

## The THEORY of QUALITY of LIFE

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### ABSTRACT

The scope is to develop and propose the fundamentals of the theory of the quality of life, that appears an old concept but it needs sound theoretical basics. This approach here proposed is based on the system science applied to the theory of quality. Developed by Quartieri in the 1980, this main fundamental value-quality relation convolute value, quality and cost of a system. System basic notion and its nature defined by von Bertalanffy and Miller and supported by the Harold Chestnut system engineering approach, has allowed Giuseppe Quartieri to develop the mentioned relation of convolution among value, quality and cost by using information theory. The analysis continues on the scale and ranking parameters to define the quality of life. The three crisis (Energy, Ecology/Climate and Economy) strongly influence the quality of life whilst the environmental factors inside the present climate change assume real priority in the frame of quality of life. Green deal and anthropic reduction of the Earth resources is one of the main topic of this analysis. New policy and management have to accept new standard for quality of life but not only money as economists are still continue to affirm. In the meantime, the concept of sustainability is criticized due to its inherent relativity and therefore its scientific nonsense. Anyway, sustainability can ever be computed by means of specific statistics still remaining and ambiguous concept part of the variability of systems. In the end of the day, the system value is not the cost but only and only the its convolution (faltung) with quality. Whilst those new concepts of quality of life are applicable, the fear of reducing the resources of the planet seems the most important concerns of some scientists, political and economic people. In this comes the divergence of ideas and opinions regarding the humanity supportability and the percentage of anthropic vs natural factors of the reduction of quality of life.

*Quality is life and life is quality, that's all we know in the World and all we need to know.*

Giuseppe Quartieri rephrasing J. Keat

**Keywords:** quality, life, sustainability, value, cost, environment, climate change, system

### INTRODUCTION

At the present time, humanity appears to be afraid of the real and potential negative effects of climate change already underway. its impacts will be severe and serious if adequate measures are not taken.

The Greta Thunberg complaint of loss of the future has produced desperate anguish among young people around the World with various movements and demonstrations. Young people roam the

World afraid of global warming, the imminent ice age, the need to eliminate waste, the need to implement energy efficiency, the search for a balanced energy mix, clean energy extended to all, until the search for the best economic conditions, the reduction of debts and many other essential factors for life and its quality. Instead, a sort of hatred should arise for any form of energy monopoly due to any negative implications for human economic

balance and survivability. European Community have receipt these claims with new Green Deal including nuclear energy. The quality of life hangs in the balance, indeed. In many places on Earth, it has already significantly decreased (Fig. 4b). During recent decades, these thoughts lead, to some extent, the basis of my research for the creation of a quality of life  $Q_L$  theory (Fig. 1, Ref. 2). The base is the ideal vision of the quality of life linked to the life mystery. Quality of life cannot be identified with the climate change phenomena.



Fig. 1 The Theory of Quality of Lfe

In the transition phase from the time characterized by oil governing the Word to the new age of the renewable energies, climate change has become the key of all. Eventually, climate change is the specific cause for producing catastrophes and consequently strongly reducing quality of life. The IPCC famous graph reported in (Fig. 2) could be and must be taken as basis for comparison of the climate changes effects with eventual strong reduction of quality of life. The theory  $Q_L$  compares itself with the past life conditions in order to deduce the projections and forecast for future. Severe

choices, selection and right missions have to be taken for modern man. Right adaptation and timing within these choices, as well as ensuring possible logistical development commitments is the main point to be implemented.

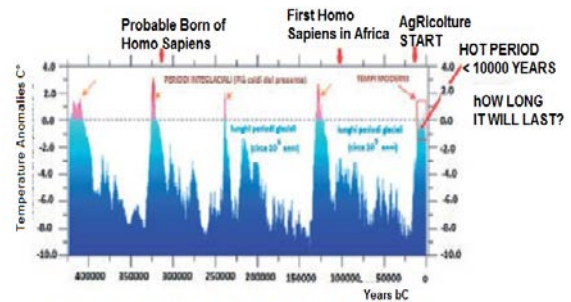


Fig. 2 Classic IPCC Climate Change temperature anomalies

The current vision for the definition of the quality of life proposed by politicians, managers but also by some researchers, appears always opened but not pleasantly, to the condition and influence of a word that is so fashionable: "sustainability".

