

WEIGHTAGE OF CRITERIA FOR ROAD GREEN PLANNING AND
PROCUREMENT IMPLEMENTATION

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DEDICATION

This report is dedicated

To my understanding and supportive supervisor, who consistently giving guidance and support,

To my beloved husband, parents and especially my mother in-law, for the encouragement and sacrifice in taking care of my beloved son during my journey to complete this report.

To my baby boy, for the understanding. Remember, what we learn with pleasure we never forget, so learn and grab the knowledge.

Thank you.

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ABSTRACT

Malaysia's Government immerse serious effort and initiative to implement the agenda of sustainable development which relatively increase the adoption of green construction practices. The initiatives includes the introduction of The National Green Technology Policy (NGTP), The National Renewable Energy Policy and Action Plan (NREPAP), Construction Industry Transformation Program (CITP), and Green Procurement as well as Voluntary Green Rating Tool System. Among the challenges in adopting green policies and initiatives in government projects along its lifecycle from inception to operation & maintenance, is seen due to a limited element of green initiatives in line with current sustainable policies that bind inside a contract. Since Malaysia has highly attention on the green infrastructure especially for highways and roads, this study aims to propose new criteria suitable for green planning and procurement in Malaysia's road development project until the operation & maintenance of the road. A survey and Focus Group Discussion were conducted in Perak, under Perak State road project whereby the maintenance contract are managed by Public Work Department (JKR) and Ministry of Rural Development (KPLB). The data collected were analysed with the help of SPSS using Factor Analysis. The study found that green planning and procurement is needed to be embedded in green policies and initiatives in Malaysia's road development project and road maintenance. However, there are vast challenges and barriers of green planning and procurement implementation that needed strategies and action to be overcome including; Lack of awareness of green planning implementation; Green planning lead to higher project cost to its green technology; Lack of clear measurement of green performance; the manufacture of green products is found in a slow responsive production whereby many green products is still under the development stage; and furthermore the Green suppliers are limited. This study proposed the weightage of criteria and sub-criteria of green planning and procurement that suitable to be considered in the contract governance of road projects.

ABSTRAK

Kerajaan Malaysia telah melaksanakan usaha dan inisiatif yang serius untuk melaksanakan agenda pembangunan mampan yang secara relatifnya meningkatkan adaptasi amalan pembinaan hijau. Inisiatif ini termasuklah pengenalan Dasar Teknologi Hijau Kebangsaan (NGTP), Dasar Tenaga Boleh Diperbaharui Kebangsaan dan Pelan Tindakan (NREPAP), Program Transformasi Industri Pembinaan (CITP), dan Perolehan Hijau serta Alat sukarela Sistem Penilaian Hijau. Antara cabaran dalam mengadaptasi dasar dan inisiatif hijau dalam projek kerajaan sepanjang kitaran hayatnya dari awal hingga ke peringkat operasi dan penyenggaraan, dilihat kerana elemen terhad inisiatif hijau yang segaris dengan polisi lestari dirangkumkan di dalam kontrak. Memandangkan Malaysia sangat memberi perhatian kepada infrastruktur hijau terutamanya lebuh raya dan jalan raya, kajian ini bertujuan untuk mencadangkan kriteria baru yang sesuai untuk perancangan dan perolehan hijau dalam projek pembangunan jalan raya Malaysia sehingga operasi dan penyelenggaraan jalan raya. Satu tinjauan dan Perbincangan Kumpulan Fokus telah dijalankan di Perak, di bawah projek jalan Negeri Perak di mana kontrak penyelenggaraan diuruskan oleh Jabatan Kerja Awam (JKR) dan Kementerian Pembangunan Luar Bandar (KPLB). Data yang dikumpul dianalisis dengan bantuan SPSS menggunakan Analisis Faktor. Kajian mendapati perancangan dan perolehan hijau diperlukan untuk diterapkan ke dalam dasar inisiatif hijau dalam projek pembangunan jalan raya dan penyenggaraan jalan raya Malaysia. Walau bagaimanapun, terdapat cabaran dan halangan yang besar dalam perancangan dan pelaksanaan perolehan hijau yang memerlukan strategi dan tindakan yang perlu diatasi termasuk kurangnya kesedaran mengenai pelaksanaan perancangan hijau, perancangan hijau membawa kepada kos projek yang lebih tinggi untuk teknologi hijau, kurangnya pengukuran prestasi hijau, pembuatan produk hijau didapati dalam pengeluaran yang responsif agak perlahan dimana banyak produk hijau masih berada di bawah tahap pembangunan; dan tambahan pula pembekal bahan-bahan hijau adalah terhad. Kajian ini mencadangkan wajaran kriteria dan sub kriteria perancangan dan perolehan hijau yang sesuai untuk dipertimbangkan dalam tadbir urus kontrak projek jalan raya.

