ISBN 979-8918-28-2

THE ALTERNATIVE ENERGY

A.Hamam and J.Q.M.Judantoro

The Central Java Province Regional Planning Agency.

I.INTRODUCTION

One of the problem that Indonesia and the world should be faced and become a chalengge for nowadays is the crisis of energy. Seldom people think about energy, that energy, specially unrenewable energy could deminish or lessening and couldn't be used again for the same purpose. Even The Central Java Regional Development Planning Agency (Bappeda Propinsi Jawa Tengah), considered that geothermal is not relevant with their daily duty in development planning. They don't aware and concious that geothermal is one of the renewable energy and it need to be develop. Also many people only thinking in political matters, such as making demonstration to ask Our President (Gus Dur) resign immediately, also even the Parliament or has given the President the first memorandum, hoping that it will be followed by the second memorandum and The People's Assembly could held a Special People's Assembly which could ask the responsibility of the President and make him resign. But in fact we have no rule like "impeachment" in USA and The Philipine.As we know, energy which we used consist of 3 (three) kinds of energy :

1. Unrenewable Energy, it means that once we use this energy, we can't use it again for the same purpose. This kind of Energy incuded among aothers, oil, gas, coal, all of this are natural resources.
2. Renewable Energy, it means that after we use it, the energy don't change it's function and can be used again, with certain process or not. Renewable Energy consisit of :
   a. Solar Energy
   b. Wind Energy
   c. Water Energy
   d. Sea Wave Energy
   e. The Tidal Energy
   f. The Heat of the Sea
   g. Biomass and Biogas Energy
   h. Geothermal Energy
3. Conversion Energy, which is mean alternative energy of oil and natural gas as a process of baking paqwdwer which fermented, by the way decompostion, or change of thr organic material and will become another chemical compound with the help of various bacteria in chemical raaction or enzym, cosnsisting of various bacteria. For Example alcohol or ethanol.

According to the prediction and estimation, the need of electricity will always rising in the next few years, especially in the Island of Java. The real capacity of electricity in the Year 2015 will reach 27000 MW. This need can't be fulfilled by existing energy resources, such as, water, natural liquified gas, natural gas, earth heat, and coal. In this case we need another alternative energy that can fulfilled this needs. From now on, there is a need to investigate another alternative energy in order that the world will not be dark and make all problems a mass.

The coming need of energy such as water energy, earth heat, or geothermal, natural gas and coal sould be develop by research. Of the Indonesian NGO's led by Prof.Dr.Mohammad SA Sastroamidjoyo, has a line of business in research of wind energy, solar energy and so on. Bad prediction is that in the Year 2006, the world and specially Indonesia will be facing fuel exhaustment, of course the condition like this wil influence or electricity management, which we know that we have a bad manegement in the development and use of energy. Also we must remember that energy is not a political commodity, like the case of lesssening the fuel subsidy in the Year 1999, which formerly planned that we should received the amount we should be given as subsidy Rp 30 trillion in facat became only Rp 18,3 trillion in the Year 2000, it is the imlpication that the price fuel or oil rise about 15 percent and brought domino effect in the life of the people and state. The rise of price demonstration and other social confilct. More ironic that the Parliament as the representative of the people, through the tariff of the Parliament, which formerly agreed the option about the amount of of lessening subsidy for the next tariff of the fuel, through the Budget Committee of the Parliament, could force the Goventment to rise the assumption price of oil from $ 18 per barrel, become $ 20 per barrel. After that suddenly the Government followed the people's opinion that the Government should postpone the rising price of fuel, although the people knew that the Government has to add Rp 250 billion per month, outside the startled money (uang kagetan) for the member of the Parliament as a compensation to the agreement of The Annual State Budget (APBN) in The Year 2000. It has been said and heard before that the subsidy will be used for the welfare of the people, especially the grass-roots.

The AFTA (2003) and The APEC (2010 and 2020) will force Indonesia to compete with other countries. In this case we need policies pattern with which full of political interest, like subsidy, protection o tariff and high economy.. Data from World Development Report, shows that energy consumption in Indonesia is belong to the high category., i.e about 280 kilogram oil equivalent (kgoe). The high consumption of energy caused by 35 percent fuel subsidy in international level, besides low consiousness of the majority of our society in using unrenewable sources of energy, like oil, natural gas and coal.

Unrenewable Energy Resources in detail is still in experimental period, except hidro-power, but Sea -Wve is still in experiment, also heat and falling tides of the sea. For Wind Energy, Prof.Dr.Mohammad Sastramijoyo, has found a tool that can change wind to electric energy. This finding has got aptent right, even the Countrie like Sweden, South-Korea, Philipine, Singapore are eager to use this finding by the license. The Indonesian Government should give arespnse to this finding and support it's development., because this finding is very useful for the future, considering that Indionesia has enough wind potention. The Experiment of this finding has been tried-out in the Island of Ceram, Bima and Central Java Province, and has been succeded. This kind of energy is very important for Indonesia which consists of thousand of Island, so that The State Electrical Company Can't reach all of that Island..

