

# Evolution Theory of the Utilization Breadth and Depth Space of Human Development Resources

## Preface

As we all know, the British scientist Charles Robert Darwin proposed the evolutionary theory of human development from the perspective of biological evolution, and the French philosopher Teilhard de Chardin, Pierre proposed the evolutionary theory of human development from the perspective of human mind. *Evolution Theory of the Utilization Breadth and Depth Space of Human Development Resources* puts forward the evolutionary theory of human development from the perspective of resource utilization.

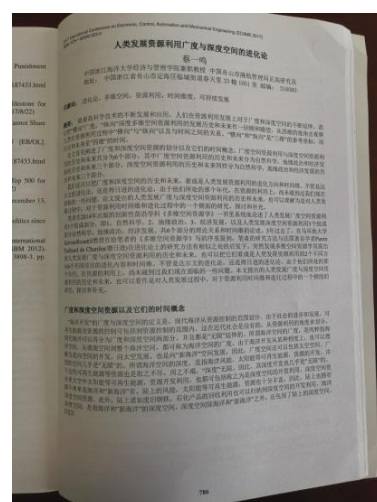
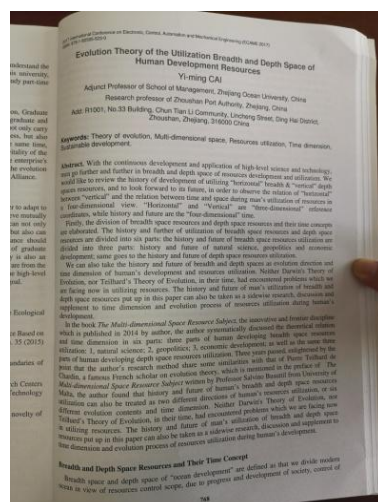
*Evolution Theory of the Utilization Breadth and Depth Space of Human Development Resources* participated in an international academic symposium held in Sanya, China, in 2017. The impact of this conference was not significant, but it is important for this paper to obtain international copyright protection through the international academic journal of the conference published by "DEStech Publications, Inc". We also broke the record of publishing only English papers and no Chinese papers in the international academic journals of this conference. The record-breaking paper was published simultaneously in English and Chinese in this academic English-language journal.

The article *Evolution Theory of the Utilization Breadth and Depth Space of Human Development Resources* is an academic paper written and completed in my spare time during my work in Zhoushan in 2017, for your reference only.

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# Evolution Theory of the Utilization Breadth and Depth Space of Human Development Resources

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**Keywords:** Theory of evolution, Multi-dimensional space, Resources utilization, Time dimension, Sustainable development.

**Abstract.** With the continuous development and application of high-level science and technology, men go further and further in breadth and depth space of resources development and utilization. We would like to review the history of development of utilizing “horizontal” breadth & “vertical” depth spaces resources, and to look forward to its future, in order to observe the relation of “horizontal” between “vertical” and the relation between time and space during man’s utilization of resources in a four-dimensional view. “Horizontal” and “Vertical” are “three-dimensional” reference coordinates, while history and future are the “four-dimensional” time.

Firstly, the division of breadth space resources and depth space resources and their time concepts are elaborated. The history and further of utilization of breadth space resources and depth space resources are divided into six parts: the history and future of breadth space resources utilization are divided into three parts: history and future of natural science, geopolitics and economic development; same goes to the history and future of depth space resources utilization.

We can also take the history and future of breadth and depth spaces as evolution direction and time dimension of human’s development and resources utilization. Neither Darwin's Theory of Evolution, nor Teilhard’s Theory of Evolution, in their time, had encountered problems which we are facing now in utilizing resources. The history and future of man’s utilization of breadth and depth space resources put up in this paper can also be taken as a sidewise research, discussion and supplement to time dimension and evolution process of resources utilization during human’s development.

In the book *The Multi-dimensional Space Resource Subject*, the innovative and frontier discipline which is published in 2014 by author, the author systematically discussed the theoretical relation and time dimension in six parts: three parts of human developing breadth space resources utilization: 1, natural science; 2, geopolitics; 3, economic development; as well as the same three parts of human developing depth space resources utilization. Three years passed, enlightened by the point that the author’s research method share some similarities with that of Pierre Teilhard de Chardin, a famous French scholar on evolution theory, which is mentioned in the preface of *The Multi-dimensional Space Resource Subject* written by Professor Salvino Busutil from University of Malta, the author found that history and future of human’s breadth and depth space resources utilization can also be treated as two different directions of human’s resources utilization, or six different evolution contents and time dimension. Neither Darwin's Theory of Evolution, nor Teilhard’s Theory of Evolution, in their time, had encountered problems which we are facing now in utilizing resources. The history and future of man’s utilization of breadth and depth space resources put up in this paper can also be taken as a sidewise research, discussion and supplement to time dimension and evolution process of resources utilization during human’s development.

## 1.Breadth and Depth Space Resources and Their Time Concept

Breadth space and depth space of “ocean development” are defined as that we divide modern ocean in view of resources control scope, due to progress and development of society, control of renewable energy and resources can be included in resource control, which is not available in recent period. Judging from resources utilization, modern ocean can be further divided into breadth space and depth space, both of which have characteristic of “being unlimited”. The so-called breadth of ocean space, purely refers to ocean space. From microscopic space to the entire ocean space, all can be called as the breadth of ocean space. To some extent, ocean development can be understood as development toward space and outer space. It is also the development of “new ocean” space, therefore, breadth space also include the outer space. Breadth space is almost “unlimited”. The so-called depth of ocean space, refers to development of ocean wind energy, solar energy and other renewable energy and other resources. Since these renewable energies and resources are inexhaustible, then “depth” is unlimited. Therefore, depth development is almost “unlimited”. Development and utilization of solar energy and other renewable resources in outer space in the future can be included in exploration of depth space. Depth space resources do not only exist in ocean and “new ocean”, wind energy, solar energy and other renewable resources on land are also very rich. Therefore, land also have depth space resources. In addition, recycling and re-use of scrap iron and steel, petrochemical products can also be regarded as exploration of depth space. Ocean depth space means the depth space of ocean and “new ocean”, while depth space also included the depth space on land, in addition to that of ocean and “new ocean”. [1] [2]

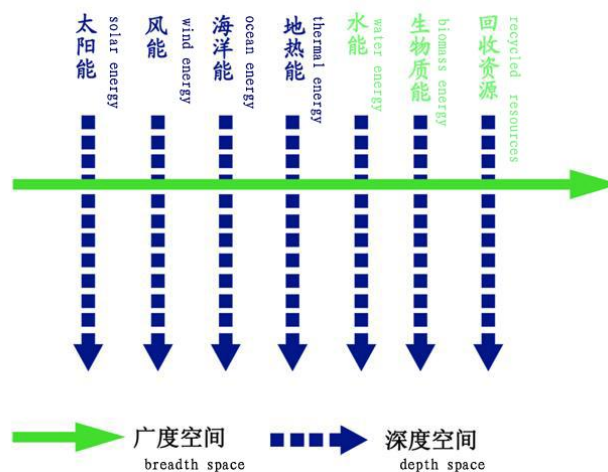


Figure 1. Breadth and depth space relationship diagram of resources

**Breadth space is the continuous extension on a horizontal “line” from marine micro-space to ocean and “new ocean”. Depth space is the continuous vertical extension on a “point” on a “line” in breadth space, obtaining energy and other resources on a point is inexhaustible. In addition, recycling and re-use of scrap iron and steel, petrochemical products can also be regarded as exploration of depth space.**

Renewable energy and resources are the representatives of depth space resources, while non-renewable fossil energy and resources represent breadth space resources.

