

Environmental Sustainability and Economic Development in China and the United States: Past, Present and Future

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Abstract

The economy of the United States that consolidated its centrality during the First World War, in these last decades it's threatened by China's performance. After centuries of stagnation, The Chinese economy has accelerated the pace at the beginning of the new century, even surpassing the United States in 2015. The economic policies of all states, even the most civilized, until a few years ago had only one objective that was to make available to its citizens an increasing amount of goods and looked only at economic growth. While it is only in the last few years, that the same leaders realized the need to include in their agendas also the protection of the environment and to look not only at the economic growth, but also at the development.

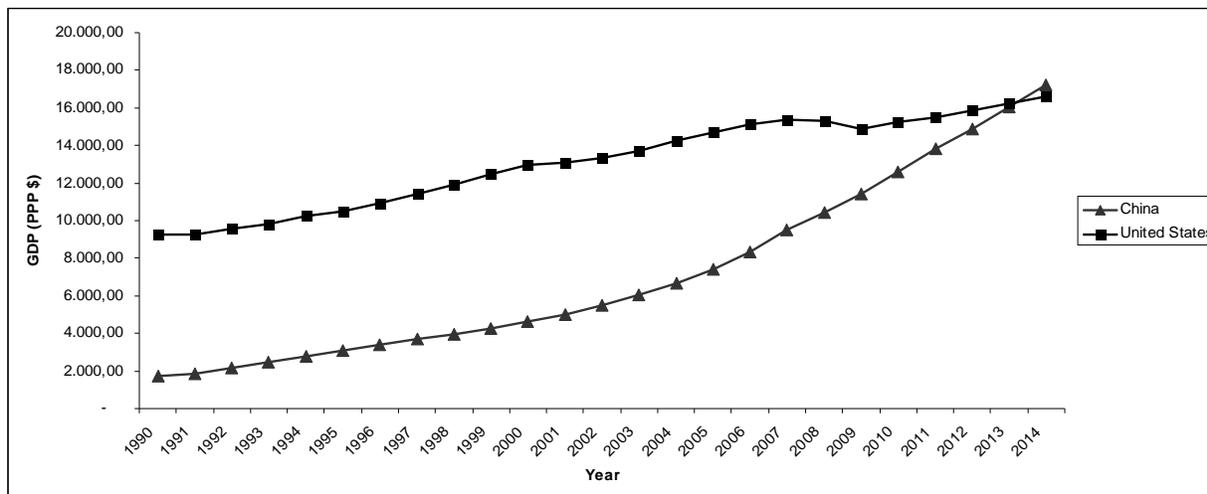
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1. The leadership dispute: economic development and sustainability of China and the United States in a historical perspective.

Among the topics that fascinate most about economic history is certainly the study of the passage of economic leadership at the global level in a long range view (Kindelberger, 1996). The centrality of the United States, that consolidated itself on the occasion of the first world conflict, just in these last years it is threatened by the record fast pace sustained by China's performance (Finklestein & Kivlehasn 2015). As can be seen from fig.1, the Chinese economy has accelerated the pace at the beginning of the new century, even surpassing the United States in 2015.

This is of course GDP data expressed in American billion dollars at parity of purchasing power, particularly relevant in view of the short period, but still does not allow to assess a real change of leadership in the long term. This reflection is based on two reasons: the first one is of a technical nature, in reference to the actual representation of the data, because it considers only the GDP, and also because the calculation in purchasing power parity is not error free; the second motivation is essentially historical, because it is necessary to wait for the United States to implement a strategy that will enable us to respond positively to this real rivalry.

¹ Although in this *paper* we present the results of a joint research work, par.1 can be attributed to Angelina Marcelli, par.2 to Antonella Laino and par.3 to Manuela Ciani Scarnicci.

Figure 1: GDP (PPP, constant 2011 international \$) of China and the United States (1990 – 2014)

Source: World Bank, our analysis from the World Development Indicators

Moreover, the Asian area and in particular China, in eras past has played a leading role in terms of economic development. Since ancient times, China had been a land of inventions and innovations, which secured major developments (Roberts, 2006) for the entire ancient era and at least up to the Middle Ages, the inventive Chinese had no equal in the world (Smith, 2007) Even, according to estimates by Maddison, during prechristian times Asia could be considered the gravitational centre of world economy (Maddison, 2005) China, in fact, could always rely on high population levels – 60 million inhabitants for the first millennium of the Christian era, against the 25 million of Europeans – on high agricultural productivity, and an avant-garde marine technology (Boserup, 1965).

