2022 IEEE Sustainable Power and Energy Conference (iSPEC)

Perth, Western Australia,
December 4 –7, 2022

‘Sustainable, Clean and Reliable Power Systems’

Call For Papers

https://attend.ieee.org/ispec-2022/

The 4th IEEE Sustainable Power and Energy Conference (iSPEC) will be held in Perth, Western Australia during the period December 4 - 7, 2022. iSPEC was established by the Chinese Society for Electrical Engineering in 2019 to emulate the IEEE PES general meeting in North America. The conference provides a forum for both researchers and experts in power engineering to discuss and share ideas, present results, reflect on past experiences and discuss future projects on sustainable power systems in contemporary climate change.

Authors’ Deadlines

Paper submission open:	15 April 2022
Full paper submission:	15 June 2022
Notification of acceptance:	15 September 2022
Final paper submission:	15 October 2022

Scope

The scope of the conference is contemporary and original research, innovative solutions for electric power industry in the area of sustainable power systems and challenges of climate change. The scope of conference includes, but is not limited to following topics:

- Modern power systems
- Renewable energy and energy storage systems
- Electric power sustainable Technologies
- Transportation electrification
- Power equipment planning & asset management
- Power system solutions towards a net-zero future
- Power engineering education
- Power electronics in power systems
- Smart grid concepts and applications
- Energy efficiency and low carbon emission
- Cyber security and IoT for power systems
- Substation automation systems
- Faults identification and quantification
- Online condition monitoring and self-healing technologies

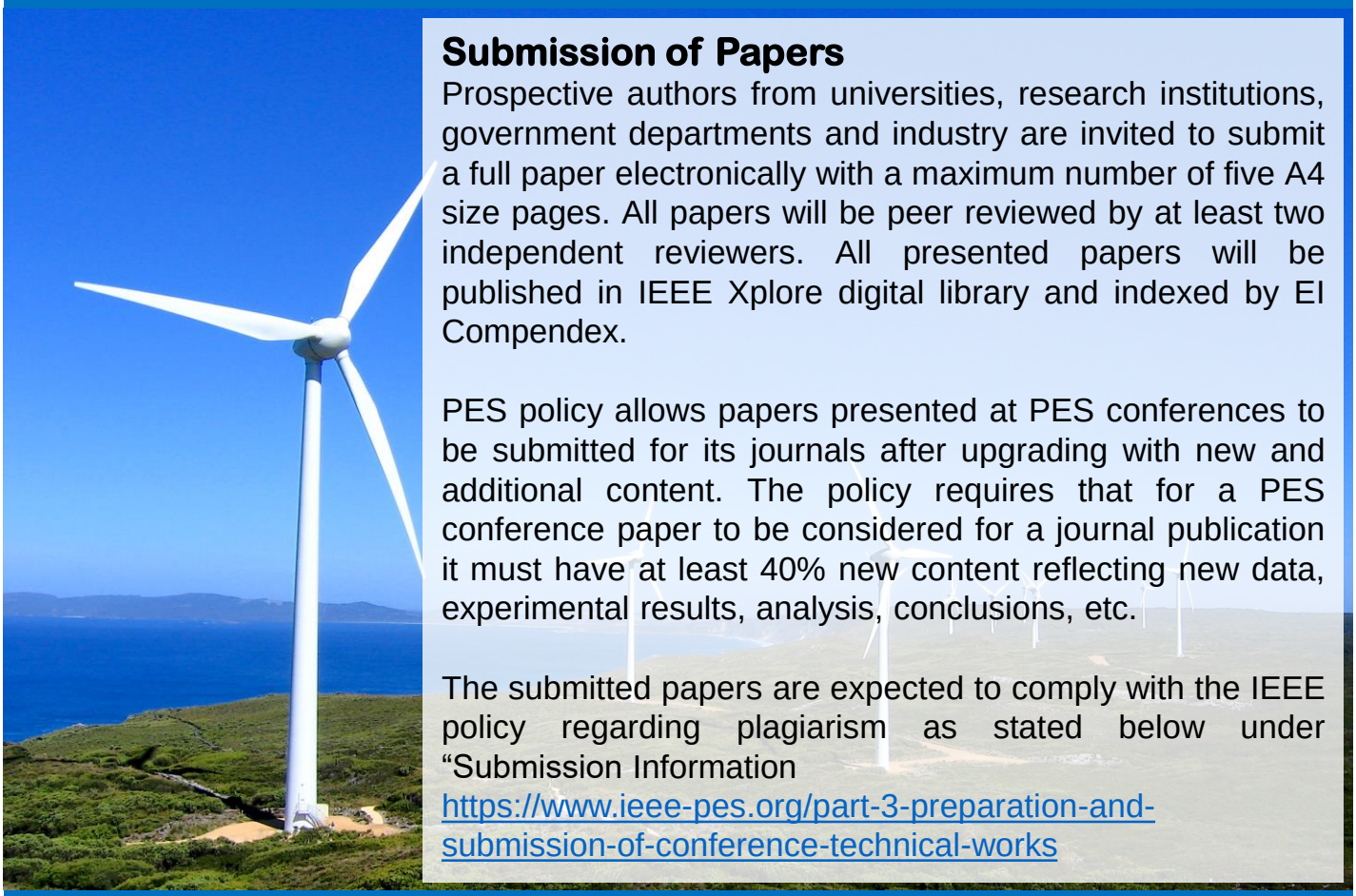
IEEE PES Power & Energy Society®

iSPEC 2022 PERTH

中国电机工程学会 SEE

Mode and Venue

The conference will be a hybrid event of which physical presentations will be held in the picturesque campus of Curtin University, Perth, Australia during the period December 4 -7, 2022. Uncertainty with COVID travel and entry restrictions into Western Australia means it is highly likely that the conference may be organised in virtual mode.