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CHAPTER 1

INTRODUCTION

1.1 Introduction of Study

Malaysia's Government immerse serious and initiative to implement sustainability development and increase the adoption of green construction practices. The green technology agenda in Malaysia has been headed by the Ministry of Energy, Science, Technology, and Environment & Climate Change (MESTECC). The National Green Technology Policy (NGTP) is launched in 2009 and focuses on low carbon growth, conservation of energy, technology localization, heading towards sustainable development, conserving the environment, enhancing public education and awareness of green technology. Another policy that launched in 2010, which the National Renewable Energy Policy and Action Plan (NREPAP) is established to enhance the utilization of indigenous renewable energy resources thus directly contributes towards national electricity supply security and sustainable socio-economic development. In addition, the Construction Industry Transformation Program (CITP) (2016-2020) has become Malaysia's national agenda to transform the construction industry aiming to transform the construction industry through four strategic thrusts: Quality, Safety, and Professionalism, Environmental Sustainability, Productivity, and Internationalization is also carrying capacity to promote sustainable development agenda with sustainable construction.

Parallel initiatives, MyHijau Program also commenced under NGTP (2009), which is also one of the government's initiatives to encourage green technology and green purchasing. The concept of green procurement in this program is a platform to promote the sourcing and purchasing of green products and services in Malaysia. However, Malaysia's construction industry still faces a challenging in shifting the stakeholders and implementation process via standard of branding to a greener mode of operation. In a project development practice, key decisions in the early stages have

the most direct impact on a project's life cycle which influenced the design stage, construction stage as well as operation and maintenance stage. Green planning and procurement adoption at the inception stage of project development are seen as being one of the most important and powerful agents of change to have important tools that are capable to integrate green practices throughout the project development process and maintenance.

Recent movement and trends of green building and infrastructure development introduced green rating tools that accepted as the scale of measurement on building and infrastructure sustainability. However, the implementation toward the contract inclusion and its governance need to be clearly stated and bind into the statement of contract. Many building green tools have been established from a long time ago since BREAAAM 1990. However, the recent development of the road rating tool might need more focus on infrastructure whereby the 'unique linear construction' called for the importance of green planning and requirement to the procurement, in example on the green road projects.

For this chapter, the background of the problem is described to reveal the research problem. Aim and objectives of this research are also identified as well as the scope of works and expected finding.

1.2 Problem Background

Focusing on road construction in Malaysia, the development has begun since before independence in 1957. The road system in Malaysia was connecting main cities between the other cities linking Johor Bahru in the south with Kangar in the north and Kota Bharu on the East Coast. After independence in 1957, rapid development planning is done to improve the road system. In Malaysia, State Roads and Municipality Roads are the longest roads that contribute to the road network system which is about 165,326.63 km followed by 14,886.84 km Federal Roads and 2,000.88 km Toll Highways. (Public Works Department, 2017).

State roads generally comprise of the primary roads providing intra-state travel between the district administrative centers. Accelerated Rural Road Program (ARRP) since 1977 initiated by governments with its initial aim to speed up and increase the number of road construction projects in providing a transportation system that is significantly needed in rural areas. The road construction in rural areas is increasingly developed and the rural transportation system is improving and expanding. This lead to more road construction projects and maintenance in the rural area. In 2015, the ARRP received the highest amount of project allocation which reached the cost of RM 781,323,000.00 (Ministry of Rural Development, 2019). This is shown the rapid development of roads in the rural area.

In line with the rapid development of road construction projects and maintenance in a rural area, the initiatives by governments toward green construction cannot be neglected. According to Dwaikat and Kherun (2018), the General Assembly of the United Nations had raised and formulated a global agenda for change to achieve several strategic goals related to long-term environmental issues. This triggered the concept of sustainable development or sustainability which was defined as meeting our needs considering the ability of future generations to meet their own needs. Furthermore, green construction is introduced as an approach to achieve sustainable development. It aims to minimal usage of natural resources for construction as well as operation and reduces the overall impact on the natural environment. This is included reducing waste throughout all the stages of construction, conserving resources through reuse and renewal strategies lowering the levels of pollutants and reducing greenhouse emissions.

Furthermore, the green technology agenda in Malaysia has been headed by MESTECC. There are some policies established as a green approached for the construction industry since 1979. The Malaysian five-year Development Plan, the NGTP, the National Energy Policy (NEP) and the National Policy on Climate Change (NPCC) play a significant role in guiding the construction industry towards the sustainability agenda. (Bohari, et. al., 2015). After 2006, CIMP, CITP, and NREPAP are launched aims to guide the industry into becoming more sustainable in delivering its projects.