However, during the course of the centuries, the China did not succeed in putting to fruition its competitive advantages and started a period of stagnation destined to last centuries². Thus, the admiration for its developments told in the XIII century by Marco Polo left the way to a situation almost paradigmatic of stagnation between the XVIII century and XIX century (Desai, 2003). In the scope of random factors that gave rise to this recession, it emerges before anything else the impetuous demographic pressure. Between 1400 and 1800 China grows from 65 million to 400 million inhabitants, as a result, the food resources soon proved to be insufficient. This was the beginning of a series of famines, but primarily the civil unrest which negatively influenced even the well known millennial process of technological innovation (Studwell, 2005).

In addition, the Chinese also refused to import the new western technologies and discouraged entrepreneurial activities (Smith, 2007). The first attempts to resume a path of modernization date back to the second half of the XIX century, when it launched a policy known as “*auto strengthening*”, with which the Qing dynasty wanted to reduce its military vulnerability, all too evident during the second war of the opium and the revolt of the Tai Ping (Arrighi & Silver, 2003).

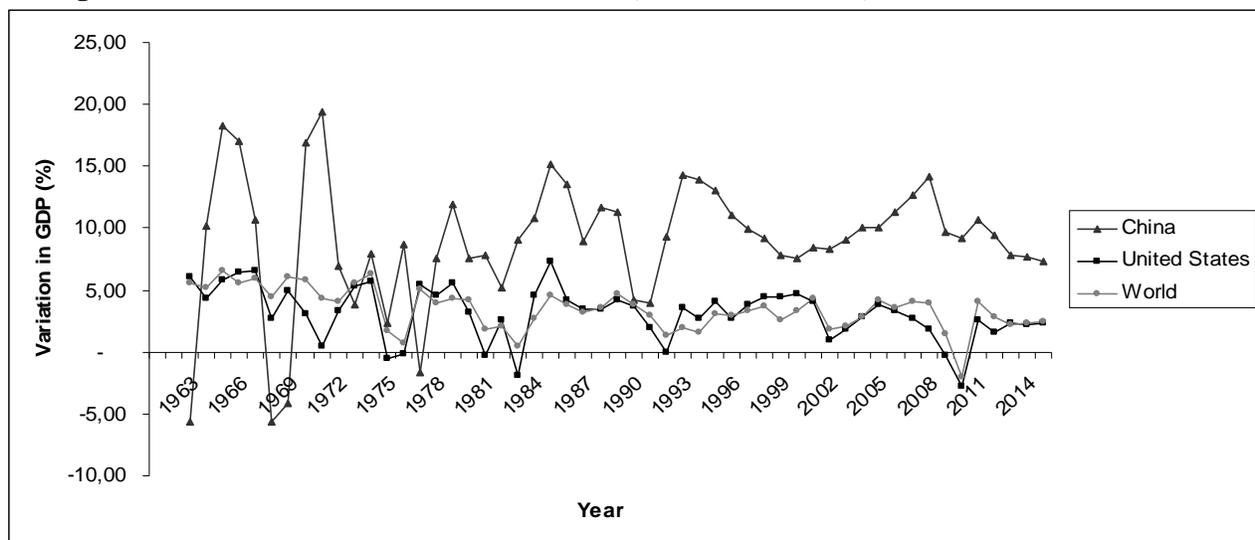
However, although we have not yet been entirely clarified of all the reasons, this policy has no positive lasting effects in the modernization of the country, and what is more, even under the military aspect, China has not managed to escape from those imperialist pressures on the part of the west, which resulted in the two world wars. In 1949 the People’s Republic of China (PRC) was proclaimed, and it established the communist regime Mao Zedong, the chairman of the board of the central people’s government until 1959, he tried in vain to pursue policies of radical development based on a model of socialistic economy (Samarani, 2004). The idea of making “the great leap forward” a policy devoid of economic realism, turned out to be a colossal failure, and even more disastrous was the “cultural revolution” (MacFarquhar, 1983). With the policy of the “great leap”, Mao, leveraging on the volunteer spirit of the masses, intended to increase the production of steel, coal and electricity and rapidly modernize agriculture, organized in rural populated Communities.

