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The 4th ASEAN International Conference
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- **24th ASEAN Energy Business Forum (AEBF-24) and**
- **The 42nd ASEAN Ministers on Energy Meeting (AMEM)**

Vientiane, Lao PDR

Conference Proceedings Book

4th ASEAN International Conference on Energy and Environment (AICEE)

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Conference Proceedings Book

The 4th ASEAN International Conference on Energy and Environment (AICEE)

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About

The ASEAN International Conference on Energy and Environment (AICEE) is an official conference that serves as a platform for academia, policymakers, and the business sector to discuss energy and climate change issues in the ASEAN region. The 4th AICEE is held in conjunction with the 24th ASEAN Energy Business Forum (AEBF-24), organised by the **ASEAN Centre for Energy (ACE)** and hosted by the **Ministry of Energy and Mines of Lao PDR**. This year, the 4th AICEE brings theme *Charting ASEAN's Energy Future for Regional Interconnectivity and Resilience*, aiming to facilitate discussions on interdisciplinary and cross-sectoral issues to promote the ASEAN Energy Blueprint and energy priorities of Lao PDR Chairmanship. The conference also received financial support from the **Economic Research Institute for ASEAN and East Asia (ERIA)** and supported by the **National University of Laos (NUOL)**, as well as in partnership with **Universiti Teknologi Malaysia (UTM)**; **Japan-ASEAN Science, Technology, and Innovation Platform (JASTIP)**; **Universitas Udayana**; **Energy Research Institute (ERI)** from Chulalongkorn University; **National Energy Technology Center (ENTEC)**; and **ASEAN Climate Change and Energy Project (ACCEPT)**.

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Foreword



The 4th ASEAN International Conference on Energy and Environment (AICEE) is held by the ASEAN Centre for Energy (ACE) and hosted by the Ministry of Energy and Mines of Lao PDR. This conference also received financial support from the Economic Research Institute for ASEAN and East Asia (ERIA) and co-hosted by the National University of Laos (NUOL), as well as in partnership with Universiti Teknologi Malaysia (UTM); Japan-ASEAN Science, Technology, and Innovation Platform (JASTIP); Universitas Udayana; Energy Research Institute (ERI) from Chulalongkorn University; National Energy Technology Center (ENTEC); and

ASEAN Climate Change and Energy Project (ACCEPT). The event is in conjunction with the 24th ASEAN Energy Business Forum (AEBF-24) and the 42nd ASEAN Ministers on Energy Meeting (AMEM), which officially takes place in Vientiane, Lao PDR on 25th September 2024.

This conference also values diversity and inclusivity to foster a rich tapestry of ideas and perspectives that strengthen ASEAN communities. Our conference aims to be an unparalleled platform that unites academics, practitioners, and government, fostering the exchange of perspectives and unveiling ingenious solutions to tackle the intricate challenges posed by today's energy and environmental landscapes. Let us collaboratively strive toward a future where diversity enhances our efforts to achieve energy security, strengthen regional energy interconnectivity, and promote a sustainability for all.

This year, AICEE embraces theme *Charting ASEAN's Energy Future for Regional Interconnectivity and Resilience*, aiming to facilitate discussions on interdisciplinary and cross-sectoral issues to promote the ASEAN Energy Blueprint and energy priorities of Lao PDR Chairmanship. This theme underscores the importance of connectivity and resilience of the region to seize opportunities and address future challenges as we move towards energy transition. It also resonates with the ASEAN blueprint, the ASEAN Plan of Action for Energy Cooperation (APAEC) 2016-2025 Phase II 2021-2025, emphasising the importance of regional integration and resilience in achieving a sustainable energy future. Under this theme, the conference incorporates the discussion among interdisciplinary and cross-sectoral to promote this year's theme of ASEAN Lao PDR Chairmanship, "ASEAN: Enhancing Connectivity and Resilience."

Strengthening energy resilience during the transition requires triple helix collaboration—academia, policymakers, and business sectors—from planning to executing the action in finding common ground and ensuring fair impacts in every aspect. Each sector plays remarkable parts in policy-making decision-making, bridging the gap between different scales of their innovations to increase the efficiency of energy transition projects. It is pivotal to note that the energy transition's framework must also be aligned with the pillars of energy security concepts, including a just principle, to optimize the decarbonization and net zero emissions roadmap.

We have received enthusiastic responses as more than 250 abstracts were submitted from Southeast Asia and beyond. The consolidated, extended abstracts are divided into thematic sub-topics, namely: (1) Energy Transition and New Emerging Technologies, (2) Interconnection: Security and Accessibility, (3) Sustainability, Engineering, and Infrastructure, (4) Carbon Pricing and Green Investment, (5) Energy and Digitalization, and (6) Environment, Policy, and Socioeconomics. The compiled full paper of the presented papers of the 4th AICEE will be published in the IOP Conference Series: Earth and Environmental Science Journal by next year.

As a regional think tank, catalyst, and knowledge centre, ACE initiated the 4th AICEE to provide knowledge sharing among the triple-helix agents to achieve strategic innovation. In this endeavour, we extend our deepest gratitude to the Ministry of Energy and Mines of Lao PDR for hosting the event, as well as the Economic Research Institute for ASEAN and East Asia (ERIA) for funding the conference. The 4th AICEE is also made possible by the support from the National University of Laos (NUOL) and our Academic Partners, who work together to ensure the scientific quality of this conference through their extensive contributions. Furthermore, I admire all the authors who have contributed to this conference, representing various communities and bringing efforts to take part in strengthening ASEAN's energy sector through academic pathway.

I sincerely hope the proceedings will serve as an invaluable resource and knowledge-sharing platform in advocating for multi-sectoral synergies among energy and environment agents. By bringing them together, we trust these conference results will support the region's advancement towards a connected and resilient energy landscape for ASEAN. Last, I do really hope that this proceeding might also emerge new collaboration or strengthen the existing partnerships among academia, policymakers, and the business sector.

Thank you.

Beni Suryadi

Acting Executive Director, ASEAN Centre for Energy

About ASEAN Centre for Energy



ASEAN Centre for Energy
One Community for Sustainable Energy

ASEAN Centre for Energy (ACE) is an intergovernmental organisation within the ASEAN structure that addresses the interests of 10 ASEAN Member States (AMS) in the energy sector. ACE was established on first January 1999. The organisation assumes a focal job in the ASEAN energy sector. It works intimately with energy specialists/services in the 10 AMS called the Sub-sector Networks (SSN) and the Specialised Energy Bodies (SEB) and with the ASEAN Secretariat, which goes about as the overseer and director of the Endowment reserve. Together, they carry out the ASEAN Plan of Action for Energy Cooperation (APAEC), a blueprint for better collaboration towards upgrading energy. Keeping the region's improvement, sustainable and harmless to the ecosystem is a fundamental concern of ASEAN's energy sector. This concern is shared as a typical subject of each Sub-sector Network in executing its programmes.

Established on 1 January 1999, the ASEAN Centre for Energy (ACE) is an intergovernmental organisation within ASEAN's structure that represents the 10 ASEAN Member States' (AMS) interests in the energy sector. By providing relevant information and expertise, the Centre strives for alignment of energy strategies within ASEAN to ensure that energy policies and programmes are in harmony with the economic growth and the environmental sustainability of the region. It is guided by a Governing Council that consists of Senior Officials on Energy leaders from each AMS and a representative from the ASEAN Secretariat as an ex-officio member. Hosted by the Ministry of Energy and Mineral Resources of Indonesia, ACE's office is located in Jakarta.

To support the energy cooperation agenda under the ASEAN Vision 2020 which binds ASEAN Member States in a partnership for dynamic development towards the year 2020, the first series of guiding policy documents was established in 1998. The document, known as the ASEAN Plan of Actions on Energy Cooperation (APAEC) which was endorsed in 1999, laid the foundation for sound policy frameworks and implementation strategies for energy cooperation with relevant dialogue partners and international organisations.

APAEC guides the implementation of multilateral energy cooperation to enhance regional integration through harmonising energy strategies amongst AMS and achieve connectivity goals in ASEAN. It also aims to enhance energy security, accessibility, affordability and sustainability under the framework of the AEC. The current blueprint, APAEC 2016 – 2025 highlights strategies on sustainability through, among others, the aspirational target of 23% renewable energy share of the primary energy mix by 2025, and 30% energy intensity reduction in 2025 based on 2005 levels.

About National University of Laos



The National University of Laos (NUOL) is a national public university founded in 1996 and located in Vientiane, Lao People's Democratic Republic. It is the first comprehensive or full-fledged university in the history of Lao PDR, with diverse options of Bachelor, Master, and Doctoral degree programs. It accepts students from all over the country as well as international students.

The university was established on 9 June 1995 in accordance to the Decree Number 50/PM of the Prime Minister of the Lao PDR, which merged the higher education institutes which were under the supervision of several ministries into one university under the Minister of Education. NUOL comprises of 10 institutions: Kuwangchen Construction University, December 2 University of Natural Resources, University of Public Sciences, Na Bong Higher Agricultural School, Dongdeok Higher Forestry School, Tat Tong Higher Irrigation School, Higher Construction School, Higher School of Commerce, Higher Technical School of Electricity, Electronics and Agriculture-Forestry University Preparation Center. Up to present time, NUOL has 13 faculties ranging from natural and social sciences and around 23,000 students.

As a leading institution for higher education, research, and cultural preservation in the country, NUOL plays four key roles: 1) providing higher education in areas required for the socio-economic development of Lao PDR; 2) performing research in natural and social sciences; 3) preserving the arts, culture, and traditions of the nation; and 4) providing academic services to society. It is also a partner of the Greater Mekong Sub-Region Academic and Research Network (GMSARN) and ASEAN University Network (AUN).

NUOL also have several institutions and centres, including Centre for Environmental Excellence (ສູນຄວາມເປັນເລີດດ້ານສິ່ງແວດລ້ອມ). The institute serves as the Technical Secretary to the National University Board of Trustees in the field of environmental quality research and analysis, facilitating basic, advanced and biomolecular analytical tools for scientific research and technical services in the field of soil, water, air, microbial quality assessment, contamination and residue assessment of food and agricultural products. In addition, it provides services in the organization of missions, training, seminars and technical consultancy to public and private agencies, technical cooperation with national and international centers, educational institutions and research institutes (regional and international levels).

Partners

We would like to convey our gratitude to the partners who have supported the 4th AICEE:

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Conference Agenda

Time (GMT+7)	Agenda			
08:00 – 09:00	Joint Opening Remarks at Main Hall			
09:00 – 09:15	Registration + Group Photo			
Parallel	Room: 02 (500 pax)			
	Zone 1	Zone 2	Zone 3	Zone 4
	Chair: Dr. Ambiyah Abdullah (ACE) Subtopic: Environment, Policy, and Socioeconomics	Chair: Monika Merdekawati (ACE) Subtopic: Interconnection: Energy Security and Accessibility	Chair: Silvira Ayu Rosalia (ACE) Subtopic: Sustainability, Engineering, and Infrastructure	Chair: Rizky Aditya Putra (ACE) Subtopic: Environment, Policy, and Socioeconomics
Participants' Presentation (each presenter will be given 10 minutes presentation and 5 minutes Q&A)				
09:15 - 09:30	49 - GIS-based Solar and Wind Resource Assessment for Enhancing Energy Security of Lanao del Sur Electric Cooperative (LASURECO) Presenter: Ms. Alnie Demoral	63 - Energy Security and Environmental Impact by Chinese-Funded Projects in the Greater Mekong Subregion Presenter: Mr. Tin Maung Htwe	4 - GREEN SPACE PLANNING USING RENEWABLE ENERGY: APPLICATION CASE AT METRO STATION NO. 1 - PHUOC LONG STATION IN HO CHI MINH CITY Presenter: Mr. Thang Vo Minh	12 - The Role of Urbanization in Fossil Fuel Demand in Developing Asian Economies: Understanding the Moderating Effect of Renewable Energy Productivity Presenter: Ms. Shruti Aggarwal
09:30 - 09:45	54 - A Way of LIFE: Instituting effective measures to implement RA 11285 (The Energy Efficiency and Conservation Act of 2019) by the employees of the City Government of Pasig Presenter: Mr. Jared Carlo Echevarria	145 - Impact of Temperature and Rainfall Changes on Energy Poverty: Insights from Vietnam's Central Coast Provinces Presenter: Ms. Yen Hai Nguyen	80 - Evaluating Energy Usage and Conservation Opportunities in Garment Factory in Cambodia Presenter: Dr. Kinnaeth Vongchanh	35 - OPTIMAL PORTFOLIO OF ECONOMIC POLICIES FOR CLIMATE CHANGE MITIGATION: A FOCUS ON THE ENERGY SECTOR Presenter: Mr. Ahmad Sabirin
09:45 - 10:00	110 - Micro-Hydro Mini-Grids for Sustainable Agriculture Enterprise Development for Isolated Communities in Ulu Papar Presenter: Dr. Alwin Long	150 - Realising the ASEAN Power Grid Vision: Lessons from the EU and Southern African Power Integration Projects Presenter: Ms. Anmol Nayak	125 - Carbon Credit Mechanisms for Sustainable Textile Industry: Climate Change Mitigation in ASEAN Presenter: Dr. KANAWUT INKAEW	16 - BUILDING BLOCKS FOR SUCCESSFUL JUST ENERGY TRANSITION PARTNERSHIPS IN INDONESIA AND VIETNAM Presenter: Mr. Jannata Giwangkara & Dr. Ceren Ayas

