STUDENT CONTRIBUTION

Reasonable Suspicion: Gloomy Future of the Kyoto Protocol

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About 25 years ago, the Intergovernmental Panel on Climate Change claimed that the greenhouse gases, in particular Carbon Dioxide, are mainly responsible for global warming and its adverse effects. The claim rapidly became an absolute and incontrovertible truth regardless of countless scientific counter-evidences. Such international trend was directed to a birth of the United Nations Framework Convention on Climate Change and the Kyoto Protocol, the detailed norm to the Convention. Even to this very day, the "man-made climate change" operates as implicit prerequisite of continuing international climate conferences and international environmental law studies. The paper tries to introduce a viewpoint from the scientific skepticism towards man-made climate change and figure out the political calculations inside Kyoto Protocol. By doing so, the author demonstrates that serious concern about the environment barely exists in current climate response system and attempts to adduce suggestions that should be made in future climate change conferences.

Keywords

Climate Change, Fossil Fuel, UNFCCC, Kyoto Protocol, Intergovernmental Panel on Climate Change, Global Warming, ETS, Common but Differentiated Responsibilities

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I. Introduction

On November 26, 2012, the eighteenth annual conference of the Parties to the United Nations Framework Convention on Climate Change ("UNFCCC") was held in Doha, Qatar. There, an agreement was reached to extend the life of the Kyoto Protocol ("KP") up to 2020, which had been originally due to expire by the end of 2012. Greenhouse gas ("GHG") reduction obligation was also reallocated. Some applaud the output of this Conference, expressing relief because of the extension of KP.[1] Yet, others still stand skeptical, pointing out that the absence of world's leading countries including the United States ("US") and China in the KP may not be an effective solution to the climate change.[2]

As a result of the Doha Conference, a few questions of international law have been newly arising, *e.g.*, an alternative energy technology aid for developing countries, allocation of reduction obligation based on the principle of equity, matter of common but differentiated responsibilities, and enactment of legislation to compensate the defect of international emission trading system. Now these pressing concerns of international society are destined to remain in existence by the extension of KP.

The primary purpose of this research is to introduce a viewpoint from the scientific skepticism towards "man-made climate change" and to figure out the political calculations inside KP from a viewpoint of international law. This paper is divided into five parts including Introduction and Conclusion. Part two will share the progress of international discourse of climate change from the beginning to the launch of the UNFCCC system. Part three will chase factors that had decisive effects on the various mechanisms of KP. Part four will attempt to brief the overall flow of the post-KP negotiations and to find out what kinds of interests were involved in the progress.

1 Staff Writer, *What Doha Did: No progress today, but a slightly better chance of progress tomorrow*, The Economist, Dec. 15, 2012, *available at* http://www.economist.com/news/international/21568355-no-progress-today-slightly-better-chance-progress-tomorrow-what-doha-did; *Doha Climate Conference Opens Gateway to Greater Ambition and Action on Climate Change*, United Nations Environment Programme, Dec. 9, 2012, *available at* http://www.unep.org/newscentre/default.aspx?DocumentID=2700&ArticleID=9353 (all last visited on Sept. 18, 2013).

2 L. Gray, *Doha: Climate Change Deal Limping towards 'Disappointing' Conclusion*, The Telegraph, Dec. 7, 2012, *available at* http://www.telegraph.co.uk/earth/environment/climatechange/9730981/Doha-Climate-change-deal-limping-towards-disappointing-conclusion.html (last visited on Sept. 18, 2013).

II. The Impeached and the Impeaching

A. Background

In the post-war period, the US dominated the world fossil fuel market which enabled her to seize the global political and economic hegemony. The US extensively developed its oil industry in the early years of twentieth century and began to vacuum the oilfields of the Middle East since 1920s.[3] During the Second World War, the US embarked upon fortifying its control over foreign oil resources, acquiring half of the petroleum businesses of the Middle East. The majority of oil trade volume and petroleum refining industries of the Middle East were under the possession of the US when the war was over. After the end of Cold War, the US began to strengthen its supremacy on the vast extension of the oil industry, as petroleum becomes a central axis in diplomatic strategy of the US. The US Dollar ("USD") became a key currency of petroleum transaction and rode drastic increasing demand through brisk oil trading on the strength of rapid globalization.[4]

While the US was metamorphosing into a superpower on the momentum of petroleum, the EU, which lacked fossil fuel deposits, was intensifying its efforts to develop alternative energy technology. Through considerable exertion for decades the Europeans secured the world's best technique in the field of alternative energy by utilizing wind, solar heat, nuclear and tide as power resources. As time went by, the US occupied an unrivaled position in petroleum-based industries such as military, aerospace and information technology. However, compared to the petroleum-based industries which now became mainstream province of the world market, the power of alternative energy of the EU in the global industrial circles was relatively weak due to high production cost.[5] Yet, still, the alternative energy was the sole weapon for the Europeans that could recover global supremacy which was divested by the US. Thus, the EU might have necessity to convert the petroleum-based energy market into alternative energy market.

The most crucial task for the EU is to erode the dominance of fossil fuels. If the demand for petroleum drops off, the sudden return of US dollars to the American market would lead to serious inflation. It would result in, with the devaluation of the dollar, aggravating the economic condition of the US. By facilitating the outflow

3 Gou Hongyang, Low-Carbon Plot 185-186 (2010).

4 G. Barudio, Devil's Tears: History of Petroleum 233 (2004).

5 *Supra* note 3.

of USD back to the US and strengthening the power of the Euro as a basic currency for alternative energy market, the EU would regain global political and economic hegemony.[6] In consequence, a series of provocative environmental keywords such as climate change, global warming, apocalypse and carbon dioxide ("CO_2") reduction have been mobilized by strategic need of the EU.

B. Global Warming

1. IPCC

The history of global warming discussion is not that long. Up until mid-1980s, the climatologists' major concern was a possibility of 'global cooling,' because the global temperature actually appeared dropping from 1940s to 1970s.[7] However, as the rumor claiming that the 'man-made' CO_2 absorbs the solar heat, consequently heating up the air temperature and triggering weather accidents, started circulating into the mass media, many people got concerned.[8] The mass communication appointed the global warming issue as a main keyword of international environmental question. Some even regarded the global warming as the most difficult conundrum that the mankind ever faced until now.[9] Papers, books and press releases warning dangerousness of climate change gushed day after day.