² This long pause of stagnation was also noted by Adam Smith, in his famous work of 1776, *The Wealth of Nations*.

However, the conviction that the agricultural production would be sufficient even in periods of scarce agricultural crops, soon proved to be rather illusory, at the expense of about 20 million people, victims of the famine (Chu-Yuan, 2014). In 1962 Mao tried the road of a semi-market economy, in which agreements engage, after a few years, the “cultural revolution”, which lasted from 1966 to 1976 which sought to sacrifice, in the name of the revolution, the “four old elements” of Chinese society, that is, stream of thought, culture, habits and traditions (Napoleoni, 2009). After Mao’s death, the new leader Deng Xiaoping, started in 1978 a plan of reform of success, geared to orient the economy toward a free market (Costa, 2012).

In particular, in 1992, a document approved by the XIV Congress introduced the concept of “socialist market economy”, which sums up a system in which the power is in the hands of the Communist Party, which continues to introduce five-year plans, but with the spread in many sectors of the economic market. As a result of this political economic turning point, China began a phase of economic ascent that seemed miraculous, not so much because in absolute growth value was higher than in more advanced western countries, but due to the increase in the annual GDP highlighted in figure 2- that started in the ‘80s of the last century, stood on an average of just less than 10% (World Bank).

Figure 2: Plot of variation in the GDP of China, the United States, and the World (1960-2014)³



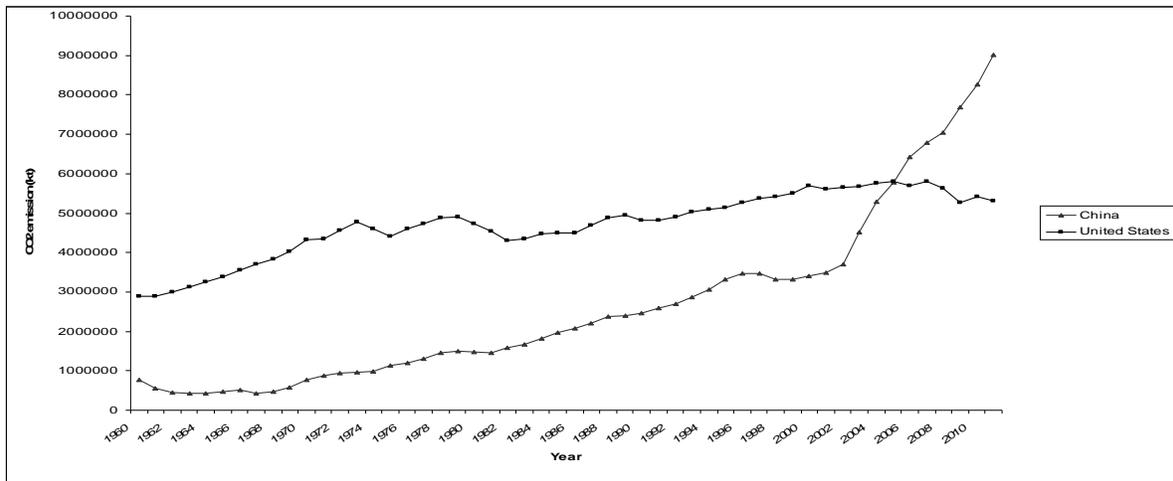
Source: World Bank, our elaboration from the World Development Indicators

The peculiarity of the growth in China is even more obvious when considering that, in the same period of time, the global performance and that of the United States (that also remains the leading country in the world) are much more moderate, being around an average growth of between 2 and 3% (World Bank). Therefore, even with very marked oscillations, in the last 50 years China has been the protagonist of an impressive economic development, however governed in fact by the idea of profit “at any cost” and the belief that wealth could of course be distributed evenly in the various areas of the country.

The economic development of China is also advantaged by substantial direct foreign investments, attracted by the definition of special economic zones, tax concessions, from the availability of low labour costs, but also by the lack of sensitivity that for a long time the Chinese authorities have taken with respect to the (negative) consequences of an industrial production with a high environmental impact. In this regard, if, for example, we take into consideration the emissions of CO₂, for the period 1960 – 2011 (figure 3), we can observe an increase, first slow to moderate, but then, at the beginning of the new century, characterized by an exponential acceleration. Even from, 2005 the carbon dioxide released in the atmosphere by China has begun to exceed that of the United States. It is thus clear that the social market economy has had an extremely negative impact on the environment.

