

**TRANSFORMATION OF PASSENGER TRANSPORTATION MODES AT
BESAKIH TEMPLE: TOWARDS SUSTAINABLE MOBILITY**

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ABSTRACT

Besakih Temple is the center of Hindu religious activities in Bali which is visited by thousands of pilgrims every year, especially during major ceremonies such as Betara Turun Kabeh and Eka Dasa Rudra. The increase in the number of pilgrims has a direct impact on the transportation system in the area. The massive use of fossil fuel-powered motor vehicles causes congestion, air pollution, and disturbances to the tranquility and sacredness of the temple area. This study aims to examine the current condition of passenger transportation and to develop a strategy for transforming transportation modes towards a more environmentally friendly and orderly system. The approach used refers to the principles of sustainable mobility, operational efficiency, and local wisdom values, especially the Tri Hita Karana concept which emphasizes harmony between humans, nature, and God. The results of the study show that the implementation of electric vehicles, better traffic management, and the provision of integrated public transportation can be effective solutions. This transformation of transportation modes is expected to support the smooth implementation of religious ceremonies, reduce negative impacts on the environment, and maintain the spiritual values inherent in the Besakih Temple area. Therefore, sustainable transportation planning is an important step that must be encouraged through cooperation between the government and other community stakeholders.

Keywords: pura besakih; passenger transportation; sustainable mobility; electric vehicles; environmentally friendly transportation; religious ceremonies

INTRODUCTION

Besakih Temple, located on the slopes of Mount Agung, is the center of spiritual and religious activities of Hindus in Bali as well as an important religious tourism destination for both local people and foreign tourists. Every year, thousands of visitors come to Besakih Temple, especially during large-scale religious ceremonies such as Panca Wali Krama and Eka Dasa Rudra. The high volume of visitors poses serious challenges to the passenger transportation system in the area, especially related to congestion, limited parking space, and the environmental impact of motor vehicle emissions. (Wiguna et al., 2022) showed that during large ceremonies, the traffic system in the Besakih Temple area experiences a high degree of saturation, especially at several major intersections. The use of VISSIM software in traffic simulations shows that the implementation of flow re-arrangement and right-turn prohibitions can reduce the saturation level by more than 35%. This indicates that strategic intervention in traffic management is needed to support the comfort and smooth mobility of visitors. In addition, the results of a study (Ni Nyoman Andayani et al., 2023) from the Bali Land Transportation Polytechnic confirmed that the parking capacity in the Besakih Temple area, although it has been improved, it still faces limitations in dealing with the surge in the number of vehicles during peak religious ceremonies. This imbalance between parking capacity and demand has exacerbated congestion and prompted the need for a systemic approach through the provision of alternative modes of transportation.

In recent years, efforts to transform transportation modes towards a more sustainable system have begun to be initiated by various parties, including local governments, managers of sacred areas, and community groups. This transformation involves the implementation of environmentally friendly transportation modes such as electric vehicles, rearranging traffic patterns, restricting private vehicles, and providing shuttle-based public transportation to connect parking points with the main area of Pura Besakih. Similar initiatives have also been implemented in the Ubud area as a spiritual and cultural tourism area, where shuttle systems and private vehicle-free zones have been gradually implemented to reduce traffic pressure and pollution (Tama et al., 2021).

However, the transformation of transportation modes in sacred areas also faces social and cultural challenges. (Viona Rosalia Berti & Purnama, 2023) emphasize that the commodification of sacred areas such as Pura Besakih, due to tourism development, can have an impact on changes in the religious values and spirituality of local communities. Therefore, the transformation of transportation modes must not only be oriented towards technical efficiency, but also consider the solemnity and preservation of sacred values. This study aims to comprehensively examine the process of transformation of passenger transportation modes at Besakih Temple, identify the challenges and opportunities that exist, and evaluate the extent to which these changes contribute to the goal of sustainable mobility. Through a descriptive- qualitative approach and field studies, this journal is expected to provide strategic recommendations for the development of transportation in other sacred areas in Indonesia that face similar problems.

METHOD

This community service activity was carried out on May 18, 2025 in the Besakih Temple area by ten students of the Bali Land Transportation Polytechnic with a participatory approach and based on local wisdom. The main objective of this activity is to introduce the concept of Passenger Transportation Mode Transformation at Besakih Temple: Towards Sustainable Mobility. The implementation of the activity began with direct observation and communication with traditional leaders, temple caretakers, and the ceremony committee in order to gain a comprehensive understanding of the mobility and logistics patterns that have been implemented during religious activities. The results of the observations were used as the basis for compiling educational materials in the form of brochures and infographics based on the values of Tri Hita Karana, namely Parahyangan (maintaining the sanctity of the temple), Pawongan (involving local communities), and Palemahan (using environmentally friendly transportation modes), as stated by (Pitana, 2010) and reinforced by (Nurita, 2022) who emphasized that the implementation of Tri Hita Karana is an important basis for the development of sustainable tourism and mobility in Bali. The educational material was delivered through field socialization activities focused on the parking area and main entrance, with delivery methods in the form of verbal appeals, direct assistance at the location, and distribution of information media by students to pilgrims and visitors. The main focus of the socialization was to introduce the use of electric vehicle-based shuttle bus services provided by the committee, as part of an effort to realize a transportation system that supports environmental sustainability and maintains the solemnity of the sacred area of Pura Besakih. This approach is in line with studies (Pamungkas et al., 2025) and (Mahalana, n.d.), which emphasize the importance of integrating electric vehicles into the public transportation system as a sustainable solution, especially in environmentally and culturally sensitive areas. In addition, the participatory method that involves local communities in every stage of activity implementation also refers to the results of research (Purnamawati et al., 2022) and (Suacana et al., n.d.), which emphasize that

community empowerment and the involvement of traditional leaders are key factors in the success of local wisdom-based programs and religious ecotourism in Bali

