and guests, welcome to Bali, welcome to Indonesia and welcome to The International Conference on High Voltage Engineering and Power System 2017 (ICHVEPS 2017). The conference will be held in Inna Grand Bali Beach Hotel Sanur Bali, Indonesia on 2-5 October 2017. The ICHVEPS 2017 is a biannual conference organized by the School of Electrical Engineering and Informatics, InstitutTeknologi Bandung (ITB), Indonesia with support of PT. PLN (Persero) and technically sponsored by IEEE Indonesia Section , Power and Energy Society Indonesia Chapter and Indonesia Inter-University Forum on High Voltage Engineering. The conference is designed to be an international forum for exchange ideas, discussion and dissemination of research results and technologies in the field of High Voltage Engineering and Power System from power utilities, universities, research institutes as well as industries. The conference received a large number of abstracts/papers submission. After review, finally 125 papers from 12 countries (Indonesia, Malaysia, India, Australia, China, Japan, Taiwan, Brunei Darussalam, France, Sweden, USA and Nigeria were accepted. The papers will be presented in 2 invited plenary sessions and 16 technical sessions. All accepted papers will be sent to IEEE Explorer (and Scopus) and selected papers will be published in International Journal on Electrical Engineering and Informatics and Journal of Engineering and Technological Sciences.

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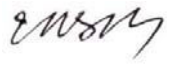

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PLENARY INVITED LECTURES

IN-1

09.00 – 09.30
Ir. Amir Rosidin, MM.
PT. PLN (Persero)
"High Voltage Engineering and Power Systems Challenge in Indonesia Power Network"

IN-2

09.30 – 10.15
Prof. Masayuki Hikita
Kyushu Institute of Technology, Japan
"High Voltage Electrical Insulation in Next Generation Power Module"

IN-3

10.45 – 11.30
Dr. Nurhidajat Sisworahardjo
University of Tennessee at Chattanooga, USA
"Data Analytics-Based Anomaly Detection in Smart Distribution Network"

IN-4

11.30 – 12.00
Mr. Kazuhiro Akima
PT. Honda R&D Indonesia
Honda Electric Vehicle Technology

IN-5

12.00 – 12.45
Prof. Ahmed Abu Siada
Curtin University, Australia
"Review of Flexible AC Transmission Systems; Enabling Technologies for Future Smart Grids"

IN-6

08.30 – 09.15
Dr. Muhammad Aziz
Tokyo Institute of Technology, Japan
"Extended Utilization of Electric Vehicles in Electrical Grid Services"

IN-7

09.15 – 10.00
Prof. Mohammad Masoum
Curtin University, Australia
"Coordination of Plug-In Electric Vehicle Charging in Smart Grid: Challenges and Opportunities"

IN-8

10.15 – 11.00
Prof. Guan-Jun Zhang
Xi'an Jiaotong University, China
"Separation of Multiple Partial Discharge Sources in Power Transformer"

IN-9

11.00 – 11.45
Prof. Yanuarsyah Haroen
Bandung Institute of Technology, Indonesia
"Past, present and future in Indonesian Public Mass Transportation. Perspective - Traction Control Systems"

IN-10

11.45 – 12.30
Dr. Robert Saers
ABB Corporate Research, Sweden
"Digitalization of Electric Power System"

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PREFACE

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October, 2017

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2-5 Oct. 2017

DOI: 10.1109/ICHVEPS42440.2017

Kartik S Sharma; Kumari Swati; R. Sarathi

Publication Year: 2017 , Page(s): 18 - 22

Abstract HTML

PD pattern of various defects measured by TEV sensor

Hikmah Prasetia; Umar Khayam; Suwarno; Akihiko Itose; Masahiro Kozako; Masayuki Hikita

Publication Year: 2017 , Page(s): 23 - 28

Cited by: Papers (5)

Abstract HTML

Dissolved gas analysis (DGA) of vegetable oils under electrical stress

M. H. A. Hamid; M. T. Ishak; M. M. Ariffin; N. I. A. Katim; N. A. M. Amin; N. Azis

Publication Year: 2017 , Page(s): 29 - 34

Cited by: Papers (8)