The time concept of depth space resources refers to different states during different periods of depth space resources, including an analysis and definition with time concept under circulation state of energy and other resources. The “point” time concept of depth space resources refers to the momentary work and extension of solar energy and other energies at one point. While the concept of “point circulation”, refers to that of plant resources. And this time concept covers a reasonable period of influences on the living environment by human’s utilization of plant resources. The time concept of “point-to-point” resource circulation refers to human society’s recycling of scrap steel, waste glass and other renewable resources. [3]

Utilizing depth space energy and other resources is the momentary work and extension at one point. The work process will not change, or weakly affect natural environment. It has no

chemical-structure impact on natural environment, or just has influence exist for a reasonable period which will restore to natural state afterwards.

There are three phase cycles of breadth space resources: short-term phase cycle, medium-term phase cycle and long-term phase cycle.<sup>1</sup> The short-term phase cycle of breadth space energy and other resources mainly refers to phase cycle in external layers of CO<sub>2</sub> produced by utilization of breadth space energy and other resources. CO<sub>2</sub> exchange between deep sea and sea surface is a very slow process. Sea surface has very limited space to store CO<sub>2</sub> and it takes more CO<sub>2</sub> through exchange with deep sea, which takes several hundreds of years to thousands of years. 2. The medium-term phase cycle of breadth space energy and other resources mainly refers to the cycle between CO<sub>2</sub> and other substances produced during human's breadth space resources utilization and fossil energy and other resources or carbonate rocks, etc. Human's history is relatively short, far from enough to witness medium-term phase cycle. Therefore, strictly speaking, medium-term phase cycle refers to circulation among CO<sub>2</sub> and other substances, fossil energy and other resources, carbonatite and so on. This cycle takes thousands of years to hundreds of millions of years. 3. The long-term phase cycle refers to the overall cycle of Earth's substances.<sup>[4]</sup>

The essential differences between breadth space resources and depth space resources lie in work time (if including circulation time) and influence on environment. Breadth space resources take longer time to work and have excessive emission which affect and destroy natural environment man live in. While depth space resources are utilized at a "point". After instantaneous work or work, the material circulation has limited impact on natural environment and is suitable for human's life. To gain breadth space resources need horizontal expansion in space, while obtaining depth space resources is based on utilization on a "point", thus has no need to rely on continuous expansion in horizontal space. It is needed to point out that these differences also apply to geopolitics of multi-dimensional space resources subject, as well as economic development of multi-dimensional space resources subject.<sup>[1][5]</sup>Resources utilization cannot be separated from scientific development based on natural science, and it has close links to geopolitics and economic development.

Analyzing the history and future of breath space resources utilization with a cross coordinate, it can be expressed by a "horizontal" line, and it can be a "vertical" line if analyze the history and future of depth space resources utilization.

Due to limited space, the history and future of 6 parts in breadth and depth space resources utilization will be discussed briefly. Their time dimension will be reviewed and prospected.

## **2. History and Future of Breadth Space Resources Utilization in Natural Science**

The widely use of fossil energy and other resources in breadth space, as well as the development and utilization of resources which gradually impacted on global eco-environment during human society development can be counted back from industrial evolution.

### **2.1 History of Breadth Space Resources Utilization in Natural Science**

In the middle of 19th century, firewood, water and coal were plants' major powers; lighting fuel were plant and animal oil, or petroleum in small quantity outcropped naturally which had little impact on environment due to small scale. With the rapid development of industry, the demand for energy fuels and industrial raw materials increased greatly, and the world's annual emissions of waste discharged into the environment rose rapidly, too.

By the end of 18th century, only more than twenty chemical elements were found. Now all 94 natural chemical elements are found, and in addition, more than a dozen of artificial elements are created. According to statistics, currently there are more than 8 million kinds of artificial chemical compounds, among which, the annual production of toxic chemicals is up to 4 million tons. <sup>[6]</sup> In the Greenland Ice Cover nearby the North Pole, lead and mercury levels have risen continuously in recent decades. At the end of the 1960s, tens of thousands of seabirds died on the Irish sea. After detection, biologists found high concentrations of PCBs in their bodies. DDT is also detected in penguins who lived on the desolate Antarctic continent.

In the 1970s, it was estimated more than 3 billion tons of solid waste were discharged into environment per year, and around 600~700 billion tons of wasted water were disposed into environment annually. [6] From 1970 to 2004, the total annual GHG emissions increased by 70%. The concentration of nitrous oxide in the atmosphere went far beyond that of thousands of years before industrialization, while the methane and carbon dioxide concentrations were far beyond the natural range over the past 650,000 years. [7]

On 2nd Nov 2014, the “Comprehensive Report”, the 5th assessment report issued by Intergovernmental Panel on Climate Change (IPCC), pointed out that climate change will increase the possibilities of bringing serious, widespread and irreversible impacts on human and eco-systems. The report confirmed that climate warming was unquestionable. Since the 1950s, many of the observed changes have been unprecedented in decades or even thousands of years. Compared to the previous assessment reports, this report was more certain that since the mid-20th century, greenhouse gas emissions and other man-driven factors had become the main cause of climate warming. The more activities which destroy the climate human carry out, the greater the risk is. [8]

Earth Overshoot Day came on Aug 2nd, 2017, almost 5 months advanced. According to a report published by World Wide Fund of Nature and Global Footprint Network recently, human emitted more carbon in the first 7 months than that seas and forests can absorb for one year. People catch more fish, cut more trees, and consume more water. While greenhouse gas emissions from coal, petroleum and natural gas account for 60% of the global human’s footprint. Human consumption of resources on the Earth equal to that 1.7 Earths can provide. The report pointed out that this year's Earth overload day was August 2, 139 days ahead of that in 30 years ago, four months advanced. [9]

## **2.2 Future of Breadth Space Resources Utilization in Natural Science**

Human beings are too greedy to obtain natural resources, almost go crazy and forget ourselves in face of maintaining a balanced cycle of nature and natural resources. If such activities would not be effectively stopped, the contradiction between man and nature will be more intensified.

