

Bioenergy Development Policy in Indonesia

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Introduction

It is believed that there is a need for compliance to the national energy in line with population growth and development acceleration in Indonesia. To date, Indonesians still depend on the non-renewable resources particularly petroleum and coal. The reserve energy tends to decline to which it would not be able to meet the long term human requirement. As a result, the government of Indonesia (GoI) attempts to develop the alternative energy substituting the conventional fuels.

Due to limited availability of fossil energy, the GoI has targeted the national use of energy transformation. In other words, it is necessary to diversify energy resources in order to secure the supply of energy. This is related to the development of bioenergy as an integral part of new renewable energy. Some crops can be processed into bioenergy sources such as oil palm, corn, cassava, sugarcane, jatropha, *sunan* candlenut, and manure.

Key features

It is noted that energy plays a very important role in improving economic activities including the national security. Consequently, energy should be managed in terms of processing, provision, and utilization in a manner that is equal, rational, optimal, integrated and sustainable. The utilization of bioenergy would be a potential market in Indonesia. There is an opportunity of about 22.26 million kiloliters of bioenergy to be developed into biodiesel, bioethanol, and kerosene or fuels substitution in the country (Table 1).

Table 1. Targeted utilization of bioenergy in Indonesia (million kiloliters)

Type of Bioenergy	2015	2020	2025
Biodiesel	3.80	4.60	10.22
Bioethanol	1.95	2.83	6.28
Kerosene substitution	1.27	1.83	4.07
Fuel substitution	0.53	0.76	1.63
Total	6.92	10.02	22.26

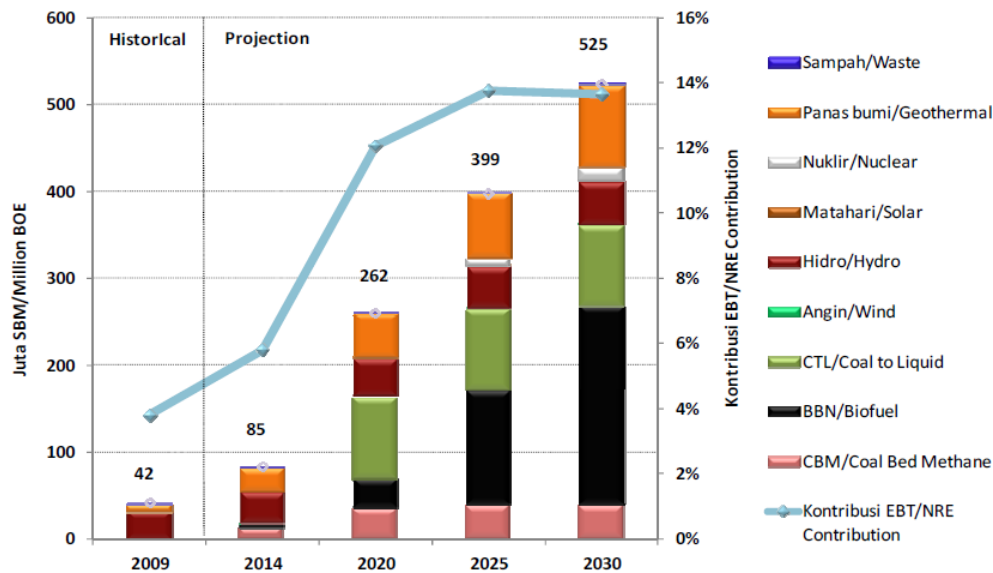
Source: Indonesian MEMR (2005)

Fig. 1 shows the development projection of new renewable energy (NRE) in 2015-2030. **First**, in 2014, the total availability of RNE would below 100 million BO (Barrel of Oil Equivalent) or about 2% of national energy requirement. This availability comprises CBM (Coal Bed Methane), hydro power plant, and geothermal. Within this year, bioenergy is excluded. **Second**, in 2020, it would be achieved at 7% includes CTL (Coal to Liquid), geothermal, hydro power plant, biofuel (about 0.5%), and CBM. **Third**, in 2025, the total availability of NRE would increase to 10.5% including bioenergy (increased about 4%). **Fourth**, in 2030, the total availability of bioenergy would increase to 6.5%.

In the period of 2005 to 2025, the GoI has planned some targets related to the production, utilization, and marketing of alternative energy derived from various sources toward decreasing fossil energy use. In 2015, it is targeted to produce energy derived from wind of about 750 KWh (kilowatts) while biodiesel would have produced and consumed at least 3% of diesel fuel or 1.5 million kiloliters. Moreover, the production and utilization of

gasohol (a premium mixer) derived from bioethanol, starch, and *nira* of about 3% of national premium fuel consumption.

Fig. 1. Projection of NRE provision and contribution ratio of NRE in Indonesia, 2009-2030



Source: Permana A.D., 2011

Policy framework

At least there are three reasons why there is an NRE development in Indonesia. They are: (1) energy is one of its basic needs; (2) the dependence of fossil energy is still high with limited reserve; and (3) NRE resources have not yet been optimized. Hence, the strategic roles of NRE are as follows: (1) increasing installed capacity of energy facility generation; (2) substituting the current uses of petroleum-based fuel; (3) accelerating the modern energy access for rural and remote communities; and (4) contributing in mitigating GHG (Green House Gas) emission.