Solar Energy has much being experimented and a few middle class househols has been completed by Solar Enery., but the more or most simple of use of this kind of energy is still need to

be develop. The Tidal Energy has been experimented by Research Institutions and Existing Universities, but it is still need to be develop. From the **Table-1** below we could see that The Unrenewable Energy in Indonesia is enough in supply or amount, but with current management system in using unrenewable energy, we are afraid that that the unrenewable energy will be deminished in short time. We all know that Indonesia is now selling liquified natural gas through underwater pipe to Malayasia. Is this decision to sell our liquified natural gas with full and serious consideration ? Or because only that we are now still in the economic crisis of situation and not yet recovered, and so that we need money ?

Geothermal which produce most in the use of energy in fact is still in development process, because besides it's capacity is not so much, also the problem of corrosion and scaling should be overcome. So that the choosing of material for this energy can be done carefully. Otherwise Geothermal Energy become energy that should be counted in pushing the need carefully.

We are aware that the management of geothermal in Indonesian Country could be improved so that the expenses can be consistent to real conditions in order that the selling price could be compete with the same price of from foreign countries, and in another side can help us overcome the lack of fuel.

Our Geothermal Energy with the system Centre of Geothermal Electric Energy (PLTP) has beginning to tak e it's role as an electric producer, also Solar Energy in small scale has been prepared to overcome the need of electric for smallscale household and as a source of energy in starting to move the water-pump system in an area at West of Java. It is interesting to be our thinking that Tidal Energy Sources in Indonesia has not yet much attention by the public and publication on it are rare, whereas or country which surrounded by sea, logically has this kind of energy. Investigations and researchs on Sea-Energy should also get the same attention. In **Table-2** we could see the electric renewable energy converted from Geothermal, Wind, Solar, Tidal Energy.

To realize the planning of management energy in Indonesia, we need integrated development planning from existing Stake-Holders such as The Government, which has the most important role in policy making. And then from existing Universities and NGO's, hoping that we will have new technological concepts in preparing human resources which could change the perception of the use of renewable energy in Indonesia.

II.THE ALTERNATIVE ENERGY

The alternative Energy consists of :

1. Nuclear Energy.
   Nuclear Power for producing energy with physical nuclear recation is a component from uranium and torium. The Government has build National Centre Nuclear Electricity of Powerr Energy (Pusat Lisrik Tenaga Nuklir/PLTN) aroud Jepara or Muria Area. Many people are against it, considering the experience of Chernobyl in Russia. So, the government must socialized this plan to the people that if we are use and implementing it carefully, it will be no danger. And the Government has the plan to begin this project 1n The Year 2004. We must also rmber that in The Year 2015, our need of energy will reach 27000 MW, it means that the need can't be fulfilled by existing energy resources, although with renewable energy like water energy, aerth heat, tidal energy, solar energy, sea- wave energy etc. So the first alternative is Nuclear Energy. Moreover Indonesia has many capacity of uranium, such as Kalan area, from survey's result has predicted has a reserve of 10000 ton of uranium, also Sumatra, Kalimantan, Sulawesi and Irian Jaya.

2. Ethanol.
   Another prediction that if Indonesia don't begin to do research now, to do continous search to seek alternative renewable energy substitution, within short time Indonesia will be an importing country of renewable energy. Ethanol is a reneewable energy and has great ptention. Since long time ago, ethanol has been used as fuel, even befire men find oil, ethanol or methanol has been used for cooking, room hetaing, lamp illumination, even up until noe ethanol are being used for wrong or bad purposes that can ruined our body., even ethanol is warm for the body. God has warn men in the Al Maideh Letter 90 ::
   "Allah has said : actually drinkng alcohol, gambling, idol worship and drawing fate with arrow, that's all contemptible deed, satan deed. So that thou should be far away trom those deeds to be lucky."

The ethanol producing process is very simple. It made from Cassava. We all know about Peuyeum from Bandung or what we call "tape" (special soft and sweet cassava) , are made in areas of cassava producers. But in process of making tape, in fact there is chemical processing between amelum manihot from cassava wit yeast mede from rice carbohidrat, with added some greater galingale with spring onion. Yeast in this case, is used for fermentation sources. In Organic Chemistry, the cassava flour is classified as polysacharide which contents microba, i.e sacaromyses, this yeast could produce enzym if has suitable medioum with compatible for it's need of living.