It is reported that surveillance stations around the world have warned that the growth rate of carbon dioxide emissions on Earth has set a record high in 2015 and 2016. After the year of 2017, it slows down slightly, but still very high. In recent years, the amount of carbon dioxide that has been released into the air has been moving towards stabilization since the 1980s, when the global climate crisis has been widely understood, at least the compiled emissions data of nations are shown in this way. One thing that deserves attention is that carbon emissions reduced but carbon dioxide emission increased dramatically. [10] If carbon dioxide amount emitted by human has not grown, why the amount of carbon dioxide in the air increases faster than ever before does? Does this mean that the natural absorption of carbon dioxide is changing? That is to say, the natural absorption capacity of carbon dioxide is declining.

As per a media report on May 25, 2016, a research report, published in the latest issue of the *Nature Climate Change*, pointed out that if the fossil fuel reserves known on the Earth are depleted, it will enable Earth less suitable for living than scientists previously speculated. World average temperature will rise 9.5 degrees Celsius, which is four times higher than the target-to limit global warming range within 2 degrees, set by the Paris Climate Change Conference in December 2015. Although this is an extreme case, experts believe that the possibility of such extreme situations should not be overlooked. [11]

The chemical reaction in the breadth space refers to the normal chemical cycle and change of the Earth and partial space substances, which is brought by the natural chemical cycle of the Earth and Space substances affected by wastes and air wastes produced in human’s living and production on the earth and in the space.

In the future of breadth space resources utilization, if human let the situation develop continuously and goes further, eco-environment will deteriorate beyond the situation that science and technology can reverse some day and it will finally lead to a new start of natural environment

cycle on the Earth. At that time, human will not exist and never mention the future of breadth space resources utilization in geopolitics and economic development. [1]

Meteorologists and geologists tell us that it is actually a normal state for Earth's climate changing over millions of years. The one million years passed is actually just a short part during breadth space resources utilization. It is also the only period during which Earth's climate did not change dramatically during Earth's climate history. Scientifically grasp a short process during the breadth space "horizontal" development, for human society, we can gain benefits and tranquility on resources utilization and environmental issues in the long term. [1][4]

### **3. History and Future of Breadth Space Resources Utilization in Geopolitics**

Putting up with time dimension on resources utilization share same purpose and function of using a ruler: to quantify breadth space resources and depth space resources in time dimension of resources dynamics and to measure resources essence in time dimension. Division of breadth space and depth space of resources provides coordinates for measuring resources time dimension. The coordinates and time dimension provides references and coordinates for development process of resources utilization during human's society development. We can also analyze, discuss basis on these references and coordinates and read from the perspective of evolution. Their time dimension is their reference to evolution time.

To obtain breadth space resources has requirements in space. It needs "horizontal" expansion to gain resources. Since man moved to ocean and "new ocean", human society brought are evolutionary change of impact on nature and environment along with great progress in science, technology and industry. On the other hand, human society is facing "energetic" "survival crisis."

#### **3.1 History of Breadth Space Resources Utilization in Geopolitics**

Analyzing in perspective of history of breadth space resources utilization in geopolitics, human unconsciously takes a way of continuous outbound development and expansion in horizontal direction of geology, though people are not clearly aware of the potential problems in every step of technology progress and external expansion, though not every step has direct relation with resources utilization. However, technology progress, external expansion, people's understanding of nature, ecological issues and geopolitics of natural resources indeed have inseparable casual relationships. [1] It means horizontal expansion (geopolitics), resources utilization and environmental issues have direct relationships.

Mankind is holding on to an old, classic and history-based development concept, never doubting expansion, further expansion and unstoppable expansion in horizontal space from viewpoints of geopolitics, economics theory and natural science. This traditional development concept seems only has one solution to improving people's living standards and solving human's development issues, that is continuously expand into horizontal space to obtain resources treasure, while the result is to bring wars, resources shortage, environmental problems and finally, man's survival crisis. [1]

Navigation technology progress led to new routes discovery and geographical discovery, as well as Colonial Conquest. New route discovery and the great geographical discovery promoted European commercial evolution and East-West cultural communication, and it also promoted human society's globalization and expansion. At the same time, colonial behavior is also the plunder to external expansion and interests.

The world war and geopolitics theory. In 1897, German geographer Friedrich Ratzel, who is considered the "first generation master" in geography, thought that a nation was an "organism" which needed space to grow, with prosperity and decline. Its prosperity required broad space and need to rely on external expansion to maintain nutrition for the "living body" growing. Hitler believed that the only way to pursue living space was to seize the land and resources in expansion through war. These theories of geopolitical aggression in reallocating the territory and resources and expanding living spaces provided the theoretical basis for the First World War between 1914 and 1918 and the Second World War from 1939 to 1945.



The traditional geopolitics is a political game with a “zero-sum” nature in the essence, an external strategy for pursuing expansion, interests and power. It has **a large, essential difference** with the law compound with geopolitics of multi-dimensional space resources and resources utilization.

### **3.2 Future of Breadth Space Resources Utilization in Geopolitics**

In fact, based on human’s current scientific level, we cannot accurately predict on various chemical and physical changes following Earth’s climate changes due to human activities, Earth's climate change after the various chemical and physical changes in the environment. Anyway, documentaries and films based on mainstream scientific research results still born. Though not as rigorous as academic papers studying and reflecting environmental issues caused by climate changes, these documentaries and films still strongly put a scientific mark on basis of world-top scientists’ research achievements. Combined with research achievements, these documentaries and films vividly reflected the possible environmental changes brought by Earth’s climate changes. [1]

“An Inconvenient Truth” premiered at the Sundance Film Festival in 2006, starred by former US Vice President Al Gore. The film is a documentary, delivering predications according to some materials and information of climate changes by academic community.

“The Day After Tomorrow “is trying to show and explain the fact that if the greenhouse effect and global warming continue developing, a major global disaster is bound to happen.

“Home——A Stunning Visual Portrayal of Earth” praises the Costa Rican government as it is the first country abandoned the military, spending all the military expenditure on national education and green tourism. The movie depicts the Israeli cultivating high-quality food crops with soil irrigation technology in the desert.

“Six Degrees Changing the World” by British scientist Mark Linus, is based on “the 3rd Assessment Report” of IPCC. It vividly describes situations and consequences in different stages of nature and human’s society geopolitics after climate rises by 6degreesCelsius, combining research achievements of modern science.

