

## ECONOMICS OF ENERGY AND THE LAW\*

### Abstract

*Economics of Energy and Law interrogates the law and economic reasoning behind the choice of production, distribution and consumption of energy resulting in an efficient and effective manner that is sustainable for the present and future generation. Such with environmental best practice mitigating climate change effect on economy. It does not ignore use of suitable and efficient technologies in energy protection that is cheap. The article considers the role law plays in economics of energy, highlighting how law and economics pursue similar goal in energy efficiency and how to deal with both concepts in energy production and consumption. The paper is completed by library research in which content analysis was utilized to make deductions and inferences of energy economics and law. The paper agrees that law can achieve energy economics. The paper is divided into two parts, part one covers introduction, definition and Energy production, distribution and consumption, what economic choices exist? While part two discusses Energy production, the economics and law involved, Energy efficiency as an Economic tool promoted by law and concludes that in energy economics and law, the key focus are energy production and consumption that is cost effective and the rational choices of production and consumption that are efficient and optimal.*

**Keywords:** Energy, law, energy economics, energy efficiency, energy production

### 1. Introduction

Law provides remedies for both specific and general needs of society. The specific needs be the interest of today while general needs may serve future interests. Law wisely used can protect even future interest of society members in succession. This wise use for which the law may be employed for man's preservation and satisfaction of his need is economics and when the decision is on how to produce, store, distribute and use energy, which may not be readily available, it is called economic of energy. It should be said that, apart from renewable energy sources<sup>1</sup>, most energy sources require human effort to convert them to finished products for easy use. The law regulating energy at once also involve economics of energy production and use in order to realize the objective of law such as coal, oil, gas, water, nuclear economics choices made by law in energy production include rational choices about non pollution of the environment, air, oxygen level in the air, safety of human who produce and use such energy and sustainable practices which in the long term will not adversely affect the ecosystem. Economics of energy and law will principally deal with cost of production of energy and the trade aspects of it in view of the laws that regulate same to see that there is efficiency in the production and use of energy. Economics of energy production has something to do with the incentives downed out to producers of energy with political decision supporting their production<sup>2</sup>.

### 2. What is Law?

There is no one acceptable definition of law by legal jurists. What has been defined in most cases is, what is a law? This is so because the term 'law' does not easily lend itself to definition just as truth and life existence is to logicians and religious philosophers. This is how some schools of law answer the question what is law?

#### Natural law

Natural law say, what is the law is based on higher law dictated by reason and Supreme Being, it is what the law 'ought' to be and not what it is and suggested two basic principles in natural law as:

- i. There are objective moral principles which depend on the nature of the universe.
- ii. These objectives moral principles can only be discovered by reason.

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<sup>1</sup> For even renewable energy sources still require advanced technology and human efforts no matter how minimal to trap and convert these sources to usable energy forms.

<sup>2</sup> World Bank 2007a DECD 2005.

Their thinking is that rules governing correct human conduct are logically connected with immanent truths concerning human nature<sup>3</sup>.

**Sociological school/theory of law:** Even though, it is difficult to identify a central proposition of sociological jurisprudence, the following elements have been identified as forming the core of their views on the law:

- a. There is nothing unique about the law,
- b. Law is just one method of social control.
- c. They refuse to accept law as a closed logical order
- d. They are skeptical about the rules as presented in the textbooks but are concerned with law in action in society.
- e. They disagree that law is universal but believes in the relativity of the law and that reality of law in any given society is, as it is socially constituted by that society<sup>4</sup>.

### **Historical and anthropological school**

This school rejects natural law postulations on law but sees law as a legal system of an arbitrary act of legislators instead of law been developed as a response to the impersonal powers to be found in the people's national spirit. This 'Volksgeist' (a unique, ultimate and often mystical reality and this is linked with the biological heritage of a people<sup>5</sup>. This school, law grows/is deeply rooted in the culture, traditions, history and institutions of a people. So the quality of human life and the need for self-expression is transmitted into these values and that each society is free to develop at its own pace. To this school, a nation or state is seen as an organism which is born, matures, and declines and dies. Law is a very important part of the organism, so 'law grows with the growth, and strengthens with the strength of the people, and finally dies away as the nation loses its nationality.