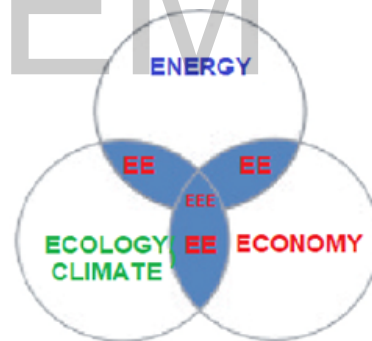


Fig. 3 The interface among Energy, Ecology/Climate an Economy (3E)

At every turn, politicians, managers and, unfortunately, even some professors condition all their interventions, presentations and concepts to the "sustainability" of the application. So, they hope to save themselves from any technical and/or scientific criticism. Adding the word "sustainable" to the concept that one advocates always serves to save oneself in a

"corner". Nobody can get to the bottom of knowing the limits except when he has really reached the limit of sustainability. This kind of concept - *sustainability* - has no scientific sense, expresses a relative concept in the sense that it changes from situation to situation, from man to man, from country to country. Sustainability is not measurable and is always "variable". It appears a truly primordial concept and therefore it has to be excluded in any serious analysis. In other words, the scope of this approach is to highlight the fault of the political, economic and social way to relate concepts and consequently also the "Quality of Life to sustainability".

When these people fail to be clear and precise then they play and place "sustainability" key. Consequently, they indicate unclear and inaccurate situations. The insertion of the "sustainability" paramount in the concept of life and quality of life is a big failure.

Some researchers and managers do make criticisms and negative comments to this (my) position. Let report the Paolo Saraceno personal comments: «Instead, at least in the environmental sphere, sustainability means living without depleting the planet's resources, something that man has been doing since he left prehistory. The first climatic changes caused by our species are traced back to that moment, which is positive because they prevented from entering a new glaciation where we should be, according to the glacial cycles that you report in figure 6. On the subject, please, see the book of William Ruddiman: The plow, the plague, the oil. The impact of man on the climate, 2007 Bocconi University Publisher».

In this context, sustainability rises up to be something very difficult to define because it changes day by day, place by place, from man to man, from country to country. Only average sustainability levels can and must be defined and approved by authorized and approved decision makers. A very large social and economic effort is needed to prevent the people from believing in sustainability as a means of hidden persuasion, before they are stopped in time.

The "sustainability" becomes only a sort of slogan with which everyone fills their mouths without any real, concrete or scientific, let alone technological sense.

The ideal vision of the quality of the systems, advocated by the great Fathers of Quality Theory (Fig. 3) suffers and thins.

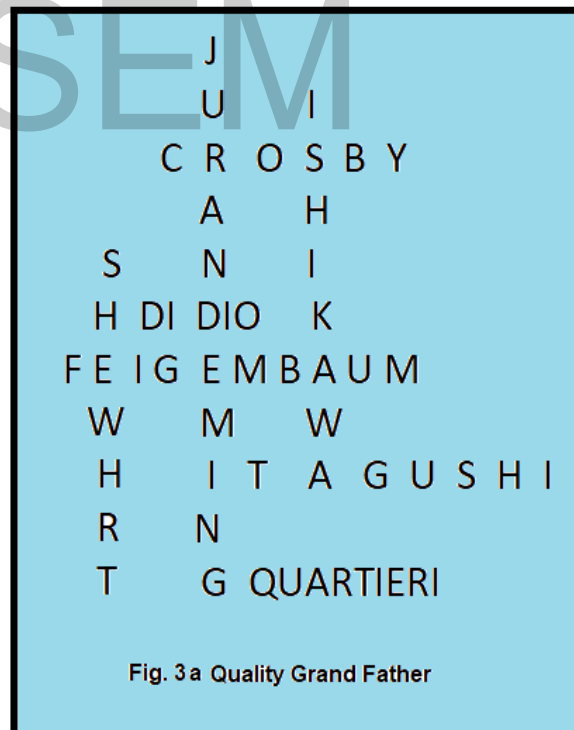
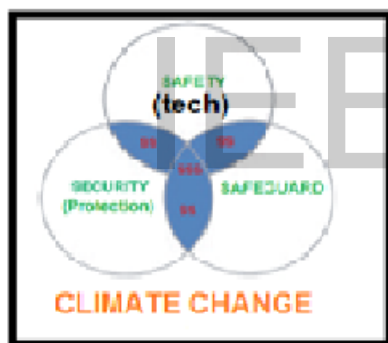


