Indonesia's Challenges and Chances to Develop Natural Resources through Youth Perspective

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Indonesia is the largest archipelago in the world. It consists of five major islands and about 30 smaller groupings. Indonesia has many fertile lands and is rich in natural resources including, forestry products, agricultural products, rubber, coffee, tea, tin, nickel, copper, oil, gas, palm products and fish. Based on these resources, it can be assumed that Indonesia is a wealthy country with a large income thanks to these natural resources. But, in reality, there are still many problems in Indonesia in regards to the developments of this country. Who can imagine that Indonesia, a country which has so many natural resources, can also be a country which lacks energy? The lack of energy access is one of the most pressing issues of this country. To expand energy access especially to rural areas, the government should look at the country's' infrastructures. The government has, however, put infrastructure as a top priority on its agenda in order to accelerate economic growth. In 2011, only 2.1 percent of the country's GDP (Gross Domestic Product) was reserved for infrastructure. In comparison, India and China spend almost 10% from GDP to invest in their infrastructure. To address the problem about energy scarcity, one action that can be taken is to enact an energy saving movement or program, either from behavior changes, or saving energy and the use of environmentally friendly technology utilization. As well as taking action on the demand side, the government could take action on the supply side by providing more support for renewable energy, such as through tax incentives. The Indonesia government must also encourage the public to adopt energy efficiency and conservation measures through public campaigns and economic incentives. It is also necessary to endorse efficient and clean energy use for both commercial and industrial sectors. Indonesia possesses a variety of renewable energy resources, including geothermal, solar, micro-hydro, wind and bio-energy. The whole explanation of the problem and solution development in Indonesia is very important to be fixed in order to support sustainable development in Indonesia, especially to increase the economy of Indonesia. As young generation, it is a mandatory to be aware of these global issues, and we do believe that Indonesia can be a developed country in the near future.

I. INTRODUCTION

Indonesia is a country that well-known as a fertile land, rich in natural resources. The total numbers of islands are Approximately, 17,508 of which about 6000 are inhabited. Straddling the equator, the archipelago is on a crossroads between two oceans, the Pacific and the Indian Ocean, and bridges two continents, Asia and Australia, also Indonesia has two seasons, wet and dry seasons. Indonesia is located between the Pacific, Eurasian, and Australian tectonic plates and has many high mountains. The highest one is over 4000 meters tall. Many of them are active volcanoes, so there are many fertile lands in Indonesia. Indonesia's most fertile land is on the island of Java. There are tropical rainforests and jungles, as well as swampy mangrove areas. Indonesia is rich in natural resources, which divided into two parts; renewable energy and non-renewable energy. Renewable energy sources include, forestry products, agricultural product, rubber, coffee, tea, palm products, fish, etc. Non-renewable energy sources include, tin, nickel, copper, oil, gas, coal, etc. Indonesia's population is the fourth largest country after China, India, and the USA. The population is a little over 250 million people.

Although Indonesia is well-known as a fertile country, Indonesia still has challenges for natural resource development. Challenges that Indonesia faces to develop the country's natural resources are:

- Country's energy demands are rapidly increasing while hydrocarbon reserves are depleting.
- Price volatility poor incentives for technological and infrastructure investments.
- Tackling climate change.
- Indonesia's management of natural resources also suffers from a lack of coordination among relevant ministries.

As a developing country, Indonesia's economic growth is increasing consistently, but there is still 25% of Indonesia not yet getting energy access, especially electricity in rural areas (Ministry of Energy and Mineral Resources of Indonesia, 2012). The high amount of energy consumption has caused an imbalance in the country's fossil energy resource exploitation (oil, gas, and coal). So, it is predicted that in the future, fossil energy reserves will run out and Indonesia will heavily depend on imported energy.

