

Energy Policy for Indonesia Sustainable Development: Zuhul

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■ Background

- ◆ World's future economic growth is heavily dependent upon energy and electricity use
- ◆ Depleting reserves and high prices for oil have had a significant effect on the role of oil in the energy mix
- ◆ Within the next 20 years, the energy mix will still be dominated by fossil energy – meaning that environmental problems will still be faced in the future
 - This is relevant to what Professor Taniguchi mentioned this morning, especially if we are committed to following the Kyoto Protocol (1997) which stipulates that 5% of emissions should be below 1990 levels

■ Structure of Primary Energy Demand in the Future

- ◆ If business continues as usual, fossil fuels dominates, constituting 90% of demand until 2020
- ◆ Indonesia still depends on fossil fuels, especially oil
 - Worse than the world figure for dominance of fossil fuels (oil, gas and coal) – World: about 90%; Indonesia: about 97%
- ◆ The same pattern will continue in Indonesia and the world, unless something is done
 - This is the responsibility of science and technology – it can play a strategic role

- Note: Although I used to be a government official (Director General for Electricity and Energy Development, and Minister for Research and Technology), I now work on campus, and I'm an academic rather than a bureaucrat – my presentation does not represent formal Indonesian government policy

■ Indonesian Energy Dilemma

- ◆ Indonesia is fortunate enough to have enough energy resources – oil, natural gas and coal
- ◆ Some of these resources have to be dedicated to earning foreign exchange (exported)
 - Indonesia is the largest LNG producer, but most of this goes to Japan
 - 2nd largest coal exporter
 - Only limited amounts of oil, but since a few years ago, Indonesia has become a net importer of oil
- ◆ The Dilemma: What should be used for domestic demand, and what should be

exported?

- To overcome the dilemma, the Indonesia government established an energy policy to secure a reliable and secure supply of energy for domestic needs

- Indonesian government aims
 - ◆ Guarantee energy availability for domestic need
 - ◆ Improve quality services
 - ◆ Guarantee long term sustainability of energy supply
 - ◆ Guarantee energy for export purposes
 - ◆ Conserve and preserve the environment

- Four pillars of Indonesian government policy
 - ◆ Energy diversification
 - Most important means for achieving our objectives
 - ◆ Energy conservation
 - Efficient energy use
 - ◆ Energy price
 - Energy in Indonesia has a social function, so energy pricing policy is significant for balancing the energy mix
 - ◆ Environment

- This presentation will focus on energy diversification in the electricity and transport sectors, and its impact on the environment

- Energy Diversification in Transportation Sector
 - ◆ The transportation sector is very important
 - From 2010, the transportation sector will dominate energy demand
 - This will become exacerbated by 2020
 - ◆ Transportation technology is geared towards oil-based technologies
 - ◆ If nothing is done in this sector, dependency on oil will remain high in the future
 - ◆ Accordingly, major efforts have been made to use:
 - CNG and LPG in cars
 - Electricity for train systems
 - Renewable energy sources, e.g. castor oil (program recently launched by the government)
 - ◆ Use of land will become critical in the future, because of competition between agriculture and energy gardens

- Energy Diversification in Electricity Sector

- ◆ In the past 15 years, Indonesia has succeeded in reducing the use of oil in the electricity sector from 77% in 1980 to 21% in 1998, by
 - Building coal power plants
 - Building natural gas power plants (including combined cycle technology)
 - Building more geothermal power plants
 - Privatization with application of legislation that petrol should not be used
 - ◆ After the crisis in 1997, oil use increased again, because of a lack of infrastructure to bring gas to Java Island (piping system not ready)
 - ◆ Now use of petrol is 30% - but confidence exists in Indonesia that if their plans can be implemented consistently and systematically that oil use can be reduced to 5% in 2010
 - ◆ Doing so, however, will not overcome environmental problems, as coal will mainly be used in place of petrol
 - ◆ Indonesia is the only “maritime” continent in the world – the nation consists of 11,000 islands
 - Java Island constitutes almost 75% of the population and constitutes about 80% of the total energy consumption for Indonesia
 - However, energy resources are scattered outside Java
 - Hydropower is located away from Java where there is no demand
 - Natural gas is found in North Sumatra and Kalimantan – far away from Java
 - ◆ When I was still Director General for Electricity and Energy Development, the ASEAN Grid program was in effect to bring more natural gas to Java (I’m not sure whether it has been continued or not)
 - ◆ To overcome environmental problems in Java, since the early 1980s Indonesia has had plans to erect nuclear power in this area
 - Feasibility studies together with the International Nuclear Agency have been carried out for an appropriate location in this area – however due to problems with social acceptance of the program, it will probably be delayed until 2016
 - ◆ Electricity production is still dominated by coal; gas is second; and renewable and new energy types remain insignificant
- Indonesia’s energy problems involve having a lot of polluting energy sources in Java
- ◆ With this in mind, future energy development in Indonesia should consider two different approaches – one for Java, and one for outside Java – to simultaneously overcome energy demand supply problems and environmental problems
 - ◆ Simulations for future gas emissions in Java Island show that if nothing is done, very severe problems will exist by 2021
 - Science and technology has an important role to help Indonesia comply