Meanwhile, as a joint work of the World Meteorological Organization and the United Nations Environment Programme, the Intergovernmental Panel on Climate Change ("IPCC") was formed in 1988. IPCC took the lead of the global warming discourse, utilizing researches provided by the Climate Research Unit of East Anglia University and Meteorological Office of the Britain, thereby ultimately supplying theoretical framework to the EU. IPCC repeatedly warned the danger of the global warming through its own assessment reports, and identified CO_2 as a major factor causing sea level rise and glaciers' discharge. CO_2 is claimed to absorb thermal infrared radiation and re-emits it back to the ground; thereby it is reducing the amount of heat that escapes to space, consequently trapping heat and warming up the Earth.[10] In particular, the first assessment report of IPCC in 1990 stated that at

6 Euishik Ahn, *Politics of Climate Change: Sudden change of US and China*, The Seoul Economics, Jul. 24, 2013, *available at* http://economy.hankooki.com/lpage/opinion/201307/e2013072417381971130.htm (last visited on Aug. 8, 2013).

7 Ito Kiminori & Watanabe Tadashi, Lies and Traps in "Global Warming Affairs" 232-234(2008).

8 G. Mitchell, World on Fire: Saving an Endangered Earth 70 (1991). *See also* A. Gore, An Inconvenient Truth (2006).

9 A. Bell & W. Strieber, The Coming Global Superstorm 10 (2000).

10 For details, *see* Intergovernmental Panel on Climate Change, Climate Change: The IPCC Scientific Assessment xiv-

least 60% of the fossil fuel combustions need to be reduced in order to stabilize the atmospheric concentration of CO_2.[11] According to this report, the US had to reduce its emissions by 7% from its 1990 levels, which connotes a *de facto* renunciation of petroleum use.[12]

2. CO_2 v. Solar Heat

Scientific research shows there were almost no systematic correlations between the atmospheric CO_2 concentration and temperature of the Earth during the past 500 million years.[13] There existed a period when CO_2 levels was almost ten times higher than today's, which was a glacial epoch.[14] Rather, the following grounds show that the principal climate driver is actually a solar activity.

First, the solar activity affects the volume of clouds, which in turn affects the temperature of the Earth. The sun constantly discharges solar wind which surrounds the Earth and shields it from the influence of the cosmic ray. As the solar activity gets weak, the volume of the solar wind accordingly diminishes and the cosmic ray easily penetrates into the atmosphere of the Earth. The cosmic rays ionize air molecules and create cloud nuclei, which produce clouds that reflect solar radiation back into the outer space. Through these series of mechanism the temperature of the Earth decreases gradually.[15] The correlativity between the cosmic ray levels and size of clouds can be thoroughly corroborated by researches employing neutron chamber.[16] This is also a reason why the landscape paintings drawn during colder period usually portray cloudy skies.

Second, the solar activity affects the volume of ozone which affects the temperature of the Earth. The more the sun becomes active, the more its ultraviolet rays enter into the Earth's atmosphere. The ultraviolet rays shatter oxygen molecules and reform it into ozone. These ozone molecules absorb more from the sun. Through these series of mechanism, the temperature of the Earth increases

xx (1990).

11 *Id.*

12 *Id.*

13 N. Shaviv & J. Veizer, *Celestial Driver of Phanerozoic Climate?*, 13 Geological Society of America 4-10 (2003), *available at* http://ruby.fgcu.edu/courses/twimberley/EnviroPhilo/Phanerozoic.pdf (last visited on Aug. 21, 2013).

14 *Id.*

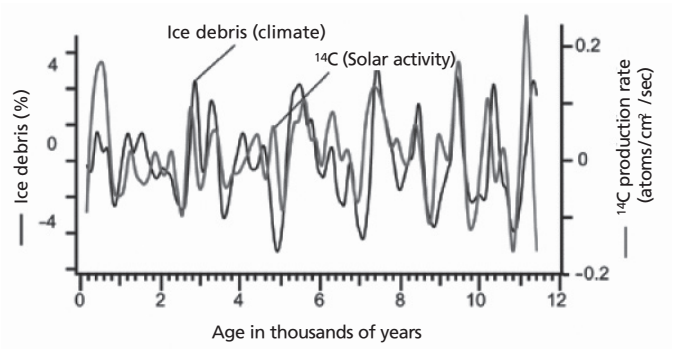
15 N. Marsh & H. Svensmark, *Low Cloud Properties Influenced by Cosmic Rays*, 85 Physical Rev. Letters 5004, *available at* http://cds.cern.ch/record/440007/files/0005072.pdf. *See also* P. Ball, *Solar Blow to Low Cloud Could be Warming Planet*, Nature, Dec. 6, 2000, *available at* http://www.nature.com/news/2000/001206/full/news001207-6.html (all last visited on Aug. 21, 2013).

16 F. Singer & D. Avery, The Unstoppable Global Warming 9 (2008).

gradually. Variation of 0.1 percent in solar radiation amount may cause 2% change in stratospheric ozone concentration.[17]

The cosmic rays create more or fewer clouds, and solar-driven ozone changes in the stratosphere creates more or less heating of the lower atmosphere. Due these two factors, the tiny variations in the sun's irradiance amplify into major climate changes on the Earth. Temperature rises if the sun gets active. On the other hand, ice age approaches if the solar activity reduces into minimum level.[18] The climate of the northern Atlantic has warmed and cooled nine times in the past 12,000 years in step with the waxing and waning of the sun.[19] Figure 1 shows the synchronicity of fluctuations in ice-borne debris (black) and carbon-14 (blue), suggesting that a varying activity of the sun can cause millennial climate change.

Figure 1: Well-Matched Wiggles[20]



At present, the solar activity can be approximately determined for any of the following three cycles as 87, 210, and 1470 years, respectively.[21] The correlation between the sun and climate change can be verified through detailed and

17 *Id. See also The Effects of Change in Solar Ultra-Violet Emission on Climate*, Imperial College London, *available at* http://www.imperial.ac.uk/college.asp?P=1832 (1998) (last visited on Aug. 21, 2013).

18 *Supra* note 16.

19 G. Bond et al., *Persistent Solar Influence on North Atlantic Climate during the Holocene*, 294 Science 2130-2136 (2001), *available at* http://www.essc.psu.edu/essc_web/seminars/spring2006/Mar1/Bond%20et%20al%202001.pdf; R. Kerr, *A Variable Sun Paces Millennial Climate*, 294 Science 1431-1433 (2001), *available at* http://ruby.fgcu.edu/courses/twimberley/EnviroPhilo/Kerr2.pdf (all last visited on Aug. 21, 2013).