Concerning that, green planning and procurement are one of the criteria that play a vital role in governing the adoption of green initiatives and policies. The adoption of green procurement in roadway development would be a major concern of the construction industry to enhance industry practices in a green, safe and economical manner. Decisions in early planning affect the design stage, construction stage as well as the operation and maintenance stage. The elements in the project contract play a crucial measure in the development of green roads and govern the implementation of any green road criteria such as materials, economy, social, environment, construction, designs, operation and maintenance criteria. The strategic framework for green procurement is still being developed in Malaysia and this will provide a set of specific guidelines for the purchase of green materials and services. It also creates a foundation of awareness that will trigger the need for action by every industry player (Bohari, et. al., 2017).Problem Statement

Sparrevik, et. al., (2018) stated that policy-driven efforts are included in the procurement process as contractual requirements and often based on legislation. This is resulting compliance of regulatory and tailored to comply with present procurement law. Besides that, Wong, et. al., (2016) highlighted that the important parts of green procurement include the selection of contractors and setting the environmental requirements in the contract. This showed that the construction procurement is a vital tool to govern the sustainable requirement and manage environmental issues involved in construction projects and maintenance.

Green procurement takes into account all lifecycle stages in the construction sector. This is included from raw material extraction, material transportation, manufacturing, product packaging, storage, and handling to the product's use and disposal or recycling (Wong, et. al., 2016). This is also included a process in the life cycle of a project which is planning, design, construction, operation, and maintenance stage. Malaysia faced challenging in adopting green policies and initiatives in government projects and maintenance. This is seen due to a limited element of green initiatives in line with current sustainable policies bind contract. Hence, green planning and procurement criteria are seen to be substantial and the element of these criteria would be identified in this study.

However, there is a very limited green element that put into the project contract which is the implementation of green planning in contract and procurement in the industry involving government projects and maintenance. Thus, the needs of green planning and procurement to spell out in the contract to govern the green policies and initiatives towards sustainable development should be identified. The major elements of green planning and procurement also will be identified in this study. Next, this will lead the proposal of new criteria that suitable for green planning and procurement in Malaysia's road development project and maintenance.

This study, develops ambiguity on several questions to be discussed lead to the aim of study.

- i. To what state of implementation of green planning in contract and procurement in Malaysia's development project and maintenance?
- ii. What are the challenge and barrier of green planning and procurement implementation in road development project and maintenance?
- iii. What are the criteria should be consider in green planning and procurement in Malaysia's road development project and maintenance?

1.3 Research Aim and Objectives

This study aims to propose a new criteria that suitable for green planning and procurement in Malaysia's road development project and maintenance. The objectives of this study are:

- i. To identify the needs of green planning and procurement to govern the green policies and initiatives in Malaysia's road development project and maintenance.
- ii. To investigate the challenges and barriers of green planning and procurement implementation.
- iii. To propose the weightage criteria of green planning and procurement to be considered in the contract governance.

1.4 Scope of works

This study is conducted in Perak. The data is obtained from the Perak State Road project and maintenance contract. The sampling choose for this study which is included road of Public Work Department (JKR) and Ministry of Rural Development (KPLB). This study did not cover the contract and procurement used by the local authority's or municipal road project development.

1.5 Expected Finding

In response, this report presents findings based on survey from industry practitioners' perspective in terms of their knowledge base of green planning and procurement adoption and practices in Malaysia.

The study is expected that the respondents agree that green planning and procurement are important to be bind in a contract in order to govern the sustainability elements included green policies and initiatives. This could be in the term of Standard of Practice (SOP), Specifications as well as Contract Administration.

Besides that, the main challenges and barriers of green planning and procurement implementation could be highlighted in this study. Thus, actions to overcome the barriers should be done and a comprehensive green elements consideration should be clearly stated in the contract.

Last but not lease, from the focus group discussion (FGD) conduct, the main criteria of green planning and procurement to be considered in the contract governance would be recognize in this study.

Therefore, this study aims to propose a new criteria that suitable for green planning and procurement in Malaysia's road development project and maintenance.

There are five criteria with highest weightage as a new criteria that suitable for green planning and procurement in Malaysia's road development project and maintenance.

1.6 Significant of Study

The finding from this research is expected to offer a significant contribution to propose a new criteria (Green planning and procurement) that suitable for Malaysia's green road assessment tools. By adopting green planning and green procurement in contract governance, it enhances industry practices in a sustainable development manner. The ignorance of green planning and green procurement would significantly reduce if its implementation is a mandatory by the government.

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