Submission of Papers

Prospective authors from universities, research institutions, government departments and industry are invited to submit a full paper electronically with a maximum number of five A4 size pages. All papers will be peer reviewed by at least two independent reviewers. All presented papers will be published in IEEE Xplore digital library and indexed by EI Compendex.

PES policy allows papers presented at PES conferences to be submitted for its journals after upgrading with new and additional content. The policy requires that for a PES conference paper to be considered for a journal publication it must have at least 40% new content reflecting new data, experimental results, analysis, conclusions, etc.

The submitted papers are expected to comply with the IEEE policy regarding plagiarism as stated below under "Submission Information
https://www.ieee-pes.org/part-3-preparation-and-submission-of-conference-technical-works

Keynote speakers

World class researchers in the area of sustainable power and energy will be invited.

Tutorials / Workshop

It is planned to conduct workshop / tutorials on Sunday 4 December 2022.

Special/Panel Sessions

Prospective organisers of special and panel sessions are invited to submit their proposals by 30 September 2022 to the conference secretariat.

Registration

Full registration includes a copy of the proceedings, lunches, morning and afternoon tea, welcome reception and conference gala dinner (hybrid mode)

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Feasibility Analysis of Implementing Hybrid Powered Electric Vehicle Charging Stations in Sarawak

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***Abstract*— The transportation sector in Sarawak completely depends on fossil fuel which produces a high quantity of greenhouse gases. A suitable design of charging stations for electric vehicles (EVs) equipped with grid-integrated renewable energy resources (RERs) can help in addressing this issue. This paper proposes to enhance the execution requirements of the hybrid-powered electric vehicle charging stations (EVCSs) in Sarawak. A generalized approach for modelling a renewable energy-based hybrid microgrid equipped with EVCS is presented in detail. Four types of microgrid configurations with biomass and solar photovoltaic (PV) systems have been studied to find the optimal size of each component feasible for EVCS. Each design of the hybrid-powered EVCS has been analyzed in terms of economic and environmental viability using the climate data with associated monetary data. The analysis shows that the cost of lowering emission to zero is directly proportional to the total net present cost (RM 259,088) when using PV microgrid-powered EVCS. The outcome of this paper provides insight for policymakers on the technical and financial benefits of EVCS deployment. It also promotes the industry of Plug-in Electric Vehicles (PEVs) in Malaysia.**

Keywords--electric vehicle, charging station, solar PV system, biomass energy, net present cost.

I. INTRODUCTION

The population in Malaysia grows steadily and is likely to hit 40 million by 2030, which may cause an increase in the number of vehicles as the transportation sector is crucial for any society. The statistical data presented in [1] shows that the number of registered conventional engine vehicles was rising steadily in Malaysia during the last year, from (8,550,469) in 1997 to (27,613,120) in 2016, and thus, an increase in carbon dioxide (CO_2) emission. In particular, the emission level of CO_2 from the transport sector is the highest (95%) compared to other sectors such as power plants (4%) and industries (1%). Therefore, the emitter of CO_2 (known as a key greenhouse gas) from the transport sector remains the major source of air pollution in Malaysia. PEVs can offer a solution to carbon emissions when charging EVs with low-carbon stations. However, increasing the number of PEVs may cause high demand for electricity. Indeed, the main barriers to the widespread adoption of PEVs are the lack of effective charging infrastructure and fast charging stations (FCSs). It is expected that the integration of EVCSs with RERs into the power grid will positively influence the intentions of consumers to accept EVs. This in turn can increase the EV hosting capacity and hence, pave the way towards sustainable transportation systems.

In 2016, Malaysia green technology corporation (MGTC) promoted the Tesla program for Malaysians to access EV-leading technology in the world. Tesla model "S" was equipped with a battery pack that offers a range of more than 400 km and coupled with its advanced digital technologies. One of the goals of MGTC's master plan is to reduce 45% of greenhouse gas emissions by 2030 [2]. In 2017, Petronas Dagangan Berhad cooperated with GreenTech Malaysia and the subsidiary of Tenaga Nasional Berhad to implement hybrid charging stations in Malaysia [3]. In Sarawak, the launching ceremony of the first EV public charging station was 2017 at CityOne Megamall, Kuching [4]. The location and size of electric vehicle charging stations (EVCS) should be considered to avoid the negative effect on the power grid caused by random charging demands [5]. Consequently, a feasibility assessment is carried out in this paper to find the optimal design for hybrid powered EVCS.

II. REVIEW OF RELEVANT STUDIES

In the face of increasing the level of greenhouse gas emissions caused by fossil-fueled vehicles, the EV is seen as one of the main alternatives in Malaysia and the current trend is high-end EVs. While growing EV uptake requires the development of charging station infrastructure, the operators emphasize that more adoptions of EVs will drive the network expansion of charging stations. This indicates that the studies in relation to the optimal sizing and location of electric charging stations have a prominent role in this domain. As the charging time is the key barrier to making EVs widely accepted, the fast charging station (FCS) is required to pave the way for more widespread implementation of electrified vehicles.

Different types of charging strategies with multiple options at EVCSs and control circuit designs for fast charging infrastructure have been proposed in the literature. As this paper focuses on operational planning and economic feasibility aspects of charging stations combined with RERs, the control strategies of power converters for FCSs are not reviewed in this section. A system architecture for grid-integration or islanded mode of battery-enabled direct current (DC) fast charging has been proposed in [6]. This approach can address the dynamic adverse

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