

Renewable energy for a better future assignment



**ASSIGN
BUSTER**

Energy shortage is a major issue everywhere in the world, but in Indonesia, it is not only a major issue, but also an urgent problem that needs to be resolved soon, otherwise Indonesia will be in very big trouble in the near future. It is true that the government has the program “ 10, 000 MM projects” for building a new power plant, but there are too many obstacles for it to be successful in the short term. The diagram shows the increase of Indonesia electrification ratio from 1980 to 2012.

Electrification ratio is a measurement of the availability rate of electricity in a certain area, this meaner in 2012 there are approximately 22% of locations in Indonesia with no electricity, but considering the low ratio back in the sass, the Government has done a very excellent Job. There are still so many places in Indonesia that have an unstable electricity supply, or even worse, no electricity supply at all.

It is a big challenge for the authorities to supply electricity across all the islands in Indonesia, therefore natural resources, such as oil and gas, are still the primary sources for most power plants in Indonesia, especially because most power plants in small islands are off the grid. Indonesia Power Plants in 2012 43. 99% 10. 67% 35. 77% 7. 89% The pie chart illustrates the percentage of each Indonesia power plants based on the power source in 2012. The highest power generation in Indonesia (43. 99%) was produced by coal, followed by 35. 77% gas, and 7. 9% oil, and less than 11% from renewable energy (PLAN et al, 2012). These statistics illustrate how much Indonesia depends on fossil fuel to produce electricity. The use of fossil fuels to produce energy is unavoidable, but the government should consider using more sustainable sources to produce energy. If we keep using our fossil

fuels, at some point in the future Indonesia will run out of resources. It is true that now the cheapest way to produce energy is to use coal, oil, and gas, but it is not the best way to produce it, otherwise we will compromise our future generations.

In my opinion, the government should start shifting the energy mix strategy into a more sustainable one. However, while such a policy is urgently needed, the fact remains that most renewable energy technology is still under development or immature. The infrastructure development or renewable energy is still too expensive to reach a level where all risk, such as financing risk, operating and maintenance risk is manageable. Therefore, all other available resources, including fossil fuels, must be utilized more fully (Cauldron, 2003).

Tama, Ashier and Teak (2012) have predicted that by 2020, almost half of the fuel for power production in South East Asia will still be coal, followed by 40% natural gas, and less than 2% oil. The rest of the power generation will be produced either by renewable energy or nuclear power. I need more sustainable resources to reduce energy are renewable energy, such as geothermal, hydro power, biomass / biogas, solar photovoltaic, and wind. Indonesia has a huge potential in renewable energy resources that are waiting to be utilized.

It is true that renewable energy projects are somewhat more expensive, but there are so many investors inside and outside the country that can help Indonesia in building the infrastructure. Geothermal Geothermal is one of the most promising renewable energy sources in the world, and Indonesia has a

very huge potential geothermal source in Sumatra, West Java and Salaries. With approximately 28, 100 MM geothermal potential, Indonesia has a very massive percentage of the world's geothermal energy reserves (about 40%).

From that figure, Indonesia has exploited around 4% (1197 MM), consequently to rank third in the world for energy consumption from geothermal (Penile Co, 2010). Geothermal power plant installed in Indonesia has increased swiftly from 145 MM in 1990 to an approximately 1100 MM installed by 2000. But this figure only represents less than 20% of the total geothermal potential in Indonesia. The Government has established overall regulations that will support this industry through various ministries, such as the Ministry of Energy and Mineral Resource, the Ministry of Finance, and the Ministry of Environment (Mock, et all, 1997).

Building a geothermal power plant requires a high amount of investment, especially in exploration stage. Exploration stage in geothermal is a preliminary stage that uses surface data to determine the exact drilling point. It will require approximately IIS\$ 30 million to drill a hole which usually need to drill up to 20 holes to get the geothermal source. That is why the geothermal development in Indonesia has been very slow. Hydro Power Around 20% of total energy needs worldwide are produced from hydro power which is currently the world's most valuable renewable energy source.

Hydro power responsible for Half of energy supply in at least 63 countries in the globe (Gonged, 2010). The picture above illustrates how a hydro power plant produces energy. The water flows from the reservoir through the intake in the Pentecost to move the turbine, where it will generates power through

the generator in the powerhouse, and finally the electricity will be distributed through long distance power line. Hydro technology is a very mature technology that has been around since hundreds of years. Indonesia has a huge potential for hydro since there are many rivers and dams across the islands.

It is true that hydro technology is already proven, but in Indonesia, an Independent Power Producer or a hydro project developer must carefully select the best technology because every hydro project location is unique and require a specific turbine design. Furthermore, Indonesia has already developed local turbine engine for hydro power plant, so the developers will have a cheaper option for selecting their turbine. Biomass / Biogas Scientific research on bio energy to replace fossil fuels has been done in many places around the world. Is there any other way to produce energy from biomass?

There are many examples where combustion is being used as a method to make food or in a larger scale to be used in an industrial heating.

Combustion means to burn any material to produce heat, which is currently also being used to produce energy. Another technique to produce energy is decomposition, which is the separation of a substance into elements by exposure to heat, light, or chemical / biological activity, where certain parts of them will produce energy. The picture above shows the variety of materials used in the combustion and decomposition process, which are divided into three categories.

The first category is material products such as fiber, pulp, paper, lumber, plywood, and cotton. This group of material requires a combustion process to

generate electricity. Secondly, waste from consumption of any material by the consumers, for instance municipal solid waste. It must be decomposed to extract ethane, which will then produce electricity. The last one is any materials come from animals and plants (agricultural residues), for example Cutthroat carcass, corn kernel, sugarcane, feedstock. Materials come from this category could be both processed through combustion and decomposition.

In Indonesia, biomass and biogas is not as popular as hydro or geothermal, because the lack of financing option to build biomass or biogas power plant. There are also many concerns about the sustainability of biomass / biogas source of supply, because it depends on how much waste or residues made from the society. Furthermore, there are several other sources of renewable energy, namely solar photovoltaic (IV) and wind power. These sources are also available in Indonesia, especially because Indonesia is an equator country and consist of so many islands.

However there are still a few setbacks in building solar IV and wind power in Indonesia. The technology for them is not as mature as hydro power or geothermal, moreover they are not as cheap as other renewable energy source as well. It is true that the technology for solar IV and wind are gradually decreasing over the years, but in Indonesian perspective, it is still too expensive. This is why solar IV and wind power are not yet well established in Indonesia, it also very hard to find a financing option for these projects.

Financing has been a big issue for renewable energy development in Indonesia, since there are only a few options available. The banking sector does not consider renewable energy as a profitable sector, and even worse they consider renewable energy as a very risky business. The Government has to put a hand on this matter, for example making an appropriate policy that favors the renewable energy developer side, another example is to establish a proper tariff for electricity produced from renewable energy sources, so that the project will be more profitable to attract the bank.