Fig. 3a Quality Grand Father

Life is a complex system to which the system approach can be applied. In the Ludwig von Bertalaffy's General Systems Theory, the general properties and laws of

systems are considered. A quality of life theory can therefore only be the product of a nomothetic research, aimed, that is, at enunciating general theoretical propositions. Quality of life  $Q_L$  is system. According to von Bertalaffy, the system is complex or a set of interacting components, a whole made up of related parts in a certain way. So, according to Miller, system is a set of units in relation. In summary, system  $\Sigma$  is an entity that has the characteristic of making itself understandable when the norm or criterion adopted by the observer in his identification (analysis, research) is known both under the static aspect (the units) and under the dynamic aspect (relationships and variability).



**Fig. 3b 3S Interface with Climate Change and QUALITY of LIFE**

The quality of life  $Q_L$  is a  $\Sigma_Q$  system and therefore it is equipped with components (units etc.) and relationships. These units linked together therefore have a structure  $S$  and functions  $F$ .

The structure is defined by the amount of information in the system  $\Sigma$  itself. The variability  $V_\Sigma$  of the system and therefore of the  $V_S$  structure are related to the variability of the  $V_F$  functions.

The quality of life  $Q_L$  as a  $Q$  system is part of this system vision. The theory of corporate

quality systems has been developed for many decades and has produced a set of standard standards (ISO standards, EN European standards and UNI Italian standards). Therefore, considering life  $L$  (or  $V$  in Italian) as a  $\Sigma_L$  system, the theory of quality of life  $Q_L$  can be developed (Ref. 1, Quartieri Giuseppe) by taking into account all the above mentioned precautions and attentions to sustainability.

### QUALITY OF LIFE

The definition of the quantity of the functions that define the quality of life  $Q_L$  is determined in the analysis itself. Normally, standard analysis uses quality of life "parameters" i.e. generalized indicators. Observations and measurements of the  $Q_L$  quality of life functions are not always available or just worst possible to get. In the framework of the quality of life system approach, it is a duty to mention the basic approaches of the great fathers of quality (Fig. 3a). In particular, it should be mentioned - one for all - the great Joseph M. Juran (Romanian-American) who, with Vilfredo Pareto, in this regard, asserts:

*"Vital few, trivial many"*

Juran deduced this vision by studying the work of the great Italian mathematician Vilfredo Pareto and applying the "Pareto Principle" to quality. For example, 80% of a problem is produced by 20% of the causes. In the last years of his life, in maturity, Juran changed the primary assertion induced by the works of Vilfredo Pareto in:

*"The vital few and the useful many"*

Thus the concept becomes: few elements or parameters are vital, but usually many parameters influence the phenomenon under examination even if they are not

necessarily essential. By applying this concept to the occurrence of system defects, Juran finds that most defects are the result of a small percentage of the causes of all defects (also published and shared by "The Economist").

In this general vision of quality, analysts (i.e. Organizations, Management and so on) first job is to study and decide which and how many indicators must be used to evaluate the quality of life. In the next works, comments and references to the "IL SOLE 24 ORE" approach (of 16 December 2019) will be issued inside the Italian regions, cities and territories quality of life evaluations.