10:00 - 10:15		197 - THE SECURITIZATION PROCESS OF ENERGY ISSUES IN VIETNAM AND ITS IMPLICATIONS FOR VIETNAM-ASEAN ENERGY COOPERATION Presenter: Ms. Truc Mai Nguyen		46 - Harmonized LID-based Building and Urban Design Policies for the Philippines Presenter: Prof. Ronald Orale
10:15 - 10:30		256 - INTER-CONNECTION REQUIRES GOVERNMENT CONNECTION: CROSS-BORDER ELECTRICITY TRANSMISSION AND THE ROLE OF GOVERNMENTS Presenter: Mr. Nick Wright		133 - AGRICULTURE RESIDUES FOR SUSTAINABLE AVIATION FUEL (SAF) AND ENERGY PRODUCTION Presenter: Mr. Tuan-Dung Hoang
10:30 - 10:45	Coffee Break + Networking			
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11:00 - 11:15	86 - Pioneering Wireless Energy Distribution for a Sustainable Future Presenter: Mr. Alex Hong	143 - ENSURING THE BUILDING A SUSTAINABLE FUTURE: INTEGRATING ENVIRONMENTAL SAFETY POLICIES AND ENERGY MANAGEMENT OF MYANMAR Presenter: Mr. Aye Chan Oo	152 - Post-BOT Horizons: IPPs Catalyzing Southeast Asia's Sustainable Energy Future Presenter: Mr. Takayuki Doi	190 - Navigating Energy Transition: Vietnam's Legal Insights and Experiences for ASEAN Presenter: Ms. Thu Hien Nguyen
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11:30 – 11:45	142 - Navigating the Smart Grid Revolution: Overcoming Challenges and Seizing Opportunities in Indonesia's Power Sector Presenter: Mr. Abdurrahman Alghani & Ms. Arzalia Wahida	105 - Transaction costs of Indonesia's Just Energy Transition Partnership Presenter: Mr. Thant Thura Zan	254 - Sustainable Waste Management in Hydropower: A Carbon Footprint Perspective Presenter: Mr. Souttiphong Keovongsa	32 - REPURPOSING AGING OIL AND GAS PLATFORMS FOR SUSTAINABLE ASSET MANAGEMENT POLICY Presenter: Ms. Meiliza Fitri & Ms. Yekti Praktiwi
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12:00 – 13:30	Lunch Break + Networking			
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Parallel	Chair: Silvira Ayu Rosalia (ACE) Subtopic: Energy Transition and New Emerging Technologies	Chair: Aldilla Noor Rakhiemah (ACE) Subtopic: Carbon Pricing and Green Investment	Chair: Dr. Youthanalack Vilaisarn (NUOL) Subtopic: Energy and Digitalisation; Energy Transition and New Emerging Technologies	Chair: Dr. Ho Wai Shin (UTM) Subtopic: Environment, Policy, and Socioeconomics
13:30 – 13:45	8 - Feasibility Study of Solar-Heat Pump Combined System for Hot Water Generation in Laos Presenter: Mr. Xayalak vilaida	155 - Does the Nudges Influence the Australian Financial Institutions to Invest in the ASEAN's Clean Energy Transition? Presenter: Mr. Bandit Xaichalern	83 - AI-driven Predictive Maintenance for Batteries RUL Presenter: Mr. Pakrigna Long	13 - STANDARD CODE OF ROOFTOP SOLAR PV SYSTEM EQUIPMENTS APPLICATION IN THE CASE OF LAO PDR Presenter: Dr. Vorachack KONGPHET
13:45 – 14:00	216 - Vietnam's Power System Decarbonization Pathways Towards 2035: A Techno-economic and Policy Analysis Presenter: Mr. Manh Tri Dao	235 - Carbon Pricing and Green Investment Practices of UAB Bank in Myanmar Presenter: Mr. Thant Thet Oo Khant	84 - A Study on Factors Influencing and Machine Learning Models for Renewable Energy Consumption Forecasting Presenter: Mr. Ensophea Toch	41 - EXAMINING GENDER EQUALITY, DISABILITY, AND SOCIAL INCLUSION INTEGRATION IN THE CIREBON ENERGY TRANSITION MECHANISM PILOT PROJECT: A CASE STUDY Presenter: Mr. Aditya Barus
14:00 – 14:15	194 - Enhancing Local Economy by Utilization of Sugar Palm Waste as Biomass Fuel for Cofiring Coal-Fired Power Plants , Presenter: Ms. Athaya Fairuz Mahadita and Ms. Khalda Az Zahra	109 - Carbon Trading Potential of Rice Farming in ASEAN: Economic and Environmental Analysis Presenter: Dr. Thaneeya Rangseesuriyachai	232 - DIGITAL TRANSFORMATION IN GEOTHERMAL ENERGY OPERATIONS: A CASE STUDY OF GEO DIPA ENERGI Presenter: Mr. Muhammad Vito Hamza	50 - Techno-economic Analysis of a 10MWp Solar PV System to Potentially Lower Lanao del Sur Electric Cooperative's (LASURECO) Electricity Rate Presenter: Mr. Michael Baughn Gregorio

14:15 – 14:30	243 - INTEGRATING CLEAN FUEL UTILISATION TOWARDS NET ZERO TRANSITION FOR POWER PLANT Presenter: Dr. Muhammad Afiq bin Zubir	174 - LEGAL FRAMEWORK FOR CARBON PRICING IN VIETNAM: A COMPARATIVE STUDY WITH THE US AND JAPAN Presenter: Dr. Hai Yen Nguyen	25 - A General Operation Model for the Smart Office Testbed Under Consideration of Microgrid Concept Presenter: Dr. Youthanalack Vilaisarn	66 - QUANTIFYING THE HEALTH FACTOR AS A MEDIATOR OF THE POLLUTION-PRODUCTIVITY RELATIONSHIPS IN INDONESIA Presenter: Mr. Ghazi Naufal Ali
14:30 – 14:45	99 - COMPETITIVENESS ANALYSIS OF ASEAN REGION IN OFFSHORE WIND ENERGY INDUSTRY Presenter: Ms. Sari Amelia	161 - Feasibility Study of Green Universities in the Greater Mekong Subregion: The United Nations Carbon Offset Platform Presenter: Dr. Alay Phonvisay		58 - Case Study of Third Party Provider for a Philippine Government Building under the Expanded Roof-mounted Solar Program Presenter: Ari Luis Halos
14:45 – 15:00	245 - LONG TERM PLANNING FOR TRANSPORTATION SECTOR DECARBONISATION IN ASEAN Presenter: Prof. HASLENDHA HASHIM	24 - CARBON PRICING TRENDS AND POLICY OPTIONS FOR VIETNAM Presenter: Dr. Phuc Dao Gia		129 - A Youth View from Indonesia: How Induction Stoves Contribute to the Nation's Energy Transition Presenter: Dr. Dzikri Hakam
15:00 – 15:15	Coffee Break + Networking			
Participants Presentation (each presenter will be given 10 minutes presentation and 5 minutes Q&A)				
Parallel	Chair: Aldilla Noor Rakhiemah (ACE) Subtopic: Carbon Pricing and Green Investment; EPS	Chair: Rika Safrina (ACE) Subtopic: EPS; Energy and Digitalisation		
15:15 – 15:30	138 - Progress and Challenges of Carbon Pricing Implementation for Indonesia: Comparative Assessment in ASEAN Presenter: Mrs. Prodia Kemala	123 - Incidences of Fire in Hospital Buildings as an Emerging Anthropocene and Overarching Need for Fire Safety for Patients A Literature Review Presenter: Ms. Emmarie Rose		
15:30 – 15:45	251 - REVIEW OF TAXONOMY APPLICATION FOR FINANCING ENERGY TRANSITION TECHNOLOGIES IN MALAYSIA Presenter: Mr. Wai Shin Ho	17 - Malaysia's Advanced Metering Infrastructure (AMI): A Regulatory Review Presenter: Mr. Muhamad Nazrin Afifi Bin Nasruddin		

15:45 – 16:00	153 - STAKEHOLDER CONSULTATION FOR ENGAGEMENT OF YOUTH AND VULNERABLE COMMUNITY IN THE JUST ENERGY TRANSITION PROCESS Presenter: Ms. Tu Vuong	202 - UNDERSTANDING THE LANDSCAPE PUZZLE: INTEGRATING LANDSCAPE CHARACTERIZATION FOR EFFECTIVE FLOOD MANAGEMENT PLAN IN BACoor CITY, CAVITE Presenter: Mr. Arjay John Secugal	
16:00 – 16:15	119 - Lake Danao Natural Park as an Additional Raw Water Source for Ormoc City's Water Supply System Project: A Valuation through Contingent Valuation and Production Function Approaches Presenter: Mr. James Ladd Molina	120 - Treasures of Sasmuan: Exploring the State, Challenges, and Conservation Responses in the Coastal Wetlands of Pampanga Presenter: Mr. Julius Ivan Caballero	
16:15 – 16:30	207 - Assessing Emission Factors for Electricity Generation in Lao PDR: A Comparative Analysis of Business-as-Usual and Net Zero Scenarios Presenter: Dr. Korrakot Phomsoda		
16:45 – 17:00	Closing Ceremony & the Way Forwards by Chair		

Topic 1

Energy Transition and New Emerging Technologies

Feasibility Study of Solar-Heat Pump Combined System for Hot Water Generation in Laos

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ABSTRACT

This study explores a solar collector and heat pump system's viability for sustainable hot water production. The flat-plate solar collector, featuring a single glass pane, copper tubes, and a blackened absorber plate, was tested in two sizes (4m² and 6m²) with different water flow rates (15L/min, 17.5L/min, 20L/min) through a 200L tank. Achieving 56.7% efficiency, it heated water from 30°C to 80°C under varying solar radiation (505 W/m² - 1,392 W/m²). A 3,300W heat pump with a 25-plate heat exchanger and a 370W water pump was used. The optimal heating time flow rate was determined to be 17.5 liters per minute. This rate achieved 5.1% heat pump efficiency, heating water to 50°C in 22 minutes at a cost of 1,382 LAK. The system can produce water up to 50°C with an 800L capacity. Economically, compared to a conventional coil water heater, the combined system had higher initial costs (15,234,500LAK vs. 9,566,000LAK) but offered substantial energy savings (81.4% annually), with a 5-year payback period and 31.8% Internal Rate of Return (IRR). Despite the upfront investment, this system presents a promising option for efficient and sustainable hot water production.

Keywords: Energy efficiency; Heat pump; Hot water generator; Solar energy; Economic

Pioneering Wireless Energy Distribution for a Sustainable Future

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ABSTRACT

Amid the escalating climate crisis and growing energy demands, the exploration of innovative and sustainable energy solutions is imperative. This document outlines AEIR's ground-breaking wireless energy transmission technology and its potential impact on energy policies, sustainability, and societal benefits, with a focus on the ASEAN region.

AEIR has developed a revolutionary photonics-based wireless energy transmission method that overcomes the limitations of traditional wired systems. This technology provides a robust and flexible energy distribution network, transmitting energy efficiently over vast distances with minimal losses. AEIR's ecosystem has the potential to become a cornerstone of energy innovation in ASEAN, offering country-specific, contextualized solutions to accelerate sustainability and energy transition goals.

AEIR's wireless energy distribution technology addresses critical aspects of the energy transition in ASEAN, including electrification of remote areas, reducing energy losses, and enhancing grid flexibility. It also enhances energy security by minimizing infrastructure dependency and strengthening energy independence. Furthermore, the technology promotes sustainability through lower energy waste and better integration of renewable energy sources.

AEIR's innovative approach extends to the economic and democratic spheres with the introduction of Netziium tokens, which aim to transform the energy sector through blockchain-based transparency, community participation, and incentivized investment in clean energy solutions.

The convergence of AEIR's wireless energy technology and Netziium's tokenized approach creates a more efficient, secure, and democratic energy future for ASEAN, aligning with the region's shared vision for a sustainable economic development.

Keywords: Wireless energy transmission; ASEAN energy transition; Sustainable energy solutions; Smart grid; ASEAN energy grid

COMPETITIVENESS ANALYSIS OF ASEAN REGION IN OFFSHORE WIND ENERGY INDUSTRY

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ABSTRACT

Vietnam and the Philippines are two ASEAN member countries categorized by WBG Offshore Wind Development as key emerging markets in offshore wind energy. Indonesia and Malaysia have secured contracts to fabricate the structure for upcoming offshore wind projects in Europe. These phenomena triggered further curiosity to investigate the competitiveness of ASEAN member countries in offshore wind industry, whether as a producer or supporting industry. To achieve the 380 GW of cumulative capacity by 2030 which is projected under IRENA's 1.5 DegC scenario, massive investments are needed to build up the offshore wind projects. Foreign investments tend to track the most competitive destination. This paper looks at the competitiveness level in a country and regional context. The current competitiveness of ASEAN region in the offshore wind energy industry was analysed by applying SWOT analysis. A set of factors for SWOT analysis of offshore wind industry competitiveness had been collected through a literature review. Expert respondents were involved to validate the findings during the study. Government willingness to develop local wind energy industry is considered as key strength. In addition, the ASEAN region is considered as low wage assembly work which provides competitive grounds for fabrication manufacturing of offshore wind farm.

