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## Alternatives selection for sustainable transportation system in Kasongan City

Evan Buwana <sup>a\*</sup>, Hayati Sari Hasibuan <sup>a</sup>, Chairil Abdini <sup>b</sup>

<sup>a</sup>*Environmental Science, Post Graduate Programme, University of Indonesia, Salemba Raya Rd., Jakarta*

<sup>b</sup>*Ministry of State Secretaria of The Republic of Indonesia, Veteran Rd., Jakarta*

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### Abstract

Kasongan City is the district capital of Katingan which has 128.906 ha area. Since the first, community of Kasongan City have used Katingan river as a public transportation lines, but in recent years the development of road is increased significantly. It has give impact for growth of motorcycles that reached 91,9% in year 2013. Transportation sector contributes about 53.33% of the total CO<sub>2</sub> emissions produced per year. This paper discusses the most important criteria and choose the appropriate alternative to develop sustainable transportation systems in the Kasongan City using Analytical Hierarchy Process (AHP). Analysis result show the most appropriate alternative is optimize the integrated road—river transportation systems. Social acceptance become the main aspects that must be met in order to increase economic activity. Implementation of this alternative is realized by develop the integrated transit locations in Kasongan City, this program could increase public transport users and reducing CO<sub>2</sub> emissions.

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\* Corresponding author. Tel.: +62 8197991331; fax: +0-000-000-0000 .  
E-mail address: [buwana@live.com](mailto:buwana@live.com)

## 1. Introduction

Regulation of The Minister of Transportation Number 49/2005 about National Transportation Systems explains that the integration between infrastructure and facilities of transportation is an important factor to support the provision of sustainable transportation services. Transportation plays a role to improve the economy by providing access for trading and services in various sectors (Wahidi, 2013). Transportation system has an influence on the population dynamics, urbanization, urban form, economic growth, and environmental quality (Sjafruddin, 2009).

Development of existing transportation systems in big cities such as Jakarta and Bandung proven to provide an economic positive contribution, but on the other hand it has not synergize with the availability of public transportation. Transportation problems arising because any gap between supply and demand, such as the unfulfilled of integrated transportation network. It make traffic flow increased, became a culture that thrives on community, this situation make some people difficult to switch from private to public transportation. Sustainability transportation system should be developed in order to create the infrastructure optimization, support energy efficiency and support the renewable energy resources (Hasibuan, 2014).

Meanwhile, the transportation system in Kalimantan could not accelerate the regional economic development. The existing local potential was not supporting by integrated transportation system at the district level or as nodes around economy. Kalimantan highway development objectives is to provide access that can touch the entire district as a potential economic node region (MP3EI, 2011).

The development of river-based transportation system in Central Kalimantan is also noteworthy because Central Kalimantan has large rivers as their potential (Chandrawidjaja, 1998). River in Borneo such as Barito River and Katingan River used for trade activities, as a source of livelihood, connector district to another district, and also support other activities that affect to the social and cultural life (Sari, 2008). Sometimes, investors initiate the development of transportation infrastructure (e.a roads, bridges and pier) to linking business areas (MP3EI, 2011).

Kasongan as the capital city of Katingan Regent considered strategic because it is adjacent to the Capital City of Palangkaraya in Central Kalimantan. Kasongan city became the center of administrative development, trade and transport node and as well bypassed Katingan River that supports economic activities around Kasongan (RPJMD Katingan, 2013). Kasongan City population growth year 2012-2013 has increased to 2.4%. The population growth is much greater if compared from the previous years (BPS, 2014). The challenges of urban areas is to manage the growth in urban areas with a moderate way that can contribute to sustainable development in order to prevent the impact of carbon emissions and resource consumption in the transport sector (Hasibuan, 2014)

Bupati of Katingan Regent establish local policies to implement the Green City Development Program (P2KH) for Kota Kasongan in November 2014 ago. One of important variable in the Green City is the availability of Green Transportation System (BLH Katingan, 2014). Improved transportation systems in Katingan Regent, especially in the Kasongan City is one of the development missions of local government period 2013-2018. Base on medium-term development plan (RPJMD) of Katingan Regent year 2013, local Government have two strategies to achieve the mission. The first strategy is to optimize the road base transportations, while the second strategy is to optimize an integrated transportation system between road and river transportation. River transportation development program not explicitly mentioned in the document of RPJMD the Katingan Regency.

Transportation program until year 2014 focus to establish the land base transportation infrastructure. Road length in the City Kasongan from 2008 to 2013 increased from 33.82 km length road becomes to 95.92 km. Evidently, roads and bridges construction encourage people to use private vehicles to transport activity because efficiency of travel time, The explosive growth of private vehicle users type of motorcycle that reached 86.58% of the total number of motor vehicles in 2013 (BPS, 2014). Consequently, exceeded of the transportation infrastructure carrying capacity and cause the congestion (Kuncoro, 2010). The implications of the use of private vehicles in Kasongan make the transportation sector became the largest contributor for CO<sub>2</sub> emissions, whereas according to Penalosa (2002).

'*Angkot*' and '*klotok*' as public transportation was decreasing due to the difficulty in obtaining income. Potential CO<sub>2</sub> emissions in the Kasongan City 2010 was 42,706.34 tons/year with the amount of emissions from motor vehicles reaches 22,772.17 ton/year whereas the portion of the land transportation infrastructure and building area is only 2% of the total Kasongan City area (Simarmata *et al.*, 2014). This situation need to managed properly, because it potentially growing and cause congestion, discomfort and other problems (Suwarno, 2012). Therefore, this

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