In Quartieri's approach (1980, Milan) to the quality of life system, environmental factors (Fig. 2) have priority in the systemic assessment of  $Q_L$ . A true quality expert should request and place, as first indicator, the effect of the environmental factors (Fig. N°4). In other words, the climate - environmental factors set - has priority in assessing the quality of life  $Q_L$ . This work gives only the introduction to the Quality of Life system analysis (Ref 1).

### **$Q_L$ SYSTEM APPROACH**

In the physics department of the universe, Einstein and others (Ref. 54) defines "Universe is an aggregate of non-simultaneous and only partially overlapping, nonidentical, but always complementary, omni-transforming, and variable energy events". With this starting point, F. Buckminster Fuller tries to include in this definition the metaphysical aspect as follows: The universe is an aggregate of all the humanity's consciously-apprehended and communicated experience with the

non-simultaneous, nonidentical, and only partially overlapping, always complementary, weighable and unweighable, ever omni-transforming, event sequences.

After a sequence of "bi-secting bits" and getting rid of irrelevancies, just subdividing the concept of universe, "it is possible to reach the concept of "system" as:

*"A system subdivides universe into all the universe outside the system (macrocosm) and all the rest of the universe which is inside the system (microcosm) with the exception of the minor fraction of universe which constitutes the system itself".*

This is a very general definition to which apply the concept of quality. Life is the system for excellence. Perhaps the most important one. Inside the system approach, Quality of Life  $Q_L$  (Rif. 1, Giuseppe Quartieri, 1980) is the level of satisfaction of inherent human expectations (health, freedom, happiness, work, richness, profession and so on) plus the stakeholder expectations (relatives, local community, society, political reasons etc.).

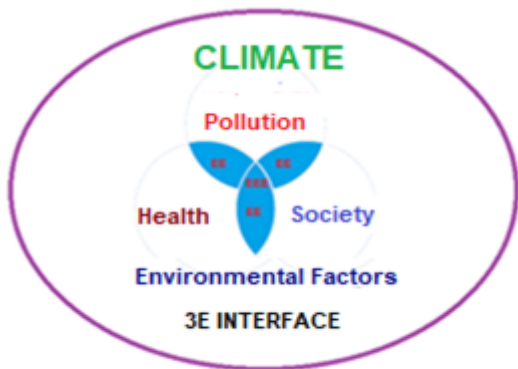
$$1) Q_L = f(x_i, t) = f_{ex}(h, f_r, h_p, w_k, r_c, p_{rof}, \dots, t) \cup g_{ex}(r_{is}, l_c, s_c, p_l, \dots, t) \cup E(T, H, f_r, h_p, w_k, \dots)$$

where: the symbol  $\cup$  represents the union of function operations that can be simply linear but, generally, can be much more complex.

#### ➤ *Personnel Factors:*

- Health: h
- Freedom: fr
- Happiness: hp
- Work: wkb
- Richness: rc
- Instruction: ist
- Profession: pf

- Relatives: rls
- Safety/Security: ss.
- Intellectual satisfaction: I<sub>s</sub>.
- Love, friendship: Lof
- Amenity: sport and so on.