Abstract HTML

Noise measurement in high voltage laboratory by using high frequency current transformer and loop antenna

Jean Pierre Uwiringiyimana; Umar Khayam

Publication Year: 2017 , Page(s): 35 - 39

Cited by: Papers (8)

Abstract HTML

Correlation of transformer paper deterioration to oil characteristics and dissolved gases

Rahman A. Prasojo; K. Diwyacitta; Suwarno; H. Gumilang

Publication Year: 2017 , Page(s): 40 - 45

Cited by: Papers (8)

Abstract HTML

Investigation of water tree characteristic in XLPE nanocomposites for medium voltage cable application

J. A. Wahab; Noor Syazwani Mansor; D. Ishak; M. Kamarol; M. Mariatti; A. B. A. Ghani; H. S. Halim

Publication Year: 2017 , Page(s): 46 - 50

Cited by: Papers (1)

Abstract HTML

Performances of long-term coastal field aged silicone-coated ceramic insulators under clean and salt fog conditions

Dini Fauziah; Heldi Alfiadi; Rachmawati; Suwarno

Publication Year: 2017 , Page(s): 51 - 56

Abstract HTML

Evolution of thunderstorm electrification before first lightning strike

Ariadi Hazmi; Primas Emeraldi; Muhammad Imran Hamid; Fadjrin Anugrah Utama; Nobuyuki Takagi

Publication Year: 2017 , Page(s): 340 - 343

Abstract HTML

The upshot of hybrid defects in coaxial gas insulated switchgear

Publication Year: 2017 , Page(s): 344 - 349

Abstract HTML

Lightning protection system for high voltage transmission line in area with high grounding resistance

Monalisa A. Malelak; Reynaldo Zoro

Publication Year: 2017 , Page(s): 350 - 355

Cited by: Papers (1)

Abstract HTML

The effect of mesh size, number of rod, & length of rod towards touch voltage, step voltage, and ground resistance in grounding system

Ishak Kasim; Syamsir Abduh; Nur Fitryah

Publication Year: 2017 , Page(s): 356 - 361

Cited by: Papers (3)

Abstract HTML

Induced voltage on medium overhead line caused by nearby strike from rocket triggered lightning

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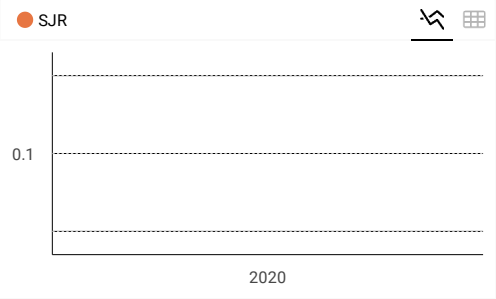