Keywords: competitiveness; investment; offshore wind; project; supply chain

Comparative Analysis of Hierarchical and K-means Clustering Techniques for Hybrid AC/DC LV Microgrids

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ABSTRACT

Rural electrification is a critical challenge in many developing countries, where conventional grid extension is often not feasible or cost-effective due to low load density and long distances. Hybrid AC/DC microgrids offer a promising alternative solution, providing a reliable and sustainable electricity supply to rural communities. This study presents a comparative analysis of hierarchical and k-means clustering techniques for optimizing cable routing by grouping loads in a low-voltage hybrid AC/DC microgrid in rural electrification areas. The proposed approach consists of several stages: (1) grouping loads into the clusters using two clustering techniques; (2) optimizing the radial topology in each cluster by using minimum spanning tree (MST) and shortest path algorithms (SP); (3) balancing the three-phase system using mixed-integer linear programming (MILP); and (4) performing an economic analysis to evaluate the effectiveness of the two clustering techniques. The methodology is applied to a real case study of an island area in Cambodia, and the performance of a hybrid microgrid under two clustering configurations is compared. The results show that k-means clustering is the most cost-efficient solution for optimizing the topology of a hybrid AC/DC LV microgrid for rural areas in Cambodia.

Keywords: Hierarchical, K-means, Optimization, Hybrid AC/DC, Microgrid

ACKNOWLEDGEMENTS

This work was funded by Cambodia Higher Education Improvement Project (Credit No. 6221-KH) for the sub-project of HEIP-ITC-SGA#07 at the Institute of Technology of Cambodia (ITC).

Navigating the Smart Grid Revolution: Overcoming Challenges and Seizing Opportunities in Indonesia's Power Sector

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ABSTRACT

Electrical power has emerged as a more significant sector in Indonesia since it is being used more frequently to advance the country's development. New measures under the National Electricity Supply Business Plan (RUPTL) 2020-2024 demonstrate the government's efforts to ensure a 23% share of renewable energy in total electricity generation by 2025 through smart grid technologies. Partnerships between PT PLN, Indonesia's monopolistic state-owned enterprise, and international energy companies have advanced smart grid technology, but they largely overlook financing problems and regulatory measures necessary for broader deployment and sustainable development.

This paper identifies opportunities for investment and exploring the prospects of smart grid development in Indonesia and comparative studies from international cases. For the progression of smart grid technologies, one of the most important requirements is a strong policy framework. An innovative investment and PPP introduction can boost investors' attraction and distribute risk projects. Moreover, introducing R & D strategies could be useful in enhancing innovation and reducing operational costs. In addition, a change in tariff structures and restructuring of the hybrid market may help improve competition in smart grid development without altering the traditional market structure. Thus, enhancing regulatory will facilitate the transition to a smarter, more reliable grid.

Keywords: Smart Grid; Energy Transition; Renewable Energy; Energy Policy

Impact of Distance and Nozzle Diameter on the Efficiency of Pico-Scale Turgo Water Turbine Blades Made from Coconut Shell

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ABSTRACT

The pico-scale generator is needed which is cheap and can be used in rural areas. Pico hydro is one solution to help provide lighting in remote villages. The Turgo turbine was chosen because of its easy-to-manufacture design, maintenance costs, and low production costs and it is easy to transport to remote areas with ease. The manufacture of Turgo turbine blades itself can use coconut shells which are easily found on the coast of Indonesia. This study aims to determine the effect of nozzle diameter on the performance of a Turgo turbine using coconut shells as a Turgo turbine blade and the effect of the diameter of a runner consisting of a fixed blade and disk on changes in the diameter of the nozzle. The method was used is experimental using a diameter variation of 8, 10, and 12 mm along with the distance between the nozzle and the blade with variations of 100, 150, and 200 mm. Based on all the results of the Turgo turbine study, it can be concluded that the best nozzle experimentally is a nozzle diameter of 8 mm with a distance variation of 100 mm and 43% for experimental and the electrical efficiency is 38%.

Keywords: Nozzle Distance; Picohydro; Turgo Turbine; Coconut Shell; Nozzle Diameter

Optimizing Grid Connectivity and Dual Energy Storage Systems for Peak Shaving and Price Arbitrage

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ABSTRACT

A dual-battery energy storage system (DBESS), comprising two parallel-connected batteries, offers a solution that extends battery life compared to conventional single-battery energy storage (SBESS). This paper explores the benefits of using DBESS in the industrial sector for peak shaving and price arbitrage, focusing solely on the costs and revenues related to the battery's installation and operation. The DBESS operational strategy involves different working hours for each battery, preventing them from charging or discharging simultaneously. This approach ensures the batteries are fully charged and discharged, avoiding partial cycles that can degrade battery health. By analyzing electricity tariffs for industrial buildings in Malaysia, potential cost savings from DBESS operation can be assessed. An oil and gas plant is used as a case study to evaluate the cost savings in electricity bills when DBESS is connected to the grid compared to when it is not. Additionally, a sensitivity analysis examines the impact of various factors, including electricity price components, energy storage types, escalation rates of electricity prices, and energy storage price deflation. By optimizing DBESS for peak shaving and price arbitrage, industrial facilities can significantly reduce electricity bills, especially in regions with high energy costs or time-of-use pricing, where demand charges are substantial.

Keywords: dual-battery energy storage; peak shaving; price arbitrage; electricity tariff; industry

Enhancing Local Economy by Utilization of Sugar Palm Waste as Biomass Fuel for Cofiring Coal-Fired Power Plants

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ABSTRACT

To support Indonesia's commitment on enhanced Nationally Determined Contribution (eNDC) to reach energy mix of 23% and 31% by 2025 and 2030, respectively, PT PLN (Persero) plans to implement co-firing in 52 Coal-Fired Power Plants (CFPP) units using 10.2 million tons of biomass per year as Indonesia has abundance resources of biomass. However, deployment of biomass resources in Indonesia are scattered and depends on geographical conditions. Thus, there is an urgent need to explore various types of biomass as co-firing raw material, such as utilizing sugar palm (aren) waste from thirteen sugar palm flour factories in Ciamis, Indonesia. These abundant amounts of waste are unutilized for more than 15 years and become unprocessed waste. Besides, this issue becomes a social issue to the local people as the waste generates unpleasant odor. Nevertheless, due to its relatively high total moisture which makes it incompatible with the CFPP cofiring specifications, dewatering machine as processing facility is required. The benefit-cost analysis showing that the establishment of biomass processing facility is a feasible project. Additionally, it is expected to boost local economy by utilizing local resources and creating green jobs, as well as achieving biomass supply target and generate revenue for the company.

Keywords: Energy Transition; Biomass; Sugar Palm Waste; Local Economy

Assessing Emission Factors for Electricity Generation in Lao PDR: A Comparative Analysis of Business-as-Usual and Net Zero Scenarios

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ABSTRACT

Despite its growing energy demand, the environmental impact of electricity generation in Laos remains understudied, particularly regarding emission factors. This research aims to quantify emission factors for electricity generation in Laos by conducting a life cycle assessment (LCA). To achieve this, the study establishes two scenarios: a business-as-usual scenario, maintaining the current electricity mix, and a net-zero pathway, phasing out fossil fuels. Lao PDR's power generation landscape comprises hydropower, thermal, solar, and biomass power plants. Each type of power plant is tracked emission factor data from the SimaPro database. The results demonstrate that transitioning to a net zero pathway reduces GHG emissions. The average emission factor of electricity production is gradually reduced, related to the decrease in thermal power plants. Since it is already phasing out completely, the average emission factor is finally equal to 0.0606 kgCO₂eq/kWh. In addition, total GHG emissions under the net-zero scenario remain lower than the business-as-usual case throughout the study period. This research provides crucial baseline data for future policymaking and emissions reduction strategies in Laos.

Keywords: Laos; Electricity Generation; Emission Factors; Life Cycle Assessment; Net Zero

Vietnam's Power System Decarbonization Pathways Towards 2035: A Techno-economic and Policy Analysis

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ABSTRACT

This study presents an open-source power expansion model to evaluate Vietnam's power system decarbonization pathways, considering various techno-economic and policy scenarios. The model was constructed on Julia, featuring both economic dispatch and unit commitment, with an hourly resolution. The model addresses Vietnam's pathway towards 2030 based on the Just Energy Transition Partnership (JETP) targets (coal cap, carbon cap, and renewable portfolio standard). Extending the analysis to 2035, the model assesses pathways relevant to the Nationally Determined Contribution revision. The study finds that each JETP target has a measurable impact on the optimal energy mix, and none is redundant. Meeting all three targets necessitates significant expansion in onshore wind and rooftop solar, highlighting challenges such as dependency on wind investments, utility solar land use budget conflict, and limited rooftop solar incentives. Compared to the sole expansion of combined-cycle gas turbines in the national plan, introducing a flexible single-cycle gas turbine (SCGT) to the mix can result in higher renewables, up to 6% reduction in system cost, and lower locked-in emissions from liquified natural gas (LNG) over the lifetime of the gas plants. These findings offer valuable insights for planners and policymakers, guiding emission target setting, capacity expansion, and market development strategies.

Keywords: Vietnam; JETP; modelling; power system; decarbonization; model

INTEGRATING CLEAN FUEL UTILISATION TOWARDS NET ZERO TRANSITION FOR POWER PLANT

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ABSTRACT

Fossil fuels account for over 70% of Malaysia's fuel mix for electricity generation. Under the overall strategy of achieving net zero nation, progressively increase the shift of fossil fuel based to cleaner fuel for electricity generation before 2050 is highly in need. This study examines the potential greenhouse gas (GHG) emission reduction by coal substitution with cleaner fuel derived from scheduled waste in power plant. The study involves a comprehensive GHG assessment analysis of cleaner fuel integration into the power sector and its related GHG emission reduction and quantification. The GHG emission is derived based on fuel properties of cleaner fuel and coal that is contributed by the elemental combustion reaction of C, H, and N which is translated into CO₂ equivalent. The finding highlighted that the substitution of 100% coal with cleaner fuel is able to reduce GHG emission up to 62%. The research highlights the potential viability of hazardous waste conversion to alternative fuel in terms of GHG reductions and provides valuable insights for policymakers, industry stakeholders, and investors in charting a course towards a net zero power sector in Malaysia and beyond.

Keywords: Power Generation; Hazardous Waste; Net Zero Power Plant; Process System Engineering; Cleaner Fuel

LONG TERM PLANNING FOR TRANSPORTATION SECTOR DECARBONISATION IN ASEAN

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ABSTRACT

The emission of greenhouse gases and climate change impacts is one of the greatest challenges facing the global community. In ASEAN, the transportation sector accounts for around 29% of total CO₂ emissions. It is predicted that the total number of registered vehicles per 1,000 population will increase by over around 5% annually which lead to an increase of emissions by threefold in 2050. Various policies and initiatives have been launched by ASEAN Member States (AMS) to decarbonise the transportation sector toward attaining the policy goal. This raises the question of what is the optimal percentage share of the vehicle that runs on biofuel, electric vehicle (EV), and natural gas (NG) can be introduced for long-term planning from 2023 until 2050 to achieve national and ASEAN regional targets. This study developed a multi-period optimisation model integrated with a policy-based scenario for the transportation sector focusing on road transport. The findings highlight the need for the multi-transportation mode to deliver cost-optimal decarbonisation strategies to meet the Regional Aspiration Scenario (RAS) while keeping the 2025 APAEC Targets. Policy intervention in most of AMS results to emission reduction in the transportation sector up to 11%, 14%, 20% in 2030, 2040, and 2050.

Keywords: transportation sector; decarbonisation; emission reduction; energy planning

Topic 2

Interconnection: Energy Security and Accessibility

Energy Security and Environmental Impact by Chinese-Funded Projects in the Greater Mekong Subregion

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ABSTRACT

This research tries to examine the economic, environmental and social implications of energy projects funded by China in the Greater Mekong Subregion (GMS). Study aims to explore how these projects influence energy security and focus on the dimensions of availability, accessibility, affordability and acceptability. Paper claims the role of Chinese investments in driving the energy transition in the GMS. The study employs a combination of Geopolitical Theory and Energy Security Theory to provide a comprehensive analysis of Chinese energy investments in the GMS auguring attention to the asymmetrical power dynamics and regional power struggles. Initiated through the Belt and Road Initiative and bilateral agreements, China invest various energy projects. By analysing impact of those significant Chinese-funded projects such as hydropower, transmission and distribution Networks, renewable energy projects and Oil and gas infrastructure in the GMS, paper investigates both the economic and environmental consequences. By exploring ecosystem changes, displacement and the social impacts on local communities, this research discusses how Chinese investments in energy projects influence the political and economic landscape of GMS countries. Furthermore, paper explore the role of these investments in enhancing energy connectivity and fostering regional cooperation in GMS and ASEAN.

The findings offer valuable insights into the benefits and challenges posed by Chinese energy projects. Study contributes to the broader discourse on sustainable development and regional stability in Southeast Asia region. Policy recommendations include to mitigate adverse impacts and promote equitable and sustainable energy security in the GMS.

Keywords: Energy Security Environmental Impact; Chinese Investments; Greater Mekong Subregion; Belt and Road Initiatives

ACKNOWLEDGEMENTS

I would like to express my deepest gratitude to the Regional Center for Social Science and Sustainable Development (RCSD) at Chiang Mai University for their invaluable support and guidance throughout this research project. Their resources and expertise have been instrumental in shaping this study.

