ENVIRONMENTAL EFFICIENCY ANALYSIS

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Abstract- This research aims to measure the efficiency of environment when the countries implement Kyoto protocol or not. By utilizing The DEA method, it will be analyzed. The developed and developing countries pay attention to the utilization of energy, including members of the G20. Some important conclusions have been concluded deal with energy, efficiency and productivity.

Keywords- Energy, G20, efficiency, Productivity

I. BACKGROUND

Energy utilization is the increased use of energy in the process of industrialization and urbanization. Both developed and developing countries pay attention to the utilization of energy, including members of the G20. G20 is a collection of developed and developing countries; they are co integrated into a most influential economic power in the world. They has focused on their economic growth. Increased GDP each year by the G20 has produced the bad output anyway, one of which is CO2. To decrease the growth of CO2 production by the G20, the United Nations (UN) issued one of environmental policy namely the Kyoto Protocol. It was initiated together in Kyoto Japan in December 1997. It is also to remain consistent G20 on economic development sustainable concept. It is the one approving the Kyoto Protocol as an environmental policy that is applied in each country. Yusgiantoro (2000) explained that to look at the efficiency of energy- planning and environmental policies on economic development can use one of these approaches, ie. input-output approach. Input consists of energy consumption as a factor of energy, labor force and FDI as a factor of non-energy and the output consists of GDP which represents good output, and CO2 emissions represent bad output. This research uses G20 selected countries as samples in 2004-2014. They interpret a wide range of coverage developed and developing countries. The method used is the Data Envelopment Analysis (DEA). DEA is a non-parametric method that measures the efficiency of using the Decision-Making Unit (DMU) (Charnes et al, 1978). Bhattacharayya et al. (1997, p.335) suggests that the regulatory and imperfect market in developing countries may change the price of inputs or outputs and can complicate the measurement of cost or profit function using a parametric approach. Several previous studies such as Peroni (2012), Li-Yang and Wang (2013) have used the technique DEA in measuring the level of environmental efficiency. Based on the background described above, the formulation of the problem posed in this study are:1). What level of environmental efficiency if the Kyoto Protocol is not implemented?,2). How big is the level of environmental efficiency is lost if the policy is not applied to the Kyoto Protocol?,3) How large is the estimated cost of each of the G20 countries when applied to the Kyoto Protocol?,4). How do changes in environmental productivity in G20 countries during the implementation of the Kyoto Protocol?,5). What policy advice for each country based on the input and output target?

II. LITERATURE REVIEW

Environmental efficiency score is used to measure the level of environmental efficiency due to the utilization of energy in order to accelerate the increase in output environmental policy. Fare et al (2004) stated that pollution is automatically attached to the production process, be it in the form of input or output. Environmental efficiency can also be defined as the ability to produce a state in generating more output but also can reduce the level of pollution generated during production. Therefore the technology is very important in the reduction of unwanted output. There are two important assumptions, firstly, to reduce the bad outputs required a lot of expenses. Secondly, the scale of return to scale is variable. This means that in this case the assumption of constant returns to scale is no longer appropriate, so that the measurement of efficiency is the most appropriate using Data Envelopment Analysis (DEA). It can compare each economic unit with other economic units and provides an overview of each unit frontier. It will be used to identify whether the unit can reduce the production of pollutants and produce more good output (Charnes et al. 1978). Economic, energy, and the environment is always related to one another. The relationship between economic-environmental, Pearce and Turner (1990) stated that economic activity only make the environment as a 'sink waste' or reservoir emissions from economic activity. This is because the economic system not as a system environment that can recycle 'waste' of the production process, and therefore the economic system in the environment as one of the inputs in the production