### **Positivist school**

This is directly opposed to the natural law school. The pure theory of law as espoused by H. Kelsen and command theory of law by J. Austin have become popular and sometimes treated aside the positive school. To Austin, Law is a command of a sovereign – a political superior for the guidance of intelligent inferiors – law subject; disobedience is backed by sanction. But to the pure law theory, law is a normative rule as laid down by man and having no root in some unseen deity. Law strictly so called is differentiated from values, norms and other rules. This is the crux of the positivist projects that 'law as it is' and not as it 'ought to be' is law and must be complied with even if it is unjust. Although, the argument of Aquinas that an unjust law is no law - *lex injustitia non est lex*. And that the law giver does not enjoy the moral right to require obedience but to repeal such law and if not obeyed, no moral wrong is done.

### **Realist school**

This can be classified into two categories, viz- the American Realist; and the Scandinavian Realist. Realists were the first lawyers to carry out social scientific research with law and legal institutions. Grey says 'a statute is not law until interpreted by the court'<sup>6</sup>. Like the sociological school, Holmes placed much emphasis on law in action rather than what is conveyed in the statute books. According to him, 'the 'bad man' does not care two straws for the axioms or deductions but he does want to know what the ... English courts are likely to do in fact I am much of his mind. The prophecies of what the courts will do in fact, and nothing more pretentious, are what I mean by the law'<sup>7</sup>.

The American realist and Scandinavian realist are agreed that rules do not decide cases. American realist does not altogether reject the normative character of legal rules. For this school, the main concern is the practical working of the judicial process as they have no interest in a general theory of law as the Scandinavians. Scandinavian realists are more concerned with the theoretical operation of the legal

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<sup>3</sup> MDA, Freeman, Lloyd's Introduction to Jurisprudence 8<sup>th</sup> ed. Sweet & Maxwell, London 2008 'p. 84 – 246.

<sup>4</sup> MDA, Freeman *ibid* 384 – 973.

<sup>5</sup> MDA, Freeman *ibid* per F.K. Von Savigny – 1079-80 –

<sup>6</sup> MDA, Freeman *ibid* per D.N. Mac Cormick (1981) 66.

<sup>7</sup> Holmes OW– The Path of the Law (1897) 10 *Hav. Law Rev.* 172-173, also pg. 1007 – MDA

system as a whole. Scandinavian realist promotes factual studies in working out the proper solutions of legal problems. So whatever definition we may wish to adopt should contain the following elements:

1. Law must embody rules and regulations for regulating the entire (at least known) spheres of human activities in any given society.
2. The law must be made by a body (no matter the nomenclature) empowered to make such laws within that legal system.
3. The law as made must be binding (and may be acceptable) and uniformly enforced when breached by any law-subject within the system.
4. Must have an institutional body/method for enforcement (i.e. Justice Administration System) within the polity.

We may now attempt to define law as being rules of conduct no matter how rudimentary made by a body so empowered for the regulation of human conduct within any society, a breach of which may or may not attract penalty of enforcement of the law by justice machinery in the legal system. We then agree that if there was any ecosystem, it must have had some Agis of law no matter how rudimentary and it was on such law that the system of production whether for agriculture, energy and social/communal living thrived. It must be based on some law that the stone-age and the upset to iron-age to industrial revolution to information communication technology (ICT) to the internet age otherwise, it will not make sense about how coordinated and systematic the advancement progressed. It was noticed that when the law changed the system of production also changed

### 3. Energy production, distribution and consumption, what economic choices exist?

Economics may be a branch of knowledge concerned with production, consumption, and transfer of wealth or the condition of a region or group as regards material prosperity<sup>8</sup>. It is also the production and consumption of goods and services which are used to fulfil the needs of those living and operating within the economy, which is also referred to as an economic system?<sup>9</sup>The economic system may be:

**Market economy** which allows the supply of goods and demand to determine prices<sup>10</sup>. This market force will ultimately affect production and satisfaction of needs with scarce resources. This is what is termed rational allocation of scarce resources for improvement of welfare of both producers and consumers.