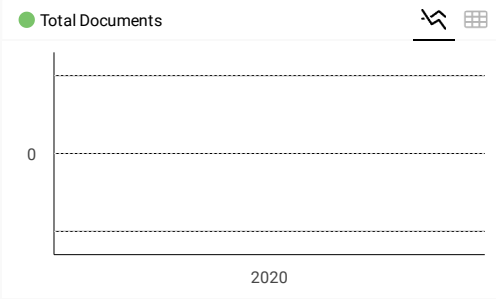

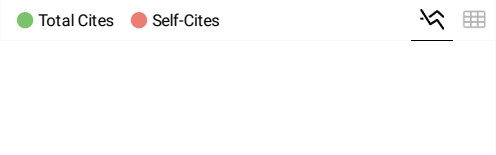

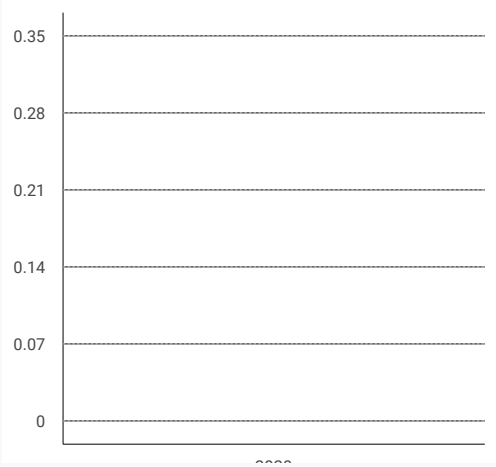

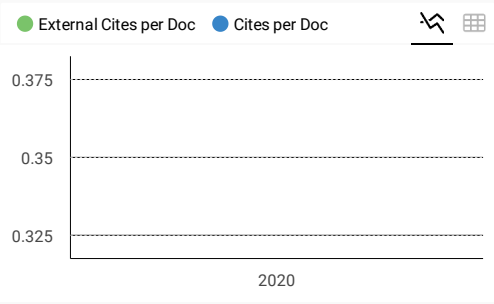

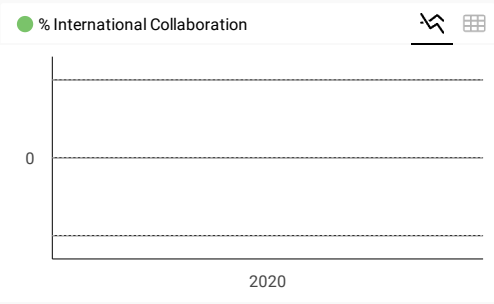

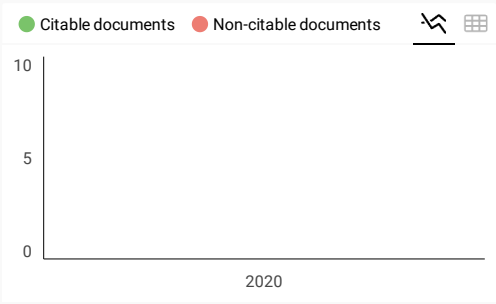

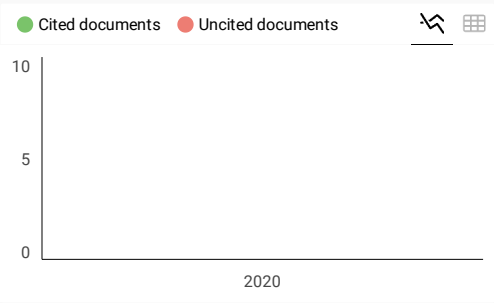

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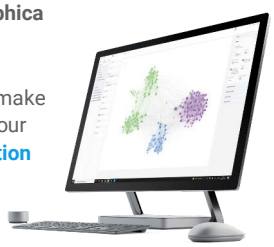

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Implementation of wireless temperature, humidity, lighting and active power online monitoring using PLC for early stage of miniature energy savings

Publisher: IEEE Cite This PDF

Waluyo ; Nandang Taryana ; R. Hendi Handian ; Andre Widura ; D Arsyad Ramadhan All Authors

Abstract:

This research would be the early stage in saving and managing energy, especially electrical energy in a miniature. The research has been done in the assembly of components, namely temperature, humidity, lighting and electric active power sensors, where they were equipped by 4–20 mA transmitters. These transmitters entered to the four channel analog module of programmable logic controller (PLC). From the PLC, using a router, the signals were transmitted to the computer in wireless remotely. Thus, besides the parameter quantities could be read in the panel, they also could be read in the computer in an online wireless remotely. Based on the testing results, for the humidity 58–60% in range, the error between the site display and PLC in the computer was only 0.3–0.4%, and for the temperature 28–30°C, the error between the site display and PLC in the computer was only 0.2–0.3°C. The error of active power depended on the power itself. For example, the rating load of 25 and 100 watts, the remote display were 23 and 96 watts respectively. While, the time for signal transmission was under 0.1 second.

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I. Introduction

Energy is a basic need to drive almost all economic and social activities. From time to time, energy need is necessary to human being, while the increasingly scarce global energy reserves. Wasteful use of energy and the excess will have an impact on environmental degradation, decline in product competitiveness [1], oil price upheavals. Along with the increasingly complex energy problems, the management of energy use on the load side, especially at office buildings and industry, it is time becomes an important part in the company's management structure [2].