The development rules of geopolitics moving to ocean and “new ocean”. The Second World War proved an axiom that if a nation took expansion of geographical space as its development strategy, it would injure others and ruin itself. It will be punished by justice definitely. Similarly, during process moving to “new ocean”, if mankind still take pure space expansion as purpose, then mankind will definitely be noticed and pushed by aliens if any. Taking pure space expansion as purpose in moving to ocean and “new ocean” will be not only restricted by natural capacity and natural harmony but also receive special attention and strict punishment from human and other creatures more developed than human(if any). Of course, human also need self-defense ability, but it should exist to defend the justice.[1][5]

In just a few hundreds of years, human’s activities range spreads from the mainland to the ocean by navigation, and further to the space - “new ocean”. We need to know the ocean and the “new ocean”, and need to go further. However, in particular, it is important to treat the ocean and the “new ocean” gently with a scientific attitude. Due to limitation on scientific rationality of resources utilization, unprecedented challenges that cannot afford to be ignored have rose between the consolidation of the natural environment suitable for human living and the overloading of resources utilization (including the expansion of geography).

### **4. History and Future of Breadth Space Resources Utilization in Economic Development**

The impacts on human society and economy development brought by chemical reaction circulation of breadth space resources due to human activities mainly refer to two aspects: economic impact due to climate changes and depletion impact due to resources consumption.

#### **4.1 History of Breadth Space Resources Utilization in Economic Development**

Resources, in thousands of forms, are the basis of human society survival and development. As early as 3,000 years ago, China had a record of using coal as fuel. About 2,000 years ago, ancient Greece began to mine and use coal.

In the 1870s, human society entered the “coal age”. Coal replaced the firewood as the main energy. In the 1970s, coal accounted for 24% of the world's energy consumption structure. Then, electrical power entered the social fields. Steam engine and thermal power station grew rapidly. By the beginning of 20th century, coal demand reached 95%. [12] During 1950-1960s, a buying spree of the four “must-have” items (car, television, refrigerator and washing machine) spread from nation to nation over the world. Global petrochemical industry has developed rapidly. In 1950, among world energy consumption, coal accounted for 50.9%, 32.9% of petroleum and 10.8% of natural gas.

In the 1960s, world energy entered the “petroleum age”. Petroleum production and consumption exceeded those of coal. Petroleum production in 1969 exceeded 2 billion tons. In the 1970s, the world's petroleum trade volume was 1.5 billion tons, accounting for about one-fifth of the world's total trade volume, and accounting for 53% of the tonnage of marine goods; Oil tankers accounted for 40% of merchant tonnage.[12]

At present, petroleum still occupies an important position among fossil fuels, followed by coal and natural gas. According to the “BP World Energy Outlook (2017 edition)” Chinese version, fossil fuels provided as much as of 85% of world' total energy supply in 2015. The report predicts that by 2035, petroleum will still be the world's largest energy source, while natural gas replace coal as the second largest energy source. And fossil energy accounts for more than 75% of the world's total energy supply. By 2035, the shares of petroleum, natural gas and coal in primary energy consumption will be 29%, 25% and 24% respectively.[13]

In the beginning of utilization and exploitation process, people lacked understanding in the natural circulation of materials left after burning of coal, petroleum and other fossil resources. Therefore, here comes an argument that resources are over claimed and unreasonably gained, as well as an evaluation that human is greed.

#### **4.2 Future of Breadth Space Resources Utilization in Economic Development**

**Economic Impact of Climate Changes.** By 2050, economy development in developing countries may stagnate or regress. According to a report released by the United Nations Development Program in 2011, economy development in developing countries could be stagnant or retrogressed by 2050 if countries do not take decisive measures to address the effects of climate change.[14] As globe goes warming, the stability and distribution of world food production will change greatly. It is predicted that by 2030, corn and wheat production will decline significantly in southern Africa. [14]

Sea level rises, resulted in flooded lowlands and eroded coasts. The tourism industry is subject to loss and the beach eroded backward. It is reported that people now need to increase the height of dams four times a year on average. As the sea level rises, the frequency of increasing dam heights grows significantly, and people's life of coastal and island countries which account for one-third of the world's population will be threatened. If the polar ice caps melt, the coastal areas will be engulfed by sea. Maldives, Seychelles and other low-lying island countries will disappear from the ground. Shanghai, Venice, Hong Kong, Rio de Janeiro, Tokyo, Bangkok, New York and other seaside cities, as well as the Netherlands, Egypt and other countries will not be able to escape from destruction, too.[15]

**Depletion Impact of Resources Consumption.** Resource is the main component of economy.

Overuse of resources brings environmental problems on human society development. At the same time, it is also accompanied by a serious problem of resources depletion. The Earth spent 4.6 billion years on accumulating petroleum, gas and coal for us. Scientists estimates that petroleum mining can sustain for 46 years, natural gas for 65 years, and coal for 169 years.[16]

By 2050, global fresh water consumption will break the bottom line. International research team released a report, saying the bottom line of annual fresh water consumption is 4000km<sup>3</sup> Current annual consumption is 2600km<sup>3</sup> and it is expected that the annual consumption will be close to the bottom line in the middle of this century. At present, China is one of the 13 countries poorest in capita water resources in the world. [16]



Native non-ferrous metal resources are becoming depleted. According to China's Mining Network, silver and other rare metals will be mined out before or after 2020. It is estimated that the indium reserve on the Earth can sustain up to 10 years. Silver will be depleted in 10 years. Once the platinum has been used up, the Earth will be impossible to regain platinum. All platinum metal in the world will be used up in 15 years. This happens on many other rare metals. Antimony metal used to make fire-resistant materials will be used up in 15 years, and zinc may be used up in 2037. According to current mining speed, the proven reserves of non-ferrous metals on the Earth by 2002 will be drained as: copper in 22 years, aluminum in 130 years, nickel in 77 years, tin in 28 years.[16]

“World Energy Outlook (2017)” forecasts that carbon emissions from energy use will grow at a rate of 0.6%, less than one-third of the average growth rate over the past 20 years (2.1%). But global carbon emissions will increase about 13% by 2035, far exceeding the IEA's 450 scenario forecast - that by 2035, global carbon emissions would have to decrease about 30% to catch opportunity to achieve the emission reduction targets set by Paris Climate Agreement.[13]

How to effectively regulate and control global carbon emissions by economic measures is clearly a serious practical problem we are facing with.

What bothers most is whether the use and emissions of breadth space fossil resources in a large quantity will lead to a sudden change in human living conditions caused by geochemical materials circulation? For all this, we human are still very ignorant, and lack of proper attention and preparation.

