Relationship between Energy Consumption in International Market and Indonesia Prices Regulation

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ABSTRACT

This research focuses on the relationship between Indonesia's energy consumption (IEC) and the politics of energy law in Indonesia. The main objective of this research is to analyze the relationship between energy consumption in International market and Indonesia price regulation. The principal regulatory approach was used in this study. The results of the study indicate that excessive and continuous non-renewable energy consumption tends to threaten the environment preservation and conflict with the value of social justice in Indonesia. The conclusion is non-renewable energy consumption impedes the development of a national energy law based on justice environmental sustainability.

Keywords: General, Government Policy, Regulated Industries, Sustainability
JEL Classifications: K20, K23, Q56, Q58

1. INTRODUCTION

The dynamics of economic globalization which increasingly advanced today, pushing all countries in all over the world continue to run fast in reforming all of its economic policies. However, in the field of economic implementation, the law policy sometimes cannot escape from controversy in society. Like Indonesia in 1980-2008 was known as an exporter of oil and other energy sources. However, since the resignation from OPEC membership, at the 149th conference in Vienna on 10 September 2008, Indonesia became an energy importer from International market. According to (Global, 2016) Indonesia's energy consumption (IEC) increased by 3.9%, having nearly doubled over the last 15 years. IEC is increasing rapidly (Amri, 2016; Gamoori et al., 2017; Ibrahiem, 2015; Omri and Kahouli, 2014) and all energy consuming and the increase of the demand for such imported commodities increases the demand for energy (Borozan, 2013).

In some literatures, it is stated that the increase or decrease supply and demand in the domestic market can be an indicator for policymaker and economists in formulating national economic policy. Concerning the demand side of the economy, consumption of the energy resources such as crude oil, natural gas, coal and electricity maximizes households' utility by satisfying their different needs in the form of a final consumer good (Ockwell, 2008; Stern and Cleveland, 2004). Related to the energy supply and demand (Posner, 1997) said that the economist can assist the policymaker not only by explaining the effects of a policy on the efficiency with which resources are used but also by tracing its effects on the distribution of income and wealth. However, till now the role of the state in the policy of energy prices has been a controversial issue in public debate.

In the context of legal policy, policymaker and economists are required to be able to find in solution in public debate that raises the conflict of interest among stakeholders and state. In other side, economic globalization is to force Indonesia and it has to harmonize its own legal systems with international legal system. The global economy implies the existence of many development countries open economy (Lane and Ersson, 2002) that tend to neo-liberal capitalism and contrary to the constitution basic principles of democracy the Indonesian economy is based on the

value of social justice. In other words, the constitution confers rights against government. A constitutional right is analytically much like the property rights (Posner, 1997). According to (Mattoo and Subramanian, 1997) that "A major challenge for the multilateral trading system is to secure the benefits of trade liberalization without infringing on the freedom of governments to pursue legitimate domestic objectives. The difficulty lies in distinguishing between two types of situations. In one, a non-protectionist government cannot prevent certain domestic policies from incidentally discriminating against foreign competitors. In the other, a protectionist government uses a legitimate objective as an excuse to design domestic policies which inhibit foreign competition. The challenge is to devise rules which are sensitive to the difference between these two situations, exonerating the former while preventing the latter. The approach suggested in this paper is to create a presumption in favour of the economically efficient policy measure, with departures inviting justification (Mattoo and Subramanian, 1997). Thus, it can be said that in the context of legal policy, in the energy sector of policymaker and economists, besides considering the gross domestic product (GDP) factor/ capita indicator, they also must count the fluctuation of energy prices in international markets to produce energy policies which are accurate and also continue to promote the environmental sustainability.

Since restrictive policies on energy use imply various economic benefits and costs, determining the direction of the empirical relationship between total energy consumption and economic growth is an important issue for policymakers as well as economists (Yasar, 2017).

This study aims to find a crucial question is how much the impact of energy consumption on environmental sustainability in Indonesia, especially the increase of air pollution. The empirical findings are based on data for the period of 2000-2015 in its influence on the legal policy of energy consumption in Indonesia, the methodological approach in this study is Grounded theory of Glaser and Strause (Glaser and Strauss, 1967).