Implementation of Wireless Temperature, Humidity, Lighting and Active Power Online Monitoring Using PLC for Early Stage of Miniature Energy Savings

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***Abstract*— This research would be the early stage in saving and managing energy, especially electrical energy in a miniature. The research has been done in the assembly of components, namely temperature, humidity, lighting and electric active power sensors, where they were equipped by 4-20 mA transmitters. These transmitters entered to the four channel analog module of programmable logic controller (PLC). From the PLC, using a router, the signals were transmitted to the computer in wireless remotely. Thus, besides the parameter quantities could be read in the panel, they also could be read in the computer in an online wireless remotely. Based on the testing results, for the humidity 58-60% in range, the error between the site display and PLC in the computer was only 0.3-0.4%, and for the temperature 28-30^{o}C, the error between the site display and PLC in the computer was only 0.2-0.3^{o}C. The error of active power depended on the power itself. For example, the rating load of 25 and 100 watts, the remote display were 23 and 96 watts respectively. While, the time for signal transmission was under 0.1 second.**

Keywords—PLC; transmitter; analog module; wireless; temperature; humidity; lighting; active power

I. INTRODUCTION

Energy is a basic need to drive almost all economic and social activities. From time to time, energy need is necessary to human being, while the increasingly scarce global energy reserves. Wasteful use of energy and the excess will have an impact on environmental degradation, decline in product competitiveness and long-term socio-economic upheavals. Along with the increasingly complex energy problems, the management of energy use on the load side, especially at office buildings and industry, it is time becomes an important part in the company's management structure [1].

A creation of new paradigm of changing times is one way to maintain growth and increase customer value in a fast paced business environment today. Therefore, it is necessary to play an important role in the development of industry and proactively addressing dynamic market [2]. Non-residential buildings have shown a rapid increase in the use of advanced technology and control systems with a variety of drivers, many of which are labeled 'smart'. If the term of smart building represented a separate thing, more advanced group, it will provide an opportunity to focus forward to the future development of non-domestic buildings [3]. Smart buildings have been researched and developed over the last three decades. This seems to be the case in all aspects of the built environment sector; smart sensors, smart materials and smart meters in the building looks to be the latest and most advanced technology in our efforts to develop high-performance buildings. Smart cities are commonly seen built into future urban environment, with a growing number of inhabitants, demanding more functionality than the limited resources and tighter building regulations. By focusing on the main driver behind the construction of the past and the present, it is necessary to assess the meaning of smart or intelligent building and bringing together the definitions for smart building which is a more advanced group, learned from building upon the success and limitations of terminology previously and meet the criteria in where the building is worth a high performance. It is clear that the design of the expected performance of non-domestic buildings change throughout history. In order for the changes that would be described as progress, it is necessary that the produced drivers of evolution have met to a higher level than before. Drivers for building development can be said to revolve around adding value to a building. This value will depend on the context and building category, but has traditionally been formed of a theme related to the cost of building throughout life, and performance, comfort and satisfaction of their building. Reduction in energy consumption has now become the driving force in him, as increasingly stringent regulations and awareness of climate change. It is recognized that the modern building as a significant design criteria. With the cost of operating a non-domestic buildings were significant when compared to the cost of capital. It is suggested that a more suitable representation of the driver is capable to retain its value over long periods of time under changing conditions of use and externally. Therefore, three different drivers to build on the progress is long life, energy efficiency and comfort and satisfaction. A building that serves forward would have minimized energy consumption, although consistently enable maximization of performance, comfort and satisfaction of its inhabitants during the long lifetime [4].

The purpose of research was to design of monitoring system on the environmental parameters (temperature, humidity and lighting), and electrical power consumption in wireless, and

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analysis of electrical power consumption associated with existing standards.

II. Research Method

Fig. 1 shows a plan for the design diagram of monitoring system. In the design, the plan was installed sensors and / or measuring parameters of the environment and electrical power. The measurement data was sent to the computer wirelessly. The stored data in the computer were processed and analyzed for the use of electrical energy.