To expand energy access especially to rural areas, the government should look after the country's infrastructures. The government has, however, put infrastructure as a top priority on its agenda in order to accelerate economic growth. In 2011 only 2.1 percent of the country's GDP (Gross Domestic Product) was reserved for infrastructure. In comparison, India and China

spend almost 10% of their GDP on infrastructure investment. To address the problem about energy scarcity, one of the actions that can be taken is by employing an energy saving movement or program, either from behavior changes or by saving energy and employing environmentally friendly technology utilization. As well as taking action on the demand side, the government could take action on the supply side by providing more support for renewable energy, such as through tax incentives. The Indonesia government must also encourage the public to adopt energy efficiency and conservation through public campaigns and economic incentives. It is also necessary to endorse efficient and clean energy use for both commercial and industrial sectors. Indonesia possesses a variety of renewable energy resources, including geothermal, solar, micro-hydro, wind and

The reason the explanation of the problem, and potential solution to the development in Indonesia is very important and needs to be fixed, is that it will help to support sustainable development in Indonesia, and improve the economic level of Indonesia. We as young generation should be aware for these global issues and we do believe that Indonesia can be a developed country in the near future.

In to the title, the author has chosen to include a focus on the "youth-perspective". Why youth perspective? Most populations in every country are dominated by younger generation. In Indonesia for example, the youth ages range from 16-30 years old. Younger people can bring the biggest influence for country's development in future, especially for Indonesia.

II. OVERVIEW

Indonesia has diverse local natural resources that can empower the industries, expand the energy access to the rural areas, and support burgeoning small and medium enterprises. Those all are essential to sustain the country development.

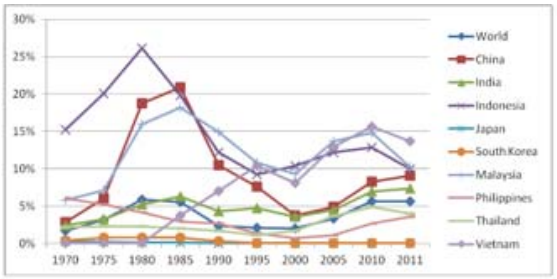

Fig. 2.1. Average Natural Resources Rents as shared of GDP (Gross Domestic Product) [5]

According to A. Gritsevskyi[7], energy has divided into some classification as the table below:

Table 2. Energy Classification [7]

Type	Renewability		Renewable	Non-renewable
Conventional	Commercial		Hydropower (large scale) Geothermal Nuclear (breeder)	Fossil fuels Nuclear (other) a/
	Traditional	Other	Solar (air drying) Hydro- (mills, pumps etc.) Wind (mills, pumps and sails) Animate (animal and human)	
		Biomass	Fuelwood "cropping" from natural forest/charcoal Twigs, leaves, sticks etc. Crop residues (straw, husks etc.) Animal residues (dung, tallow etc.) Industrial residues (wood waste, sawdust etc.)	Fuelwood "mining" Charcoal
Non-conventional	Novel	Biomass	Plantation and marine crops (for distillation, pyrolysis etc.) Biogas	
		Other	Solar (collectors, photovoltaic) Hydro (mini and micro) Wind (wind motors) Tidal, wave power Ocean thermal gradients Heat pumps	Nuclear (fusion) Petroleum from coal, shale etc. Synthetic natural gas

Natural resources are divided into two parts; non-renewable energy and renewable energy. All natural resources should be used wisely to fulfill the needs of future generations.

A. Non-Renewable Energy

Non-renewable energy sources are energy stores with zero or a minute rate of replenishment relative to their depletion by a human being. Most non-renewable energy sources are converted to usable energy by thermal or nuclear reaction. Non-renewable energy sources have stored the natural energy flux of Earth's biological and geological past of the formation of elements in the early history of the universe.

Non-renewable energy resources, including oil, natural gas and coal, constitute the majority of the natural resource rents from non-renewable resources. Overall, crude oil and coal are the major resources of natural resource rents in Asian

economies, especially Indonesia, followed by mining and natural gas.

Indonesia's petroleum and mining sectors have taken the role as key drivers in the country's transition from a developing country to a middle income country [8].