with the Kyoto Protocols, and cooperation is a must

- Two different approaches: one for Java-Bali Island, and one for outside Java-Bali Island
 - ◆ Java-Bali Island – new approaches
 - Use low sulfur coal-supply
 - Apply high thermal efficiency process
 - Use anti pollution equipment
 - Use electrostatic precipitator
 - Use fluidized bed boiler technology & other high tech boilers
 - Nuclear options – although Indonesia has seismic problems to deal with: Java is prone to earthquakes
 - Burn low quality coal in Sumatra and use AC/DC cable to bring electricity Java-Bali Island
 - ◆ Outside Java
 - Demand for electricity outside of Java is low
 - Rural electrification has an important role
 - Need to Increase the use of new & renewable energy sources
 - Specific islands have their own resources – applying new renewable energy outside of Java can provide new job opportunities
- Research and development activities (in particular through cooperation with NEDO in Japan)
 - ◆ Ocean wave energy
 - ◆ Bio-diesel energy
 - ◆ Hybrids
 - In remote areas outside of Java, usage of energy is basically for land and watching TV, etc. – in these cases, solar energy can be used in the afternoon, and conventional power plants used at night
 - ◆ Biomass
 - ◆ Energy garden
 - ◆ Hydrogen (but it is still somewhat out of reach and very expensive)
- The problem with renewable energy is that the price of electricity is still not competitive enough compared to traditional forms of energy
 - ◆ A long and consistent process of R&D and policy is needed for renewable energy to be implemented
 - Consistency in this process has been disturbed sometimes by political and economic factors
 - Cooperation is needed – especially participation from the industrial

sector...if energy is just seen as an economic commodity, the aims of Indonesia's policies will not be reached

- Role of the UN to give subsidies to developing countries enabling better high technology with low costs is important – if it is affordable for developing countries, R&D can be conducted more effectively

■ Conclusion

- ◆ The Indonesian energy sector is still heavily dependent on non-renewable fuel such as fossil fuels and natural gas as a source of energy
- ◆ These non-renewable fuels are finite and gradually depleting and also contribute to the emission of greenhouse gas
- ◆ The implementation of various policies and programs by the government of Indonesia has increased the awareness of the importance of the role of renewable energy in a sustainable energy system
- ◆ For the Indonesian archipelago, the energy solution really depends on its geographical position and natural resources

Question and Answer:

Q (Taniguchi): Two things. I was shocked when I heard that Indonesia was becoming a net oil importer – when I was working in the OECD, Shell oil experts predicted that more than 10 years ago, and we were very shocked. When you say “net importer”, you are still exporting some kinds of oil, but also importing some oil. What is the difference between the oil exported and imported? From where are you importing oil?

My second, more important question is for the Chinese expert as well, about tradable permits. Even in Indonesia, when coal is used instead of oil, gasification is needed and technology for gasification is needed. Developed countries try to buy CO₂ emission quotas from China or Indonesia. In this context, tradable permits are a good opportunity for Indonesia & China to gain technology from developed countries. Developed countries always try to get what they want by selling expensive technologies, but tradable permits, might allow you to utilize advanced technology. The Kyoto Protocol accepts tradable permits. What do you think about tradable permits? Are they good for your countries? Are they good for the world?

A: As you're aware, Indonesia now produces not more than 1 million barrels of oil (oil equivalent). Due to the economic value of Indonesia's oil, Indonesia is willing to sell good oil, and then buy lower grade oil from abroad to satisfy domestic consumption needs (domestic consumption needs are over 1 million barrels...now it is about 1.4 million barrels per day). So that means the deficit is 400,000 barrels a day - 400,000

barrels a day need to be imported to fulfill the gap. We also prefer to sell better oil and import low grade oil for energy generation purposes. Even though oil prices are going up, Indonesia does not get an economic windfall, because some coal oil is still imported...it's a no-win solution.

About the second question, I'm not sure; if you mean that in order to gain better technology Indonesia will have to sell low-sulfur coal abroad – that is the existing policy right now. We even have this kind of commodity exchange directly in our trade policy. Perhaps the Chinese representative can better answer that question.

Q (Taniguchi): My second question is concerned with tradable permits; in relation to the Kyoto Protocol decision to promote the transfer of technologies from developed countries to developing countries which need the newer technology to control the aggravation of the environment. It's a genius idea. It comes from some top-level scientists. The UN is also managing trade to try and reduce CO₂ emissions from 2008 – 2012; Japan is obliged by the Kyoto Protocol to reduce the level of CO₂ emissions to those existing in 1990. It's a hard target. If Japan assists China's industry (which currently emits heavy volumes of CO₂ emissions) with the transfer of Japanese technology, reducing China's CO₂ emissions, Japan can buy CO₂ emission quotas from China. This effectively is a trade. Accordingly, my question is mainly to China, but in the future, when Indonesia tries gasification, you can probably utilize technology from developed countries, through the system of tradable permits.

A: As far as Indonesia is concerned, if this excellent idea can be implemented in Indonesia, it would be very helpful to Indonesia. There is no indication of objection to this idea in our policy. It would put us in a good position to apply new technology at lesser cost.

Kaya: The point that Professor Taniguchi raised can be discussed in the panel discussion later – panelists may also have comments, so discussion can be saved for later.