When prices are at par with supply, a state of equilibrium is reached. The opposite is when supply is more than demand, the price falls or where supply is short than demand, the prices hiked because too many persons are chasing few goods<sup>11</sup>. In the last two instances, there is no efficiency assuming the goods is energy. Although the second gives rise to huge profit which market forces dictate, it is however exploitative and anti-welfarism. Normally, capital, land, labour and entrepreneurship are the factors to look upon in the production of goods and services to satisfy human needs and aggregate profit. The other types of economic structures are:

*Mixed economies* are markets with government interventions and regulations in certain sector to filling the gaps and create a sort of balance where producers stay in business but do not bug down consumers with high cost of goods and services. *Command-based economies* have a central political figure determining the prices and distribution of goods and services. Examples include the socialist/communist economies. The economy is centrally planned to avoid common inequalities but this remains common feature of it<sup>12</sup>. *Green economies* operate with the goal of cutting down carbon emissions, resorting to biodiversity, alternative energy sources which are renewable and environmentally friendly. By employing advanced technology, green economies focus on increased efficient production of energy and consumption while eliminating any adverse effect to the earth and its resources<sup>13</sup>.

<sup>8</sup> Oxford online dictionary accessed April 11, 2020.

<sup>9</sup> Will Kenton updated July 8, 2019 investopedia.com accessed April 11, 2020.

<sup>10</sup> *ibid.*

<sup>11</sup> *ibid.*

<sup>12</sup> Will Kenton

<sup>13</sup> *ibid*

It was those four factors that Adam Smith in his book ‘Wealth of Nations’ - 1776, advocated was responsible for choices of production and prices of goods and services. Although entrepreneurship was considered the controlling factor, the rest were of such importance that were required if the entrepreneur was to bring to bear his human ingenuity. But today, technology is ‘omnipresent’. It has taken over the means of production and displacing entrepreneurship. It is capital intensive and controls how to produce; it produces energy and saves labour (energy) dissipation. Technology assist entrepreneur in efficient decision making and matching choices with production system that is most efficient to save cost, maximize output and profits. The relevance of technology in economics of energy is summed up as ‘better the conditions of perfect competition are approximated, the more the state of the economy will gravitate towards an efficient equilibrium’<sup>14</sup>

Policy/law targets the approximation of perfect competition to produce improved welfare for citizens and efficiency in service delivery and consumption. To realize this the choice is market governance or regulation, a sort of mixed market economy because market economy forecloses optimal efficiency<sup>15</sup> but law because it is future oriented and present ideal, it considers not just the present gains but the interest of future generations and the sustainability of energy by preserving the system. It is in this broad nature of law that economic choices find real expression in terms of the decision of production, distribution and consumption of energy. There is a question of economic importance to be answered here is, is ignorance of future choices a source of uncertainty to production and consumption? Should policy makers pay attention to reasons for intervention in the market such as consumer’s lack of self-control, ignorance to choose rightly, lack of fund to purchase needed services. Economic choices are to be rational and objective, there is an often verdict of irrationality and choices or preferences made are to be viewed as such. But the reality is that looking back out present choices at a later time; it will be considered a mistake<sup>16</sup>. This is the concept of hyperbolic discounting as against exponential discounting which is time consistent<sup>17</sup>. One thing is that preferences exist as choices in energy production, distribution and consumption, for instance in Germany, electric transportation was federal government strategic goals to become the lead market for electric transportation by 2020. To achieve this government made direct funding intervention<sup>18</sup> and tax<sup>19</sup> incentives to drive production and consumption. In the same vein, the United States of America (USA) wants to put one million electric vehicles on the road in 2020; Also China and Japan are doing the same already<sup>20</sup>. The other thing to mention here is market risk and/or political risk. The efficiency of energy depends on how it was produced and time spent on refuel or recharge, for instance, renewable energy, nuclear energy versus fossil energy. One may compare the weight of batteries and fueled tank, or average time required to refuel a tank or fully change a battery or the season in which solar works optimally and when it will not be a reliable source of energy. Or even the economy of cost of consumption on consumers. All these will suggest the nuisance for potential buyers of a multipurpose vehicle for long distance travel<sup>21</sup>.