The strategy of RNE development and utilization is as follows: (1) improving the national electricity supply through the development of geothermal and hydro power plant; (2) improving the electricity access in remote areas, small islands, and border areas with micro hydro and solar power plants; (3) developing the bioenergy power plant including agricultural waste and municipal solid waste to provide electricity as well as to improve the environment; (4) developing the wind power and ocean energy plant pilot projects in order to prepare the stage of commercialization; (5) utilizing the biofuel (solid, gas, and liquid) for the substitution of fuel oil; and (6) developing new energy (CBM and shale gas) commercially and employing the conventional energy business regulations and practices. With regard to this, effort to increase the utilization of NRE includes creating the market through supplying utilizing and subsidizing biofuels, regulating the feed-in tariff on selling price of NRE, and providing incentives and facilities (taxes, duties, licensing, etc.).

The NRE development is implemented through the program under government budget and private investments. The government budget program covers: (1) iconic island for renewable energy; (2) clean cooking stove; (3) self-sufficient village energy; and (4) special allocation fund for rural electrification. On the other hand, the private investment program

includes: (1) NRE for on-grid electricity; (2) NRE for fuel; and (3) NRE for rural electrification (locally available small scale, off-grid).

With regard to the self-sufficient village energy, the developed activities are based on participatory rural approach program. Some arrangements related to this program are as follows:

1. It aims at opening employment opportunity, reduce poverty, and produce biofuel.
2. The location could be placed at agricultural and fishery based or transmigrant area.
3. The plant is managed by local farmer enterprises or small and medium scale businesses.
4. The central and local governments provide contribution for plantation (seeds, grand parent stock seed, machineries etc.) through government budget.
5. The location of the program is nominated by local government. However, it is still possible that it is nominated by entrepreneurs, NGOs (Non-Government Organization), or local communities.

There are some regulations governing the development of NRE in Indonesia, namely:

1. Law No 30/2007 concerning energy, Law No.27/2003 stipulating geothermal, and Law No. 30/2009 on electricity and its derivatives. These Laws govern the priority supply and use of renewable energy of which one of them is biofuel.
2. Presidential instruction No. 1/2006 on biofuel supply and utilization as other energy.
3. Presidential Instruction No. 5/2006 concerning the national energy policy in which the production of NRE is targeted about 17% from the national energy mix by 2025.
4. Ministry of Energy and Mineral Resources (MEMR) Regulation No 32/ 2008 concerning the provision, utilization, and procedures of commerce of biofuel as other fuel to which it will be a mandatory of biofuel utilization (biodiesel, bioethanol, and bio-oil) in transportation, industry, commercial, and electricity generation sectors.
5. The MEMR Regulation No 25/2013 amended the MEMR Regulation of No. 32/ 2008 on acceleration for biofuel mandatory usage.
6. Align Regulation for NRE such as the MEMR Regulation No. 4/2012 and No. 19/2013 regarding feed-in tariff for electricity generated from bioenergy power plants (biogas, biomass, and municipal solid waste)

The Presidential Instruction No. 1/2006, in particular, established the framework for coordination among ministries to promote the supply and use of biofuel. It designates the responsibility of ministries on formulating and implementing policies, including incentives, tariffs and trading systems, as well as standards and procedures for cultivation methods, processing, quality testing, the supply and distribution of biofuel, and the provision of land and the development of research and technology. Based on this instruction, the Ministry of Agriculture has the tasks of: (1) encouraging the supply of biofuel; (2) implementing the extension program for biofuel; (3) facilitating the provision of seed and seedling plants for biofuel; and (4) integrating the development and postharvest plants for biofuel.

The observable fact shows that there is a trade-off between the allocation of lands for food and bioenergy, respectively. Therefore, to avoid this trade-off, the development of bioenergy should be directed to: (1) use unutilized lands which are available about 23.201 million hectares; and (2) use abandoned land of about 14.9 million hectares (in 2009). As a result, ensuring the sustainable food and bioenergy production should be followed by the steps of: (1) identifying the trade-off in land allocation for food and bioenergy purposes; (2) conducting the study on economic opportunity cost of land especially in terms of relationships of social cost and land degradation as well as food security and bioenergy.

Conclusion

The Grand Strategy of Agricultural Development (2015-2045) underlines that improving bioenergy development is one of the directions toward sustainable bioenergy development-based integrated biorefinery with raw material supply-based agro-ecological system. The national economy should be transformed from fossil energy to bioenergy mode. Hence, it is required to establish the comprehensive policy framework on bioindustry as a core national bio-economy development emphasizing the bio-product development. A part from that strategy, there is a need to develop trade and fiscal policies providing specific incentives to bioindustry, including bioenergy and its directive products. It is supported by partnership scheme between large-scale and small-scale bioindustries, integrated corporation, and bio product standardization.

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