## **5. History and Future of Depth Space Resources Utilization in Natural Science**

Division and time concept of depth and breadth space resources are the basis of history and future of natural science, geopolitics and economic development under multi-dimensional resources. Without the basis, history and future are out of question. Breadth space and depth space resources include “new ocean”-the space. In academic concept, they achieve common development in integration with “trinity” of natural science, geopolitics and economic development. It can be seen that there is big difference between concepts of breadth & depth resources and that of renewable and non-renewable resources. Depth space resources utilization in natural science is to achieve scientific and rational use of depth space resources via technological inventions, innovations and industrial transformation in this field.

### **5.1 History of Depth Space Resources Utilization in Natural Science**

From two million or three million years ago to 10,000 years BC, chipped stone tools were popular among human and fire was already in use. The invention of fire is the earliest use of solar energy in human history. About 8000 BC - 2000 BC, primitive agriculture appeared. Human began to use plant resources in depth space by cultivating rice, chestnut and other crops. People began to use renewable energy in a very early stage, pumping water with millstone driven by wind, husking rice and milling grains with mill wheel driven by running water, drying food by sun, and transporting logs by stream.

In 1600, French built the first tidal mill of America in the east coast of Canada. In 1615, French engineer Solomon de Cox invented the first solar-powered engine.

In 1799, there were thousands of imaginations of using wave energy over the world. The wave energy device patent with written records can be traced back to 1799.[17]

In 1881, the French physicist Arsenal published an article “Sun ocean energy” on the newspaper. It proposed to use temperature difference between warm seawater on surface and cold water beneath to drive heat machine. [18]

In 1895, inventor of AC generator and AC power transmission technology, Tesla made generating units for Nicaragua hydropower station of USA. In 1897, the world's first 100,000HP power station--the Niagara hydropower station established and it became the main source of power for the City of Buffalo which was 35 kilometers away.[19]

In 1901, the US engineers successfully developed a 7350W-solar steam engine by using 70 square meters of solar concentrators. The device was installed in California of USA to do experiments.

In 1950, the former Soviet Union designed a small experimental device, the world's first solar tower thermal power plant, carried out extensive, basic explorations and researches on solar thermal power technology.

In the mid-1950s, tidal energy utilization boomed in China's coastal areas. By now, a 40kw tidal power station in Shashan, Zhejiang Province is still preserved. [20]

In 1973, the outbreak of the global petroleum crisis stimulated research and development of solar energy technology. According to circle sources, from 1981 to 1991, people built more than 20 different types of megawatt-class solar thermal power experimental stations with installed capacity more than 500kw.[21]

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In the history of renewable energy development, contribution ratio of wind power, water energy, solar energy and other resources in energy supply increased significantly. Now hydroelectric power, wind power and solar energy utilization cases have sprung up rapidly around the world.

## **5.2 Future of Depth Space Resources Utilization in Natural Science**

Renewable energy and resources are inexhaustible, with no or little harm to the environment. They are widely distributed across the world and are suitable for local development and utilization. Renewable energy and resources mainly include solar energy, wind energy, ocean energy, biomass energy, etc. Solar energy refers to the sun's thermal radiation. The sun will exist for billions of years, and for humans, solar energy can be considered inexhaustible. Solar energy is direct conversion of solar radiation energy among photo thermal, optoelectronic and photochemical forms. Wind energy, water power, ocean thermal energy, wave energy and biomass energy are also derived from the sun. Wind energy exists every place on the earth because it is generated by air flow heated by solar energy and other energy. Ocean energy can usually be contained in renewable energies of ocean, including tidal energy, wave energy, marine current energy, ocean thermal energy, ocean salinity energy, etc. Biomass energy mainly refers to chemical energy stored inside of biomass transformed from solar energy through plants' chlorophyll photosynthesis. Geothermal energy refers to the heat resources coming from internal part of the Earth.

The ultimate solution to future energy resources will be replaced by the combination use of depth space resources. Relatively speaking, depth space resources also need to be used under specific conditions and time, without which, there are still possibilities to bring varying degrees of impact and changes on environment.

The future development of smart grid solves the problem of poor voltage stability in power network application while utilizing depth space resources. It is also an important support to connecting wind energy, solar energy and other new energies to the grid. The improved interconnection standard will make grid more accessible to various power generation and energy storage systems. From small capacity to large capacity, different kinds of power generation and energy storage can be interconnected at all voltage levels, including distributed power supplies such as photovoltaic power generation, wind power, advanced battery systems, plug-in hybrid vehicles and fuel cells. Business users can install their own power generation equipment (including efficient CHP installations) and power storage facilities. It will be easier and more profitable.[22]

## **6. History and Future of Depth Space Resources Utilization in Geopolitics**

Circulation of breadth space resources in short-term, medium-term and long-term is endless waiting for human living conditions circulation. Human cannot survive through this long wait. Human society cannot afford the natural law of circulation. Obviously, it is required to transform traditional geopolitics into new geopolitics.

Utilization of depth space resources or control of depth space resources is a new term, to clearly clarify and understand the phenomena of new "politics" and "economical" geography in the

objective world. The existence of depth space in natural science refers to unlimited, inexhaustible renewable and environment-friendly energy and other resources. While in the field of social science, it can be transformed into depth space control highly associated with politics, economy, diplomacy and military.

Coal, petrochemical fossils and other resources are the main resources which brought about contradictions, fights and even wars among countries concerning traditional interest control right of sea power, land power and air power in “breadth space” to get more resources. Dividing by political geography, sea power, land power and air power all belong to geopolitics. While depth space control power is another new “geopolitics” after human entered 21st century--renewable energy times. It is the space control power for the new generation of resources interests. Depth space control power is a new geopolitics theory with “four-dimensional” characteristics proposed on basis of theory of dividing resources utilization into breadth and depth spaces. [1]

The diagram below reflects time dimension of multi-dimensional space resources, as well as correspondence and comparison between energy exploration and utilization and geopolitics development from Primitive Society to Future Society.

Table 1. Time dimension of geopolitics in multi-dimensional space resources [23]

Firewood Time	Firewood Time	Fossil Energy Time	Multi-dimensional Space Resources Time
Primitive, Slave Society	Feudal Society	Modern Society	Future Society
1. Tribal Politics National, Ethnic Politics	1. National, Ethnic Politics	1. National, Ethnic Politics 2. More complicated sea power, land power and air power theory 3. Obvious Impact on Earth's air and environment from Resources' chemical circulation time	1. National Politics; Four-dimensional Politics 2. Depth Space Control Power 3. Gradually weakened impact on Earth's air and environment from Resources' chemical circulation time 4. Gradual transition of traditional geopolitics

### 6.1 History of Depth Space Resources Utilization in Geopolitics

As early as the 13th century, Edward I era in England, there was a record of protest on “harmful smell” of coal emissions.