I organized this paper as follows: First, section 2nd present the existing literature review, section 3rd discusses research methodology and section 4th followed by empirical results. And finally, section 5th conclusion and implication of energy policy.

2. LITERATURE REVIEW

In traditional economics the basic institutions of the market economy ware taken for granted. In the global systems outside the OECD world are described as having more of state interference, and as a legacy from the command economy or in the form of state-capitalist system as with economic nationalism. The global system consequently means the increased economic interdependencies of a set national or subnational economies, where multilateral and international public and public organizations are involved, states and firms being the main actors (Meyer, 2000). One attempts to describe the functioning of market rules stating the institutional conditions that enhance market performance (Eggertsson, 1990).

In the global economy implies of many countries including Indonesia have to open economies system. An open economy is an economy which is the moment of the opening of the activities of exports and imports have become so huge that together they constitute about 50% of the GDP of a country. In the global economy the multinational corporations (MNCs) play a major role and they propagate themselves by mean of foreign direct investment. The MNCs also encourage many governments have to adjust the national rules of economy as the world rules of economy. Unfortunately, economic regulation of the world economy has not kept pace with the evolution of either the real (Lane and Ersson, 2002). According to IMF, global economy refer to the growing economic interdependence of countries worldwide through the increasing volume and variety of cross-border transactions in goods and services and of international capital flows, and also through the more rapid and widespread diffusion of technology (IMF, 1997). National economies are undoubtedly becoming steadily more integrated as cross-border flows of trade, consumers are buying more foreign energy.

The influence of global economy to the massive national economic development of Indonesia affecting on the level of development of IEC and other impacts is the increase of air pollution level. As described by (He and Gao, 2017) that the neutrality hypothesis of no direct causal links between energy consumption and economic performance (Sharmin and Khan, 2016). Recently, (Solarin and Ozturk, 2016) examine the relationship between natural gas (energy) consumption and economic growth in 12 OPEC member countries for the period of 1980-2012.

The national level of national energy consumption should soon be followed by legal policy based on the principles of social justice and environmental sustainability (Hassine and Harrathi, 2017) explained that principally, the level of energy consumption is inversely with population growth, economic development, technological development and decreased air and environmental quality levels. In line with Hassine and Harrathi above, Fotourehchi, (Fotourehchi, 2017) in his article mentioned that basically there are a lot of studies in the literature that have examined the causality relationship between energy consumption and economic performance in confirming four above hypotheses. In terms of causality and in cross-countries and within country specific contexts, several studies have found bidirectional causality between energy consumption and economic growth, supporting the feedback hypothesis (Apergis and Danuletiu, 2014; Rafindadi and Ozturk, 2017; Tiwari, 2011; Tugcu, 2013). While some studies have concluded unidirectional causality from energy consumption to economic growth and confirmed the growth hypothesis (Apergis and Payne, 2010; Bhattacharya et al., 2016; Esso, 2010; Tiwari, 2011), some others have found unidirectional causality from economic growth to energy consumption, supporting therefore the conservation hypothesis (Öcal and Aslan, 2013). Moreover, mixed results have been derived regarding the direction of causality between different proxy variables of energy consumption and economic growth (Kula et al., 2012; Bowden and Payne, 2010; Jebli et al., 2016; Pao and Fu, 2013; Tugcu, 2013; Yıldırım et al., 2012; Al-Mulali et al., 2015) and the absence of causality between energy consumption and economic growth, supporting neutrality hypothesis (Menegaki, 2011; Payne, 2010).