Market risk does not itself signify market failure but it is an inherent contradiction of a perfect market. It includes consumer acceptance of goods, reliability, long range, quick refueling, recharging and pricing<sup>22</sup> while political risk may include government policy summersault for instance Malabu oil block and Nigerian government cancellation of the sale of oil block after deal was reached in 1998 but

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<sup>14</sup>Stephan Meyer Intergenerational choice under uncertainty: The case of future energy technologies – Legal and Economic perspectives, springer international publishing AG. Part of Springer Nature 2018, K. Mathis, B. R. Huber (eds) Energy Law and Economics, Economic Analysis of Law in European Legal scholarship 5 <https://doi.org/10.1007/978-3-319-74636-4-9>; p.174.

<sup>15</sup> *ibid.*

<sup>16</sup> *ibid* p. 175.

<sup>17</sup> *ibid.*

<sup>18</sup>Richlinie Zur Forderung des Absatzes von elektrisch betriebenen Fahrzeugen (umweltbonus) (Finding Guidelines for the support of the marketing of Electric vehicles (Environmental Bonus)J. 29 June 2016, Bundersan Zeiger Amtlicher Teil (Federal Gazette Official section) pp. 8,17, 1 July 2016 B1.

<sup>19</sup> Sec. 3d. Kraftfahrzeugsteuer gesetz (Kraftsta) (Motor vehicle Tax Act), 26 September 2002, BGBl. 1@ 3818, last amended by Gesetz (G); 23 December 2016, BGBl 1@3234 art. 19 para 8 (Ger.)

<sup>20</sup> Giz gumbutt (2016) pp 34-53; see also Berger (2015).

<sup>21</sup> *ibid* 180.

<sup>22</sup> *ibid.*

concluded in 2011<sup>23</sup>. Mayer has argued that some dubious state intervention accounts for market failure and resembles a command economy. If you take German Government policy of electric car intervention and tax incentive to push Germans to buy and use electric cars, instead of allowing same to compete with combustible fossil powered engines is a violation of market economy it assuredly professes and denies consumers power of choice of preference. The soundness of this policy of German and by extension Europe and advanced technologies to ban combustion engine by 2030 is not clear<sup>24</sup>. The point being made is that, the law as a neutral master should not be called in aid to one technology against another but, the economics of satisfaction from goods based on reliability, durability, ease of refueling energy and pricing be allowed to inform choices of consumers and not government instinct to drive into extinction a particular means of energy by labelling it as environmentally unfriendly just to sell a new technology at a disequilibrium price. This policy is even most unfair on Nigeria and other oil exporting economies who sell oil to fund her national budget. These countries account for the world's poorest economies and therefore world most poor and vulnerable people who have been played out by international oil companies and host countries in the international politics and interpretation of United Nation's notion of ownership of natural resources and control and the right to self-determination.

One thinks that energy efficiency means different things to economically and technologically advanced countries and the developing countries. Whereas in developed countries with functional industries, their emissions does not result in adverse effect on climate to justify closure of such industries, it is developing countries fossil energy and major source of budget funding that should be technically outlawed because it damages the environmental and causes climate change and in order to reverse the trend and preserve the earth for future generation, to justify research and development in energy efficient cars riding by electricity whether powered by batteries or solar were sponsored by state funds against combustion engine. Who told them that, that is what the future generation wants? I think keeping options open for the present and future generation will present each with equal opportunity to preferences particularly if you consider that 80% of world energy is supported by fossil energy<sup>25</sup>. It has not been disputed that fossil energy is not efficient and reliable. The major complain is that it emits CO<sub>2</sub> to the atmosphere. There are already technologies to capture CO<sub>2</sub> or even reduce its burning by high combustion engine lubricants. So why the ban on fossil combustion engines? What is the economic justice of this new policy on oil producing nations? There may be some other reasons other than what is being said now, like sale of new technology etc. In another breath of logic, if 89% of CO<sub>2</sub> emissions come from fossil fuel and industries, it would be right that both ought to be outlawed for causing such damage to earth and its resources<sup>26</sup>. Any discriminatory decision will not be rational exponentially.

