Energy Plan of Yogya Province

By Using a LEAP Model Approach

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Abstract

World energy crisis is now happening, and the energy consumption largely controlled only by the industrialized nations of the world (Zhao 2008). According to the projections of the World Energy Agency (International Energy Agency-IEA), by 2030 world energy demand increased by 45%, or an average increase of 1.6% per year. The implication is that the security of energy supply will decrease, and the potential to trigger a global economic recession again (Connolly, Lund, Mathiesen, and Leahy (2009). This fact has been addressed by several countries to redesign its energy planning policy, as is done in China (Taoa, Zhaoa, and Changxin (2011), Thailand (Wangjiraniran, Vivanpatarakij, and Nidhiritdhikrai (2011), Turkey (Karabulut, Alkan, and Yilmaz, 2008), Iran (Ghader, Azadeh, and Zadeh, 2006), and further has been done in Sweden (Nilson and Mårtensson 2002). developed countries such as Canada (Tubss, 2008) and California (Ghanadan and Koomey 2005) even have anticipated the crisis energy with energy planning early.

Yogyakarta (DIY) is one of the provinces in Indonesia that has no fossil energy potential. All activities of the community in Yogyakarta Province is highly dependent on the stability of energy supplies from other regions, where almost all energy needs in Yogyakarta, such as fuel oil and LPG supplied from the outside area with the use of energy increasing each year. Electrical energy was supplied from the interconnection network of Java-Madura-Bali (JAMALI) because there are no power stations to fulfill the electricity demand of Yogyakarta. This means that all activities of the community in Yogyakarta province is highly dependent on the stability of energy supplies from other regions. By this phenomenon, the Government of Yogya Province, as the opinion of Cai, et.al (2008) and Connolly, Lund, Mathiesen, and Leahy (2009) was supposed to do the proper planning on energy supply in order to build the strong energy security to fulfill the energy needs of society. Energy planning in order to secure supply of energy is an important agenda for energy policy in Yogya (Stern, 2011), if not Yogyakarta will have serious energy issues that will affect to the economy and public welfare.

Energy plan in order to secure supply of energy is an important agenda for energy policy in Yogyakarta, so that energy usage can be optimized. For the purpose of this research we developed econometric models by using LEAP (*Long-range Energy Alternative Planning*) software. LEAP software will be generated an energy plan based on energy scenarios that is Business as Usual (BAU) scenario, Moderate (MOD), and Optimistic (OPT) scenario. In the BAU scenario, the calculation of energy forecasts are based on the pattern of energy use as they did in the base year. OPT and MOD scenario was developed based on the energy policy of intervention in terms of energy conservation and renewable energy. Based on the approach of energy final use and the three scenarious: BAU, Mod, and Opt, obtained the distinctions of energy consumption resulting from each scenario, elasticity levels of energy use and carbon emissions.

Base on that scenario projection of energy demand of Yogyakarta Province shows that Overall demand for fuel oil in 2030 was 6861.35 thousand BOE, BOE Thousand 6782.24, and 6651.82 thousand BOE respectively for BAU scenario, MOD, and OPT. At the same period the demand for electricity is at 2417.11 thousand BOE, BOE Thousand 1994.96, and 1807.06 thousand BOE respectively for BAU scenario, MOD, and OPT. Demand for LPG in 2030 was 1156.29 thousand BOE for the BAU scenario and the MOD and 1151.49 for OPT scenarios. Demand for energy-dense types consisting of coal, coal briquettes and firewood in 2030 amounted to 31.01 thousand BOE, 25.04 thousand BOE and 25.65 thousand BOE respectively for BAU scenario, MOD, and OPT. GHG emissions based on the scenarios that have been prepared showing that the

impact of the implementation of energy efficiency and renewable energy can reduce greenhouse gas emissions generated by the use of energy to run the activity sectors.

Based on a series of analyzes that have been conducted, Energy elasticity of Yogya Province using BAU scenario until the end of the projection is greater than 1 (e> 1), both for electricity and fuel. This condition illustrates that the energy consumption in the Yogya province have not been efficient or wasteful, due to increase of 1% economic growth requires energy in larger quantities. Meanwhile, based on Optimistic scenario by including aspects of energy conservation policy as outlined above, elasticity DIY Energy until the end of the projection record numbers smaller than 1 (e <1), both for electricity and fuel. This shows that with the implementation of conservation programs that Yogya can optimize energy use becomes more efficient.

Key Words : Energy Plan, LEAP, Yogya Province, Scenarios, Energy Elasticity

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