3. EMPIRICAL ANALYSIS

According to IEA (2016) that a 30% rise in global energy demand to 2040 means an increase in consumption for all modern fuels, but the global aggregates mask a multitude of diverse trends and significant switching between fuels. Moreover, hundreds of millions of people are still left in 2040 without basic energy services. Globally, renewable energy - the subject of an in-depth focus in World Energy Outlook (WEO)-2016 - sees by far the fastest growth. Natural gas fares best among the fossil fuels, with consumption rising by 50%. Growth in oil demand slows over the projection period, but tops 103 million barrels per day (mb/d) by 2040. Coal use is hit hard by environmental concerns and, after the rapid expansion of recent years, growth essentially grinds to a halt. The increase in nuclear output is spurred mainly by deployment in China. With total demand in OECD countries on a declining path, the geography of global. Energy consumption continues to shift towards industrializing, urbanizing India, Southeast Asia and China, as well as parts of Africa, Latin America and the Middle East. China and India see the largest expansion of solar photovoltaics; while by the mid-2030s developing countries in Asia (including Indonesia) consume more oil than the entire OECD. Yet, despite intensified efforts in many countries, large swathes of the global population are set to remain without modern energy. More than half a billion people, increasingly concentrated in rural areas of sub Saharan Africa, are still without access to electricity in 2040 (down from 1.2 billion today). Around 1.8 billion remain reliant on solid biomass as a cooking fuel (down by a third on today's 2.7 billion); this means continued exposure to the smoky indoor environments that are currently linked to 3.5 million premature deaths each year.

According to (Fotourehchi, 2017) energy is depleting, any disruptions in non-renewable energy supply, hitting non-renewable-dependent activities and households, so leads to serious risks related to energy prices. Non-renewable energy consumption has dependent-challenges such as environmental degradation, climate change and global warming that caused by rapidly increasing greenhouse gases emissions such as CO_2 and methane. The International Energy Agency (IEA, 2009) suggests that current trends in energy supply are still economically, environmentally and socially unsustainable. It is projected that the primary energy demand will increase by 1.5% per year between 2015 and 2030, with fossil fuels being a dominant energy source (Apergis and Danuletiu, 2014). It is expected due to increasing energy demand, energy-related CO_2 emissions will more than double by 2050. Therefore, many countries are faced with energy security and environmental renewable energy are very high.

In further development, according to (IEA, 2016) that the Paris agreement on climate change, which entered into force in November 2016, is at its heart an agreement about energy. Transformative change in the energy sector, the source of at least two-thirds of greenhouse-gas emissions, is essential to reach the objectives of the Agreement. The changes already underway in the energy sector, demonstrating the promise and potential of low-carbon energy, in turn lend credibility to meaningful action on climate change. Growth in energy-related CO_2 emissions

stalled completely in 2015. This was mainly due to a 1.8% improvement in the energy intensity of the global economy, a trend bolstered by gains in energy efficiency, as well as the expanded use of cleaner energy sources worldwide, mostly renewables. An increasing slice of the roughly $1.8 trillion of investment each year in the energy sector has been attracted to clean energy, at a time when investment in upstream oil and gas has fallen sharply. The value of fossil-fuel consumption subsidies dropped in 2015 to $325 billion, from almost $500 billion the previous year, reflecting lower fossil-fuel prices but also a subsidy reform process that has gathered momentum in several countries. The renewables-led transformation of the power sector has given focus to a new debate over power market design and electricity security, while traditional energy security concerns have not gone away. Adding in issues of energy access, affordability, climate change and energy-related air pollution, as well as problems with public acceptance for different types of energy projects, there are many trade-offs, co-benefits and competing priorities that need to be untangled across the energy sector. This is the task that the WEO takes up in different scenarios and case studies, with the additional opportunity in 2016 to provide the first comprehensive examination of the new era opened up by the Paris Agreement. All the Paris climate pledges, covering some 190 countries, have been examined in detail and incorporated into our main scenario. More stringent decarbonisation options examined in WEO-2016 include not only the 450 Scenario (consistent with a 50% chance of limiting global warming to 2°C) but also a first examination of pathways that could limit warming further.

In other hand, according to Bob Dudley (Chevron, 2016), that Prices for all fossil fuels fell in 2015 for all regions. Crude oil prices recorded the largest decline on record in dollar terms, and the largest percentage decline since 1986. The annual average price for Brent, the international crude oil benchmark, declined by 47%, reflecting a growing imbalance between global production and consumption. The differential between Brent and the US benchmark West Texas Intermediate (WTI) narrowed to its smallest level since 2010. Natural gas prices fell in all regions, with the largest percentage declines in North America; the US benchmark Henry Hub fell to its lowest level since 1999. Coal prices around the world fell for the fourth consecutive year. Energy developments oil remained the world's leading fuel, accounting for 32.9% of global energy consumption.

