PROCEEDING

PLN International Conference and LIKE 2019
2019 International Conference on Technologies and Policies in Electric Power & Energy (ICT-PEP)

Yogyakarta, Indonesia
October 21st-24th, 2019
FOREWORD

Excellency all of distinguished guest and participant,

First of all, I would like to say thank you to all of participant for joining our premier PLN International Conference on Technology and Policy in Electric Power and Energy 2019. Such an honor and pride for PLN for the first time ever become the host of international conference of energy and power technology in collaboration with IEEE.

PLN (Persero) is one of Indonesian stated owned enterprise which have responsibility to make sure that integrated electricity in Indonesia have a good reliability and availability. We could say that PLN is one and only electricity company in Indonesia. As the grown up of disruptive era for the last decade, PLN has to face many challenges both internal and external through electricity business such as renewable energy development especially roof top solar panel that has grown up so fast and become threat for PLN’s business process especially when the large scale of renewable energy power plants that will give a lot of change in stability system.

The mandate of Public Service Obligation from the Government, where PLN is demanded to continue to suppress state subsidies and improve efficiency. Completion of the 35,000 MW electricity infrastructure development program including transmission and distribution projects. The issuance of presidential decree on electric vehicle in Indonesia, which creates a new opportunity for PLN to innovate.

For more than 70 years, PLN has experienced electricity throughout the country from large cities to rural and remote areas. Therefore, it is important for PLN to explore our potential to always be at the forefront in the electricity sector in Indonesia.

PLN have a Certification Center, Research and Development Center, Electricity Maintenance Center, and Subsidiaries that can be a place for PLN to innovate so that PLN is always ready and agile in facing these challenges.

PLN Research and Development have to become a sensor, receptor and processor for threats, obstacles, challenges and interference both externally and internally for the present and the future. PLN is expected to be able to provide the best input to BOD that can be accounted for scientifically and be able to open an information window about Gain, Risk, and Mitigation in the future.

Finally, I would like to say thank you very much for International Conference Participants, both domestic and foreign who have attended and participate in this event. We also say thank you and express our appreciation for IEEE for being willing to be a co-hosted event together with PLN. We also need to convey to all delegates present that PLN is always open to cooperating, and we hope that in the future we can continue to collaborate and discuss further about various innovations, especially in terms of Energy and Power Technology.

Sripeni Inten Cahyani
CEO PT PLN (Persero)
FOREWORD

Firstly I would say thank you to all of participants for your contribution and presence, thank you also to the Committee and all parties who strived for the implementation of this event. In particular, we would like to thank EEE for being our partner in organizing this Conference.

This conference will be part of PLN’s history, because this is the first international conference held by PLN in collaboration with IEE and we hope this conference will become PLN’s annual agenda.

This conference was designed as a forum for electricity community in this matter: regulators, academics and electricity practitioners to share knowledge and discuss new advances in the field of Electricity Generation, Transmission, Distribution and Policy.

We, as the committee, unexpectedly received extraordinary enthusiasm from the entire electricity community which was marked by the submission of 168 papers to us, both from within and foreign and both from Academic Institutions and Corporate Institutions in a relatively short period of time (less than 1 year since the announcement).

We, as the committee, have conducted the review process of 168 papers that were coming from 8 countries. Among them, 13 papers were accepted, 103 papers were accepted after revision, and 52 papers were rejected. So that the total number of papers that passed the selection is 116 papers.

PLN in the future has a lot of homework both in research, innovation and standardization activities. We ask for the support of all engineer and researcher of electricity to work together with us to respond to the challenges ahead in the future.

Finally, we as the organizing committee asking for apologize if there are many mistakes during this event. Thank you very much for your participation and see you on the next event.

Bagus Setiawan, M.B.A.

General Manager of PT PLN (Persero) Pusat Penelitian dan Pengembangan Ketenagalistrikan (Research Institute)
FOREWORD

Dear esteemed Readers,

International Conference on Technology and Policy in Electric Power & Energy (ICT-PEP), held in Yogyakarta, Indonesia, October 21st – 24th, 2019, is a platform for policymakers from governmental institutions, researchers from National and International Energy Research Institutes, academicians from Universities as well as managers and engineers from Industries, to share results and ideas on the latest development of technology and policy in electric power and energy management.

This conference is organized by PT PLN (Persero) Research Institute in collaboration with the IEEE Indonesia Section. It is supported by local universities such as Universitas Indonesia, Institut Teknologi Bandung, Universitas Gajah Mada, Institut Teknologi Sepuluh Nopember, Universitas Diponegoro, Universitas Sebelas Maret, Universitas Telkom, Sekolah Tinggi Teknologi PLN, and overseas universities, as well as energy research institutes in Asia, Australia, and Europe. Without the support of these universities and institutes, ICT-PEP 2019 would not have been possible.

The success of ICT-PEP 2019 also depends on the effort, talent, and great work of authors who have written and submitted papers on a variety of topics. Within six months period, we received and reviewed a total of 168 paper submissions that contributed to the area of Generation, Transmission, Distribution, Smart Grid, Renewable Energy and Energy Policy. Praise is also deserved for the program committee members and reviewers who have invested significant time in analyzing and assessing multiple papers, who hold and maintain a high standard of quality for this conference. The double-blind review is applied for each paper, with criteria including originality, writing styles, scientific contribution, applicability, appropriateness, and completeness, are assessed. This is to ensure high-quality papers are produced, besides to comply with IEEE requirement. As a result, 13 papers were directly accepted, and 103 were accepted with either minor or major revisions.

In addition to the contributed papers, we are truly honoured to have keynote and invited speakers from Ministry of Energy and Mining of Republic of Indonesia, PT PLN (Persero), IEEE Indonesia, Institut Teknologi Sepuluh Nopember (Indonesia), Australia National University and Universiti Teknologi Malaysia, who agreed to participate in this conference and share ideas as well as latest information on National Energy Policy, Energy Research and Development, Future Energy System, Smart Grid and IR 4.0 Technologies Application in Electric Energy Management.

Last but not least, on behalf of all scientific committee members, we hope this conference provides an excellent platform for all participants, including speakers and organizers to share results and ideas for better future energy management system.

Prof Dr. Ir. Ing Eko Supriyanto
Chairman of Scientific Committee
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KEYNOTE SPEAKER

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   ![Syofvi Feliandi Roekman](image)

   **NEXT ROLE OF PLN’S RESEARCH**

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II. **Prof. Dr. Ir. Mochamad Ashari, M.Eng.**

   ![Mochamad Ashari](image)

   **SMART GRID CURRENT STATUS AND FUTURE DEVELOPMENT IN INDONESIA**

   PROF. MOCHAMAD ASHARI
   RECTOR (PRESIDENT) OF INSTITUT TEKNOLOGI SEPULUH NOPEMBER (ITS)
   INDONESIA

III. **Dr Matthew Stocks**

   ![Matthew Stocks](image)

   **THE ENERGY TRANSITION**

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   RESEARCH SCHOOL OF ELECTRICAL ENERGY AND MATERIALS ENGINEERING
   THE AUSTRALIAN NATIONAL UNIVERSITY

IV. **Prof. Dr. Ir-ing Eko Supriyanto**

   ![Eko Supriyanto](image)

   **TECHNOLOGY 4.0 APPLICATION IN ELECTRICITY BUSINESS MANAGEMENT**

   EKO SUPRIYANTO
   E LIFE SOLUTIONS, UNIVERSITI TEKNOLOGI MALAYSIA