B. Renewable Energy

Renewable energy sources are types of natural energy flux useful for human needs regularly occurring on or near Earth's surface and additionally useful natural energy stores that are replenished by natural flux within the timeframe of conceivable human use. All known renewable energy sources originate in, or are close derivatives of, electromagnetic radiation of our Sun, the Earth's and Moon's gravitational fields and heat radiating from earth's interior. Renewable energy sources are practically inexhaustible, though some sources such as geothermal and ocean thermal energy conversion may be locally depleted by human use at a rate that exceeds replenishment by natural flux [7]

The renewable energy sector needs investment to encourage innovation in technologies, and to achieve their potential. It is expected that such investment will lead to a reduction of production costs, so that renewable energy will be competitive with fossil fuel in the long run.

III. CHALLENGES AND CHANCES

Growing concerns over energy security and the threat of climate change have all stimulated investment in the development of alternatives to conventional oil.

According to Fridley [1], alternative energy can be divided into two categories:

- Substitutes for existing petroleum liquids (ethanol, biodiesel, biobutanol, dimethyl ether, coal-to-liquids, tar sands, shale oil), both from biomass and fossil feed stocks.
- Alternatives for the generation of electric power, including power-storage technologies (wind, solar, solar thermal, tidal, biomass, fuel cells, batteries)

A large proportion of this demand has been met by polluting fossil fuels, mainly oil. With a production capacity of half a billion barrels per year and increasingly limited oil reserves, it is estimated that Indonesia's remaining 10 billion barrels of oil reserves will be exhausted in less than 20 years. If no new reserves are created, Indonesia will become a significant oil importing country.

As a result of declining production, oil and gas explorations are moving to the eastern regions, which means companies financing high-risk and high-cost projects that require advanced technology. In the eastern part of the country companies also have to face the challenge of a weak power and transport infrastructure, which can affect the cost and efficiency of their production.

Switching to renewable energy won't be easy. Promoting renewable energy requires structural adjustment and high levels of initial investment. Indonesia needs to strengthen its legal framework, environment and energy policy, and transparency and accountability systems.Indonesia's management of natural resources also suffers from a lack of coordination among relevant ministries.

Another obstacle is Indonesia's government system. Not only is the bureaucracy lacking in capacity and resources, but it is also riddled by inter-departmental tension at a national level. Most local governments have very limited capacity or understanding the implications of various energy scenarios. There is no established policy framework through which to encourage local government to pursue renewable energy initiatives.

Adjusting prices and removing subsidies could promote better energy efficiency and conservation. Opportunity to improve is allowed. Some studies show that Indonesia could relatively painlessly achieve increased energy efficiency by as much as 10-30% in households, 10-23% in the commercial sector, and 7-21% in industry. However, eliminating fuel subsidies has never been an easy task. Many ordinary Indonesians hate the idea of paying more for fuel, electricity and related services. Throughout the past ten years, the government has had some success at whittling away at these subsidies, but the issue remains politically contentious. [1].

According to Budiman et.al. [4], there are several different ideas that could help to reshape Indonesia's energy sector and unleash sustained growth in the decades ahead;

- Find the political will to reduce energy subsidies.
- Address the root causes behind the slow expansion of power generation capacity.
- Introduce tailored incentives for oil and gas exploration and development, including unconventional solutions.
- Accelerate the national gas infrastructure 'blueprint'.
- Upgrade existing refineries as soon as possible.
- Upgrade the fuel distribution network.
- Invest in renewable resources.
- Invest in gas for transportation.
- Promote electric vehicles in major cities.
- Build local cutting-edge capabilities and leaders.

The Government should take action on the supply side by providing more support for renewable energy. Indonesia possesses a variety of renewable energy resources, including geothermal, solar, micro-hydro, wind, and bio-energy. Indonesia has more geothermal energy potential than any other country, estimated to be 28,000 Mega Watt (MW). That amount can fill energy for 40% electricity energy.

Successful renewable energy development would address escalating concerns over environmental issues and reduce dependency on conventional energy resources. Significant investment and serious governance reforms are needed to achieve this.

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