In the design, 4-20 mA transmitters were installed for temperature, humidity, lighting and electrical power. Furthermore, the data came into the input analog module of PLC. From PLC, the data sent to the Router, then sent in wireless, and finally into the computer.

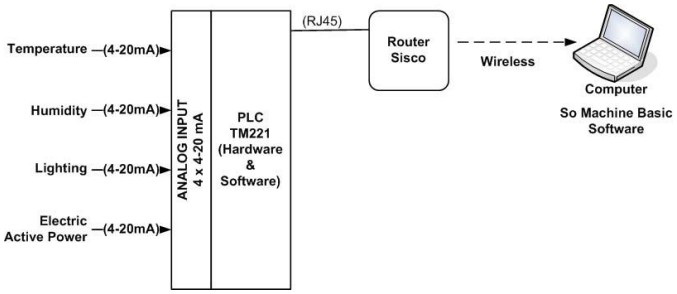

Fig. 1. Circuit diagram of monitoring system

The wiring diagram of electric power measurement was equipped by 4-20 mA transmitter as shown in Fig. 2. The supply was from source 220 V, single phase. While the current could set as maximum of 5 A. The display could be set as wattmeter or amperemeter. The 4-20 mA transmitter.

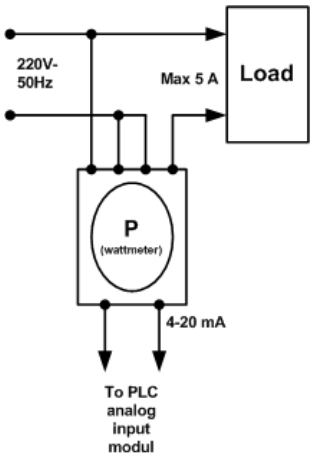

Fig. 2. Wiring diagram of electric power measurement equipped by 4-20 mA transmitter

III. Results and Discussion

Fig. 3 shows the monitoring kits of environmental parameters, which were temperature, humidity and lighting sensors, and electric power meter, where they were equipped by 4-20 mA on every equipment those connected to the analog input modul of PLC. From the analog input module, the data came to the PLC controller, where the data would be processed. Furthermore, the data were sent to the router, and from the router, they were sent to the computer in wireless. The power supply 24 Vdc was for supplying the temperature and humidity sensors. The electric power meter was loaded by a lamp.

Fig. 3. Monitoring kits of environmental parameters and electric power

Fig. 4 shows the configuration processes of PLC type and the analog module selection. For this case, the PLC was TM221 type, and using the four channel analog module. The used PLC TM221CE16R series, 16 I/O (9inputs and 7 outpus). While, the used input analog module was TM3T14 series, where it was 4 (four) inputs.

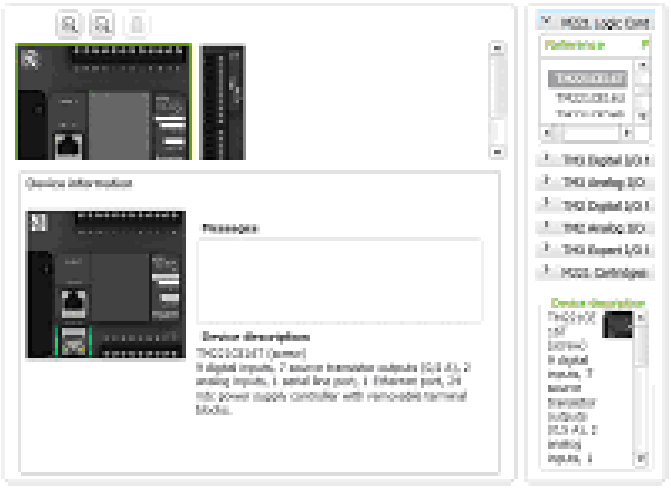

Fig. 4. Configuration processes of PLC and analog module selection

Fig. 5 shows the configuration processes of software for the analog inputs. The analog input addresses were %I1.0, %I1.1, %I1.2 and %I1.3 for lighting, temperature, humidity and power parameters respectively. The lighting, temperature, humidity and power ranges were 0-2000 lux, -20-60 centigrade, 0-100% and 0-1300 watt respectively. The analog types were 4-20 mA. These ranges were adjusted to the real measuring ranges of equipment.