20 R. Kerr, *As the Sun Waxes and Wanes, So Does Climate*, Science, Jul. 27, 2013, *available at* http://news.sciencemag.org/2001/11/sun-waxes-and-wanes-so-does-climate (last visited on Aug. 31, 2013).

21 W. Dansgaard et al., North Atlantic Climate Oscillations Revealed by Deep Greenland Ice Cores 288-298. *See also* L. Keigwin, *The Little Ice Age and Medieval Warm Period in the Sargasso Sea*, 278 Science 1503 (1996), *available at* http://climateaudit.files.wordpress.com/2007/10/keigwin_sargasso.pdf (last visited on Aug. 21, 2013).

macroscopic data from extensive study fields. Researches analyzing, (1) glacial till,[22] (2) the oxygen isotopes in the tiny one-cell organisms of a seabed sediment core,[23] (3) landslide records,[24] (4) fossils,[25] (5) stalagmites,[26] (6) tree rings[27] and (7) coral reefs, support the fact that the cyclic activity of the sun induces climate changes.[28]

Historical materials also provide considerable evidences. The Egyptians had to construct dams and canals on the Nile River due to low water level resulted from cold and dry climate from B.C. 750 to B.C. 200.[29] For roughly 800 years until around A.D. 600, a warm period continued. Archaeologists found grapes and olives cultivated in the Italian peninsula for the first time.[30] During this period the food production was constantly enhanced, which in turn increased population size.[31] The cooling period kept up again from A.D. 440 to B.C. 900, even freezing the Nile River.[32] The warm period returned from A.D. 900 to A.D. 1300, allowing farmers to grow grapes even in the northwestern Europe.[33] During a cooler period between A.D. 1300 and A.D. 1850, known as the Little Ice Age, the intense cold glaciated Themes River, causing poor harvests, food shortage and acceleration of disease transmission.[34] The cycle of the Earth's temperature change shows virtual match

22 G. Bond et al., *A Pervasive Millennial Scale Cycle in North Atlantic Holocene and Glacial Climates*, 278 SCIENCE 1257-1266 (1997), *available at* http://www.bio.puc.cl/labs/clatorre/SemV/Bond_etal_1997_pervasivemillenialHolocene.pdf (last visited on Aug. 21, 2013).

23 W. Berger & U. Rad, *Decadal to Millennial Cyclicity in Varves and Turbidites from the Arabian Sea: Hypothesis of Tidal Origin*, 34 GLOBAL AND PLANETARY CHANGE 313-325 (2002), *available at* http://www.sciencedirect.com/science/article/pii/S0921818102001224 (last visited on Aug. 21, 2013).

24 F. Dapples et al., *New record of Holocene Landslide Activity in the Western and Eastern Swiss Alps: Implication of Climate and Vegetation Changes*, 96 ECOLOGAE GEOLOGICAE HELVETIAE 5 (2003).

25 For details, *see* A. Viau et al., *Widespread Evidence of 1,500-yr Climate Variability in North America during the Past 14,000 Years*, 30 GEOLOGY 455-458 (2002); Keigwin, *supra* note 16.

26 S. Niggermann et al., *A Paleoclimate Record of the Last 17,600 Years in Stalagmites from the B7 Cave, Sauerland, Germany*, 22 QUATERNARY SCIENCE REV. 555-567 (2003), *available at* http://www.sciencedirect.com/science/article/pii/S0277379102001439 (last visited on Aug. 21, 2013).

27 Ancient tree rings from 14 sites on three continents in the northern hemisphere showed that temperatures in an era known as the Medieval Warm Period some 800 to 1,000 years ago were closely matched the warming trend of today. For details, *see* J. Esper, E. Cook & F. Schweingruber, *Low-Frequency Signals in Long Tree-Ring Chronologies for Reconstructing Past Temperature Variability*, 295 SCIENCE 2250-2253 (2002), *available at* http://eas8001.eas.gatech.edu/papers/Esper_et_al_Science02.pdf (last visited on Aug. 10, 2013).

28 For details, *see* R. CERVENY, WEATHER'S GREATEST MYSTERIES SOLVED 23 (2009); B. LOMBORG, COOL IT: THE SKEPTICAL ENVIRONMENTALIST'S GUIDE TO GLOBAL WARMING 53-112 (2008). *See also supra* note 16.

29 D. EASTERBROOK, EVIDENCE-BASED CLIMATE SCIENCE 24 (2011). *See also supra* note 15, at 99.

30 H. ALLEN, HISTORY OF WINE 75 (1961).

31 R. CLAIBORNE, CLIMATE, MAN AND HISTORY 344-347 (1970).

32 *Supra* note 16, at 147-169.

33 H. LAMB, CLIMATE, HISTORY AND THE MODERN WORLD 162-163 (1982)

34 *See generally* B. FAGAN, THE LITTLE ICE AGE: HOW CLIMATE CHANGE MADE HISTORY 1300~1850 (2001) .

with the solar activity cycle.[35] The last cooler period was the Little Ice Age of 14th century. The Maunder Sunspot Minimum, when there was virtually no sunspots for some seventy years and marked the sun's weakest moment, caused very cold weather during the period.[36] According to the solar activity cycle, the present time would be a moment that the temperature gets warm again from the Little Ice Age.[37]

The intensity of the solar activity varies cyclically. In addition, the Earth's orbit around the sun forms an ellipse; this particular orbit repeatedly contracts and expands in a cycle of 100,000 years.[38] The amount of the sunrays arriving at the Earth decreases if the Earth and the sun get farther from each other. Furthermore, the gradient of the Earth's axis alters on a cycle of about 41,000 years, which also results in a variation of solar energy reaching the Earth.[39]

To sum up, the principal driver of the macroscopic climate change is the sun. Compared with the sun that alternately creates ice age and warm period, the Earth's environmental variables including human activity almost have no effect on the climate.[40] The hominids and other organisms have been withstanding climate cycles over millions of years. Many species faced extinction or dramatic population downsize when they failed to adapt to the changed surroundings. On the other hand, species flourished in favorable environment. The physical and substantive evidences left in the Earth clearly reveal that the solar activity constantly regulated temperature patterns. The species appropriately adopted according to this climate change.[41] Although the accuracy of some of these scientific evidences is currently controversial, considering CO_2 as a main control stick of the temperature change is not fully convincing.

3. Threat

IPCC and the scientists on the European side approved the man-made climate change as *fait accompli* and warned of countless abnormal weather phenomena as result of the global warming.[42] IPCC argued that the temperature rise will dissolve

35 *Supra* note 19.