Based on the factors above, the influence of non-renewable energy consumption toward the level of air cleanliness and environmental sustainability in Indonesia can be analyzed by the principal regulatory approaches using the principal regulatory approach. It is explained as follows (Posner, 1997) one approach, input control is for the legislature or an administrative stakeholders to prescribe the specific measures that the polluter (energy consumers) have to take in order to avoid heavy legal sanction. This approach requires that the regulator (lawmaker/policy maker) have an enormous amount of information about the costs and benefit of alternative methods of pollution control.

A second approach is to establish the level of pollution emissions deemed tolerable, to compel the polluter (energy consumer), under

penalty of injunction or fine, not to exceed that level, but to leave the choice of method to the industry (output control). And third approach, not yet employed in this country but a great favorite of economists, is to tax pollution. The wealth effects of a pollution tax are shown in Figure 1. The tax is set at level calculated to induce the firm to emit the optional amount of pollution, the amount at which the marginal social benefit (MB) from abating pollution equal the marginal costs of abatement. MB is assumed to fall to zero (cross the horizontal axis) at the point where zero pollution is emitted. Thus the point 0, a on the horizontal axis is the amount of pollution (i.e., 0) abated when no effort at abatement is made and the amount of pollution emited as result (a), while c,0 is the amount of abatement (c) at the zero pollution level (so a = c). At q, where the optimal amount of pollution is abated, the firm incurs a cost equal to the area, dqa, under MC between a and q, and in addition pays a tax, equal to the rectangle decq, on the unabated pollution. Under an emission standard that forced the firm to carry abatement to q it would incur cost dqa but would pay no tax.

According to (Chevron, 2016) The chart above shows the trend in benchmark prices for Brent crude oil, WTI crude oil and U.S. Henry Hub natural gas. The Brent price averaged $44 per barrel for the full-year 2016, compared to $52 in 2015. As of mid-February 2017, the Brent price was $55 per barrel. The majority of the company's equity crude production is priced based on the Brent benchmark. Crude oil prices remained low through much of 2016, but increased modestly late in the year after OPEC announced production cuts. On November 30, 2016, OPEC agreed to cap production at 32.5 million barrels per day starting in January 2017. The WTI price averaged $43 per barrel for the full-year 2016, compared to $49 in 2015. As of mid-February 2017, the WTI price was $53 per barrel. WTI traded at a discount to Brent for much of 2016 due to high inventories and excess crude supply in the U.S. market (Chevron, 2016).

Based on Figures 2 and 3, those figures prove that the level of energy consumption in Indonesia continues to increase compared with the level of energy consumption of other countries. Thus, it is assumed that there has been a decline in the level of air quality and environmental sustainability in Indonesia.

In the context of energy consumption in Indonesia, according to Agency for the Assessment and Application of Technology (BPPT, 2016) the increase in final energy consumption by sector happens every year in period 2000-2014, except in the year 2005 and 2006. The final energy consumption increased with average of 3.99% per year from 555.88 million BOE in 2000 to 961.39 million BOE in 2014. This data was obtained from the Handbook of Energy and Economic Statistics of Indonesia 2015 issued by Ministry of Energy and Mineral Resources. Total final energy consumption by sector discussed here does not take into account consumption of other petroleum products. Calculation of the final energy consumption covers industrial, household, commercial, transportation, and other sector. The other sector includes agriculture, construction, and mining. While commercial sector includes hotel, restaurants, hospitals, supermarkets, office buildings, etc. During 2000-2014, final energy consumption declined especially in 2005 and 2006. This was caused by the increase in the fuel price that led to the decrease in industrial productivity and the decline of final energy

Figure 1: Level of pollution tax

Figure 2: West texas intermediate price

Figure 3: World crude market trends

consumption in industrial sector at 2005 and in transportation sector at 2006. Policy on increasing domestic fuel prices encouraged the increase in inflation. Based on data from Bank Indonesia, inflation in January 2005 reached 7.32% and rose to 17.1% in December 2005. The highest final energy consumption in period 2000-2014 occurred in industrial sector, followed by household, transportation, commercial, and other sector as the lowest. On the other hand, the highest annual growth was held by transportation sector with average of 6.46%. This is caused by rapid growth in number of vehicles in Indonesia from 19 million vehicles in 2000 to 114 million in 2014 (Statistical of Land Transportation, Ministry of Transportation, 2014) with 13.7% of average increase.