#### **4. Energy production, the economics and law involved**

Oil and gas production cost apply differently for any country. Factor that may affect the cost of the product include if country is oil and gas producer, self-sufficiency in local refining of petroleum or non-shipment of refined product, holding capacity etc. For Nigeria, marginal production cost for Deep water is N30.00 per barrel while onshore is N15.00 only per barrel<sup>27</sup>. We sell at the international market price and later repurchase the refined products, and bear the cost of shipment to land the products in Nigeria and consequently discharge same into tank farms and further truck the products to major distributors and retailers all at additional cost. The system is not efficient as landing cost of oil in Nigeria prior January 31, 2020 was N141.07 per liter but in January, 2020, it dropped to N92.89 per liter<sup>28</sup>. The huge difference is accounted for by the cost of shipments and storage and trucking to retailers. Further, the slight reduction in pump price of premium motor spirit (PMS) above economically speaking resembles

<sup>23</sup>Malabu OPL 245 with a signature bonus of \$20 million being a onetime assignment fee to Nigerian Government, [www.thecable.ng](http://www.thecable.ng) accessed April 11, 2020.

<sup>24</sup>Decision 'Energiewende-retten, verk-erhswende einleiten' [save the Energy Revolution, start a Transportation Revolution'] of the Green Party's 40<sup>th</sup> Federal Assembly, November 2016, at p.6, available at [https://www.gruen.de/fileadmin/user-upload/Dokumente/BDK\\_2016\\_muester/EV-01\\_Energiewende\\_rettten\\_verkehrswende\\_einleiten.pdf](https://www.gruen.de/fileadmin/user-upload/Dokumente/BDK_2016_muester/EV-01_Energiewende_rettten_verkehrswende_einleiten.pdf) accessed 3 March 2017 and Retrieved April 12, 2020.

<sup>25</sup> Fossil energy – client earth.org>fossil-f... accessed April 16, 2020.

<sup>26</sup> *ibid.*

<sup>27</sup> <https://knoema.com/vyronoe/cos...> accessed April 16, 2020.

<sup>28</sup> <https://www.vanguard-ngr.com>>. accessed April 12, 2020.

market economy but the Nigerian oil industry is heavily regulated and there is visible government presence that tally with the mixed and command economy.

Furthermore, local refining is good economic choice the law should enforce. It will not only make for self-sufficiency in petroleum products, it will create employment and result in the best use of by-products of crude oil and boost local industries and pharmaceuticals<sup>29</sup>. The preference to source petroleum from outside Nigeria is not only expensive, it can be explained by hyperbolic discounting as irrational, yet it is a present choice fueled by politics and corruption and consistently pursued blindly by Nigerian leaders against the benefits offered by local refining. But it is not only in the areas of oil production that Nigeria makes irrational economic choice, you can see this in electricity generation, distribution and transmission. For instance, Nigeria with an estimated population of 194,748,265 million in 2018<sup>30</sup> produces 3000-3700 MW of 5,900MW<sup>31</sup> of installed capacity and leaves over 90 million people without connection to the national grid. The industries are worse hit with cost of production of goods in Nigeria being very high. The direct effect is high cost of living for Nigerians and low economic activities because of constant black out. The cumulative effect is poor living standards of Nigeria and high cost to secure energy to power home and industries.

There is also poor distribution of power as Nigerians are not largely metered. Most consumption of power is paid on estimated billing system. The evil pang left by the 2005 power sector reform is to retain one monopoly company: the Transmission Company of Nigeria (TCN) to transmit electricity to the 11 Distribution Companies (DISCOS) across the country. Currently, the TCN can only transport about 5,000 MW. So unless government increases the transmission capacity of TCN, it cannot meet the power needs of Nigeria which targets to increase its capacity to 20,000 MW in the next five years. It is expected that when the Mambilla station comes on board with its 3000MW, it will stabilise power supply in Nigeria<sup>32</sup>. In the last decades, the government policy on port revenue generation target set for custom saw 907 containers of various equipment imported for 126 transmission projects seized by customs for port charges and demurrage. These are clear examples of how government intervention in the economy turns into market risks.