36 J. Eddy, *The case of the Missing Sunspots*, 236 Scientific American 80 (1977). *See also* R. Tkachuck, *The Little Ice Age*, 10 Origins 51-65 (1983), *available at* http://www.grisda.org/origins/10051.htm (last visited on Aug.31, 2013).

37 *Supra* note 16.

38 L. Elkins-Tanton, The Earth and the Moon 18 (2006).

39 R. Carson, The Sea Around Us 222 (1989).

40 Dansgaard et al., *supra* note 20; Bond et al., *supra* note 21.

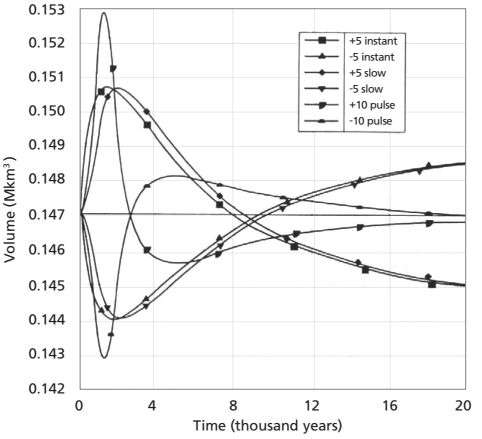
41 *Supra* note 16. For details, *see* S. Idso et al., The Specter of Species Extinction 1-39 (2003).

42 Intergovernmental Panel on Climate Change, Climate Change: The IPCC Impacts Assessment (1990), *available at* http://www.ipcc.ch/ipccreports/far/wg_II/ipcc_far_wg_II_full_report.pdf (last visited on Aug. 21, 2013).

the ice bergs and cause a sudden rise of the sea level;[43] convulse the ecosystem and dramatically decrease the biodiversity of species;[44] conceive severe drought and desertification thereby giving rise to famine and refugee.[45] However, as mentioned below, temperature rise shall not be regarded as an omen for disaster.

Whether instant or slow, the temperature rise of around five degrees gives 1.5 percent fluctuation to the total ice volume.[46] In the early stage of warming period, the temperature rise vaporizes more moisture from the ocean. This moisture, conveyed by clouds, accumulated on the surface of the glacier, consequently augmenting the volume of the ice sheet for more than eight thousands years.[47] After another few thousands of years, the warmth reaches the lower parts of the ice sheet and warms it enough to compensate for the raised accumulation on the surface, finally resulting in a decreasing ice volume. It takes almost 20 thousand years until the total ice volume actually reflect the five degrees warming.[48] This means glaciers' discharge of today cannot be an outcome of recent global warming.[49] Figure 2 presents changes in total ice volume as a function of time, based on the six experiments on climate-change.

Figure 2: Ice Volume Changes[50]



43 *Id.* at 2-20. *See also supra* note 10, at 257-282.

44 *Id.* at 3-25.

45 *Id.* at ch. 5-3.

46 J. Naslund et al., *Numerical Modelling of the Ice Sheet in Western Dronning Maud Land, East Antarctica: Impacts of Present, Past and Future Climates*, 46 J. GLACIOLOGY 54-66 (2000), *available at* http://www.igsoc.org:8080/journal/46/152/igs_journal_vol46_issue152_pg54-66.pdf (last visited on Aug. 21, 2013).

47 *Id.*

48 *Id.* 60-61.

49 *Supra* note 16.

50 *Supra* note 46.

In fact, satellite observation records from late 1980s to mid-1990s when the global warming discourse was dawning show that the total ice volume has been actually increased.[51] It is true that the temperature over the Antarctic has increased, if the area is confined to the Antarctic Peninsula which takes up about three percent of total Antarctic. A broad array of Antarctic surface stations and satellite measurements shows that temperatures over the other 97 percent of the Antarctic continent have actually been decreasing, since the 1960s.[52]

According to its own computer model, IPCC warned that the temperature rise in current trend may cause global sea level rise by more than 80cm by 2100.[53] Yet, analyzed data collected from satellites or tide gauge foresee that the rising degree in sea level may not exceed 15cm by 2100.[54]

Figure 3 shows the means and techniques of recording sea level changes to make predictions for sea level rise during the next century. Multiple field observations (i.e. classical sea level research), tide gauges and satellite altimetry are all based on observational data. They give a uniform prospect for the future. The model-based outputs form the loading models and the scenario-based outputs of IPCC give much higher predictions values. The observational-based value of +10±10 cm (±5±15 cm) for year 2100 is strongly advocated as it is more realistic than the model outputs.[55] The sea level rise will be slow and gradual, and will, therefore, guarantee the littoral ecosystem enough time to move towards higher ground.

51 Xiaojun Yuan & D. Martinson, *Antarctic Sea Ice Extent Variability and Its Global Connectivity*, 13 J. Climate 1697-1717 (2000), *available at* http://www.ldeo.columbia.edu/res/div/ocp/pub/yuan/2000JC_Yuan.pdf (last visited on Aug. 21, 2013).

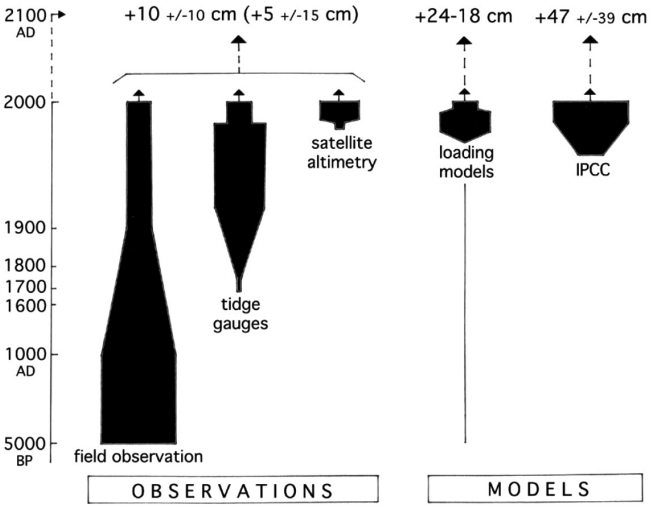
52 J. Comiso, *Variability and Trends in Antarctic Surface Temperatures from in situ and Satellite Infrared Measurements*, 13 J. Climate 1674-1696 (2000), *available at* http://journals.ametsoc.org/doi/abs/10.1175/1520-0442(2000)013%3C1674%3AVATIAS%3E2.0.CO%3B2; D. Thompson & S. Solomon, *Interpretation of Recent Southern Hemisphere Climate Change*, 296 Science 895-899 (2002), *available at* http://www.atmos.colostate.edu/ao/ThompsonPapers/ThompsonSolomon_Science.pdf (all last visited on Sept. 24, 2013).