Impact of Temperature and Rainfall Changes on Energy Poverty: Insights from Vietnam's Central Coast Provinces

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ABSTRACT

The study examines how changes in temperature and rainfall affect energy poverty in ten provinces in the Central Coast region of Vietnam, using data from the Vietnam Household Living Standards Survey (VHLSS) for the years 2018 and 2020. Energy poverty is determined by the ratio of energy expenditure to household income, with a critical threshold set at 10%. The energy expenditure data, which includes costs for electricity and other energy sources like coal, firewood, oil, gasoline and gas, were drawn from the VHLSS datasets. The study aims to determine whether variations in temperature and rainfall influence energy poverty in the region's provinces. The study employs the fixed effect method and quantile regression to assess the impact of these changes, incorporating control variables related to household and province characteristics. The findings indicate that changes in temperature and rainfall positively affect energy poverty in the ten provinces. Additionally, the results show that household income and size negatively impact on energy poverty: higher household income is linked to a decrease in energy poverty, while larger household size is associated with an increase. Furthermore, the study highlights inequalities in energy poverty based on age groups and marital status.

Keywords: Energy poverty; Rainfall changes; Temperature changes; Vietnam Household Living Standards Survey (VHLSS)

Realising the ASEAN Power Grid Vision: Lessons from the EU and Southern African Power Integration Projects

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ABSTRACT

The ASEAN Power Grid (APG) is envisioned as a catalyst for economic development and energy integration within Southeast Asia, offering enhanced energy security through a fully integrated cross-border electricity infrastructure. Despite its economic potential, the project is subject to technical, political, and financial challenges. On the technical front, it requires grid compatibility, substantial infrastructure, smart grid technologies, and uniform market codes. While financially the project demands significant investments, that is beyond the capacity of member states. Again politically, sovereignty concerns, and geopolitical tensions have posed significant barriers. Amplified further by the lack of robust regional energy policy and regulatory frameworks, policy design plays a pivotal role in overcoming these multifaceted challenges to realize the APG vision. This paper employs a comparative analysis of successful energy grid integration projects worldwide, such as the EU Power Grid and Southern Africa's Power Pool, to derive lessons on policy levers, political and socio-economic incentives that have facilitated multi-lateral cooperation. The research contributes to the discourse on regional energy integration by providing actionable insights for ASEAN policymakers and stakeholders. The findings highlight harmonisation of technical standards and regulatory policies, creating innovative market incentives, and promoting regional collaboration to create finance mechanisms can overcome gridlocks.

Keywords: ASEAN Power Grid; Decarbonization; Energy Integration; Regional Energy Connectivity; Policy Design

THE SECURITIZATION PROCESS OF ENERGY ISSUES IN VIETNAM AND ITS IMPLICATIONS FOR VIETNAM-ASEAN ENERGY COOPERATION

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ABSTRACT

Energy is becoming increasingly concerned in Vietnam due to rising domestic demands, geopolitical tensions, and the transition to sustainable development. Amid such circumstances, Vietnam has issued a Resolution on Orientation for the Vietnam National Energy Development Strategy to 2030, with a vision to 2045 and several other action plans. This motivates the authors to analyze Vietnam's energy policy through the lens of securitization theory. The paper explores the process of securitizing energy issues in Vietnam and its implications for Vietnam-ASEAN energy cooperation. By using qualitative research including content analysis of policy documents and secondary sources, the authors determine Vietnam's energy securitization process in three phases: non-securitization, politicization and securitization. The paper finds that Vietnam is currently in phase three of energy securitization, manifested in its harmonized policy and strong collaboration for energy development, aligned with its national interests, domestic environmental policy, and international green transition commitments. This article also elaborates on the achievements and drawbacks of Vietnam's energy securitization process, providing valuable experiences to share with ASEAN partners, particularly Laos, Myanmar, and Cambodia to shape the energy policy framework in the context of socioeconomics and sustainable development goals (SDGs) in the region.

Keywords: Energy securitization; Vietnam; ASEAN; Cooperation; Energy policy

INTER-CONNECTION REQUIRES GOVERNMENT CONNECTION: CROSS-BORDER ELECTRICITY TRANSMISSION AND THE ROLE OF GOVERNMENTS

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ABSTRACT

ASEAN has long recognized the potential benefits for energy security and security from the cross-border transmission of electricity. The ASEAN Power Grid (“APG”) aims to develop a regional cross-border transmission and integrated power market across its ten member states. More recently, the sharing of renewable power resources has triggered a surge in the investigation of opportunities for expansion of the APG as part of regional decarbonization efforts. The large and growing network of cross-border inter-connectors in Europe provides strong evidence of the potential opportunities for ASEAN. However, Europe’s physical network is underpinned by a pan-European regulatory framework that supports capital and operational investment that is not yet present in ASEAN.

While ASEAN must chart its own course, private sector investment and finance will be critical to unlocking the long-term capital required to realize the potential of cross-border inter-connection. There are risks that private sector market participants cannot manage in isolation from host Governments. Policy stability and, ideally, consistency across jurisdictions will be essential to both private investors and their lenders, particularly where power moving through and not merely between jurisdictions.

Keywords: cross-border transmission; inter-connectors; treaties; private finance

Topic 3

Sustainability, Engineering and Infrastructure

GREEN SPACE PLANNING USING RENEWABLE ENERGY: APPLICATION CASE AT METRO STATION NO. 1 - PHUOC LONG STATION IN HO CHI MINH CITY

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ABSTRACT

The topic comes from demand of connecting spaces between public transport and surrounding green spaces to other spaces. Simultaneously, to adapt to climate change and the depletion of fossil energy, design platforms for this type of public space will be applied from renewable and environmentally friendly energy materials. The topic uses desk research methods, consultations with urban experts on building green space models, combined with 3D modelling techniques to simulate green spaces through professional software like SketchUp, Lumion and Adobe Photoshop. The results of the topic emphasize the importance of green space in a city's infrastructure as a biological shield while creating richness in the urban landscape, and as a public space to connect people. However, the way of using green spaces in the study area and also in Vietnam hasn't brought maximum efficiency and is somewhat wasteful of green spaces resources, especially using of energy to operate green spaces hasn't guaranteed sustainability for the whole in general. The model (figure) of green space makes maximum use of renewable energy sources and applies the connection of spaces together, bringing convenience and benefits to residents as well as having a good impact on the environment and contributing to limiting energy waste.

Keywords: Construction using Renewable Energy; Green infrastructure; Green space; Sustainable planning

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Biomethane for Energy and Environment Sustainability of The New Capital City of Indonesia

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ABSTRACT

The development of biomethane from the handling of palm oil mill liquid effluent (POME) to be integrated into the energy mix of Nusantara, Indonesia's new capital city, can benefit the energy and environmental aspects. Given the context and identified issues, this study aims to analyse the potential of biomethane in Nusantara and its neighbouring provinces to meet the energy needs of Nusantara, develop a spatially focused implementation strategy, and quantify the potential reduction in greenhouse gas emissions from the project. The research employs quantitative methodologies to investigate the potential of biomethane sources, utilizing spatial analysis using GIS-based software (ArcMap), and UNFCCC method to calculate the GHG emission reduction potential. The results show substantial biomethane capacity in Nusantara and East Kalimantan from POME, which can substitute natural gas in Nusantara. The volume reached 36.9 thousand m³ per hour and will rise to 76.2 thousand m³ per hour by 2031, surpassing Nusantara's gas demand of 55.7 thousand m³ per hour. The GHG emission reduction calculation shows that methane recovery from wastewater treatment projects will considerably reduce GHG emissions. Each year, a minimum of 2.58 MMtCO₂e can be reduced, equivalent to approximately 6.62% of Indonesia's GHG emissions from the industrial sector in 2019.

Keywords: Nusantara; biomethane; POME; GHG; palm oil wastes

The Impact of the Breakwater Model Includes the Geometry of Pontoon and Mooring Line Variation Towards Hydrodynamic Response in Marine Floating Solar

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ABSTRACT

This study aimed to the impact of the breakwater model including the geometry of poonton and mooring line variation on Hydrodynamic Response in a Marine floating solar system using CFD simulation. Variations used are pontoon geometry, number of mooring line, Irregular wave, and water depth. The result showed that adding Breakwater, Cylindrical, and Rectangular pontoon geometries resulted in lower Hydrodynamic Response than the Purefloat model. The Breakwater model exhibits the most significant reduction in hydrodynamic response, with a notable 59% decrease across all six degrees of freedom (DOF), followed by the Rectangular model (56%) and the Cylindrical model (47%). Furthermore, 6 mooring lines effectively reduce wave excitation impacts and Hydrodynamic Response across all six DOF. On average, 6 mooring line configuration leads to 27% decrease in the Response Amplitude Operator (RAO) value and a 9% decrease in mooring line tension. This research provides valuable insights into the efficient and reliable design for the development of Marine FPV systems, especially in the renewable energy industry to enhance the system performance and sustainability.

Keywords: Marine Floating Photovoltaic (Marine FPV); Break Water Model; Mooring line; Response; Amplitude Operator (RAO)

Evaluating Energy Usage and Conservation Opportunities in Garment Factory in Cambodia

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ABSTRACT

Ensuring a balanced energy demand and supply is crucial for a country's energy security. Energy efficiency plays an important role in mitigating greenhouse gas emissions, thereby reducing production costs through decreased energy consumption expenses in manufacturing processes. This study examines the energy consumption trends of a factory over three years, with recorded energy consumptions of 5,214,190 kWh in 2020, 6,559,128 kWh in 2021, and 6,202,542 kWh in 2022. The analysis reveals that heaters consume the most energy at 37%, followed by sewing machines and air compressors at 20% and 19% respectively, with cooling and ventilation sharing 15%, lighting and air conditioning each representing 4%, while other equipment types collectively contribute 3% to 2% of the total energy consumption. To reduce energy usage, the main energy-consuming equipment such as air compressors and lighting necessitated hourly monitoring of actual energy consumption. An audit identified potential energy savings opportunities, including detecting and addressing air leakage, implementing vacuum ironing system usage methods, and replacing fluorescent lamps with higher efficiency LED lamps. While some energy-saving measures require no investment, others involve costs but yield significant reductions in energy consumption.

Keywords: Energy efficiency; energy audit; energy intensity; garment factory; Cambodia

Carbon Credit Mechanisms for Sustainable Textile Industry: Climate Change Mitigation in ASEAN

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ABSTRACT

The textile and garment business exerts a significant influence on both the economy and the environment, underscoring the necessity for sustainable actions to diminish carbon emissions. This study examines the efficacy of carbon credit systems in fostering sustainability in the ASEAN textile industry. The research employs a mixed-methods approach, including quantitative and qualitative analyses, to investigate carbon emissions data and economic data related to carbon credits. Statistical approaches and regression models demonstrate a substantial decrease in emissions as a result of the use of carbon credits. Textile enterprises have been found to achieve significant improvements in their efficiency of reducing emissions when they implement carbon policies, as demonstrated by case studies. The study additionally analyses successful sustainable business models and assesses the influence of regional trade agreements and green finance programs in promoting sustainable practices. The results are consistent with worldwide climate goals and emphasise the need of synchronised regional initiatives. Policy proposals stress the importance of ongoing collaboration and the incorporation of carbon credit trading to further improve sustainability in the textile industry. This research provides significant insights for policymakers, industry stakeholders, and researchers who are working towards promoting a more sustainable textile industry in ASEAN.

Keywords: Textile Industry; Carbon Credit Mechanisms; Climate Change Mitigation; Sustainability; ASEAN

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Post-BOT Horizons: IPPs Catalyzing Southeast Asia's Sustainable Energy Future

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ABSTRACT

Leveraging the Build-operate-transfer (BOT) project experience of Nam Ngiep 1 Power Company in Laos, this paper delves into the pivotal role of Independent Power Producers (IPPs) in Southeast Asia's energy sector, particularly in the period following project handover. The BOT model is integral to infrastructure development in the region, especially in hydropower projects where concrete structures and other components can remain operational for over 100 years. The post-BOT phase can be considered the most significant for the project's overall success and sustainability.

By utilizing a comprehensive analysis of technical and economic data alongside a series of case studies, the paper uncovers the contributions and potential of IPPs in driving sustainable energy development in the region. The findings reveal key insights into effective strategies for post-BOT engagement, emphasizing the importance of policy frameworks, technology adoption, and stakeholder collaboration. Specifically, the study highlights three critical factors: cross-border regional-level optimization of power generation; data-driven long-term planning; and open access to transmission networks.

The paper aims to provide a blueprint for future IPP projects, ensuring that they not only succeed commercially but also contribute substantially to the region's energy security and environmental objectives.

