

Emission Reduction of Diesel Generator Engine Fueled By Dimethyl Ether (DME)

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Indonesia as a developing country populated by more than 200 million people is facing a dynamic economic activities. The growth of industrial sector, transportation and the development of commercial and residential areas are rising rapidly. All of these activities require energy, more than 1 billion oil equivalent in various forms of energy have been consumed in 2015. The industrial sector occupy the 1st rank (33.54%) in energy consumption, with the biggest portion belongs to coal consumption (220,639 BOE). After coal, comes fuel oil (gasoline, diesel fuel, kerosene, etc) with domestic demand as high as 110,691 BOE.

Rather than industrial sector, we put the focus on commercial sector, which use generator engine to provide electricity for their own purpose. Including in this sector are generator engines used for shopping centers, mini markets, apartments, hospitals and office buildings. The oil consumption for this sector is around 4 million oil equivalent annually.

The resulting emission from the activity of generator engines used in commercial sector that came from residential, shopping and office spaces contributes significantly on air pollution in urban areas and settlements. In 2014, Jakarta was the third city with high levels of pollution. Until now, the government is still attempting to reduce and anticipate such type of air pollution.

In this research, we substitute the diesel fuel used in the generator engine with Dimethyl Ether (DME), expecting the reduction of pollution level in these areas. We convert the diesel fuel in a modified generator engine to DME in our facility (Fuel Laboratory of LEMIGAS). Utilization of DME as a fuel for generator engine reduced HC emission level of more than 50% and opacity of more than 45% compared to diesel fuel. With further development of DME conversion system on generator engine, we expect emissions reduction could be even better.

Keywords: Dimethyl Ether, generator engine, emission reduction