Nd **Fig. 4 Quality Factors Interface**

*Environmental Factors:*

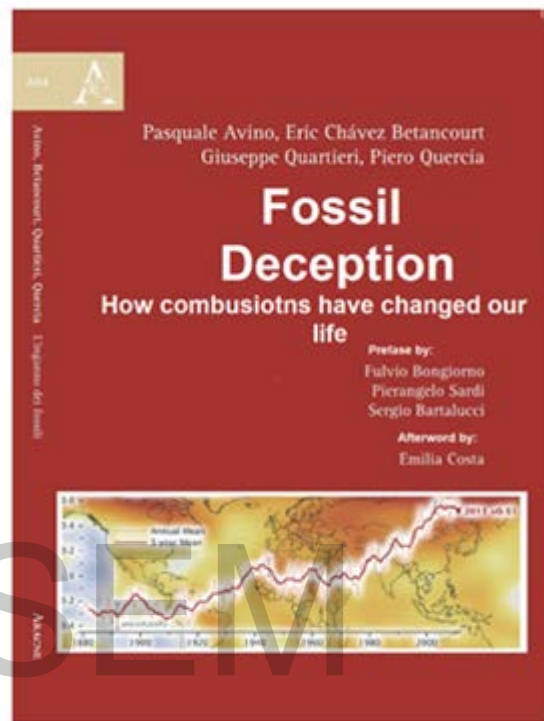
- Temperature: T
- Umidity: H
- Accelerations: a<sub>c</sub>
- Vibrations: v<sub>b</sub>
- Etc. (35 natural factors plus the anthropic ones).

➤ *Economic Factors:*

- Life Standard  $sd_i = f(PIL, BES, \dots)$
- Parameters  $= x_i = (I_a, I_{ha}, sd_i, q_0, q_{max}, \dots, r_{is}, l_c, s_c, p_l, \dots, T, H, f_r, h_p, w_k \dots \text{ecc. ecc.})$
- Time: t
- Gross Domestic Product (GDP)

The current environmental climate crises are directly connected to the energy and economic crises (Fig. N° 3). The correlation illustrated in Fig. N° 3 shows the very salient interfaces between the three fundamental categories that must be taken into due account when assessing the quality of life.

These three categories can be and are disentangled in terms of "indicators", especially by assessors who rely only on reducing quality to more and less large number of indicators.



**Photo1, Fossic Deception**

An example of assessment of Quality of Life with 90 indicators, along the Italian regions developed by "IL SOLE 24 ORE" (218) is the most striking and illustrative case.

*Anyway, it is a duty to clearly affirm that the results of the Quality Analysis given in the Journal "IL SOLE 24 ORE" cannot be accepted easily because of the first position given to Milan in the ranking. Milan is in the center of the most polluted flat land, Padania, in Italy!*

Everyone knows that the environmental crisis has recently been tackled head-on by the new President of the European Community Ursula von der Leyen (Green



New Deal: 3 billions Euro (trillions) for humanity salvation; nuclear energy, reforestation, oceanic algae, photosynthesis, accelerated melting of the ice-sheets of Greenland and western Antarctica, the drying of rain forests and the thawing of Arctic permafrost and so on; no finance to France project but to Italy one). In next articles, other essential parameters of the quality of life, will be tackled and analyzed including economic and financial aspects. Always these last topics are taken as first position in the ranking by the worldwide power groups.

### Eco-Sustainable Welfare: BES, SEW

During last decade, in Italy specialists have introduced a new indicator, result of “welfare ISTAT/CNEL Project” to overcome the need to apply the GNP. This choice is based on the idea that the scope of obtaining and maintaining good or reasonable  $Q_L$  values can be reached only and only by taking into account social, environmental parameters (indicators) but not only economics ones.

*Analyses and Resulted parameters:*

- Initial Quality of Life:  $q_0 \cong q_m$   
(minimal quality)
- Maximum quality:  $q_{max}$
- Human Average Life:  $I_a = \tilde{l}$
- Human Average Life in good health:  
 $I_{ha} = \tilde{h}$ .

Among the potential models, the first and simplest is the exponential model produced by reflection on the evolutionary development of the human species:

$$(2) \quad Q_L = Q_{MAX} (1 - e^{-Q_L t})$$

In this simple formulation each quality variable must be considered normalized, i.e.  $q_i = \frac{x_i}{\bar{x}}$  in such a way that the linear combination rule is applicable:

$$(3) \quad Q_L = \sum_{i=1}^n q_i$$

So the quality formula is:

