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A review of biofuel policies in the major biofuel producing countries of ASEAN: Production, targets, policy drivers and impacts

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ABSTRACT

Since the turn of this century, development of biofuels have progressed rapidly in Indonesia, Malaysia, Philippines and Thailand—the major biofuels producing countries in the ASEAN (Association of South East Asian Nations). The article analyses the biofuel polices, underlying drivers, and way forward for sustained biofuel development in these countries. Favorable regulatory and economic mechanisms have played an important role in the production, utilization and market penetration of biofuels in these countries. A large variety of biofuel support policies are in place ranging from policy targets, blending mandates, tax incentives and other financial schemes to stimulate the development and adoption of biofuels. Indonesia is leading the region in biodiesel production and Thailand is leading in ethanol production. Though each of these countries have had occasional setbacks in their production, in totality, there has been positive growth in biofuel production and an upward trend in future is likely with increased demand, consumption, enforcement of mandates and realization of policy targets. The biofuel development of these countries is motivated by several factors, mainly their concerns for energy security (e.g. to reduce the dependence of oil imports) and socio-economic development (e.g. to increase income generating opportunities). Climate change is not the primary motive of these countries to pursue biofuel development. However, sustainable production of biofuels and reliance on second generation biofuels can provide opportunities for these countries to translate their growth potential into economic revenues under carbon finance and thus address greenhouse gas emissions and climate change concerns.

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1. Introduction

Biofuels are receiving increasing global attention as an alternate energy resource as they address energy security, climate change and poverty reduction [1–5]. This can be seen from the increase of biofuel production (and consumption) around the world. From the turn of this century, till 2011, world ethanol production increased from 17 to 86.1 billion l, while that of biodiesel grew from 0.8 to 21.4 billion l [6]. Global biofuel production had annual increase of almost 13% in 2010 [7] (see Fig. 1).

Globally, Brazil and United States lead in biofuel production, and several Asian countries are also actively promoting biofuel development. Particularly in the ASEAN (Association of Southeast Asian Nations), Indonesia, Malaysia, Philippines, and Thailand have accelerated their attempts to develop the biofuel industry. For example, Indonesia and Malaysia, the two largest producers of palm oil in the world, together account for 85% of world's palm oil [4]. In order to promote the development of biofuels and its penetration in the market, these ASEAN countries have put forward policies, plans, blending mandates, incentives, etc. The rapid expansion of biofuel production witnessed over the last few years in these countries has been largely policy driven [1,8,9] (in the pursuit of energy security or lowering greenhouse gas emission or improving rural development [1,3,5,10]).

To understand how biofuel policies have promoted the growth and development in these ASEAN countries, an assessment of biofuel policies is the subject of this article. Biofuel policies for this study refer to policies, plans, programs that have been introduced to promote and regulate the production and consumption of biofuels—both biodiesel and ethanol. ASEAN is a geo-political organization of ten member countries. Indonesia, Malaysia, Philippines, Singapore, and Thailand are the founding members, and Brunei Darussalam, Vietnam, Lao PDR, Myanmar and Cambodia are the other members. For the purpose of this study, the ASEAN region denotes the major biofuel producing nations in this region, namely Indonesia, Malaysia, Philippines, and Thailand. The paper investigates the biofuel development in these countries, influence of the policies and plans to this sectoral development, including the underlining drivers promoting biofuel development, adoption and utilization in the region.

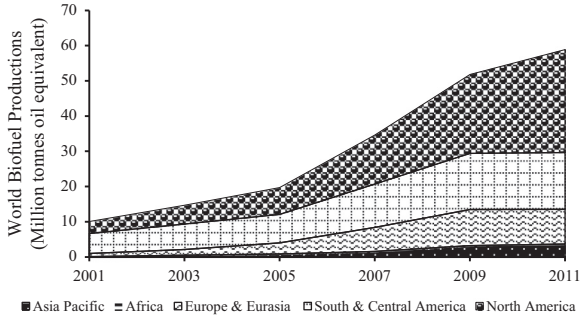

Fig. 1. World Biofuels production in million tones oil equivalent (Data obtained from BP Statistical Review [7]).

The research is based on review of literature, information and analysis of secondary data obtained from various sources, published databases, official reports and statistics. The first part of the paper reviews the biofuel policies of the selected ASEAN countries to understand in what way the policies have fostered the production and utilization of the biofuels. The second part of the paper explores the underlying drivers for biofuel development in these countries and the third part discusses the commonalities and differences. The paper concludes with a discussion on the implication of the biofuel development in these countries.

2. Biofuel policies

This section reviews the biofuel policies in the selected ASEAN countries and discusses the influence of their policies in the production and utilization of biofuels .

2.1. Malaysia

2.1.1. Policies

Malaysia launched the Four-Fuel Diversification Policy in 1981, focusing on four main sources of fuel, namely oil, hydro, gas and coal. The policy was aimed at reducing dependency on oil in energy consumption particularly in the power sector. In 2005, this policy was expanded to include renewable energy (RE) as the fifth fuel to supplement energy supply from conventional energy resources [11]. Recognizing its potential for the biofuel market, the Malaysian government in 2006, adopted the National Biofuel Policy, in line with nation's Five-Fuel Diversification Policy, to promote the production and consumption of biodiesels underpinned by five strategic thrusts (i.e. Biofuel for Transport, Industry, Technologies, Export and Cleaner Environment) and launched B5 i.e. blended diesel with 5% palm oil.

The Malaysia's policy on biofuel was formulated with an expectation to bring the following benefits (The National Biofuel Policy, 2006 [12]): mitigating effect of petroleum price escalation, savings in foreign exchange, environment friendly source of energy, new demand for palm oil, mutually beneficial effects on