³ The indicator taken into consideration is the GDP (constant 2005 UD\$)

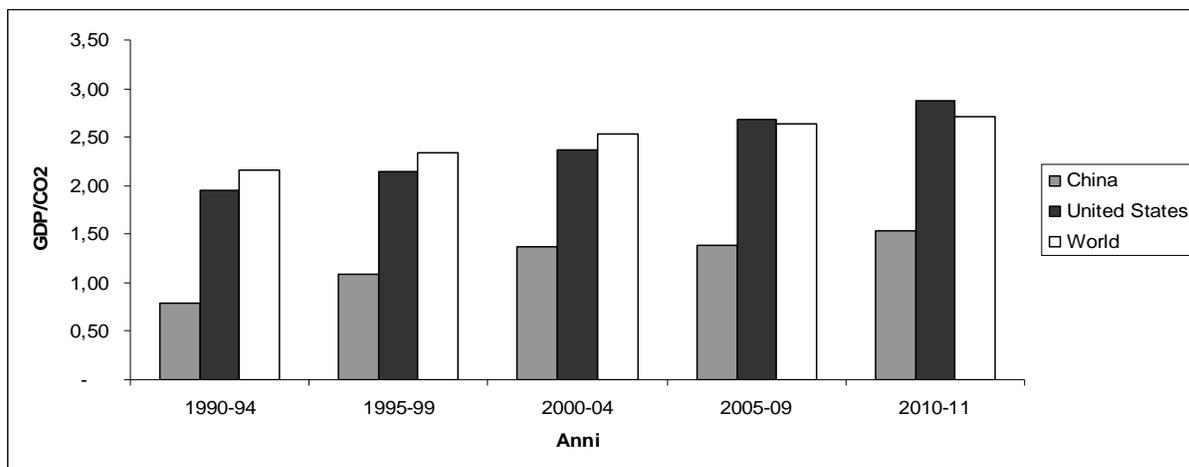
Figure 3: CO₂ emissions in China and the United States (1960-2011)



Source: World Bank, our elaboration from the World Development Indicators

The relevance of this data, expressed in absolute value, turns out to be even more significant when one considers that the GDP of China is still significantly lower than that of the United States. However, you must interpret the trend detected in light of additional indicators, consistent with the different peculiarities of the countries. Just to give an example, if in 2005 – therefore in equivalent levels of CO₂ emissions – the income produced by the United States, in purchasing power parity and constant prices, was exactly twice that of China, on the other hand, the resident population of the Rising Sun was more than four times that of the United States (World Bank). In any case, to complete the picture, though for large lines, may be useful to consider the relationship between GDP (purchasing power parity and constant prices) and CO₂ emissions in order to assess the relationship between economic growth and world pollution. Figure 4 shows a series of histograms representing the quinquennial averages (except the last series, which is related to the last two years available) relative to China, the United States and the world. By correlating the GDP (expressed in millions of \$) with the emissions of carbon dioxide we can estimate how much growth is achieved with the emission of one Kt of CO₂ in the environment. The comparison between the graphs shows us a performance almost aligned with the overall global levels, indeed with a tendency to progressive improvements. China’s system of production, although it highlights a trend of slightly more pronounced improvement than the United States, remains capable of producing only a little more than half of the GDP of the United States for carbon dioxide emissions.

Figure 4: GDP produced per unit of CO₂ emitted⁴



Source: World Bank, our elaboration from the World Development Indicators

⁴ Indicators taken into consideration were the GDP, PPP,(constant 2011 international \$) available only since 1990 and the CO₂ emissions (kt) only available up to 2011

Although faced with the described critically qualitative issues which have historically characterized the processes of development of China's economic system, it should be pointed out that it currently seems to be gradually maturing, within the Chinese authorities, a more complete sensitivity with respect to the issue of environmental externalities of the production process; in fact, many of the socio-economic objectives of programmatic plans are characterized now with more stringent attention to natural resources and environmental issues, also solicited by greater circulation of information and the development of a more widespread collective awareness on the importance of environmental issues.

2. The twelfth five-year plan of Chinese programming: a step toward environmental sustainability of the production process.