RESULTS AND DISCUSSION

This community service activity was carried out for one day in the Besakih Temple area, with the aim of introducing the transformation of passenger transportation modes based on local wisdom in sustainably supporting the implementation of religious ceremonies. The approach used was participatory and cultural, involving traditional leaders, ceremony committees, pemedek, transportation managers, and the local community to ensure that changes in the mobility system are in line with local values and community needs.

1. Field Observation Results

Observation activities conducted by students of the Bali Land Transportation Polytechnic found that visitor mobility in the Besakih Temple area is still dominated by private vehicles, both two-wheeled and four-wheeled. This causes congestion, especially on the main access route to the temple, especially on big piodalan days such as Panca Wali Krama. The limited parking area around the sacred area is also unable to accommodate the surge in vehicles, so many vehicles are parked irregularly on the shoulder of the road, which causes total congestion and disrupts the smooth flow of traffic. In addition, the level of public and visitor awareness of sustainable transportation modes is still relatively low. Most visitors are not yet aware of the free electric vehicle- based shuttle bus service that has been prepared by the committee, and tend to prefer using private vehicles for reasons of comfort and flexibility.



Figure 1. Students conduct field observations



Figure 2. tudents record the arriving worshippers

2. Implementation of Socialization

The socialization conducted by the Bali Land Transportation Polytechnic student team received a fairly positive response from most of the pemedek and tourists. The delivery of educational materials arranged in the form of brochures and infographics based on the Tri Hita Karana principle has proven effective in attracting attention. This material not only conveys technical information about transportation services, but also touches on spiritual and local cultural aspects that are relevant to the context of the existence of Besakih Temple as a sacred area. The direct delivery method through verbal appeals and assistance in the field also makes it easier for visitors to understand the importance of using environmentally friendly transportation modes. Several visitors who previously did not know about the existence of the shuttle bus finally found out about the free shuttle bus service that had been provided by the committee so that pemedek and tourists chose to use the service after receiving an explanation from the team.



Figure 3. Brochure on Transportation Mode Transformation at Besakih Temple



Figure 4. Student Awareness Program for Religious Visitors

3. Challenges and Opportunities Analysis

The transformation of transportation modes at Besakih Temple aims to overcome congestion and pollution caused by private vehicles by providing environmentally friendly electric vehicle-based shuttle buses. This effort not only supports sustainable mobility but is also in line with the local wisdom values of Tri Hita Karana which emphasizes harmony between humans (pawongan), nature (palemahan), and God (parhyangan) (Octaviani et al., 2024). The great opportunity of this program lies in its ability to create an image of environmentally friendly tourism, support carbon emission reduction, and strengthen local community involvement through spiritual and cultural approaches (Putu Mahyuni & Agung Tistha Dewi, 2021). However, this transformation also faces challenges, such as the lack of supporting infrastructure such as bus stops and shuttle bus information systems, as well as weak initial socialization from the committee before students participated in educating pemedek and tourists. This indicates the need for continuous education and a community-based approach so that people's behavior can change as a whole. In addition, regulatory support, cross-sector collaboration, and a sustainable financing system are needed to ensure the operational continuity of this transportation service, as in a similar study on the development of electric buses in Jakarta (Huda et al., n.d.).

4. Implications for Sustainable Mobility

The transformation of transportation modes at Besakih Temple has positive implications for sustainable mobility in the sacred area, where the use of electric vehicles as the main mode of transportation is not only able to reduce carbon emissions and suppress air pollution previously caused by fossil fuel vehicles, but also significantly reduce traffic density and minimize congestion, especially during major religious ceremonies, as well as strengthen the integration of local wisdom values such as Tri Hita Karana which integrates technical, spiritual, social, and environmental dimensions into a sustainable transportation system, as shown in studies on the development of ecotourism and green mobility in Bali based on the principle of harmony between humans, nature, and God (Runa, 2012; Tourism Business Management Study Program, Bali State Polytechnic, Indonesia et al., 2025)

CONCLUSION

The transformation of passenger transportation modes at Besakih Temple has had a positive impact on environmental sustainability and smooth mobility during religious activities. Students of the Bali Land Transportation Polytechnic have successfully introduced a free electric vehicle-based shuttle bus service to pilgrims and tourists through a participatory and educational approach. Visitors began to understand the importance of using environmentally friendly transportation after receiving direct socialization in the field. However, limited infrastructure and the habit of using private vehicles are still challenges that must be overcome together. Therefore, the government, pilgrims, tourists, stakeholders and local communities need to continue to collaborate so that sustainable transportation systems can be implemented consistently and widely in other holy areas in Indonesia.

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