### **5. Energy efficiency as an Economic tool promoted by law**

The notion of economic efficiency seem to be a tool for comparison of legal rules to institutions in which they operated and is not available as a universal standard<sup>33</sup>. Institutions, it should be noted operate in different environment and cost which influences their output and where there are more than one function or legal solution pursued, there will be multiple levels of efficiency to be attained<sup>34</sup>. For instance, the reforms of 2005 of power sector in Nigeria is a legal instrument used to break the monopoly of National Electric Power Authority which first became a Power Holding Company of Nigeria (PHCN) before it was finally unbundled in 2005 into 6 Generating Companies of Nigeria (GENCOS), 11 Distributing Companies of Nigeria (DISCOS) and the Transmission Company of Nigeria (TCN). Remove political risk from electricity market and reassure investors of the sanctity of contract, assure consumers that they will derive value from services of DISCOS. When these services are reliable and satisfying it becomes rated in terms of economic performance; and such are said to be efficient. Spiller and Tommasi were of the view that only countries with institutional framework that reduces political risk can improve performance of electricity sector<sup>35</sup>. Although different approaches were adopted

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<sup>29</sup> Kimberly Amadeo, Crude oil: definition, types, uses, impact- the balance, <https://www.thebalance.com.>crude...> last updated June 25, 2019 accessed April 19, 2020.

<sup>30</sup> Nigerian Population Commission (2018)–worldometers <<https://www.worldometers.info/world-population/nigeria/population/access>> accessed April 11, 2020.

<sup>31</sup> Bolanle Onagoruwa%20 Onagoruwa%20 presentation%20 DG%20SEC.pdf> accessed April 11, 2020.

<sup>32</sup> Full Speech: Fashola Unveils FG's Road Map for Solving Nigeria's Power Crises, [May 2016] <[www.nigeriaelectricityhnb.com](http://www.nigeriaelectricityhnb.com)> accessed April 16, 2020.

<sup>33</sup> De Geest and Vanden Bergh 2004, p.xf/introduction accessed April 16, 2020.

<sup>34</sup> Brand 2007, Conceptual comparisons: towards a coherent methodology of comparative legal studies, Brooklin J. int'l L, 32(2) 402-66; p.427. see also, De Geest, G. and Van den Bergh, R. (2004), Introduction, in G. De Geest and R. Van den Bergh (eds), comparative law and Economics, vol. 1, Cheltenham, UK and Northampton, MA, USA: Edward Elgar.

<sup>35</sup> Spiller, P. T and Tommasi, M. (2005). The institutions of regulation. An application to public utilities in C. Menard and M. Shirley (eds), Handbook of New Institutional Economics, Dordrecht et al. Springer

because countries have different goals it seeks, to achieve but the overall electric power sector reforms have followed these frameworks:

- (a) Privatisation of state-owned utilities
- (b) Vertical separation of competitive segments from regulated segments
- (c) Horizontal restructuring of generation segments
- (d) Designation of an independent system operator;
- (e) Creation of wholesale and auxiliary services markets;
- (f) Promoting access to the transmission network;
- (g) Unbundling of retail tariffs
- (h) Arrangements of supplying customers when retail competitions is not in place;
- (i) Creation of independent regulatory agencies;
- (j) Transition mechanisms<sup>36</sup>.