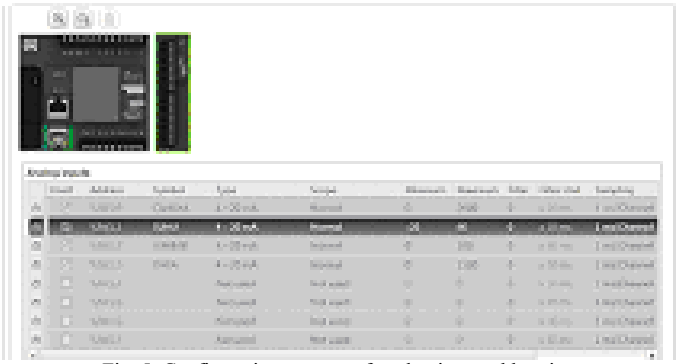

Fig. 5. Configuration process of analog input addressing

Fig. 6 shows the configuration processes of IP address selection. For this case, the address was 192.168.1.10 and the subnet mask was 255.255.255.0. This address should be unique.

Fig. 6. Configuration process of IP address selection

Fig. 7 shows the programming processes for analog diagram. This figure indicates the design of ladder diagram for four analog inputs. The instruction was used %MW and followed by the address numbers.

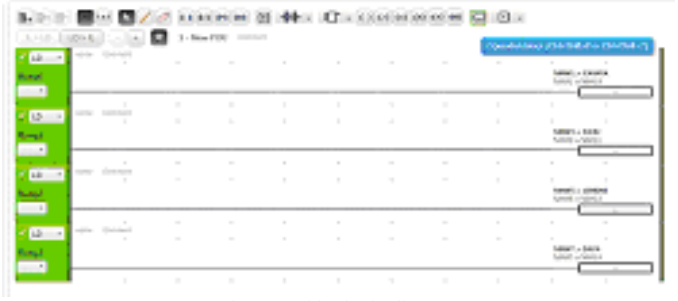

Fig. 7. Ladder logic diagram

Fig. 8 shows the programming for running. For running program, it should be login the program, and the IP address would appear.

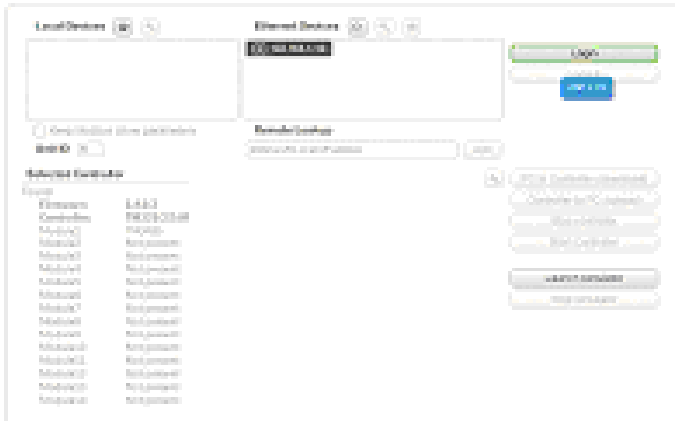

Fig. 8. Program running

Fig. 9 shows the wireless connection. For this case, the name wireless connection was 'PLC1' and it should be 'connected'.

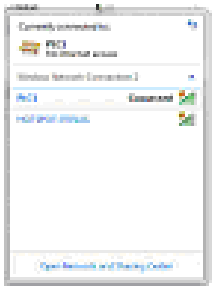

Fig. 9. Wireless connection

Fig. 10 shows the running program online display, where running in real time. The real numerical numbers would displayed on the laptop screen. The time different between the equipment display and the screen display were in order of milliseconds (ms).