The economic growth that China has been protagonist in recent decades has been fed by many strategic errors, some of which are irreversible, which, if measures are not taken for a radical change in terms of development strategies, could lead to dangerous reversals. The environmental pollution has caused a dramatic increase in the number of deaths and depletion of environmental resources, first among all air and water (Song and Woo, 2008). The country is trying for some time to abandon the prevailing manufacturing model, replacing it, progressively, with the development of the service sector, to insure greater utilization of the labor force with increased income for the citizens, necessary to sustain internal consumption.

This choice will have significant repercussions on the production system of the country and, in the alternative, energy consumption, because the production of services requires a smaller amount of resources and energy with respect to industrial production. The stimulus for this trend reversal stems from the catastrophic environmental consequences of the growth process that has affected China in recent years. This uncontrolled process has contributed to the creation of real unsustainable areas of life, with the presence, in the Chinese territory, of the first sixteen most polluted cities in the world, and with 80% of its water courses irremediably contaminated (Hongjian, Shaun, Suisheng, and Brown, 2013).

The philosophy which inspires the twelfth five-year plan sets the internal consumption as a *driver* of sustainable growth, in order to curb the *deficit* of foreign demand determined by the world crisis, and to improve the living conditions of the citizens, a demonstration that the protection of the environment and the quality of life of the Chinese people is an urgency that can no longer be neglected. The harmonious growth of the Chinese colossal also passes through the enfranchisement of the local production by the IDE: in this respect the increase of local consumption, and the quoted income support, are needed in order to reduce China's dependence on exports.

After more than twenty years of growth without any control, nearing the realization of the completion of the twelfth five-year plan, China is moving toward a new perspective on reading of the economic objectives already achieved and still to achieve. In this regard it is determinant the objective of restructuring the production system as a whole, it is no longer functional just to increase its results, but also a reduction of its environmental impact, with increasing attention to the quality, as well as the quantity, of the results achieved, through the promotion of tools and projects that strive to reduce pollution emissions and use of exhaustible resources. The twelfth five-year plan, which covers the period 2011-2015, is innovative, not only for the objectives that it proposes to achieve, but also for the foundation that poses new transformations in the years to come.

China is today a country seriously concerned about the environment that its population lives, in addition to the enormous gap between the development of urban areas and the backwardness of the rural areas (Yuè, 2014). The general situation goes from bad to worse if we consider the lack of coordination and mindful programming of the use of the soil on the urban level: the lands "urbanized" have grown at a faster rate than twice the growth of the population, without programming, or coordinating, the load capacity of the resources and the environment.

Decisive element of the new route set for the development of the Chinese economy is, therefore, the five-year plan in which new *targets* have been identified for the use of renewable energies, as well as to policies for improving the energy efficiency, with considerable allocations for projects involving environmental protection.

The five-year plan in word represents a turning point even with respect to the rules for determining the objectives, which have seen a diligent participation of local governments, in view to balance and harmonize the many social and economic souls in this great country (Fattini & Prodi 2013)

Sustainability is the key word that characterizes the entire plan: this identifies some emerging areas to consider strategically important for the growth and sustainable development of the country. They include environmental protection, the use of biotechnology, and the development of food equipment with alternative energies.

The continuous postponement to the concept of sustainability represents the real factor of discontinuity with respect to the programming of the past, and justifies a pending analysis of a plan, which, while coming to completion, represents the premise and the cornerstone of inspiration for future plans. In the above mentioned sectors the process of innovation and research appears to be very important and at the basis of its foundation: in this respect, the plan provides for an increase in spending for R&S, going from 1,7% to 2,2% of the GDP (Roach, 2011).

The twelfth five-year plan is the document that is most attentive to the environment in Chinese history, even if it is not the only programming tool of environmental interventions issued by the government: during the United Nations climate conference in Copenhagen in 2009, the Chinese government made important commitments toward the international community. The authorities committed to reducing by 40-45% the carbon intensity and reach a 15% of the total consumption of energy from non-fossil fuel by 2020. It is worth noting how the active role that China has decided to take in addressing to demolish environmental pollution and the general interest toward sustainable development represents an exceptional and unique presentation card for a country which has the need and interest to obtain accreditation from partners and the international community.