They agreed that where these models were followed, reforms were largely successful. Although, Joskwo had further argued that the reforms resulted in implementation of basic legal and political infrastructure upon which the energy reform proceeded and thrived; he suggested that performance should be compared on alternatives like wholesale competition and access to network. But Joskwo's and Spiller and Tommasi postulations are better in theory than in real world. We have seen reform failures and lack of political will for successive government to follow through. In Nigeria for instance, which followed the above model, in 2005 when it broke the monopoly of NEPA, created a transition company PHCN which was unbundled in 2013. The Electric Power Sector Reform Act (EPSRA) created a regulatory agency the National Electricity Regulatory Commission (NERC), created 6 GENCOS; 11 DISCOS and 1 TCN. It also created the Nigerian Bulk Electricity Trading (NBET) Plc. Electricity markets whether wholesale and retail have been created including a market operator; market-based tariff is being charged consumers and there is consumer access to networks and NERC for complaint but generation target have not been achieved talk more of transmission. From 2013 to date, consumers are reaped off by DISCOS as estimated billing persists and the number of house-hoods using prepaid meters is negligible. It is hard to see how institutional environments have changed. The DISCOS task consumers to buy poles wire to be connected and still charge consumers utility bills. When step down transformers are bad, consumers are charged utility bills just as in the time of NEPA, when in fact, there was no power supplied<sup>37</sup>. The community has to buy the transformer and paid Ibadan Electricity Distribution Company (IBEDC) over N600, 000.00 only to fix it. So, in Nigeria, it seems nothing has changed in terms of attitude of the DISCOS as a monopoly only in theory. It seems further, that countries like UK, USA and others in Europe where these models had worked enjoy better culture of questioning and accounting for every service/energy and measurement. Work ethics may be another reason. It seems, if workers earn the right wages from their labour, they will plan to buy and use the right amount of energy needed and insist on the right measure for what is paid for. Therefore, prepaid meter is the right option and NERC is advised to vigorously enforce it to give Nigerian electricity consumers value for their money. This in economics is equilibrium, where energy paid for is equal to energy demanded and supply. The same if enforced will curb energy thief and leakage and cause DISCOS, GENCOS and TCN to be efficient and even scale up their capacities. The other way law impacts economics of energy is legal transplant from one country to another to cause desired change in the energy sector. This can be seen exemplified in the electric sector reform borrowed from USA<sup>38</sup>, and sustainable development goals and Paris convention of United Nations in respect of climate change actions of less greenhouse gas emission into the atmosphere<sup>39</sup>.

<sup>36</sup> Little Child, S. (2006) Forward: The market versus Regulation; in F. P. Sioshansi and W. Pfaffenberger (eds), *Electricity market reform*, Amsterdam: Elsevier P. xviii, Joskow P.L (2006) Introduction to electricity sector liberalization; lesson, learned from cross-country studies, in F.P. Sioshansi and W. Pfaffenberger pp4-6.

<sup>37</sup> New market case in Ilisan Remo, Ogun State in 2018-2019.

<sup>38</sup> Joskow, Paul L. *Deregulating and regulatory reform in the U.S electric power sector*, (Massachusetts Institute of Technology, Centre for Energy and Environmental Policy Research, 2000) <https://hdi.handle.net/1721.1/44967> accessed April 19, 2020.

<sup>39</sup> On 12<sup>th</sup> December 2015, in Paris France, parties to the United Nations Framework Convention on Climate Change (UNFCCC) see also Giuseppe Bellantuono *The comparative law and economics of energy market*, 9780857932587.00017, p. 248.

## 6. Conclusion

It is hazy to determine energy efficiency only by functionalism or performance as there are complementarities and competitions in the institutional environment – governance, politics, cultural elements, regulations, and even market forces. Carrying on a healthy dialogue will see whether energy efficiency will happen fast or later or not all. In Nigeria for instance, there is poor perception of energy economics and energy mix. This has resulted in the high cost to repurchase refined petroleum and heavy reliance on oil and gas while other alternative source now termed clean sources of energy are in abundance in Nigeria. Further, economics of energy and law dealt with cost of production of energy and the trade aspects of it suggesting that the efficiency in production and use of energy is why the law regulates same. Also, economics of energy production from the part of most governments to producers comes in the form of incentives and tax cut of production of the target commodity. For instance, production of ethanol and biofuel may not be environmental protection but policies on tax incentives, consumption mandates exist with political decision supporting their production<sup>40</sup> or if you consider electric car production in Germany. So law wisely used can direct energy economics and achieve efficient use of energy and at optimum pricing of energy. The way the law achieves this is by establishing the legal framework/policy upon which energy production, economics and trade aspects are carried on, including detection of infraction and enforcement.

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<sup>40</sup> World Bank . (n. 2).