Keywords: IPPs; BOT model; Policy Frameworks; Cross-border power optimization; Open access transmission networks

Enhancing Energy Efficiency and Conservation in ASEAN

Transportation: Policy Insights and Best Practices

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ABSTRACT

This paper examines the current state of Energy Efficiency and Conservation (EE&C) policies in the transportation sector across ASEAN member states (AMS). As the region's most energy-intensive sector, with projected Total Final Energy Consumption (TFEC) reaching 492 Mtoe in 2050 according to the 7th ASEAN Energy Outlook, transportation offers significant opportunities to reduce energy consumption and greenhouse gas emissions. To bridge the knowledge gap in EE&C policies in the ASEAN context, this paper analyses existing policies, programs, and initiatives focusing on vehicle fuel economy, public transport, and electric vehicle adoption. Through comparative assessments on EE&C policies and measures for road transportation in the ten AMS, questionnaire survey distributed to AMS through the Energy Efficiency and Conservation - Sub Sector Network (EE&C-SSN) Focal Points, and country reports presented by official delegates from AMS during capacity-building workshops, the research identifies successful strategies, addresses implementation challenges, and provides actionable recommendations for policymakers and stakeholders. By synthesising lessons learned and best practices, this research contributes to developing effective EE&C policies for a more sustainable transportation sector in ASEAN, supporting broader regional and global sustainability objectives.

Keywords: ASEAN; Energy Efficiency; Transportation; Policy; Best Practices

Sustainable Waste Management in Hydropower: A Carbon Footprint Perspective

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ABSTRACT

This study examines the carbon footprint of waste management practices at the Nam Theun 2 Hydropower Plant in Laos, emphasizing the importance of sustainability in the hydropower sector. The relevance of the topic lies in the environmental impact of waste generated by hydropower plants, which, although producing renewable energy, can contribute significantly to greenhouse gas emissions. Using a combination of data collection and emission calculation methods, the study quantified emissions of Carbon Dioxide (CO₂), Methane (CH₄), and Nitrous Oxide (N₂O) from various waste management activities, including waste transportation, solid waste disposal, biological treatment, incineration, and wastewater treatment. The main results indicate that the waste sector of the hydropower plant is a considerable source of GHG emissions, particularly from transportation and treatment processes. The study identified key emission sources and proposed strategies to reduce the carbon footprint, such as optimizing waste handling and integrating advanced treatment technologies. The conclusions highlight the necessity of incorporating carbon footprint considerations into waste management strategies to enhance the overall sustainability of hydropower operations, offering valuable insights for similar projects and informing effective waste management policies aligned with climate goals.

Keywords: Carbon Footprint; Greenhouse Gas Emissions; Waste Management; Hydropower; Sustainability

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Topic 4

Carbon Pricing and Green Investment

CARBON PRICING TRENDS AND POLICY OPTIONS FOR VIETNAM

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ABSTRACT

The development of carbon markets and mechanisms has demonstrated a major effort to combat climate change in countries around the world. Recently, many countries have consistently implemented novel mechanisms for carbon pricing to successfully meet their commitments under the Paris Agreement. The concept of carbon pricing is being examined from a wider perspective, encompassing its role not just as a crucial policy for mitigating climate change but also as a means to generate money, stimulate innovation, and contribute to the achievement of larger sustainability and development objectives. This article investigates the current trend of carbon pricing around the world and then identifies opportunities and challenges of such mechanism to combat climate change. Thereby undertaking a comprehensive examination of the diverse carbon pricing initiatives implemented by the global community and drawing implications for policies and laws in Viet Nam.

Keywords: emission trading system; climate change; carbon pricing; carbon taxes

Carbon Trading Potential of Rice Farming in ASEAN: Economic and Environmental Analysis

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ABSTRACT

The pressing nature of climate change necessitates prompt measures to decrease greenhouse gas emissions and augment carbon sequestration. Carbon trading provides strong incentives for reducing emissions, and ASEAN's rice farming plays a crucial role in this process. This study investigates the feasibility of incorporating carbon trading into rice cultivation in ASEAN, a prominent global rice producer where conventional flooded fields release substantial amounts of methane. Through the implementation of enhanced agricultural techniques and participation in carbon trading, the rice farming industry has the potential to shift from being a significant source of methane emissions to becoming a net carbon sequester. The economic analysis emphasises significant financial advantages for rice producers in the ASEAN region, such as increased income from carbon credits, decreased expenses, and improved investment prospects. From an environmental perspective, carbon trading provides incentives for using techniques that effectively reduce methane emissions, enhance soil health, and promote biodiversity. However, it is essential to tackle the intricacies of carbon credit systems and geographical disparities. This study demonstrates the potential benefits of combining carbon trading with sustainable rice cultivation, including enhanced farmer livelihoods, the achievement of international climate objectives, and the mitigation of global warming.

Keywords: Carbon Trading; Rice Farming; ASEAN; Greenhouse Gas Emissions; Sustainable Agriculture

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Progress and Challenges of Carbon Pricing Implementation for Indonesia: Comparative Assessment in ASEAN

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ABSTRACT

This research examines policies recommendation to address ASEAN's six key challenges in the implementation of carbon pricing instrument by using EU successful experience e.g. (1) highly regulated energy market and price; (2) electricity and fossil fuel subsidies burden; (3) unrecorded CO₂ emission due to informal economy activity; (4) lack expertise in technology relevant to low carbon industry; (5) non-uniformity carbon pricing instrument and its policies; and (6) high emission free allowance. ASEAN is falling behind in its energy transition, posing several risks, notably the climate risks associated with not achieving the Paris Agreement goals. Thus, accelerated transition initiatives shall be taken into consideration by developing effective carbon market and deploying CCUS. By leveraging insights from the EU's approach, ASEAN's energy policy should be reformed to shape a voluntary to fully mandatory carbon market and govern carbon pricing instrument through compliance market (e.g. carbon tax, ETS) and voluntary carbon markets (carbon credit) mechanism. This research is the first ever research present comprehensive policies recommendation on carbon pricing instrument that designed to guide the policy makers develop effective carbon market and deployment of CCUS, specifically in order to improve Indonesia economic competitiveness among ASEAN countries.

Keywords: NDC; Carbon Pricing; Carbon Tax; Carbon Market; Cap and Trade; Cap and Tax; Carbon Credit; CCUS

Does the Nudges Influence the Australian Financial Institutions to Invest in the ASEAN's Clean Energy Transition?

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ABSTRACT

ASEAN needs a vast green investment to enable its clean energy transition (CET). Meanwhile, Australian Government has dynamically advocated its Australian financial institutions (AFI) to invest more in ASEAN's CET. With this coherent policy, this research proposes to examine if applying behavioral economic approach (nudge) would foster AFI investments toward ASEAN's CET. Through a natural field experiment, this research will conduct a non-incentive online survey targeting 1,969 AFIs owning a total asset of A\$ 8.89 trillion. This research will conduct the treatment survey to test if three nudge treatments—default setting, pre-commitment, and social norms—effectively influence the AFI's willingness to invest (WTI) into ASEAN's CET. Empirically, this research deploys the Ordinary-Least-Squares (OLS) regression to estimate the influence of the nudge treatments to WTI. Academically, this research would contribute to green finance and green nudge experimental fields, especially toward fostering green investment from a wealthy nation to a developing nation or region. Specifically, it will explore if nudges could be an effective policy to bolstering AFI investment toward ASEAN's CET. If empirically effective, it would imply that behavioral economic policy (nudge) could be an alternative – a cost-efficient and scalable policy – for ASEAN to fostering international green investment into ASEAN's CET.

Keywords: Clean Energy Transition; Green Investment; ASEAN; Australian Financial Institutions; Behavioural Economics

Feasibility Study of Green Universities in the Greater Mekong

Subregion: The United Nations Carbon Offset Platform

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ABSTRACT

This study investigates the possibility of establishing sustainability hubs at universities in the Greater Mekong Subregion (GMS) which is a part of ASEAN+1. The goal of the project is to increase environmental awareness on college campuses, accomplish carbon neutrality, and encourage eco-friendly actions by utilising the UN Carbon Offset Platform. The project incorporates part of the three-step procedure from the UNFCCC Secretariat's Climate Neutral Now effort which focuses on estimating climate impact, reducing environmental impact, and using Certified Emission Reductions (CERs) to offset residual emissions. The key outcomes include a significant reduction in carbon footprints across universities, targeting a minimum 50% reduction equivalent to 22,950,000 t-CO₂e per year, based on the population of 9,000,000 individuals at 2.55 t-CO₂e per person, with the carbon credit price assumed to be \$14.04 per ton as of May 19, 2024. Through the selling of carbon credits, the project is anticipated to generate a minimum of \$112,776,300 in annual financial benefits. The system costs about \$2,000,000, and economic analysis shows amazing metrics like a quick 2.02-year break-even point and an IRR of 341%. The study indicates that the execution of this project has the potential to significantly advance sustainable development and climate action in GMS.

Keywords: Green Universities; Greater Mekong Subregion (GMS); The United Nations Carbon Offset Platform; Feasibility Study

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LEGAL FRAMEWORK FOR CARBON PRICING IN VIETNAM: A COMPARATIVE STUDY WITH THE US AND JAPAN

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ABSTRACT

Carbon pricing is a critical mechanism for reducing greenhouse gas emissions and mitigating climate change. Establishing an effective legal framework for carbon pricing is essential for Vietnam to meet international climate commitments and drive low-carbon economic development. This paper examines the current state of carbon pricing legislation in Vietnam, identifying key challenges and opportunities within its legal and economic contexts. By comparing these findings with the established frameworks in the US and Japan, the paper highlights best practices, innovative strategies, and potential pitfalls. Key criteria for comparison include regulatory scope, implementation mechanisms, economic impacts, and enforcement strategies. The main results reveal significant differences in the maturity and complexity of carbon pricing frameworks among the three countries. While the US and Japan have advanced systems with established market mechanisms and compliance structures, Vietnam's framework is in its nascent stages, facing challenges such as regulatory gaps and limited stakeholder engagement. The conclusions drawn suggest that Vietnam can benefit from adopting best practices from the US and Japan, particularly in enhancing regulatory clarity, promoting market-based solutions, and fostering public-private partnerships. These findings provide actionable insights for policymakers to strengthen Vietnam's carbon pricing framework, ensuring it supports the country's environmental and economic goals effectively.

Keywords: Carbon pricing; Vietnam; legal framework; climate change; comparative analysis

Carbon Pricing and Green Investment Practices of UAB Bank in Myanmar

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ABSTRACT

The paper examines UAB Bank's carbon pricing and green investment practices in Myanmar. The paper highlights the bank's initiatives that reduce environmental impact, promote sustainable growth, and empower stakeholders financially and socially. This study additionally investigates the UAB's role and commitment to environmental sustainability concerning the United Nations Sustainable Development Goals, as well as its efforts to reduce energy use, carbon emissions, and water discharge. This research method is conceptual, and based on a comprehensive literature review, financial institution websites, and literature reviews. A variety of research journal papers supported this study. The UAB website was utilized and evaluated to gain knowledge regarding the contribution of various green banking methods, both domestically and internationally, to sustainability. The study is designed to provide insight into UAB Bank's approach to sustainable banking practices and their influence on the Myanmar Banking Sector.

Keywords: Sustainable Development; Carbon Pricing; Myanmar; United Nations

REVIEW OF TAXONOMY APPLICATION FOR FINANCING ENERGY TRANSITION TECHNOLOGIES IN MALAYSIA

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ABSTRACT

Energy transition involves the global shift from fossil fuels to renewable energy to combat climate change, aligning with international climate goals like those in the Paris Agreement. Green finance, including transition finance, supports this shift by providing financial tools to help industries, particularly in hard-to-abate sectors like steel and cement, in reducing carbon emissions. Transition finance is essential for these sectors to adopt sustainable practices and technologies, increasing energy efficiency and lowering carbon intensity. However, many financial analysts lack the technical knowledge to properly assess green technologies, risking misclassification and greenwashing. To address this, Malaysia developed the Bank Negara Malaysia Climate Change and Principles-based Taxonomy (BNM CCPT), guiding analysts in evaluating whether projects meet the criteria to be classified as green. However, the rapid evolution of green technologies may render the framework insufficient for critical assessments. This paper reviews the BNM CCPT, compares it with global taxonomies, and offers recommendations to improve the framework, emphasizing the need for enhanced analyst knowledge to accurately assess the economic potential, environmental impact, and carbon footprint of green technologies. Bridging the knowledge gap in energy transition and transition finance is essential for the accurate application of the taxonomies and the integrity of sustainable finance.

Keywords: Green Technology; Energy Transition; Energy Efficiency; Renewable Energy; Green Technology

Topic 5

Energy and Digitalisation

Malaysia's Advanced Metering Infrastructure (AMI): A Regulatory Review

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ABSTRACT

The electric smart meter represents a significant advancement in energy metering technology, revolutionising the way electricity consumption is measured and managed. These innovative devices provide real-time information about energy usage, enabling both utility providers and consumers to monitor and optimize their electricity consumption patterns more effectively. The global roll-out of electric smart meters has gained momentum in recent years. Numerous countries, including the United States, United Kingdom, Canada, Australia, and several European nations, have embarked on large-scale deployment initiatives. This widespread adoption is driven by the potential benefits that smart meters offer to both individuals and society as a whole. This paper reviews and provide a qualitative analysis of the regulatory processes in implementing Malaysia's Advanced Metering Infrastructure (AMI) according to 6 identified smart meter roll-out assessments and proposes way forward for better and organized AMI roll-out. It suggested that clear communication to all stakeholders in terms of roll-out plan, expected benefits and regulatory compliance is key to a successful implementation.