53 *Supra* note 10, 277.

54 N. Morner, *Estimating future sea level changes from past records*, 40 Global and Planetary Change 49-54 (2004), *available at* http://ruby.fgcu.edu/courses/twimberley/envirophilo/estimating.pdf (last visited on Aug. 21, 2013).

55 *Id.* at 50.

Figure 3: Past and Future of Sea Level Change[56]



Foreseeing famine and drought caused by global warming is not convincing, either. High temperature vaporizes much moisture from the ocean and lead to an increase in precipitation. Generally, hot and humid climate is a favorable condition for food production. Human society flourished during the warming period. It is often possible to see the vestigial remains of vineyards that were thrived in Medieval Warming.[57] The increasing levels of CO_2 in the Earth atmosphere may also promote cultivation because CO_2 functions as fertilizer to most plants.[58] When CO_2 concentration doubles, the plant's growth rate would increase for 20-30 percent. Interaction of warm temperature and advances in agricultural technology consequently lead to relief towards world hunger.[59]

C. UNFCCC

Pertinent to mention here that without focusing on ceaseless suspicions and

[56] *Id.*

[57] Tkachuck, *supra* note 36.

[58] H. Mayeaux et al., *Yield of Wheat across a Subambient Carbon Dioxide Gradient*, 3 Global Change Biology 269-278 (1997), *available at* http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1437&context=usdaarsfacpub (last visited on Aug. 21, 2013).

[59] In fact, most of the famines and drought disasters of the past were rather results of poor agricultural skills, unproductive environment and government failings. *See supra* note 16.

scientific evidences, IPCC and the EU constantly have been provoking public opinion concerning climate disaster. Under this circumstance, in 1992, UNFCCC was adopted.[60] The adoption of UNFCCC was a notable event, because, before UNFCCC, there was no written international norm which prohibits air pollution.

UNFCCC, through its preamble, elevates the change in the Earth climate and its adverse effects as a "common concern of humankind," sharing with concern that 'human activities' have been "substantially increasing the atmospheric concentrations of greenhouse gas."[61] Moreover, UNFCCC notes that "the largest share of historic and current global emission of greenhouse gases has originated in developed countries, that per capita emissions in developing countries are still relatively low and that the share of global emissions originating in developing countries will grow to meet their social and development needs."[62] It also acknowledges that "widest possible cooperation by all countries and their participation in an effective and appropriate international response in accordance with their common but differentiated responsibilities and respective capabilities and their social and economic conditions" are required.[63]

UNFCCC also defines climate change as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods,"[64] and declares that the ultimate objective of it is to achieve "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."[65] The Convention emphasizes the "common but differentiated responsibilities and respective capabilities" and places stress upon principle of equity and historical responsibilities of developed countries, mentioning that the developed countries should "take the lead in combating climate change and the adverse effects."[66] It is needless to say that these devices are rooted in a premise that human activities cause climate change and GHG emissions must be controlled in order to halt its adverse

60 S. Oberthür & C. Kelly, *EU Leadership in International Climate Policy: Achievements and Challenges*, 43 Italian J. Int'l Aff. 35-50 (2008), *available at* http://www.tandfonline.com/doi/pdf/10.1080/03932720802280594 (last visited on Sept. 18, 2013); L. Groen & A. Niemann, *Challenges in EU External Climate Change Policy-Making in the Early Post-Lisbon Era: The UNFCCC Copenhagen Negotiations*, *in* EU External Relations Law and Policy in the Post-Lisbon Era 318 (P.Cardwell ed., 2012).

61 UNFCCC pmbl.

62 *Id*.

63 *Id*.

64 *Id.* art. 1.

65 *Id.* art. 2.

66 *Id.* art. 3.

effects. More than 400 signatures were collected to the 1992 Heidelberg Appeal, which expressed skepticism on the idea of restraining GHG emissions, only to bring no change.[67]

UNFCCC classifies its parties into Annex I, Annex II and non-annex countries, imposing them on common but differentiated duties for the sake of greenhouse gas reduction. Annex I is composed of 41 countries including the EU, Eastern Europe and the OECD members except South Korea, Mexico and Chile. These countries were bound by obligations to return the GHG emission quantity to their 1990 levels.[68] Annex II countries are Annex I members, except Eastern European countries, and obliged to provide technical and financial aid to non-annex parties.[69] Finally, the non-annex parties are developing countries exempted from reduction obligation.

In addition, UNFCCC establishes Conference of the Parties ("COP") in order to regularly "review the implementation of the Convention" and produce "the decisions necessary to promote the effective implementation of the Convention."[70] COP became an annual conference after the entry into force of UNFCCC in 1994. At COP-3 held in Kyoto in 1997, a Protocol, popularly known as the Kyoto Protocol, which lays down detailed reduction obligations for the developed countries, was adopted. KP was also produced by IPCC. Through its own assessment report in 1995, IPCC nailed down that: "The balance of evidence suggests that there is a discernible human influence on global climate."[71] This report was formally accredited by COP-2 and became a theoretical background pressing for the birth of a detailed protocol to UNFCCC.[72]

67 *See* The Heidelberg Appeal, American Policy Center, Mar. 29, 2002, *available at* http://americanpolicy.org/2002/03/29/the-heidelberg-appeal (last visited on Aug. 21, 2013).

68 UNFCCC art. 4 & annex I.

69 *Id.* annex II.

70 *Id.* art. 7

71 Intergovenmental Panel on Climate Change, IPCC Second Assessment: Climate Change 1995, *available at* http://www.ipcc.ch/pdf/climate-changes-1995/ipcc-2nd-assessment/2nd-assessment-en.pdf (last visited on Aug. 21, 2013).

72 *See A Brief Analysis of COP-2*, Earth Negotiations Bull., *available at* http://www.iisd.ca/vol12/1238016e.html (last visited on Sept. 16, 2013).