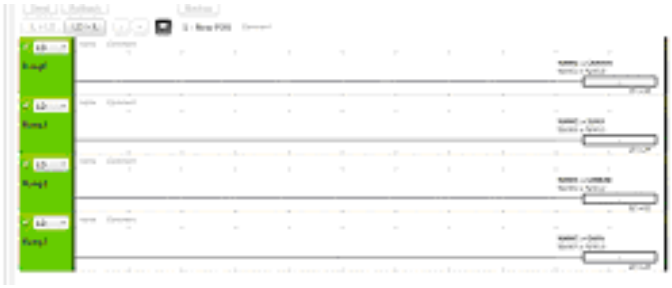

Fig. 10. Running program online display

Table 1 lists the samples for humidity and temperature measurements. There were different values, between on the equipment and monitor display, both for humidity and temperature. Nevertheless, the different values were very small values. The average different value of humidity was only 0.62% and the average different value of temperature was only 0.255ºC.

TABLE 1. HUMIDITY AND TEMPERATURE MEASUREMENT RESULTS

Hours	Humidity (%)		Temperature (oC)	
	Display	SoMachine	Display	SoMachine
11.12	59.7	59.3	29.7	29.4
11.14	59.7	59.3	29.7	29.4
11.16	59.6	59.2	29.6	29.3
11.18	59.6	56.2	29.7	29.4
11.20	59.1	58.7	29.7	29.4
11.22	59.8	59.3	29.6	29.3
11.24	59.1	59.7	29.5	29.2
11.26	59.4	60.0	29.4	29.2
11.28	59.6	60.2	29.4	29.2
11.30	59.7	60.3	29.4	29.2
11.32	59.6	60.3	29.5	29.2
11.34	59.1	59.8	29.5	29.3
11.36	59.6	59.2	29.5	29.2
11.38	59.1	58.9	29.5	29.3
11.40	59.1	58.4	29.5	29.3
11.42	59.6	58.3	29.5	29.2
11.44	59.4	58.1	29.5	29.2
11.46	59.4	58.0	29.4	29.2
11.48	59.2	58.5	29.4	29.2
11.50	58.0	57.7	29.4	29.2

Table 2 lists the samples for lighting measurements. The lighting sensor did not have display on the equipment. Therefore, to make sure on the proper operation, it was tested in the outdoor and indoor locations. Fortunately, the sensor operated well, when conducted the lighting measurement. In outdoor measurements, the results were between 176 and 190 lux, and the measurement results for indoor location were between 87 and 89 lux.

TABLE 2. SAMPLE OF LIGHTING MEASUREMENT

Outdoor	Indoor
190	89
189	88
188	87
187	88
186	87
187	88
186	87
185	88
184	87
183	88
182	89
191	88
189	89
188	88
187	88
186	88
185	88
184	88
183	88
182	87
181	88
180	87
179	88
178	87
177	88
176	87

Table 3 lists the samples for electric power measurements. The meant power was active power, with unit of watt. There are small values of different measurements between SoMachine measurement on the monitor and the display measurement on the equipment. The differences were between 1.2 and 2 watt, or 1.68 watt in average. Thus, it was reasonable as in accurate.

TABLE 3 ELECTRIC POWER MEASUREMENTS

Load power (W)	SoMachine measurement (W)	Current display (A)	Power display (A)
100	95	0.424	93.3
200	186	0.840	184.8
300	275	1.241	273.0
400	370	1.673	368.1
500	455	2.061	453.4

The transmission speed of wireless was around 0.1 ms. The signal strength was influenced by barriers, such as walls. The maximum distance that could be reached was around 15 m. For vertical transmission, it could be reach only one floor higher level. This simulation of data transmission between devices wirelessly works well. All data packets were sent and received on each device.

IV. CONCLUSION

Based on the results of measurement and analysis of testing in this research activity, it can be concluded that the method used in the simulation of data transmission wirelessly can run well. The average different reading values between the equipment display and the monitor for the humidity and the temperature were only 0.62% and 0.255ºC respectively. While, the active power one was only 1.68 watt in average. The signal strength was influenced by barriers.

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