Keywords: Advanced Metering Infrastructure; smart meter; energy efficiency; digitalisation; regulatory review

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A General Operation Model for the Smart Office Testbed Under Consideration of Microgrid Concept

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ABSTRACT

A power distribution system is undergoing a major transition towards minimizing a carbons emission and promoting sustainable development. One of the key transitions is a Microgrid (MG) paradigm that is currently representing an in-trend operation philosophy and acting as a green building block within a power distribution system. In this case an accurate operational model is the key enabling solutions for an operational planning of the microgrid. Nonetheless, the existing models is fall short in validating the solutions using only simulation software that potentially not well reflect to a practical condition. Due to the lack of practical testbed and benchmark, the solution obtained by the existing models might not be well validated. Addressing to this gap, this work proposed the mathematical operation model while validated with an implemented testbed smart office at a Faculty of Engineering, NUOL. First, the general operation model is formulated that capturing the philosophy operation of the smart office. Subsequently, the proposed model is modified and incorporating the well-known Energy Management System (EMS) concept with techno-economic considerations. Finally, the proposed models are implemented and solved in a MATLAB environment while the effectiveness of the models is validated using the extracted practical data from the testbed system.

Keywords: Microgrid; Smart Office; EMS; Optimal Operation; Testbed System

AI-driven Predictive Maintenance for Batteries RUL

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ABSTRACT

Predictive maintenance is a critical capability for prolonging the lifespan and reliability of battery-powered systems. This research explored the use of various machine learning and deep learning models to accurately predict the Remaining Useful Life (RUL) of batteries based on operational sensor data. The research utilized several key factors that have been identified in the literature from 2018 to 2024, including Cycle Index, Discharge Time, Time at 4.15V, Time Constant Current, Decrement 3.6-3.4V, Maximum Voltage Discharge, Minimum Voltage Charge, and Charging Time. These factors were used as inputs to train and evaluate the predictive models. The study employed a comprehensive approach, evaluating the performance of different machine learning algorithms, such as regression models, decision trees, random forests, and neural networks, including Long Short-Term Memory (LSTM) models, in accurately forecasting the RUL of batteries. The results demonstrate that the LSTM models outperform the other techniques, achieving the lowest root mean squared error (RMSE) and mean absolute error (MAE), as well as the highest coefficient of determination (R^2) in predicting the RUL of batteries. The superior performance of the LSTM models can be attributed to their ability to effectively capture the temporal dependencies and nonlinear patterns inherent in battery degradation data.

Keywords: Remaining Useful Life; Machine Learning; Deep Learning; Predictive Maintenance; Battery-powered system

A Study on Factors Influencing and Machine Learning Models for Renewable Energy Consumption Forecasting

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ABSTRACT

Renewable energy (RE) is vital for addressing climate change and ensuring global energy security. As RE technology adoption grows, accurate forecasting of RE consumption is essential for grid planning and integration. This paper reviews key factors affecting RE consumption and explores machine learning (ML) and deep learning (DL) models for forecasting RE usage. It examines socioeconomic, demographic, and environmental variables influencing the demand for RE sources like solar, wind, and hydropower, highlighting factors such as GDP, population, energy prices, government policies, and weather conditions. Additionally, it considers how technological advancements, consumer behavior, and energy efficiency measures shape RE demand. The study evaluates ML techniques from 2020 to 2024, including artificial neural networks, support vector machines, random forests, gradient boosting, and DL models like long short-term memory (LSTMs) and convolutional neural networks (CNNs), for forecasting RE consumption. It analyzes the strengths, limitations, and accuracy of these models based on case studies across residential, commercial, and industrial sectors. The findings show that DL models, particularly LSTMs and CNNs, outperform traditional ML techniques in RE consumption forecasting, effectively capturing complex nonlinear relationships and temporal dependencies in RE data for greater accuracy and generalization.

Keywords: Renewable Energy; Energy Consumption Forecasting; Machine Learning; Deep Learning; Socio Economic

DIGITAL TRANSFORMATION IN GEOTHERMAL ENERGY OPERATIONS: A CASE STUDY OF GEO DIPA ENERGI

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ABSTRACT

Geothermal energy is pivotal driver in Indonesia's energy transition. It offers constant flow from the earth crust into steam turbine. Hence, geothermal power plant is expected to have high availability and reliability. Recognizing this demand, Geo Dipa Energi (GDE) has integrated asset management into its business process to enhance production efficiency and minimize interruptions. This strategic shift has been supported by the implementation of Business Intelligence (BI) as a pilot project. Leading to establishment of the operation digital transformation initiatives: Geo Dipa Energi Operation, Reliability, and Efficiency Center (GEOREC) equipped with a predictive analytics technology in its operation by harnessing Internet of Things (IoT) and Machine Learning. This paper discussed the development and outcomes of this digital transformation initiative, framed within People, Process, Technology (PPT), Data to Decision, and ADKAR change management model. Results indicated both a significant benefits, including tangible profit from previously unrealized production output and an improvement in productivity per person. GEOREC has become a foundational element in enhancing operation & maintenance process, with ongoing iterations expected to further refine its capabilities and features.

Keywords: Business Intelligence; Analytics; People Process Technology; Data to Decision; Change Management

Topic 6

Environment, Policy, and Socioeconomics

ASEAN Energy Policies: The Effect of Electricity Generation on CO2 Emissions

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ABSTRACT

ASEAN's power sector pathways to net-zero emissions (NZE) by 2050 are consistent with the Paris Agreement goal to limit global warming to 1.5°C. Many studies indicate that the electricity generation sector is linked to huge CO₂ emissions, especially from fossil fuels. Even though renewable energy could be beneficial by decreasing levels of CO₂ emissions, the cost of investment in this green energy is higher than for fossil fuels. To encourage NZE policy, government subsidies can help the electricity sector by covering part of the cost of production. This study employs panel data analysis to determine whether ASEAN's electricity generation by various sources increases the carbon intensity of electricity consumption levels, using yearly data from nine ASEAN countries from 2000 to 2019. The results show that electricity generation from oil and coal is one of the most significant contributors to CO₂ emissions in the country. However, when capturing the sources of renewable energy, electricity generation from wind and other renewable sources significantly reduces carbon emissions. The findings thus support policies to encourage electricity generation from renewable sources for more efficient management of energy supply decarbonisation, which can be instrumental for ASEAN countries in the fight against global warming.

Keywords: electricity generation; CO₂ emissions; ASEAN; energy policies; panel data analysis

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We would like to thank ASEAN Centre for Energy, BP Global, and Our World in Data for the data and the information, and Mr. Robin Neill for valuable advice, as well as Rajamangala University of Technology Phra Nakhon and our research networks, including the Universiti Teknologi MARA, Hull University, and the Public University of Navarra that supported this research until the operation was successfully completed.

The Role of Urbanization in Fossil Fuel Demand in Developing Asian Economies: Understanding the Moderating Effect of Renewable Energy Productivity

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ABSTRACT

Urbanization is a critical process of demographic transition, which endures environmental and socio-economic adversities. These hardships highlight the significance of sustainable urban growth aligned with Sustainable Development Goals (SDG) 11, which advocates for inclusive, resilient, and sustainable cities. This study investigates the potential of sustainable urbanization through the lens of renewable energy productivity, examining its ability to alleviate fossil fuel consumption amidst rising urbanization. We explore the influence of urbanization, renewable energy productivity, regulatory quality, and human capital on fossil fuel consumption. We have utilized a balanced panel dataset of 20 developing Asian economies from 1996 to 2020, employing a two-step dynamic Generalized Method of Moments (GMM) and Driscoll-Kraay Standard Errors to estimate the model. The results reveal that urbanization and human capital are positively associated with fossil fuel consumption due to rising energy demands from the concentrated population and their lifestyle. In contrast, renewable energy productivity and regulatory quality mitigate fossil fuel usage by encouraging efficient use of renewable energy and regulating sustainable policies. Furthermore, the interaction between urbanization and renewable energy productivity specifically portrays a compelling force in diminishing fossil fuel dependency, emphasizing a pathway towards SDG 11.

Keywords: Developing Asian economies; Human capital; Renewable energy productivity; Regulatory quality; Urbanization

STANDARD CODE OF ROOFTOP SOLAR PV SYSTEM EQUIPMENTS

APPLICATION IN THE CASE OF LAO PDR

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ABSTRACT

To ensure the efficiency and safety of rooftop solar system (RTSS) deployment in Lao PDR, the technology needs to be safe and reliable to satisfy both utility and customer expectations. Due to the novelty and complexity of photovoltaic (PV) systems, most users are unable to discern between high- and low-quality systems; thus, they might make their purchase solely on the basis of price. Unmet expectations from suboptimal PV system performance and safety events can have a negative influence on customer uptake and the solar business. A lack of technical expertise might result in poor quality RTSS equipment and practices. Furthermore, the tiny size and huge number of these projects make it difficult for regulators to monitor and enforce standards and guidelines for equipment and installation techniques. Quality and safety issues are key contributing factors to developers, investors, and consumers' confidence in RTSS installation and deployment. This paper reviews standard codes for RTSS recognized worldwide, including safety standards, PV modules, solar PV inverters, high- and low-voltage switchgear, protection systems, AC/DC cable selection, junction boxes, battery/battery chargers, PV monitoring systems, energy meters, installation, testing, commissioning, operation, and maintenance, taking into account the Lao interconnection grid code

Keywords: Standard code; Rooftop solar system; Solar photovoltaic system equipment; safety

BUILDING BLOCKS FOR SUCCESSFUL JUST ENERGY TRANSITION PARTNERSHIPS IN INDONESIA AND VIETNAM

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ABSTRACT

Southeast Asia is a fast-growing region with significant opportunities to accelerate decarbonisation. Just Energy Transition Partnerships (JETPs), the high-level partnership agreements signed with Indonesia and Vietnam to accelerate low-carbon transition through a country-led model, are core delivery mechanisms to achieve net zero emissions and wean off coal in the region. Even though the JETPs propose a potential enabling environment for an accelerated, equitable transition, their 18 months of their implementation showed it will not be plain sailing. Against this backdrop, we developed a comprehensive framework to demonstrate what good looks like for operationalizing JETPs effectively. The systemic benchmark examines the enabling environment to enhance energy security, accessibility, affordability, sustainability and interconnection. The financing benchmark evaluates the capacity for concessional and grant funding to leverage bankable projects. The governance benchmark evaluates institutions' ability to put regulations that align with energy policy goals with net zero commitments. The socio-economic benchmark evaluates JETPs based on their ability to provide social protection. The additionality, sustainability and transformative capacity of JETP implementation is significant for accelerating the momentum for the energy transition, while enabling further financial flows into these two countries and strengthen the governance of climate action.

Keywords: JETP; systemic; financial; governance; socio-economic

REPURPOSING AGING OIL AND GAS PLATFORMS FOR SUSTAINABLE ASSET MANAGEMENT POLICY

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ABSTRACT

Indonesia faces significant challenges in managing its aging oil and gas platforms, which are pivotal assets to support sustainable development objectives. With approximately 600 oil and gas platforms, many of which are approaching or have exceeded their intended lifespans, the need for effective management strategies is important. This research examines the existing asset management regulatory framework for retired oil and gas infrastructure in Indonesia, along with key challenges and opportunities for sustainable repurposing. Employing a mixed-methods approach, including policy analysis and global case studies, the study aims to formulate policy recommendations for transforming these platforms into assets that support renewable energy initiatives, marine safety, and environmental conservation. The expected outcomes are to provide a comprehensive analysis of current asset management policies regarding repurposing oil and gas platforms; socio-economic and environmental challenges; asset repurposing opportunities, and to develop enhanced strategies for asset reutilization. This will benefit policymakers by contributing to the improvement of state asset management strategies and supporting Indonesia's transition to a sustainable economic framework. The findings are anticipated to influence national policies by integrating environmental stewardship with economic resilience, potential economic and environmental benefits, and ultimately fostering a model for sustainable asset management of retired oil and gas platforms.

Keywords: Indonesia; asset management; oil and gas platforms; sustainable repurposing; policy analysis

OPTIMAL PORTFOLIO OF ECONOMIC POLICIES FOR CLIMATE CHANGE MITIGATION: A FOCUS ON THE ENERGY SECTOR

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ABSTRACT

Climate change mitigation is a global imperative in the 21st century, with the energy sector being a significant contributor to greenhouse gas emissions due to its reliance on fossil fuels. The transition to cleaner energy sources is crucial for achieving mitigation goals. The study aims to identify and analyze the most influential economic policies for climate change mitigation in the energy sector. The research methodology involves a comprehensive review of literature and case studies from various countries, including Germany's Energiewende policy. The study finds that a mix of monetary policy instruments is necessary for effective climate change mitigation. Carbon pricing, subsidies for renewable energy, and energy efficiency standards have proven effective in driving the transition to a low-carbon economy. The German Energiewende case study demonstrates the success of combining feed-in tariffs, emissions trading, and subsidies to increase renewable energy use and reduce CO₂ emissions. It emphasizes the need for a strong and consistent policy framework, policy flexibility, public engagement, and a just transition framework to address the social and economic impacts of the energy transition. The study suggests, Germany's Energiewende provides a model for other countries, policies must be tailored to local contexts to ensure successful implementation and public acceptance.