The majority of the CDM (*clean development mechanism*) projects are concentrated in the country under the Kyoto protocol as flexible mechanism to reduce greenhouse gas emissions. Through this mechanism, the companies can invest in green projects in developing countries and obtain CERs (credit emission reductions) equivalent to one ton of CO₂ each, computed in order to reach the established international *target* levels. In other terms, through this mechanism, you can relocate the reduction of pollutant emissions, supporting *green* projects in emerging economies. In this regard, China represents one of the largest recipients of these projects. Still, the price of CERs is determined on the basis of the ratio supply-demand of the Chinese market (Yuè, 2014). One of the tools frequently used by the Chinese government to stimulate the renewable energy sector has been the tax incentive, even if the commitment is not limited to provide reductions and exemptions for companies operating in the “*green*” sector: in this regard, we should remember the provision of grants and incentives especially for companies that operate in the sector of wind and solar energy.

In this context, the twelfth plan provides for a total exemption from taxation for projects related to the conservation of water and CDM projects, in addition to a further reduction in taxation of 50% for the following three years (Jianliang, Feng, and Tverberg, 2013)

The local authorities, for the first time in Chinese history, have played a primary role, having to manage and govern territories very different from each other, with particularity toward one or the other of the possible alternative energies. The plan proposes to make *environmentally-friendly* not only the national productive system, but also direct investments coming from foreign countries toward reality in line with the turn attentive to the environment. The so-called “catalog” (for direct foreign investments in industry), today has a clear *eco-friendly* cut, having regard for the relevant number of integrations that concern encouraged investments. Among them, companies committed to projects for the construction of equipment suitable for the production of renewable energy, the manufacture of essential components for the development of energy-efficient vehicles, the production of tools for high energy efficiency and functional in the reduction of emissions in the textile sector, in addition to technologies for depuration of waters and waste recycling.

The goal of “*cleaning*” the energy consumption of the Chinese will engage the country beyond the objectives defined in the twelfth five-year plan, resulting in three main steps (Feng & al, 2011)

- By 2020: beginning of the reduction of CO₂ emissions, through a progressive decarbonization of the productive structure and a more intense exploitation of the gas;
- 2020-2030: reduction on a large scale of emissions, in order to arrive at levels equal to those of 2005;
- 2030-2050: further reduction of emissions that should reach 50% of 1990 levels, in line with the objectives at international levels.

At the operational level, in 2014, was launched the thirteenth five-year plan that will cover the years 2014-2020, in which the emphasis, yet again will be, on the importance of Looking to the future with foresight in the field of energy, with systematic intervention and strategicity. The plan in words promotes international cooperation and the active participation of the country in this area (Gabusi, 2011).

The Chinese economists look, given these circumstances, with even greater confidence at the thirteenth five-year plan, believing that this will implement tools for a rapid growth of the green economy.

In this regard, it is common belief that political leaders are now determined to steer the development of the Chinese economy toward eco-sustainable mechanisms. The field of environmental protection, then, can produce a significant growth, and create a sort of “convert” of an economy that until now caused considerable damage for which the Chinese citizens paid a high price (Jianliang, Feng, & Tverberg, 2013). In this new horizon and in the path toward a productive system less damaging to the environment, with more recycling, companies that produce more pollution and have high energy consumption are destined to succumb. At the same time, however, the relevant areas for clean energy can grow by compensating for these losses: in other words, we will witness a qualitative replacement of enterprises and production processes, and to a movement of capital from the areas of high energy impact to areas of energy development and or a lower impact on the environment (Feng, & al, 2011).

China, presents itself, therefore, as a machine in the race toward a deep restructuring of its industrial fabric, economic and social, with a turn to *green energy* that is unparalleled in any other country in the world. In this view there were numerous revisitation and updates of targets at an institutional level: in 2014 it was the objective of achieving, by the end of 2017 70 GW of photovoltaic power and 150GW of wind power⁵. In other words, by 2017 the country believes to be able to cover with renewable energy 13% of its electricity demand, triggering a virtuous process that will be able to find definite fulfilment with the approval of the thirteenth five-year plan (2016-2020), already in the offices of the mandarine authorities. The slowdown in the use of coal can lead to “save” resources for an amount equal to 7/9 points of GDP to invest in *low-carbon* activities and partial recovery of environmental damages, substantial and sometimes irreparable, produced by an uncontrolled growth (Green & Stern, 2014)

3. The projections of the Club of Rome

The study on the global scale of the sustainability of development finds also thanks to the *Club of Rome* (Spini & Grassi, 2014), association of scholars founded in 1968. The Club of Rome, since its origins has represented an international role in the avant-garde analysis of issues concerning the limits to the development, intense from the point of view of environmental protection. One of the major concerns of the members of the association is that the future of humanity proceeds hand in hand with sustainable economic development.