In other hand, final energy consumption by type, during the years 2000-2014, was dominated by oil fuel (gasoline, diesel oil, IDO, kerosene, fuel oil, avtur and avgas) but with the lowest growth compared to other energy. During this period, the total oil fuel consumption increased from 315 million BOE in 2000-308 million BOE in 2014, rose with average of 0.18% per year. In 2000, the consumption of diesel oil has the largest share (38.7%) followed by kerosene (23.4%), gasoline (23.0%), fuel oil (9.6%), IDO (3%) and avtur (2.2%). Subsequently in 2014 the order is shifted into gasoline (45.5%), diesel oil (45.2%), avtur (6.3%), kerosene (1.5%), and fuel oil (1.5%). Oil fuel consumption patterns change is due to the high consumption rate of private cars and airplane. Transportation sector held the highest share of oil fuel consumption with 79.7%. Substitution of oil fuel to gas (CNG, LNG) was not effective because of the limited infrastructure. In industrial sector, coal consumption increased from 36.1 million BOE (8.59 million tonnes) in 2000 to 220.6 million BOE (52.53 million tonnes) in 2014, rose with an average of 13.8% per year. Consumption of natural gas in period 2000-2014 increased with an average growth of 2.6% per year. The small growth of natural gas consumption as final energy was caused by the limitation in national gas network infrastructure. Electricity consumption during the period 2000-2014 had an average growth of 6.8% per year. Electricity consumption rose due to the rising in income per capita and electrification ratio so that the use of electrical appliances such as air conditioners, washing machines, refrigerators, irons, lamps, and other also increased. In 2014, the national electrification ratio amounted to 84.4%, an increase of 3.9% from 2013.

Unfortunately, Potency of new and renewable energy (NRE) in Indonesia is not fully utilized. One of the regulation governing the use of NRE is Presidential Regulation No. 5 of 2006 on the National Energy Policy. To support the development of NRE in Indonesia, mapping the existing potential of NRE in Indonesia is required. Green industry is an industry that in its production process prioritizes the efficiency and effectiveness of resource usage in a sustainable manner as to harmonize industrial development with environmental preservation that can provide benefits to the community. Green Industrial Policy is stipulated in Law No. 3 year 2014 on Industry. Government will formulate policy, institutional capacity building, standardization, and provision of facilities in order to realize green industry. High scenario and base scenario can be observed as energy conservation scenarios that produce different GHG mitigation. The GHG mitigation difference would be even greater if the NRE utilization in four selected industries is considered. Types of GHG emissions described in BPPT-OEI 2016 are CO_2 (Energy and IPPU), CH_4 (Energy), and N_2O (Energy). Global warming potential for CH_4 is 28 and for N_2O is 265 (IPCC, 2014). As in BPPT-OEI 2015, calculation of GHG emissions in BPPTOEI 2016 use IPCC-2006 methodology with Emission Factor as follows:

1. Tier-1 for coal and natural gas combustion.
2. Fugitif emissions, as well as CH_4 and N_2O emissions for fuel combustion.
3. Tier-2 for fuel combustion, especially CO_2 emissions.
4. Tier-3 for CO_2 emissions from natural gas usage as raw material for the fertilizer industry.