Keywords: portfolio; economic; climate change; and energy

EXAMINING GENDER EQUALITY, DISABILITY, AND SOCIAL INCLUSION INTEGRATION IN THE CIREBON ENERGY TRANSITION MECHANISM PILOT PROJECT: A CASE STUDY

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ABSTRACT

This study examines the integration of Gender Equality, Disability, and Social Inclusion (GEDSI) within the framework of the Cirebon Energy Transition Mechanism Pilot Project. Using a qualitative case study method, the research explores the operationalization of GEDSI principles, emphasizing the role of just energy policies and collaboration among various stakeholders. Methodologically, the study involves in-depth analysis of policy documents, news, and stakeholder interviews to evaluate the mainstreaming of GEDSI considerations in project planning, implementation strategies, and outcomes. The analysis encompasses participation and control in decision-making processes, economic justice, access to resources, socio-cultural integration, and complaint and remedial mechanisms. According to this study, vulnerable groups such as women and persons with disabilities continue to be marginalized and have not completely benefited from the energy transition mechanism. Furthermore, this study underlines the difficulties in achieving inclusive energy transitions, emphasizing the significance of just energy policy and effective multistakeholder collaborations. By focusing on the Cirebon case, this study provides practical insights into integrating GEDSI principles in energy transition and offers actionable recommendations to enhance the inclusivity and effectiveness of energy transition mechanism in Indonesia and across ASEAN countries.

Keywords: GEDSI; Energy Transition Mechanism; Energy Justice; JETP

Harmonized LID-based Building and Urban Design Policies for the Philippines

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ABSTRACT

The study provides key recommendations from a policy review on water-related issues in the National Building Code of the Philippines (NBCP), identifying necessary adjustments to address climate change and urbanization challenges. It advocates for a Holistic Environmental Integration policy, mandating mini-Environmental Impact Assessments (mEIA) in building plans, and calls for Mitigating Geo-Hazard Risks through geohazard risk assessments for all projects. Additionally, it proposes covering 50% of land with green spaces for sustainable urban development and effective stormwater management and emphasizes stringent measures for wastewater disposal and stormwater separation. The study also promotes the integration of Low Impact Development (LID) technologies, assessing projects for LID compliance. These recommendations align with existing policies such as NBCP, CLUP, GBCP, BP 220, SCP, and WCP, aiming to fortify Philippine building policies and foster sustainable urban development, resilient infrastructure, and proactive environmental management.

Keywords: Low Impact Development; National Building Code of the Philippines; Green Building Code of the Philippines; Governance; Green Engineering

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GIS-based Solar and Wind Resource Assessment for Enhancing Energy Security of Lanao del Sur Electric Cooperative (LASURECO)

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ABSTRACT

Energy security is a vital aspect for any electric cooperative in the Philippines, including LASURECO, which is facing challenges in meeting energy supply needs crucial for its economic growth. The huge gap in electrification indicates the immediate need to consider local energy resources that are easy to implement and operate. Solar and wind energy are prime examples of such resources. They offer several advantages, including their renewable nature, scalability, and shorter gestation period compared to conventional sources. The study employs various tools, including GRASS GIS and QGIS, along with specific functionalities such as r.sun, slope analysis and raster calculator. The Multi-Criteria Decision-Making Analytic Hierarchy Process (MCDM AHP) tool is employed for site suitability analysis, with QGIS supporting this assessment through its raster calculator tool. The results show that Lanao Del Sur possesses abundant solar and wind resources, more than sufficient to meet the province's future power demands. The estimated solar capacity potential amounted to a sizable 63.1 gigawatts, while the wind capacity potential was estimated at 47.6 megawatts. Therefore, promoting solar and wind projects in the highly suitable areas identified could play an important role in ensuring and enhancing Lanao Del Sur's energy security.

Keywords: energy security; resource assessment; renewable energy; GIS; AHP

Techno-economic analysis of a 10 MWp solar PV system to potentially lower Lanao del Sur Electric Cooperative's (LASURECO) electricity rate

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ABSTRACT

This study addresses the electrification challenges faced by LASURECO and explores sustainable and cost-effective solutions. Recognizing the benefits of solar power—such as its renewable nature, scalability, and shorter gestation period compared to conventional sources—the research focuses on the potential of a 10-MWp solar PV plant in meeting LASURECO's energy needs and reducing electricity costs. Using QGIS, three optimal sites in Marawi, Tugaya, and Ganassi were identified through site suitability assessments. PVSyst was then employed for solar PV design, as well as for technical and financial assessments at these locations. The study found that configuring 30,768 PV modules on 5.2 hectares of land could potentially lower electricity costs by 13-26% compared to current rates. The financial model, based on a 70:30 debt-to-equity ratio, requires a capital investment of approximately 168 million PHP from the cooperative. Despite this substantial upfront cost, economic evaluations estimate an IRR of 12% and a ROI of 45.7%, underscoring the project's long-term viability. Therefore, this study advocates for the immediate deployment of a 10-MWp solar power plant at the identified sites as a strategic solution to bridge electrification gaps and enhance energy security and affordability in Lanao Del Sur.

Keywords: electricity affordability; solar PV; GIS; PVSyst; electric cooperative

A Way of LIFE: Instituting effective measures to implement RA 11285 (The Energy Efficiency and Conservation Act of 2019) by the employees of the City Government of Pasig

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ABSTRACT

The Energy Efficiency and Conservation Act of 2019 enabled Local Governments to be part of the nation's quest towards Energy Efficiency. Zooming the implementation in the City Hall of Pasig, the law was faced with mixed results. Despite scoring exceptional scores during the Department of Energy's energy audit of the Pasig City LGU Administration Building, there were unverified reports of "superficial" compliance. Airconditioning units and lightings are not compliant with utilization standards side-by-side with anecdotal information suggesting mismanagement of electronic office equipment. Using a quadrumvirate of methods: survey, key informant interviews, independent utilization of the same audit checklist, and comparison of energy consumption before and after the implementation of the EE&C Act, the results of the study uncovered opportunities for improvement. The work also spawned various mechanisms to raise the bar of EE&C implementation in the workplaces of the Pasig LGU in hopes of translating awareness to behavioural change.

Keywords: Local policy implementation; Energy utilization; Energy sustainability; Energy conservation; Energy efficiency

Case Study of Third Party Provider for a Philippine Government Building under the Expanded Roof-mounted Solar Program

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ABSTRACT

The development of solar power using private Roof-mounted Solar Providers (RSPs) is one of the strategies adopted by the Philippine government in meeting its target of 35% Renewable Energy share in the power generation mix by 2030. In order to evaluate this arrangement, a case study of developing a Roof-mounted Solar Facility (RSF) on one of University of the Philippines Open University's (UPOU) buildings is examined. A conceptual design of a RSF is made for one of its buildings. This design is then evaluated using Discounted Cash Flow (DCF) Analysis from both the point of view of UPOU as a government entity, as well as from that of the private RSP. The project is economically feasible for the government entity at a hurdle rate of 10%. On the RSP's side, the project can make economic sense at a Weighted Average Cost of Capital of 14.97% even if the electricity rate is set 46% lower than that of the Distribution Utility (DU). Thus, it is feasible for the Philippine government to engage private RSPs to develop and maintain rooftop solar facilities on its behalf since the arrangement makes economic sense for both parties.

Keywords: Philippines solar; Partnership for renewable energy; Solar contracting

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QUANTIFYING THE HEALTH FACTOR AS A MEDIATOR OF THE POLLUTION-PRODUCTIVITY RELATIONSHIPS IN INDONESIA

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ABSTRACT

Pollution (in this term, air pollution) is an environmental phenomenon that negatively impacts the lives of the broader community and harms all aspects of the human dimension, such as health and the economy. This study aims to quantify the impact of pollution on worker productivity in developing countries using longitudinal data from Indonesia in two periods (2007 and 2014) and utilizing satellite data to represent air pollution data better. This study uses an instrumental variable (IV) approach and expands it by quantifying health aspects as one of the transmissions in the relationship between pollution and productivity. The result is that pollution negatively impacts worker productivity, with a dominant negative effect transmitted by health factors and determines their productivity. For this reason, the government is involved in tackling increasing pollution to minimize the increase in disease cases while minimizing economic losses from this phenomenon in the future.

Keywords: Pollution; Labor Productivity; Instrumental Variable (IV); Mediation Analysis; Developing Country

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Transaction costs of Indonesia's Just Energy Transition Partnership

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ABSTRACT

A Just Energy Transition Partnership (JETP) is a climate finance mechanism, comprising a host country and an International Partner Group (IPG). It is part of a global initiative that has committed to providing billion-dollar financial packages to partner countries in the developing world. However, implementing a multilateral partnership requires a lot of effort and many transactions to be successful, since JETP consists of multiple stakeholders. Transaction costs (TCs) refer to the costs incurred in the process of developing a partnership. There is a gap in the knowledge related to exploring the transaction costs associated with the JETPs. This study adopts a mixed-method case study approach for JETP Indonesia. By combining a scoping review of the gray literature, document analysis of JETP documents, and interviews, the study provides an in-depth analysis of both the types and drivers of TCs associated with JETP Indonesia. This study finds that asset specificity, uncertainty, frequency, legitimacy, and accountability influence the TCs in the partnership governance of the JETP Indonesia. Thus, JETP Indonesia and IPG should strengthen the institutional framework, ensure inclusivity, improve cooperation and coordination, be more transparent and realistic in communication about the JETP, improve data accessibility, and set up an independent monitoring system.

Keywords: JETP Indonesia; Climate finance; Transaction costs; Partnership governance; Mixed method

Micro-Hydro Mini-Grids for Sustainable Agriculture Enterprise Development for Isolated Communities in Ulu Papar

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ABSTRACT

Malaysia's aspiration towards Net Zero by 2050 requires major shifts in policies, energy generation, and consumption patterns. Producing energy is no longer the sole focus of a 98% electrified nation; the emphasis has shifted towards cleaner production, empowerment, and energy democracy. Initiatives such as large scale solar (LSS), net-energy-metering (NEM), and the upcoming mini-grid-based energy trading system have spurred renewable energy growth yet overlooking inclusive electrification needs. Understanding the needs of various stakeholders is critical. This study examined input from multi stakeholders, focusing on empowering rural communities in agriculture through low carbon energy transition. By applying the multi criteria analysis with multi-helix actors and focus group discussion enables funders to understand the gap in the development of sustainable agriculture enterprise for these isolated communities. These approaches were validated through interviews, providing milestones for community members, local authorities, state, federal governments., academicians and funders. The study suggests upgrading on the micro hydropower systems to help develop a low carbon agriculture enterprise. Results indicate that a multi-criteria analysis approach, incorporating stakeholder input, is essential for effective low carbon energy transition and improvement on socioeconomic for rural community in Malaysia as a means toward the macro-outline for Malaysia's net zero ambition.

Keywords: low carbon energy transition; micro hydropower; socioeconomic; sustainable agriculture enterprise

Lake Danao Natural Park as an Additional Raw Water Source for Ormoc City's Water Supply System Project: A Valuation through Contingent Valuation and Production Function Approaches

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ABSTRACT

Ormoc City has been actively improving its supply system over the past years as it lacks natural reserve. This study aims to explain how a natural reserve such as Lake Danao Natural Park can contribute to solving the pressing issues of water deficiency in Ormoc City. The objective of the study is to evaluate the present condition of the households' water use in Ormoc City and determine their willingness to pay, its factors and reasoning behind, for the improvement of water supply and sanitation through Contingent Valuation and Production Function Approaches. Results show that the demographics have a significant linear relationship to the willingness to pay of the respondents. The study also presented the estimated population's willingness to pay for a better and improved water supply and sanitation through processing Lake Danao as an additional water source for the city. In conclusion, further valuation research on Lake Danao Natural Park may be explore more to enhance the management of the natural resources resulting to its possible contributions to the community.

Keywords: Ecosystem; Lake Danao; Valuation; Willingness to Pay

Treasures of Sasmuan: Exploring the State, Challenges, and Conservation Responses in the Coastal Wetlands of Pampanga

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ABSTRACT

The Philippines is among the world's 18 mega-biodiverse countries, showcasing an exceptional array of flora and fauna. Notably, it also holds a remarkable standing in plant species diversity, claiming the fifth spot worldwide. The Country's biological wealth is further underscored by its significant species endemism, with 25 plant genera and 49% terrestrial wildlife. The avian population also thrives, positioning the Philippines fourth rank in bird endemism. Sasmuan Pampanga Coastal Wetland sprawls across a vast expanse of 3,500 hectares. This ecological gem garnered international recognition in 2021 as a Ramsar Site or Wetland of International Importance. Standing as the eighth Ramsar Site in the Philippines and the first in Central Luzon. As a Ramsar Site of International Importance, the Sasmuan Pampanga Coastal Wetland represents a unique and valuable ecosystem facing various challenges. By exploring its current state through descriptive and spatial analysis, the drivers and pressures impacting the ecosystem, and the ongoing conservation responses, this study aims to understand the significance of preserving the Sasmuan Pampanga Coastal Wetland. It provides recommendations for enhancing conservation efforts to ensure the long-term sustainability of this biodiverse coastal wetland.