On the first definition of limits to the development given by the Club of Rome in 1972, deemed by many too “pessimistic”, enjoyed however the effect of raising awareness in the scientific world on environmental issues.

The United Nations, for example, took to organize meetings, including one of special emphasis “The conference in Stockholm in 1972”, which was attended by 113 Nations, during which the United Nations Environment Program (UNEP) was born (Mora, 2012).

Of course, the visions presented did not enjoy unanimous acceptance and for this movements of opinions on completely opposing positions were born, that rejected the environmentalists theories based on two assumptions:

- It could not limit with bonds of exploitation of the resources the countries still in development, when this would lead to a further slowdown in their growth;
 - The resources available in that particular historical moment were still enough for the long-term growth, and in any case you could always make use of the rules of the market to rebalance the system.
- These debates, born forty years ago, are still open. For today, you can delineate four main stream of thought of environmental economics:
- The refusal of the limits to the development, as a strong belief that the resources are sufficient for the growth of the nations, and that, however, new technological advances and new scientific research will overcome the current limits. This type of thought can be identified as an extreme technocentric vision.
 - The confidence in the market’s mechanism, understood as expectation that the rules given by the market laws lead to strategic exploitation of resources. The basic hypothesis is that if environmental factors are equipped with prices, then it will automatically generate a rational management and then a conservation of resources. In this vein you eliminate the thought of the unlimitedness of resources, but importance is given to self-regulation. Then, in this case, you can speak about moderate technocentrism..
 - Assignment of an instrumental value to the environmental resources that is the need to protect the resources. In this case one can speak of an environmentalist moderate ecocentric vision.

⁵ National Development and Reform Commission (May 2014)

- Absolute priority of respect toward environmental goods, that is a total recognition of the fundamental rights of nature regardless of the rights of mankind.. There is talk of extreme preservation and an intrinsic vision of nature.

Single basic element of this vision is that, in any case, the environmental factors may not be looked at as free goods, but should be considered as economic goods and expressed in terms of a price, as a function of which will determine the cards of supply and demand. Not considering, or considering only in part, the train of thought just illustrated, there is in any case evidence which cannot be not taken into account:

- The non-renewable resources are in any case intended to be exhausted;
- Renewable resources can become non-renewable if we do not take into account the regeneration period;
- The environment is not unlimited and therefore sooner or later will create a problem in the management of waste.
- If, on the one hand it is true that technology and scientific progress are trying to solve these three problems, on the other side a continuous increase in population and its needs continue to exert increasing pressure on these three negativity. Just think of the constant increase in waste that can be fought with targeted consumption and recycling activities. It is also true that in every case recycling is an expensive activity and still does not allow the full recovery of the materials and energy. China's growth , as previously seen, is a phenomenon characterized by a particular dynamism, unlike other nations that have a slow rate of growth or in a stationary state.

Future scenarios might be, undoubtedly, among the most varied. To attempt an estimate from an environmental and energy point of view it could be no other than the Club of Rome.

In particular, on April 5th 2013, in Rome was presented the original work by Jorgen Randers⁶ 6, entitled "2052 Global scenarios for the next 40 years"; (Randers, 2013) . The report, fruit of the revision by 30 experts, was presented – and therefore endorsed – by the General Secretary of the Association, Jan Johnson; by the president of the Foundation Aurelio Peccei, Roberto Peccei; by the president of ISTAT, Enrico Giovannini; by the scientific director of WWF Italia, Gianfranco Bologna; the vice-president of Unicredit, Paolo Fiorentino.

The report, which is based on statistical data, collected also thanks to the new satellite system, and on for casts of adaptive type, was concerned to investigate especially the weakening of the ecological footprint of the planet (Randers, 2013) On the whole, according to Randers, if humanity continues to persevere in this tendency of excessive consumption of resources, then, in a rather short period, earth would collapse. The world's population could reach 8.1 billion by 2042, with a decline in fertility in urban areas; the rate of growth of GDP would decrease, while the CO₂ would continue to increase, creating a further rise in the temperatures (Randers, 2013).