III. Kyoto Protocol System

A. GHG Emission Reduction

KP reaffirms the objective and principles of UNFCCC through its preamble[73] and demands Annex 1 Parties to "implement and/or further elaborate policies and measures in accordance with its national circumstances,"[74] such as "research on, and promotion, development and increased use of, new and renewable forms of energy, of carbon dioxide sequestration technologies and of advanced and innovative environmentally sound technologies."[75] Furthermore, KP imposes the Annex I Parties obligations to individually or jointly ensure that aggregate anthropogenic CO_2 equivalent emissions of the GHGs listed in its Annex A do not exceed assigned amounts, calculated pursuant to the quantified emission limitation and reduction commitments inscribed in Annex B.[76] Thereby, the 39 countries including the EU were bound by duties to reduce the overall emissions of gases inscribed in Annex B during the commitment period, i.e., from 2008 to 2012.

In spite of the official title, Framework Convention on 'Climate Change,' UNFCCC brings its focus on the global warming discourse, in particular, CO_2. The same, of course, applies to KP, which contains the detailed norm of UNFCCC. In other words, UNFCCC and KP are international legal grounds which consolidate a link connecting the following four scenarios: climate change discourse; GHG restrain trend; fossil fuel demand reduction; and the extension of alternative energy market. Yet, the ultimate objective of the EU was far more ambitious.

B. Flexibility Mechanisms

The EU designed some market-based devices that provide incentives to the countries which reduced more CO_2 and force the countries to purchase the credit when they cause more emission. The idea was realized and inserted into KP with a title of Kyoto Mechanism. KP sets out three flexibility mechanisms composed of International Emission Trading System ("ETS"), Joint Implementation ("JI") and Clean Development Mechanism ("CDM"). ETS is system which postulates total emission quantity and allocates Assigned Amount Units to the individual countries.

73 KP pmbl.

74 *Id.* art. 2.

75 *Id.*

76 *Id.* art. 3.

It then allows countries having emission units to spare to sell the excess capacity to countries that crossed their targets.[77] JI is scheme allowing Annex I parties to invest in an emission reduction project in any other Annex I country as an alternative to reducing emissions domestically. The countries can invest in projects that reduce GHG emissions in an Annex I country where emissions reduction may be cheaper. Then, these countries can use the resulting Emission Reduction Units towards reduction goal.[78] CDM is a mechanism allowing Annex I countries to implement an emission-reduction project in non-annex countries. Such projects may result saleable Certified Emission Reduction credits, which can be counted towards meeting reduction targets.[79]

ETS indirectly compels countries to use alternative energy instead of fossil fuels. JI is structurally more advantageous to the EU for alternative energy technology. Above all, the reference currency of emission trading system is Euro. It was certain that when the emission trading will be universal, the scare of carbon market may overwhelm the current derivative markets and will bring economic loss to the US.[80] In summary, the Kyoto Mechanism was an ultimate purpose of the climate change discourse; it is the reason why the US refused to participate in KP.

Opposition from the US was of course much anticipated to the EU from the beginning. The EU realized the necessity to receive support from the developing countries in order to consolidate justification of the KP system. This is why the EU depreciated the reduction obligations of the developing countries by inserting the common but differentiated responsibilities into KP, because, in early 1990s, CO_2 emission by the developing countries was not a something noticeable, so imposing obligations on the developing countries was not considered seriously. Therefore, it can be inferred that the CDM system was introduced to gather the active support of the developing countries. Providing technological assistance to the developing countries may help form global opinion against the usage of fossil fuel and thereby will induce pressure on the US. However, not everything was smooth sailing.[81]

C. Holes

The CDM market did not operate through properly the way that the EU originally

77 *Id.* art. 17.

78 *Id.* art. 6.

79 *Id.* art. 12.

80 *Supra* note 3.

81 *See generally* G. Jeffrey, The Global-Warming Deception: How a Secret Elite Plans to Bankrupt America and Steal Your Freedom (2011).

expected, due to sharp economic growths of major developing countries such as China. China successfully attracted the CDM projects of many giant multinational corporations, utilizing her cheap labor force. As the wind power industries of China enhanced drastically, China's CO_2 reduction amount made up nearly one-third of the global CDM market.[82] Moreover, the developing countries began to emit more GHGs behind the shield of common but differentiated responsibilities. When developing countries will achieve economic development by uninhibited usage of fossil fuels and plunge into the global CDM market, all efforts to monopoly the world emission market control would turn to dust.[83]

To make matters worse, ETS did not function properly. Originally, ETS was designed to improve air pollution in the US for the purpose of reducing the pollutants through the trading of emission. At that time it was successful because ETS was implemented among the companies of similar capabilities; therefore evaluating reduction effort was not very difficult. However, things were different in emission trading at global scale, because the reduction effort can easily be influenced by economy fluctuation.[84] *E.g.*, emissions allowances traded at 8.57 Euro per metric ton of carbon dioxide on January 2005; reached to a peak price of 31.58 Euro in April 2006; and then collapsed to 0.3 Euro in December 2007; thereafter increased to 25 Euro by December 2008 and again collapsed to 6.5 Euro by December 2011.[85] Consequently, ETS has turned to be a money game of speculators, directing massive buying-spree when the price collapsed and disposal in case of market recovery.

ETS did not actually halt the GHG emission. Russia's 1990 emissions, *e.g.*, were 2,405 million tons, and had fallen by 2001 to 1,614 million tons.[86] Yet, this reduction amount was an unearned income which was mainly resulted from the economic instability due to collapse of the former Soviet Union.[87] These 800 million tons of credits enabled the EU to just pay Russia and earn perfunctory certificate of reduction rather than shutting down fossil fuel plants or removing trucks from its

82 For details on China's reduction of carbon emission, *see* Xiaoyi Jiang & Fahui Hao, *Legal Issues for Implementing the Clean Development Mechanism in China*, 4 J. East Asia & Int'l L. 37 (2011)

83 *Supra* note 2.

84 *Supra* note 7.

85 For details, *See* United States Government Accountability Office, *International Climate Change Programs: Lessons Learned from the European Union's Emissions Trading Scheme and the Kyoto Protocol's Clean Development Mechanism*, GAO Report to Congressional Requesters, *available at* http://www.gao.gov/new.items/d09151.pdf (last visited on Aug. 21, 2013).

86 Larry Bell, *Climate Change: Russia is Steamed about U.N.'s Kyoto Carbon Credit COP-Out*, Forbes, Jun. 13, 2013, *available at* http://www.forbes.com/sites/larrybell/2013/06/23/climate-change-russia-is-steamed-about-u-ns-kyoto-carbon-credit-cop-out (last visited on Aug. 21, 2013).