Keywords: Biodiversity; Wetland; Coastal; Pampanga; Sasmuan

Incidences of Fire in Hospital Buildings as an Emerging Anthropocene and Overarching Need for Fire Safety for Patients A Literature Review

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ABSTRACT

Climate change has affected people all over the world. Extreme heat in tropical countries has been evident, and it is getting hotter. Hence, fire incidents are inevitable. Numerous news reports highlight instances of hospital fires in third-world countries, such as the Philippines. Existing studies say that hospitals have poor fire safety measures (Aslani & Habibi, 2018). The reviewed literature identifies commonalities in the study of various hospitals globally, along with an analysis of their fire resilience. This study contributes to the literature about fire safety as a dimension of hospital resilience. The methodology will operate in two phases. First, we assess the literature by comparing and contrasting the published pre- and post-COVID periods. Secondly, we analyze the perspective on fire resilience according to its geographical location. The aim is to apply the gathered literature to determine the resilience of hospitals to fire with the changes brought by the pandemic. Also, the study wanted to understand how published literature varies based on the economic development of the country. The Findings based on presented literature expand the theoretical knowledge that government policies, fire preventive assessment and compliance of hospital administration to fire preventive programs are needed more in developing countries globally.

Keywords: Emerging themes; Safe spaces; Socioeconomic change; Walking Narrative; Secured Environment

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A Youth View from Indonesia: How Induction Stoves Contribute to the Nation's Energy Transition

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ABSTRACT

Cooking significantly contributes to global energy demand and CO₂ emissions. In Indonesia, a major consumer of Liquefied Petroleum Gas (LPG), much of this demand is met through imports. Transitioning to greener energy sources, like solar cookers and induction stoves, is crucial. However, challenges arise with induction stoves due to concerns about electricity availability and installation costs. Engaging Indonesia's youth in this transition is essential. This study explores the adoption of induction stoves from the youth's perspective, using a framework combining the Value-based Adoption Model (VAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT). Key factors examined include Performance Expectancy (PE), Perceived Alternative Value (PAV), and Conversion Cost (CC) towards Conversion Intention (COIN). Surveys will be conducted with 192 young people aged 12-42 years who currently use LPG. The data will be analyzed using Partial Least Squares Structural Equation Modelling (PLS-SEM). Findings suggest PE and PAV significantly influence COIN, with PAV mediating the effect of PE, while CC does not significantly impact COIN. These results highlight a strong inclination towards sustainability and readiness to adopt new technologies despite cost concerns, providing valuable insights for policymakers to design youth-oriented energy transition programs.

Keywords: energy access; youth perspective; induction stove

AGRICULTURE RESIDUES FOR SUSTAINABLE AVIATION FUEL (SAF) AND ENERGY PRODUCTION

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ABSTRACT

Agricultural residues, often considered by-products of crop and livestock production, have emerged as a promising feedstock for sustainable aviation fuel (SAF) and energy production. This paper explores the potential of agricultural residues as feedstock for SAF and energy generation, emphasizing their benefits in reducing greenhouse gas emissions and promoting circular economies. We review various agriculture residue sources and its conversion technologies, including biochemical, thermochemical, and hybrid processes, assessing their efficiency, scalability, and economic viability. The paper also discusses the challenges associated with feedstock variability, logistical considerations, and technological limitations. By analysing case studies of okara powder waste in Vietnam and recent advancements in the field, we provide insights into optimizing the utilization of agricultural residues and highlight policy implications for fostering innovation and integration into existing energy systems. Initial analysis results of bio-oil released from a fast pyrolysis process of okara powder waste shows that this residue is phenolic and alcoholic, which might be suitable for upgrading into SAF. Our initial findings indicate that with targeted research and development, agricultural residues can significantly contribute to sustainable energy solutions and climate mitigation strategies.

Keywords: Okara powder waste; pyrolysis; sustainable aviation fuel; bio-oil; sustainability

Predictive Analysis of GHG Emissions Using Machine Learning: A Case Study of Indonesia in Achieving Net-Zero Emissions

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ABSTRACT

This study aims to examine Indonesia faces a challenging journey towards achieving its net-zero emissions target by 2060. This research presents a predictive analytics framework for informing greenhouse gas emissions in Indonesia utilizing machine learning tool. Given the complexity of climate variables and the urgency of effective climate policy, evaluation methods are insufficient. The framework aims to provide actionable insights into the effectiveness of existing climate policies and future strategies. Methodologically, the research uses quantitative which involve data collection from international databases, data preprocessing, and then applying machine learning algorithms for predictive analysis by utilizing time-series. The findings indicate a significant correlation between the model's predictions and existing climate data, thereby validating its applicability in policy assessment. By integrating this predictive model into climate policy, the study offers data-driven approach to climate governance, bridging the gap between technological advancements and climate data. This research contributes both to the academic discourse in predictive analytics and GHG Emission, as well as providing a practical tool for policymakers in Indonesia working towards the 2060 net-zero emissions goal.

Keywords: Predictive Analytics; Greenhouse Gas Emissions; Machine Learning; Climate Policy; Indonesia's Net-Zero Emission

ENSURING THE BUILDING A SUSTAINABLE FUTURE: INTEGRATING ENVIRONMENTAL SAFETY POLICIES AND ENERGY MANAGEMENT OF MYANMAR

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ABSTRACT

This paper explores the intricate relationship between Myanmar's environmental safety policies and energy management practices. The paper discusses how robust environmental safety protocols can support energy use. Includes exploration of opportunities to reduce environmental impact and operational costs. The study examines existing frameworks and case studies to identify best practices in integrating socioeconomics and energy management. This research will provide a comprehensive understanding of the factors influencing the integration of environmental safety and energy management, leading to actionable recommendations for building a sustainable future. In addition, the role of technology is analyzed and the potential advantages of a holistic approach are discussed. By examining the synergies between these two critical areas, this research aims to provide valuable insights and inspiration for organizations seeking to enhance the environmental performance of countries in the ASEAN region and achieve sustainable operations.

Keywords: Energy; Environment, Policy; Socioeconomics; Sustainable

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STAKEHOLDER CONSULTATION FOR ENGAGEMENT OF YOUTH AND VULNERABLE COMMUNITY IN THE JUST ENERGY TRANSITION PROCESS

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ABSTRACT

This study explores the challenges and opportunities for youth participation and vulnerable community engagement in Vietnam's Just Energy Transition process. Using a descriptive quantitative survey of 176 youth and local consultation with 24 youth leaders and vulnerable community members, the study identifies three main challenges for youth to execute their energy transition initiatives including financial accessibility, project implementation skills, and support from local authorities for legal procedures. The findings also show that people living in poverty in remote areas and ethnic minorities have limited access to renewable energy due to pricing and technology awareness constraints. In addition, local people living in the renewable power plant areas demand for earlier consultation, more job opportunities, and better compensation prior, during, and after the plants are constructed. The study proposes a multi-stakeholder approach to promote youth actions and local empowerment towards energy transition through: (1) Increasing financial access, easier disbursement, and legal procedure support from public and private sectors for local initiatives; (2) Systematic education, awareness raising, and capacity building provision at all levels on energy transition and project implementation; (3) Youth and local engagement in the decision-

making process. This approach aims to create an inclusive and sustainable mechanism towards Just Energy Transition.

Keywords: Energy Transition, Youth, Vulnerable Community, Empowerment, Inclusion

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Blue Carbon Offset Mechanisms: Assessing Needs and Potential Impacts of Mangrove Conservation and Carbon Trading in Indonesia

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ABSTRACT

Blue carbon, referring to the carbon stored by coastal ecosystems such as mangroves, seagrasses, and salt marshes, is essential for mitigating climate change. Indonesia possesses a substantial blue carbon capacity, with CO₂ storage potential estimated at 400 to 600 gigatons. However, this capability remains largely untapped, with only a few carbon capture and sequestration (CCS) projects currently in Indonesia. Effective carbon offset mechanisms are increasingly important, especially in the context of Indonesia's rapid industrial expansion and deforestation. Existing regulatory shortcomings, such as inadequate standardized procedures and oversight, limit the effectiveness of these efforts. This study explores the necessity of clear governance and cross-sector collaboration in regulating carbon trading. Properly implemented policies could harness the potential of Indonesia's mangrove ecosystems, enhancing carbon storage while also supporting coastal defence, biodiversity, and local livelihoods. This study utilizes bibliometric analysis and GIS mapping to evaluate carbon storage capacities, alongside sentiment analysis with Orange AI to gather public feedback on policy initiatives. The findings aim to inform the development of a comprehensive carbon trading system, fostering sustainable funding for mangrove conservation within blue economy and broader ecological. This study seeks to address critical environmental issues and promote Indonesia's sustainable development through effective carbon trading strategies.

Keywords: blue carbon; carbon offset; policy; blue economy

Exploring the Potential Enabling Factors of Indonesia's Coal-Fired Power Plant Early Retirement: A PESTLE (Political, Economic, Social, Technical, Legal, and Environmental)-Based Analysis

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ABSTRACT

To achieve the Paris Agreement temperature limit target, phasing out coal from the global energy system is imperative. Indonesia has committed to reducing emissions in its energy sector and instituted regulations for retiring coal-fired power plants. However, significant inhibiting factors confront Indonesia's coal transition process. Existing research on coal phase-out predominantly focuses on developed countries in the Global North, leaving uncertainties about the pathways for countries in the Global South and emerging economies. This study investigates potential enabling factors for Indonesia's early retirement of coal-fired power plants. Employing a multi-method approach integrating document analysis and semi-structured interviews with thirteen experts, the research uses thematic analysis to highlight the interconnection of energy transition dimensions based on the PESTLE framework. Our research found that the most substantial potential enabling factors are found within the legal (the supply-side policy) and economic (the demand-side policy) dimensions. The current policy framework mainly addresses the supply side, as shown by the coal-fired power plant moratorium, but lacks market pull for the demand side, such as carbon finance and renewable energy incentives. Addressing this issue requires establishing a commercially viable coal phase-out scheme, emphasizing the integral link between coal plant retirement and renewable energy deployment.

Keywords: Coal-Fired Power Plant; Early retirement; Energy transition; Emission reduction; Renewable energy

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Navigating Energy Transition: Vietnam's Legal Insights and Experiences for ASEAN

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ABSTRACT

To achieve net-zero emissions by 2050 and the decision to join the Global Coal to Clean Power Transition Statement, Vietnam has made positive strides in balancing a growing economy with increasing energy demands and the need to reduce carbon emissions in an energy system heavily relying on fossil fuels. As Vietnam progresses towards a more sustainable energy future, its legal framework plays an important role in facilitating this transition. By analyzing Vietnam's laws and regulatory mechanisms, this research identifies key factors that underpin the efficacious implementation of energy transition policies. Additionally, it elucidates the achievements and obstacles encountered by Vietnam's legal apparatus in its trajectory towards energy sustainability and examines analogous challenges and shared experiences within the ASEAN region regarding energy transition objectives. The study proffers strategic recommendations grounded in Vietnam's practical experiences, positing that the nation's legal practices in energy transition exhibit substantial congruence with prevailing international laws and multilateral agreements to which Vietnam is a signatory.

Keywords: net-zero emissions; energy transition; energy sustainability; Vietnam; Vietnam's legal system; ASEAN

Social Perception and the Feasibility of Household Rooftop Solar Power in Southeast Vietnam

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ABSTRACT

The global shift towards renewable energy is gaining momentum in developing countries, including Vietnam. In recent years, Vietnam has emerged as a competitive player with intensive national implementation of renewable energy. The unique context of Vietnam's energy landscape, coupled with the urgent need to address the increasing energy demands and environmental challenges, makes the feasibility of household rooftop solar power a particular research topic. The scope of this research is Ba Ria-Vung Tau province (BRVT), located in Southeastern Vietnam, and is one of the top electricity producers in the country. Vital as it is, there is limited scholarly work on energy transition and its influence on the local socio-economic activities of BRVT and vice versa. A case study on household solar energy via surveys is conducted with 73 household respondents. It aims to understand the social perception of household RTS based on the supports and constraints of existing policies and how social attitude can influence the development of RTS in BRVT and Vietnam. The results show that the local household RTS installation rate is low, but demands for household RTS are positive, and customers' decision-making is driven by comprehensive price competitiveness, installation and post-service costs, convenience, and climatic impacts.

Keywords: Rooftop solar power; Vietnam; Policy; Social perception

UNDERSTANDING THE LANDSCAPE PUZZLE: INTEGRATING LANDSCAPE CHARACTERIZATION FOR EFFECTIVE FLOOD MANAGEMENT PLAN IN BACOR CITY, CAVITE

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ABSTRACT

Communities in Bacoor City, Cavite, Philippines are presently at risk of flooding emerging from rapid urbanization. Along with this situation are landscape-based solutions that must be prioritized for the city's flood management practices that may potentially reduce damage to human life and properties. The communities in Bacoor City, Cavite, Philippines were considered in this study as potential sources of best practices that can inform other urban and peri-urban communities on good flood management through the intervention of Landscape Architecture. This research employs SWOT-PESTLE Analysis, DPSIR Analysis, and Landscape Character Assessment to evaluate all environmental features of the city. These methods were preassigned to investigate their advantages in studying the landscape and its capacity to provide valuable insights to characterize the city's landscape to produce a better flood management plan. This research utilizes a multifaceted approach, which includes desk reviews, observations, interviews with key informants, mapping, and Landscape characterization. By doing so, an integrated flood management plan set in a spatial context was the result leading to determining strategic areas, nodes, and networks that are crucial, thus serving also as potential flood management reference for other communities with similar conditions especially in the Philippines.

Keywords: Landscape Characterization; SWOT and PESTLE Analysis; DPSIR Analysis , Landscape-based solutions; Flood Management Plan

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