In 1962, American biologist R. Carson published a scientific work “Silent Spring”. It described ecological damages caused by abuse of chemical pesticides, and caused strong reverberations.

In April 1968, about 30 people including scientists, economists, anthropologists, industrial entrepreneurs and politicians from different countries of Europe met in Rome and had a two-day heated discussion on human development and future issues. Consequently, the Club of Rome was set up. On March 12, 1972, the Club of Rome published its first long report “The Limits of Growth”. Universities of many countries and regions listed it in their must-read books. The Club of Rome shoot to fame.

In 1972, the United Nations convened a meeting on human environment and adopted the Declaration of the United Nations Conference on the Human Environment.

In 1987, the UN World Commission on Environment and Development presented a “sustainable development” model in its report “Our Common Future”.

In 1980, the German Green Party founded, and it only took 3 to 4 years to become the third largest political party in German politics. In 1990s, the Greens continue to grow in Europe, some also involved in forming a coalition government

The United Nations Framework Convention on Climate Change (UNFCCC or FCCC) was adopted in 1992. It is the world's first international convention handling detrimental effects on human economy and society brought by global warming through overall control of carbon dioxide and other greenhouse gas emissions.

In December 1997, the third meeting of parties to the United Nations Framework Convention on Climate Change was held in Kyoto, Japan. “Kyoto Protocol” was adopted (Kyoto Protocol; full name “United Nations Framework Convention on Climate Change Kyoto Protocol”). It is a supplement to “United Nations Framework Convention on Climate Change” (UNFCCC).

During 15th-18th Dec, 2009, the 15th Conference of the Parties to the UNFCCC was held in Copenhagen, Denmark. In the afternoon of 19th, Dec, the United Nations Climate Change Conference came to an end in Copenhagen, Denmark, finally reaching an agreement of a non-legally binding Copenhagen Accord.

At the 18th session of CPC Central Committee in 2012, ecological civilization was written into the Party Constitution for first time.

On Dec.12th, 2015, nearly 200 parties to the UNFCCC reached a consensus in adopting the Paris Agreement. It has 29 terms in total, including objectives, mitigation, adaptation, loss damage, funding, technology, capacity building, transparency, global inventory and so on. On April 22nd, 2016, more than 100 countries gathered in the United Nations to witness the signing of the Paris Agreement. The Paris Agreement is the third milestone of international legal text on climate change in the history of mankind. Following the UNFCCC and the Kyoto Protocol, it will form a global climate management pattern after 2020.[24]

The 11th G20 Leaders Summit was held in Hangzhou, China from September 4th to 15th, 2016, discussing sustainable development agenda by 2030 as a core issue. UN Secretary-General Ban Ki-moon said: “China is committed to promoting the G20 transition from the short-term mechanism dealing crisis to a long-term mechanism on achieving sustainable development. It is China's great contribution to G20, as well as to global governance.”

On Sep4th, 2016, Chinese President Xi Jinping and US President Barack Obama handed China's and US' ratifications of “Paris Agreement” to UN Secretary-General Ban Ki-moon at the G20 Leaders Summit, marking the two largest economies in the world officially joined the Paris Climate Change Agreement, demonstrating the ambition and determination of the international community in tackling global problems. “I am honored to receive in person the ratification documents submitted by China and the United States.” Secretary-General Ban Ki-moon highly appreciated the contribution of China and the United States made in responding to climate change.[25]

On June 1st, 2017, US President Trump announced at the White House that “the United States will cease the implementation of the non-binding Paris Agreement”. The United States' withdrawal from the “Paris Agreement” may only complete process by November 2020. Moreover, there are also many domestic controversies on its withdrawal from the “Paris Agreement”. Both the media and the state government seem not go for Trump's decision, and some state governments express they will continue to implement the Paris Agreement. [26]Withdrawal from “Paris Agreement” only let the United States lose more global credibility and influence, more harm than good.

## **6.2 Future of Depth Space Resources Utilization in Geopolitics**

The future of depth space resources utilization in geopolitics has inseparable connections with demands in following three aspects and one measure:

**Demand in harmony with nature.** Utilization of depth space resources is based on fresh discoveries of natural science laws, therefore it has a direct link with natural harmony. Depth space resources utilization in geopolitics is the politics derived from the natural science of using depth space resources.

Then time dimension mentioned in multi-dimensional space resources subject --four-dimensional space includes past and future. It is the geopolitics which transcend classes, combine with future development, lie on basis of natural science and harmonious philosophy and hold universal value. It reflects a new interpretation of resources utilization law and control of human's greed activities of resources use and demands in maintaining balance of ecological balance in nature.

**Demand in National Economic Safety.** In respect of resources utilization of modern society, the new standards of national economic safety mainly have two aspects: Firstly, how serious impact does resources utilization have on environment? Secondly, do resources meet the standards of

sustainable development? Depth space resources are a new kind of productive force. Due to different properties and characteristics, its geopolitical development in the future has essential difference with that of breadth space resources.

Demand in Industrial Structure Adjustment. Recalling the history of human’s energy utilization, after experienced a few different periods of firewood time, peat time, coal time, fossil time, now mankind is gradually adjusting use into new energy (depth space resources) use. Every innovation and reform in energy utilization of human society has brought new and important changes to society’s improvement and development. A huge development opportunity in the history was always accompanied by a revolution in the industry. Shortage of energy and other resources was not only crisis but also a heaven-sent opportunity.

Depth Control Power, In Chinese characters, power and right are represented by one character with no difference. The reason why the author translates “right “into “power” lies in two points: firstly, sever resources shortage and serious environment pollution are badly in need of protection of a strong force; secondly, translation of depth space control power same as sea power, land power and air power will make this point more easily understood. From the geopolitics, depth space control power is also a new kind of control power though it has essential differences with traditional sea power, land power and air power. However, to change the bad habits in human social development, we need strong power to deal with them. Of course, we also need “to hit what men like” by offering economic benefits. Therefore, in the process of implementation, it becomes critical to solve problems in using depth space resources mainly through market means, economy vs economy.[1]

**In future, whoever scientifically and rationally develop and use energy and other resources in depth space as mankind need own the key to harmonious development with nature concerning deplore energy and other resources of nations and human, and own the key to peace and primary material base controlling the fate of world and human.[5]**

## 7. History and Future of Depth Space Resources Utilization in Economic Development

The main task of using multi-dimensional space resources in economic development is to use economic means to solve the resource and environmental problems of resource utilization at a time point on the timeline of depth space, or to use the special observation angle of multi-dimensional space resource science to explain and analyze problems in resources use by human society, including the status quo and development in the future, and to solve and correct human’s misunderstanding in resources utilization via economic means.