While according to (British Protaliom: 2016) IEC increased by 3.9% in 2015, having nearly doubled over the last 15 years in 2015 growing consumption of coal (+15%) was partially offset by falling oil (−3.2%) and natural gas (−2.7%) consumption. Coal consumption has doubled. Since 2010 and in 2015 coal became Indonesia's dominant fuel (41.1% of energy consumption), followed by oil (37.6%) and then natural gas (18.3%). Natural gas consumption fell by 1.1 Bcm in 2015 - to its lowest level since 2008 and more than 8% lower than its peak in 2010. After a sharp fall in 2014, hydro grew by 5.9% in 2015 and made up just under 2% of IEC. Indonesia produced 54% of its oil consumption in 2015, almost identical to 2014 and the lowest proportion in our records - this compares to an oil surplus in 2002 and a 75% ratio just 5 years ago. Production of all fossil fuels fell in 2015: Oil (−3.2%), gas (−0.3%) and coal (−14.4%). Indonesia's coal production fell to 392 million tonnes, its lowest level since 2012. Indonesia is now the 5th largest coal producing country in the world - being overtaken by India in 2015. Natural gas production was marginally lower in 2015 compared to the year before and 12.4% lower than the 2010 production peak. The ratio of natural gas production to consumption increased to 189% in 2015, compared to 184% in 2014 and a 20-years average of around 200%. Indonesia's CO_2 emissions from energy use increased by 5.7% in 2015, lower than the 10-years average (+6.0%). Energy intensity (the amount of energy required per unit of GDP) decreased by 0.9% in 2015 - the same as the 10-years average.

Thus, based on the findings above, it can be drawn a point that the relationship between the level of demand or energy consumption inversely with the impact that appears: That the higher the economic growth rate of GDP/economic indicators, the higher the level of energy consumption. On the contrary, the high level of energy consumption, the tendency has impact on the decrease of air quality and the decrease of environmental quality. Based on these findings, the level of non-renewable energy consumption should be limited and optimized through the politics of energy law based on the environmental sustainability with social justice.

According to (Arnscheidt et al., 2008), institutional legislative theory offers a way of thinking about that issue. As model illustrates, every law has two addresses the relevant social actors (primary role occupants) and the officials of one or more designated government implementing agencies (Figure 4) as follows Figure 5.

4. CONCLUSION

The era of economic globalization encourages Indonesia to immediately maintain its existence in the international association, such as open the tap of international trade with various countries in this world. Nevertheless, the opening of the Indonesian market for transnational businesses has great consequences for economic law politics of Indonesia, especially in the energy sector. These consequences will be a new challenge for lawmakers or policymakers and economists in formulating their policy or legislation products which always based on fair and equitable environmental sustainability.

Figure 4: Energy market trends

Figure 5: Law making policy
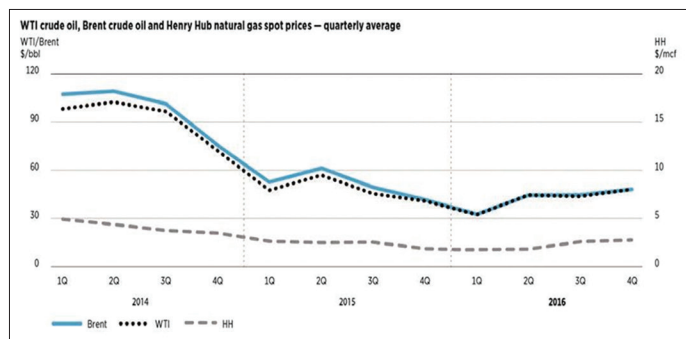
Figure 5: Law making policy
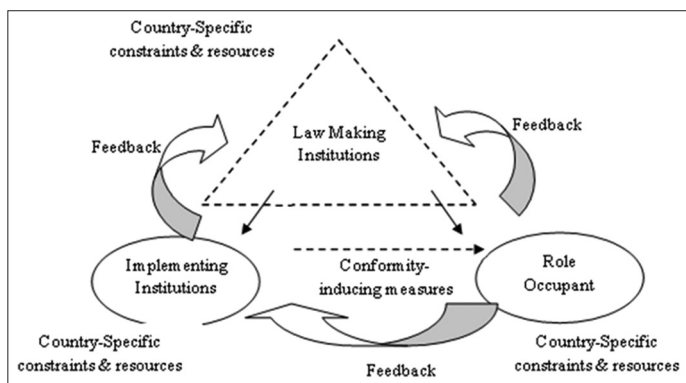
There are several elements that must be considered by lawmaker/policymaker and economist in making regulation for energy consumption, namely the position of Indonesia as a consumer country of foreign energy, fluctuation of energy price in international market has impact on the exchange of rupiah rate against dollar, the economic growth rate of GDP, Environment and air cleanliness O_2.

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