87 *Id.*

vital transportation infrastructure by means of escalating already high diesel fuel taxes.[88]

As a matter of fact, ETS accelerated the GHG emission in some spheres. The UN allocated different credits for each GHGs based on their warming effect and duration. CO_2 was given a value of 1 per metric ton, Methane is valued at 21, nitrous oxide is at 310 and HFC-23, the waste gas which is used for making the world's most common coolant, is at 11,700.[89] In other words, earning 11,700 credits by destroying a ton of HFC-23 is far more beneficial to manufacturers rather than just earning one credit by eliminating a ton of CO_2. The market price for carbon credits varies considerably with demand, from about 9 USD to nearly 30 USD per credit.[90] Since there is no particular restriction regarding the method of reduction, it is possible to profit credits by intentionally churning out more HFC-23 and destroy its waste byproduct.[91] The credits thus made could be sold in international markets, earning tens of millions of US dollars a year. Such business discourages air-conditioning companies from switching to less-damaging alternative energy. Since 2005, 46 percent of all credits have been awarded to the 19 coolant factories, which employed this method in Argentina, China, India, Mexico and South Korea.[92]

Doubt towards effectiveness of KP was forming gradually as the principle of common but differentiated responsibilities and CDM transform trap to the EU and ETS continues to stay unstable. Judging such pace as a signal of an international skepticism about the UNFCCC system itself, today the EU contemplates a need to modify the elements of KP through the future conferences with a focus on post-KP climate responding system.

88 *Id.*

89 *See* Global Warming Potentials, UNFCCC, *available at* http://unfccc.int/ghg_data/items/3825.php (last visited on Sept. 18, 2013).

90 E. Rosenthal & A. Lehren, *Profits on Carbon Credits Drive Output of a Harmful Gas*, N.Y. Times, Aug. 9, 2012, *available at* http://www.nytimes.com/2012/08/09/world/asia/incentive-to-slow-climate-change-drives-output-of-harmful-gases.html?pagewanted=all&_r=0 (last visited on Aug. 8, 2013).

91 *Id.*

92 *Id.*

IV. Post-Kyoto Negotiations

A. Copenhagen Conference

1. Bali Roadmap

COP-13, which was taken place in Bali, Indonesia drew up the Bali Roadmap to strengthen negotiations for all-out implementations of KP and decided to establish the GHG reduction system after the first commitment period of KP which was due to expire at the end of 2012, until COP-15.[93]

2. Copenhagen Feud

In 2009, COP-15 of UNFCCC took place in Copenhagen, Denmark. The goal of COP-15 was to arrange the climate change response system posterior to 2012. This conference was very important for the EU because if they would fail to extend the tenure of KP, the legal ground to compel the GHG reduction and to continue the ET system would disappear and the scheme to shake the status of USD would also go down the drain. Needless to say, China, India and Brazil did not support the position of the EU throughout the conference.[94]

At the Copenhagen conference, the biggest point at issue was whether the principle of common but differentiated responsibilities should be repealed or not. As major developing countries such as China that achieved rapid economic improvement extend their economic influence through the Kyoto Mechanisms within the ambit of the principle of common but differentiated responsibilities, the EU felt the urgency to alter the situation.[95] This was the reason why the Danish Text which imposes equal reduction obligations to both developing and developed countries and does not allow poor countries to emit more than 1.44 tons of CO_2 per person by 2050, while allowing rich countries to emit 2.67 tons was secretly inserted in the conference agenda without proper procedures.[96] Yet, the Danish Text failed to

93 Bali Action Plan §1, *available at* http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf#page=3 (last visited on Nov. 4, 2013).

94 Staff Writer, *EU Looks beyond 'Weak' Copenhagen Climate Deal,* EurActiv.com, Dec. 19, 2009, *available at* http://www.euractiv.com/climate-change/eu-looks-weak-copenhagen-climate-news-223311 (last visited on Nov. 4, 2013).

95 *Supra* note 3.

96 Staff Writer, *Draft Copenhagen Climate Change Agreement - the 'Danish text,'* The Guardian, Dec. 8, 2009, *available at* http://www.theguardian.com/environment/2009/dec/08/copenhagen-climate-change (last visited on Sept. 18, 2013).

go through due to the stiff opposition of the developing countries.[97] Though, at least, the Copenhagen conference did not end up breakdown as the EU feared, owing to an unexpected Redeemer: the subprime crisis.

3. Turning Point

Faced the subprime crisis, the US finally realized that the CO_2 reduction strategies including ETS could derive considerable fortune and help to improve the pressing economic crisis. Initially, the US denied participating in the KP system in order to avoid the emission trading market under the control of the EU. In other words, there was no reason for the US to disregard KP if the initiative of the emission trading market leaves the nest of the EU and rolls into the clutch of the US. If the US would become a centre of a new emission reduction system that would employ USD as key currency and would involve Brazil, South Africa, India and China, it could overcome the economic crisis and secure the status of USD. The GHG restriction system was timely collapsed because of the global financial debacle.[98] This led the US at the Copenhagen conference actively mediate discord between the EU and developing countries, and to promise to approve financial support to the UN's Green Climate Fund ("GCF"), the 100 billion USD climate change fund that will be used to assist developing countries in their efforts to combat climate change.[99] Thus, although COP-15 failed to draw a binding covenant, at least it ended with a promise to convene again, deciding to discuss specific reduction goal at COP-16 and provide financial support to the developing countries about 30 billion USD by 2012 and 100 billion USD by 2020, as the US suggested.[100]

The European dream to seize global economic supremacy by dominating the emission trading market is getting more difficult to realize, at least for now. The EU saw the necessity to maintain the flexibility mechanisms and to halt the developing countries from forming power inside ETS.[101] Meanwhile, the US entertained an ambition to build up a foundation to reconstruct the emission trading market. Both sides are now became to share a common purpose: to secure the control tower of the emission market; to prevent the industrialization of the developing countries; and to

97 Id.

98 *Supra* note 6.

99 S. Goldenberg, *US Bids to Break Copenhagen Deadlock with Support for $100bn Climate Fund,* The Guardian, Dec. 17, 2009, *available at* http://www.theguardian.com/environment/2009/dec/17/us-copenhagen-100bn-climate-fund (last visited on Sept. 18, 2013).

100 *Supra* note 90.