In terms of time dimension, the characteristics of depth space economic development mainly are shown in two aspects. One is the natural characteristics of natural resources science. The depth space resource is an endless extension of “one point” in “vertical” direction. while breadth space resource is an endless extension of “one line” of a “plane”. This is also a feature of resources space dimensions. the other is time expansion of resources utilization development, the history and future of resources utilization in economic development. It is the time dimension generated under a specific time with specific time conditions in the process of human’s resources utilization.

The time characteristics of development and future of resources utilization in time dimension of multi-dimensional space economic development are shown in the following table. It expresses the (evolution) relations among economic development, energy and resources utilization, social development and ages(time)

Table 2. Time dimension of multi-dimensional space resources’ economic development[23]

<b>Thousands of Years Ago</b>	<b>2000-3000 Years Ago</b>	<b>300-400 Years Ago</b>	<b>Hundreds of Years in the Future</b>
<b>Firewood Time</b>	<b>Firewood Time</b>	<b>Fossil Energy Time</b>	<b>Depth Space Resources</b>
<b>Primitive, Slave Society</b>	<b>Feudal Society</b>	<b>Modern Society</b>	<b>Future Society</b>

Tribal, Ethnic, National Economy	National, Ethnic Economy	National, Global Economy	National, Global Economy; Depth Space Resources Economy; “New Ocean” Resources Economy; Four-dimensional Resources Economy
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**Thousands of Years Ago:** Thousands of years ago mentioned in above table refers to period from thousands of years to 10,000 years ago. It was firewood time in energy use and belonged to primitive and slave society period, with tribal economy, ethnic and national economy as economic development forms.

Developments of human society on the Earth vary widely. And there are huge differences in productivity and civilization degrees during Nations’ and human groups’ development, differences existing in different development periods. The time dimension of multi-dimensional space resources economic development showed in above table, like “thousands of years ago-firewood time”, is only a token time reference to energy development, social civilization and economic development.

**Tribal Economy** refers to economic activities among tribes before nations came into being. During this period firewood was the main energy

**National, Ethnic Economy** refers to economic activities among nations and ethnics after nations appeared. During this period, firewood and coal were the main energy.

**2000-3000years ago** Feudal society existed for 2000-3000 years during human development belong to firewood time in energy use and with ethnic and national economy as main economic development forms

**300-400 years ago** In modern society (300-400 years ago), human entered fossil energy time with national and global economy as main economic development forms.

**National Economy and Global Economy** refer to economic activities among nations/over the world after industrial revolution. During this period, fossil energy is the main energy.

**Hundreds of Years in the Future.** Mentioned in above table and it is only an approximation, referring 100~1000 years in the future. In view of energy and other resources utilization, human will enter an era basis on comprehensive use of multi-dimensional space resources, with characteristics including national and global economy as economic development forms, depth space resources economy, “new ocean” resources economy and four-dimensional resources economy

**Depth Space Resources Economy** refers to economic activities among nations/over the world in depth space in order to solve resource and environmental problems existing in fossil energy of breadth space.

**“New Ocean” Resources Economy** refers to economic activities to explore and use resources, the extension into space in resources utilization; “new ocean” resources economy can also be divided into breadth space resources economy and depth space resources economy.

**The Four - dimensional Resource Economy** is that the original “three - dimensional” research of resource economy plus the observation and research in time dimension. The fourth dimension refers to the time dimension of breadth space resource economy and depth space resource economy.

## 7.1History of Depth Space Resources Utilization in Economic Development

Carbon asset is the economic means used to carry out the depth space control power by depth space resource economy. Of course, the creator of carbon asset did not make such an explanation. But when people divide resources into breadth space resources and depth space resources, from another point of view, it seems that we can see the importance more clearly in using depth space resources and implementing depth space control power with such interpretation.

Carbon asset originally does not exist in the world. It cannot be treated as a commodity and there is no economic value in it. However, in 1997, the “Kyoto Protocol” was signed. Politicians, scientists and economists, in order to deal with climate change, had active researches and discussions, then regulated that the emission of greenhouse gases including carbon dioxide should



be limited under the premise of reasonable environmental capacity, leading to the right of carbon emission and the emission reduction amount(credit) become scarce, making it a product with commodity value which is called carbon asset. At the same time, the formation of the global carbon market created the conditions for its global circulation as a commodity.

The Kyoto Protocol establishes flexible cooperation mechanisms to reduce greenhouse gas emissions, like Emissions Trade (ET), Joint Implementation(JI) and Clean Development Mechanism (JI).

According to above cooperation mechanisms, carbon tradecan be divided into two types-Allowance-based transactions and project-based transactions.

The world's carbon exchanges mainly include the European Union Greenhouse Gas Emission Trading Scheme (EU ETS), the UK Emissions Trading Group (ETG), the Chicago Climate Exchange (CCX), the National Trust of Australia (NSW) and so on.

In 2006, "Carbon Market Status and Trends" released by the World Bank showed that the total global carbon trading is \$30 billion for the whole year among which European emissions trading accounted for \$24.4 billion.

In October 2011, the General Office of the National Development and Reform Commission of China issued the *Notice on Carrying out the Pilot Project of Carbon Emissions Trading*, and approved the seven provinces and cities in total, four major municipalities of Beijing, Tianjin, Shanghai and Chongqing plus Hubei Province, Guangdong Province and Shenzhen City, to carry out carbon emissions trading pilot work.

In 2015, "China Energy News" and the China Energy and Economic Research Institute jointly launched authoritative activities studying and evaluating the new energy industry. They released the ranking of "Global New Energy Enterprises Top 500" for 2015. Total income of selected Asia's enterprises was RMB1,065.3 billion, accounting for 37.6% of the total. Asia rankedNo.1 for the first time by surpassing Europe.[27]

On April 22, 2016, the Paris Agreement was signed in New York. From the point of view of environmental protection and governance, the greatest contribution of the Paris Agreement is to define the "hard targets" associated with the global climate and economy. The parties to the agreement will strengthen the global response to the threat of climate change, controlling the global average temperature increase no more than 2 degrees Celsius compared with the pre-industrial level, and trying best to control the temperature rising within 1.5 degrees Celsius.[28]

On June 1, 2017, US President Trump announced at the White House that "the United States will cease the implementation of the non-binding Paris Agreement", including the cessation of national voluntary contributions and the Green Climate Fund. United Nations Secretary-General Guterres stressed that this was "a very disappointing thing".[26]

China's new energy companies have seen a significant increase in global competitiveness. According to the 2016 "Global New Energy Enterprise Top 500"evaluation results, China (including mainland China, Hong Kong, Macao, and Taiwan) has 193 companies entered the "Top 500" list, increased by 27compared with 2015 (168), accounting for 38.6% and ranking first. Enterprises on "Top 500" list come from 36 countries and regions. [29]

