SIMULATION OF BIOMASS GASIFICATION IN DOWNDRAFT GASIFIER USING ASPEN PLUS

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ABSTRACT

The purpose of this study is to study the simulation of biomass gasification in downdraft gasifier using ASPEN Plus and to identify the characteristics and chemical composition of biomass. To achieve this objective, the chemical and physical characteristics of biomass and how to simulate the biomass gasification process in downdraft gasifier using Aspen Plus were studied. Simulation of biomass gasification was done using Aspen Plus. The parameter that were used to study the simulation of biomass gasification using Aspen Plus were the effect of gasification temperature and air-fuel ratio towards the amount of syngas produced. It was observed that the gasification product which is syngas was dependent on the gasification temperature and the air-fuel ratio used.

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CHAPTER 1

INTRODUCTION

1.1 Research Background

Nowadays, demand for energy keep increasing because of many factors. Recently, the U.S. Energy Information Administration has released *International Energy Outlook 2016* (IEO2016) projects that world energy utilization will develop by 48% between 2012 and 2040. Most of this growth will come from countries that are not in the Organization for Economic Cooperation and Development (OECD), together with countries where demand is guided by stable economic advancement, mainly in Asia. Non-OECD Asia, as well as China and India, accounts for more than half of the world's total rise in energy utilization over the forecast period (Doman, 2016). Figure below shows the world energy consumption by source from 1990 to 2040.

Figure 1.1: World energy consumption by source