101 *Supra* note 2, at 291-311 & 332.

strengthen the GHG reduction system by abandoning the principle of common but differentiated responsibilities.[102]

B. Doha Conference

1. Cancun & Durban Prelude

The major agenda at COP-16 in Cancun, Mexico (2010) was about a new protocol that imposes reduction obligation to both developing and developed countries. Both the EU and the US stressed on the need for China's participation in the GHG reduction system. Developing countries including China and India stoutly opposed to such argument, without losing sight of differentiated historical and present responsibilities.[103] Eventually, the Cancun conference ended up without a specific conclusion, postponing further negotiations to the 2011 Durban conference.[104] The same conflict was repeated in Durban, directing COP-17 to again fail to draw detailed conclusion. Yet, the Durban conference ended up abstractly determining an extension of KP.[105] It delegated the responsibility for setting up of specific extension period to Doha conference and decided to negotiate for the new international climate responding system until 2015 for the target year of 2020.[106]

2. Doha Climate Gateway

In November 2012, the anticipated COP-18 was held in Doha, Qutar. In this conference, the effective period of KP was extended for eight years, and the emission reduction goal was set up to 18% by 2020 below the 1990 level. How to build new climate response system which will begin from 2020 was simultaneously discussed. The flexible mechanisms including ETS and CDM also got life extension.[107] Regarding GCF, however, a detailed blueprint setting up the time and procedure to

[102] *Supra* note 3 & 81.

[103] C. Hugueney, *Clarion Call on Cancun Climate Conference*, China Daily, Nov. 25. 2010, *available at* http://usa.chinadaily.com.cn/epaper/2010-11/25/content_11609622.htm (last visited on Sept. 18, 2013).

[104] J. Oram, *An Outcome of Sorts, but the Road from Cancun to Durban is full of holes,* World Development Movement *available at* http://www.wdm.org.uk/cancun/outcome-sorts-road-cancun-durban-full-holes; Staff Writer, *Climate decisions postponed to Durban III,* InfoSud Hum. Rts. Tribune, *available at* http://www.infosud.org/Climate-decisions-postponed-to,9402 (all last visited on Nov. 4, 2013).

[105] Staff Writer, *Kyoto Extended in Durban Climate Deal*, Press TV, Dec. 12, 2011, *available at* http://www.presstv.ir/detail/215157.html Durban: Towards full implementation of the UN Climate Change Convention, UNFCCC, *available at* http://unfccc.int/key_steps/durban_outcomes/items/6825.php (all last visited on Nov. 4, 2013).

[106] *Id.*

[107] *Outcomes of the U.N. Climate Change Conference in Doha, Qatar,* Center for Climate and Energy Solutions, Dec. 7, 2012, *available at* http://www.c2es.org/docUploads/c2es-cop-18-summary.pdf (last visited on Nov. 4, 2013).

allot and raise the support fund was not established, so the construction of specific financing plan was pushed back to COP-19 in 2013.[108]

The US refused to jump in the second commitment period, as well. Russia, Canada, New Zealand and Japan have all issued statements to the effect that they will not sign to a second commitment period.[109] Consequently, the scope of KP was limited to only 15% of the global CO_2 emissions. This is an initial point of the gradual disintegration of the EU-based climate responding system and its US-based reorganization.

V. Conclusion

The current climate change response system has been progressing in a polarity between two superpowers, the EU and the US. The serious concern about the ecosystem or the consideration for the developing countries has never been existed in this progress. To make matters worse, most of the reasonable suspicions towards CO_2, global warming and current climate response system have been ignored and treated as a cancer threatening the ground of KP. In fact, although more than 30,000 scientists signed on the Global Warming Petition Project that impeaches the man-made global warming, little has been changed yet.[110] On this account, the scope of climate change discussion in dimension of international law has been limited to subjects such as principle of equity or sustainable development, in relation to the allocation of reduction duty or technical aid for developing countries. However, if the fact that CO_2 from fossil fuel combustion does not seriously affect the Earth temperature is admitted and the close relation between CO_2 emission amount and per capita national income of the developing countries is considered, blocking economic development by restraining the usage of fossil fuel is rather to be considered as an impediment to the sustainable development. In fact, KP shall be gazed from more various angles because it stands as a result of 'political' endeavor to create a 'legal' binding by giving 'scientific' justification to the 'market' mechanism that unilaterally allows 'economic' advantages to developed countries.

[108] *Id.*

[109] *Id. See also* K. Ritter & M. Casey, *UN Climate Conference: Kyoto Protocol Extended at Doha, Qatar Talks*, Huffington Post, Dec. 8, 2012, *available at* http://www.huffingtonpost.com/2012/12/08/un-climate-conference-kyoto-doha-qatar_n_2262371.html (last visited on Sept. 18, 2013).

[110] *See* Global Warming Petition Project, *available at* http://petitionproject.org (last visited on Aug. 21, 2013).

Pointing only a small prism of law to KP rather intensifies such unilateral and unreasonable structure.

The most ideal solution to the present reality would be a complete, verifiable and irreversible dismantlement of the current climate response system including ETS. However, the existing UNFCCC system has been continuing for more than 20 years despite persistent reasonable scientific suspicions, which places expectation upon developed countries to admit the scientific evidences leaving KP ineffective. Numerous climate negotiations will be hosted for many years in future and new climate response system would be established in 2020. The psychological warfare between the EU and the US will follow. Yet, the global warming discourse will not soon crumble, as long as the GHG reduction obligation and the flexibility mechanisms remain in existence.

More realistic task is to separate developing countries from unfair damages and to reduce investment income resulted from disturbance of the emission market. The discretionary authorities of the public officials should be reduced and detailed criteria shall be established in case of reallocating reduction amounts to the companies that faced downturn or business extension. Strict legal requirements for emission trading are also necessary to prevent emission credit speculation. Above all, the developing countries should retain persuasive ground for themselves. Fossil fuel usage is almost inevitable for the developing countries to enter into a certain growth orbit, as long as the alternative energy remains far too expensive and not cost-efficient. Economic growth of the developing countries is usually accompanied by corresponding CO_2 emission. In addition, fossil fuel was also a main propeller that gave such a strong economic capability to today's developed countries. Therefore, it is nothing but a blocking of rightful development if developed countries urge developing countries to restrain the use of fossil fuel, because it would be tantamount to demanding to halt economic growth. Exact statistics on this aspect should be submitted at the future climate conference.

It is true that we need to move away from much dependence on fossil fuels, because they are not inexhaustible resources. If so, the alternative energy technologies shall be considered as universal resources for all mankind. It is necessary to draw widespread recognition that monopolization of the alternative energies by few developed countries is not advisable for the sustainable development. What is ultimately essential for now is to establish global norm that acknowledges the core alternative energy technologies as common assets of humankind and prohibits making profit from such technologies.