Development Status of New Global Energy Enterprises. "Top 500 of Global New Energy Enterprise " for 2016 show that the lowest operating income of enterprises on the "top 500" list step on a new level, reaching RMB758 million, increased by RMB133 million compared with the RMB625 million in 2015. Judging from the income scale, among "Top 500" enterprises of 2016, enterprises engaged in solar energy, wind energy, biomass and multi-industry the total operating income of RMB 2829.1 billion, accounting for 92.26% of total operating income. Among them, the total operating income of diversified industrial enterprises was RMB1462.6 billion, accounting for 47.69% of the total operating income; that of solar energy enterprises wasRMB721.4 billion, accounting for 23.53%; that of wind energy enterprises wasRMB292.2 billion, accounting for 9.53%; that of biomass enterprises was RMB352.9 billion, accounting for 11.51%. While other new enterprises mainly depending on energy-storage batteries reached an income of RMB 237.4 billion, accounting for 7.74%. In 2016, global new energy industry investment reached a new high. New

energy power generation capacity continued to grow rapidly, and mergers and acquisitions intensified. Industry development presented new trends and characteristics.[29]

Though renewable energy grew rapidly, it is noteworthy that, according to “BP World Energy Outlook (2017 edition)” forecast, in the field of power generation, share of renewable energy in global power generation will increase from 7% in 2015 to about 20% by 2035. While by 2035, the proportion of renewable energy in the energy consumption structure will be much lower than that of oil and gas, even much lower than that of coal which will touch the consumption top in 2025.[13]the development of depth space resources utilization still has a long way to go.

## **7.2 Future of Depth Space Resources Utilization in Economic Development**

If the impact of climate problems on the environment is also taken into account, it becomes neither an international nor a domestic problem, but a challenge to the survival of mankind, as well as the common survival and death of most animals and plants living together with mankind. The air is the first resource of human’s living. If the air is polluted, it is a “poison gas” problem for everyone living in the air.

The constant climate talks have been staging “Tragedy of the Commons” in real from time to time.[30] Nations are just like shepherds on a pasture. Though everyone knows the pasture is increasingly withered, they think it is useless to keep their own animals with empty belly. And they would rather let the pasture finally disappear if one’s own comity will let others to carve up pasture’s income. Since the climate warming, the individual and the country’s self-interest behaviors in the real “The Tragedy of the Commons” are just as those described in the article with little success. However, as long as the threat of climate warming and environmental problems exist, efforts to achieve carbon economy will not change. Carbon economy will only take larger and larger proportion of the economy. There is more evidence proving economic means such as carbon trade and carbon finance are effective tools for addressing resource and environmental problems in the process of human development. Although it is still unknown how long the carbon economy can accompany with human on the timeline depth space resources economy at current stage; the carbon economy means will accompany us for a long time as long as they are effective for resources and environmental problems during human society marching into the ocean and the “new Ocean “.

In the past, there were four times of energy revolution during development of human society. Revolution of depth space resources came the first, then followed by three fossil energy revolutions.

For revolutions in the future, energy revolutions belong to depth space resources revolutions based on modern industry. Every energy revolution has led to changes, progresses and developments in human society. The first energy revolution of drilling wood to make fire by friction has been recorded in the prehistoric Chinese ancient myths and legends. In western theology, there is also legend of Prometheus stealing fire from heaven. The discovery and use of fire prompted further evolution of mankind, bringing people from the primitive society into a civilized society. The second revolution is peat energy revolution. Peat is a kind of fossil energy. The Netherlands is rich in peat resources which are also easily mining with low prices. From the use in 1560s, peat resources began to dry up until the 1680s.[31] At that time, the Netherlands was called the world’s most energy-intensive economy, and also the world’s first modern economy. The third revolution is coal energy revolution. In 18th century, taking steam engine invention and application as the main symbol, the England promoted the coal energy revolution. And the industrial revolution of coal energy in 18th and 19th century effectively promoted the revolutionary changes in national productivity in United Kingdom, Germany and other developed countries, leading them become the world’s most technologically advanced and most dynamic industrial countries. In the 1870s, coal replaced wood as the main source of energy in global energy utilization. The fourth revolutions is petroleum energy revolution. In the 1960s, world energy entered the “petroleum age”. Petroleum production and consumption exceeded those of coal. At the beginning of 20th century, US’s major energy began to shift from coal to petroleum. It established the world’s first car-centered economy, leading development of steel, glass and rubber industries.

The prosperity of the world economy in 20th century was largely based on petroleum and the infrastructure and transport systems that were built around the petroleum industry.

The first energy revolution of drilling wood to make fire by friction led mankind off primitive society and promoted human evolution, being the most important one among the four energy revolutions. Energy revolution in the future, i.e. the revolution of depth space resources, is also an essential revolution like phoenix nirvana to avoid elimination disaster of environment and gain re-born development with no less importance than that of 2th~4th energy revolutions during human development process. Today, the common tangle human society is facing with is the increasing pressure on environment brought by fossil energy. It seems developed and developing countries more and more rely on traditional energies, being reluctant to abandon them. Developed countries should actively use their own advantages in the industrial structures and carbon economy, and play their advantages of industrial structure and carbon economy better to make greater progress. For the vast number of developing countries, they need to get financial support through carbon trade on one hand and on the other hand, need to be proactive, to do a good job in industrial optimization and transformation and to achieve the normalization of carbon economy in own country. History has proved that every energy revolution had brought opportunities for industrial transformation and world economic prosperity, as well as progress and development for human. At that time, the developed countries did nothing in the new energy, then they would lose good opportunities in the transformation of new energy industry and the use of new productive forces, resulting in possibilities of being surpassed by other emerging countries in the new economic prosperity, industrial transformation, productivity improvement, and even social progress.

**Time Proof of Multi-dimensional Space Resources.** The purposes of depth space resource utilization economics are to explain and analyze problems in resources utilization and environment of human society via the special angle of depth space resource economics, and to solve the resource and environmental problems in resources utilization by economic means.

We often say that let time tell. Usually only time can tell whether one thing is right or wrong. **One of the important characteristics of multi-dimensional space resources subject is the introduction of time dimension, discussing natural science, geopolitics and economic development of human resources utilization in angle of interrelated past and future time dimension on natural science, geopolitics and economic development.** Future of natural sciences, geopolitics and economic development of breadth and depth space resources utilization are, in fact, exposition on time-proving consequences.[1] [32]

This kind of exposition on time-proving consequences and analysis on history actually are the lateral research, discussion and supplement to time dimension and evolution process of different direction, different projects of human development and resources utilization.

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