The daiastase enzym could make hydroplysis and change cassava flour to maltose sugar. With the exixting of maltose enzym, this maltose sugar hydrolized and changed to sugar glucosa. Besides that in the yeast we could find sacaromyses wich could produce zimase enzym, so that could deviede glucosato be carbondiocide and ethanol or alchohol. The Basic of ethanol producing as fuel to replace oil and natural gas, is a fermantation process. It is a conversion or change of organic material to be a new chemical composition with the help of yeast as supply of various bacteria. After this fermentation process, the result should be a gradual destilation to produce ethanol with high level/degree and qauality, it is about 95 %. The high degree ethanol could be convert to benzine or premium, solar or oil . Although the price of ethanol is now higher than benzine or premium, but in the future it could be the opposite, so that the use of ethanol could be economically cheaper. For the development of ethanol, men have try to make wahat so called gasohol. It is 20 % ethanol and 80 % benzine or premium. In the future this mixed experiment could be added more ethanol by trying to make high level or degree and better quality of ethanol.

III.CONCLUSSION AND RECOMMENDATION

Indonesia is now selling liquified gas to Malaysia through underwater pipe. Our question, is that fully considerable, considering that maybe in thr year 2015, if we don't seek and doing experiment about renewable energy, we will face big trouble in energy problem. Has the authorities made serious

considerble onit, because liqiufied gas is an unrenewable energy. We need intregrated forward planning between stake holders, who are involved in the optimalization of the use of energy as follows :

1. It need to push research and development in using renewable energy, as a substitute of conventional energy.
2. Rebuilt or reimproving National Centre of Nuclear Energy (Pembangkit Listrik Tenaga Nuklir/PLTN), considering that from glbal research, Indonesiamhas potential resources of mineral with radio-active content.Mineral Energy with radioactive content is an ideal conversion of unrenewable energy because the cost in long term are relatively cheap. But the conciousness, preparedness and safety of the people should be carefully considered.
3. The upgrading of management for neregy using conversin become basic need in using energy optimally. Because with management paradigm like now, we will know that energy are not yet been used optimally.
4. The potention of ethanol energy are very potential in substituting unreneable energy, because since former times our ancestirs had been using this kind of energy. And because ethanol is made from cassava, so we are rich o cassava, you could find cassava everywhere in Indonesia.

The Integrated Stake -Holders menioned above are as follows :

1. The Government as decision and formal legal formal policy maker, which could make a political decision in reformulating the energy development direction, specially renewable energy within a short or long period.
2. The Universities and various Research Foundations, which be hope to make technlogical concepts and so that witin shortest possible time we could have a reliable converion of unrenewable energy. The Role of The Researchers from the Universities in the field of energy are very important because we hope that within sortest possible time we could have a reliable technical conversion of energy.
3. Funding Institution, which will support the funding for the research, development and guarantee of the quality and econmic vakue of renewable energy.
4. The Consumers, which have received the burden and activitie of energy. That's why the perception and understanding level of society to the renewable energy, including nuclear energy sould be made better and solid.
5. The Law Institutions, which have a role in protecting and supervising the doer or agent of the renewable energy in order that everything can follow the agreement and rule. Because as far as now, the doer or agent of the renewable energy has done it's role consistent to it's function and do it properly, but the same steps and goals are not yet as what the existing needs is.

If the Stake-Holders could sit together and formulate the problem we all feced, and could find good or better understanding and cooperation, we believe that by "The Grace of God" the problem of energy could be going as well as we hope.

REFERENCES

Tsatsarinis, G. 1993, Thermo Economic Analysis and Optimization of Energy sytems, Washington DC.

Moran, M.J, 1989, Availability Analysis, A Guide to Efficient Energy Use, Asme Press, New York.

Ahern J.E, 1998, The Exergy Methods of Exergy System Analysis, John Wiley & Sons, New York.

Wall G, 1994, Exergy Use In The Swedish Society, Asme Press, New York.

Scientific Bulletin, 2000, Energy, The Centre of Energy UGM, Edition No.9, August 2000, Yogyakarta.

IAGI, 1985, The Explanation of Energy Map Indonesia, Geology Agency, Bandung.

Wall, G.Sciubba, E and Nasso V 1994, Exergy Use in Italian Society, Journal Energy, London.

Kotas, T.J, 1998, The Exergy Method Of The Thermal Plant Analysis, Asme Press, New York.

Table-1
RESERVE OF UNRENEWABLE ENERGY SOURCES IN THE WORLD

Oil	Middle East (70%)	Indonesia (1,1%)
Natural Gas	Russia (25%)	Indonesia (1-2%)
Coal	North-America (25%)	Indonesia (3,1%)

Table-2
ELECTRIC RENEWABLE ENERGY

Source	Installed Capacity		Production per Year	
	MW_c	%	GWh / y	%
Geothermal	7049	52.0	42053	79.6
Wind	6050	44.7	9933	18.8
Solar	175	1.3	229	0.4
Tidal	264	2.0	602	1.2
Total	13538	100.0	52817	100.0