DECARBONISATION PATHWAYS FOR INDONESIA'S BUSES INFRASTRUCTURE (DIBI) USING ROUTING ENERGY ESTIMATION TOOL, RENEWABLE ENERGY AND ECOSYSTEM MODELLING

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Introduction

Indonesia's transport planners will use Australian software to digitally twinning bus depot infrastructure, enabling the introduction of electric buses. This will be cost-effective and scalable, generating demand for Indonesian batteries made from lithium and nickel. The study will analyze energy efficiency, thermal comfort, and harmful pollutants in major bus terminal buildings, aiming to reduce harmful emissions and support sustainable public transportation.

Background

- Indonesia's energy sector generated 600 million tons of carbon dioxide (Mt CO2) in 2021. Transportation contributes to nearly 29 % of the country's CO2 emissions, where 90 % is emitted from road transport.
- Indonesia's transport sector is a major source of greenhouse gas emissions, with CO2 emissions reaching 149,538 thousand tonnes in 2023, accounting for 22% of the country's total emissions.

Objectives

01 The study will analyse a major bus terminal building's energy efficiency and thermal comfort.

02 The study will measure (with the aim of reducing) several dangerous pollutants, including particulate matter, carbon and nitrates.

03 A major aspect of the project will be to evaluate how electric buses could affect different groups of people based on gender equality, disability, and social inclusion (GEDSI) criteria.

04 This evaluation will help in developing and executing sustainable public transportation to support wider energy and transport equity objectives.

"Our recommendations will inform the development of a better system, from inception to implementation."

Preliminary Findings on GEDSI

- Demographic researchers suggest that women generally constitute about 51% of the population in the majority of countries. Our study, the first of its kind on a bus terminal in Surakarta, focuses on thermal/noise comfort and air pollution levels. Our survey shows that women make up an even larger portion of transit users (77% of the total passengers). We found that, amongst others, air pollutant (such as PM2.5 and PM10) levels were exceeding WHO safe levels and that most users (73%) perceived the terminal as "warm to hot" due to the poor terminal design.
- The Palur Terminal Survey by the DIBI-KONEKSI Project indicates that a greater focus is needed on gender equity policies to support women's employment, as females make up only 22% of employees compared to 78% male employees in May 2025.

Research Phases

1. A conceptual framework for decarbonisation effort of public transport system: a scoping review
2. A comparative evaluation and optimisation of various technology options for decarbonisation of public transport system: A case of Indonesia
3. Decarbonisation Pathways for Public Buses Infrastructure: A Case study from Indonesia KONEKSI DIBI Project

Data Collection Process

- Semi-structured interviews of potential users of the different types of passengers, including the different vulnerable GEDSI groups (including women, children, senior citizens and people with disability.
- Focus Group Discussions (FGD) with the Project team, Indonesian stakeholders.
- On-site Observations.
- Project notes, Documents.
- Secondary data from published articles and reports.

Partner Organisations

UNIVERSITAS SEBELAS MARET UNS · ICENERGY INSTITUTE · itp RENEWABLES · ICLEI Local Governments for Sustainability · BRIN · UMN · EVENERGI · Surakarta

KONEKSI Knowledge Partnership Platform Australia - Indonesia · UNIVERSITY OF CANBERRA · NEVCE National Electric Vehicle Centre of Excellence · DECARBONISATION of ELECTRIC BUSES DIBI-KONEKSI (AU-ID) Project

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