The environment, then, would impose serious constraints on economic growth, but would vary depending on the national cases considered. According to Randers, economies such as those of the USA will enter into stagnation; Russia, India, Brazil and South Africa, on the other hand, according to estimates, will progress. All economic systems will necessarily have to find a compromise between the needs of mankind and the protection of nature. The compromise between man and environment in reality already exists (Mora, 2012). But exists only because man realized during the course of the centuries that if the environment is exhausted or is irreparably damaged, even human survival is compromised. Many businesses will be tragically stopped, such as the exploitation of non-renewable resources, which we will discuss shortly.

Or you can think of renewable resources, such as forests, that should be regenerated in compliance with the rules of natural regeneration, in order not to become also non-renewable resources. Modern economy and wellbeing has led man to believe that to know and appreciate the environment is an essential factor to create the economic growth desired. The economic policies of all states, even the most civilized, until a few years ago had only one objective that was to make available to its citizens an increasing amount of goods and looked only at economic growth. While it is only in the last few years, that the same leaders realized the need to include in their agendas also the protection of the environment and to look not only at the economic growth, but also at the development.

⁶ Jorgen Randers, a member of the *Club of Rome* and co-author of the first Report of the foundation; "The limits of development" in 1972. Fulco Pratesi " Adapting to the limits of the planet—scientists interrogate the politicians " *Il corriere della sera* April 8, 2013 pg.34

In spite of a global framework strongly at risk, entirely unexpected were the projections that relate to China, which, thanks to its ability to change, will be—always according to Randers—an example of success (Randers, 2013). Randers can see in Chinese politics the basis for addressing more clearly the limits of growth, as for example the policy of the “one child” which has allowed and will result in a more contained growth of the population. This type of politics, not only will bring advantages; the labour force will be reduced and will increase the load to be supported, intense as the number of inhabitants per worker. In addition China has a very high savings rate, 40% compared to the income of the nation, element that made it possible to finance American imports for the first decade of the twenty-first century, to this savings equals a high investment, equal to 35% of the GDP (Randers, 2013). The projections made by the report speak of a contraction of these investments at the expense, of an increase in money spent by the Chinese government to contrast environmental pollution, the depletion of natural resources in order to adapt to global warming. In addition, government efforts will be directed toward energy renewal in favour of renewable energy sources.

So, to summarize, the five-year plan, which we have talked about in the previous paragraph, could really be useful in combating poverty and climate change. On the basis of industrial growth projections, energy consumption will double by 2030, before we can talk about reduction induced by an improvement of energy efficiency. For this reason also the emissions of pollutants will increase, according to estimates – despite politics that will bring energy efficiency and clean energy – of 10 tons of CO₂ per year per Chinese, against a sustainable level equal to one ton per annum per subject. These worrisome values are not only afferent projections involving China, but also the United States. By decarbonising its economy, China could increase the GDP by more than 900 billion euro, create nearly 10 million jobs and save 150 million euro in energy costs (Yuè, 2014).

The main driver of this turning point is definitely the economic benefit, and the country’s “hunger” for energy, the convenience can be seen in the fact that continuing production at sustained levels, without paying attention to the methods of production, creates negative externalities which spread from one area to another: the water pollution and contamination of the land in many areas of the country, for example, exposes the citizens directly, and through the food ingested, at very high health risks. It triggers a sort of cannibalization of the production process, through which, the excellent results of the industrial sector, go to undermine the potential results of the agricultural sector, in addition to the citizen’s quality of life. The environmental degradation makes the poorer sections of the population more vulnerable, especially in rural areas, which base their sustenance on the products of the earth and the use of natural resources. This rural “poverty” can lead to an excessive use of “depletable” resources speeding up the degradation.

The main problem (Feng & al, 2011) is that the measures taken by the central government are not sufficient to compensate for environmental damages caused by a quick growth: the stated goals of reducing CO₂ emissions to the 2005 levels is still insufficient, whereas those levels are deemed by OMS to be 5 times higher than those considered safe for our health. According to the same organization the high levels of pollution have led, from 2007, to 656,000 premature deaths from disorders directly related to pollution, in addition to the numerous cases of diseases which, while not resulting in death, have increased health care costs that the government must support. It is estimated that in 2007 between pollution, diseases, and premature deaths the charcoal coasted China 7 points of GDP.