$$(4) \quad Q(t) = Q_{MAX} (1 - e^{-\sum_{i=1}^n q_i t})$$

### System Approach

The classic representation of the system input-output model (Fig. 4 and 5) can be used for the construction of the basic system model for the quality of systems and life (Fig. 4 and 5). Let be  $\Sigma_E$  the quality-ecologic sub-system of  $\Sigma$  (Fig. 1). The environment E around the quality system  $\Sigma$  strongly influences the life system itself producing effects ranging in a large field of figures. First of all, the applied environmental factors  $E_F$  are natural. The standard amount of natural environmental factors  $E_F$ , influencing the quality of life  $Q_L$ , are more than 30 while the standard climate (or weather) is usually

defined and measured by only 3 factors (T, H, P). The ecologic factors  $F_{ec}$  are those environmental factors that have directly effects on the quality living entities health during any phase of the life. The global system is nowadays complicated by many other artificial factors (electromagnetic waves, artificial radioactivity, car exhausting gas such as  $CO_2$ , and others:  $C_6H_6$  benzene,  $NO_x$ , etc.) extremely polluting the Earth and Biosphere. Consequently, they degrade the quality of life of humans.

One the fundamental "inputs" is summarized in the "environmental factors" which strongly affects the system itself. The mathematical model of the basic quality system is represented in the following figure N ° 5.

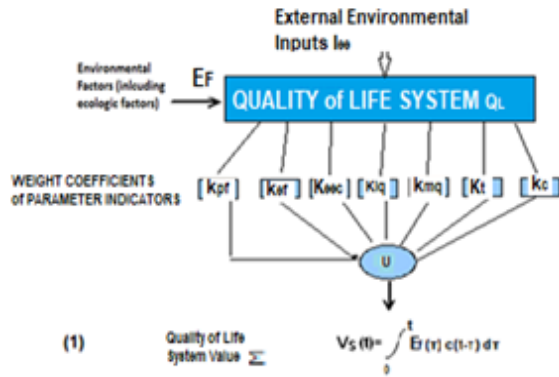


Fig.5 System Approach to Quality of Life

In this figure, it is shown the basic Quartieri System Value formula for computing the value-quality  $V_q$  of a even complex natural or anthropic system  $\Sigma$ . By definition, classic and even modern economy theories do not agree with this formula. Economists measure all in terms of money and do not weight value with quality of the subject. In other words, according to economists, the value concept, measured in money (Dollar, Euro etc.) does include inherently the concept of quality. Apparently this could be true.

**Poor People Approach (PPA) to  $Q_L$**

People want to see quality outside and not inside the value. In classic economy, it is:

$$V_{\Sigma} = C_{\Sigma}$$

The value of system  $\Sigma$  is equal to its cost. This is currently accepted by very most of the people but first of all economists, financiers, capitalists, top and standrd managers and so on. This classic economic

approach is shared by large Companies, Global economy and so on. In the proposed approach the  $Q_{\Sigma}$  is out of the  $C_{\Sigma}$ :

$$Q_{\Sigma} \neq C_{\Sigma}$$

and

$$C_{\Sigma} = \text{not } \exists Q_{\Sigma}$$

Actually  $Q_{\Sigma}$  is an independent variable vs the cost  $C_{\Sigma}$ .

In the social-economic approach of the development and growth of the world population, one of the fundamental parameter of "disquality of life" is given by the enormous increase of population and its negative effects for the human survival (loss of food, poverty, and so on). The population growth has happened with differentiate social development in various parts of the World. Statistics guarantee the continuing of the growth and of the associated social development only and only in some well defined limit range. However, this process could be used, and described, preferably, with the word "sustainability" of the growth.

Really, it is only a question of having reached the amost maximum limit of the logistic growth (or esponential one, Fig. N° 9).

The Quartieri logic prediction and argoments on this topic resolves only and only in a reduction (Fig. N°1) of the generalized growth and development, unless there are only limited "pools" of overdeveloped regions.

In any case, it must distinguish between development and growth. In the climate change framework, the more probable situation is the increase of the growth but without social development (blue zone in Fig. 6a).





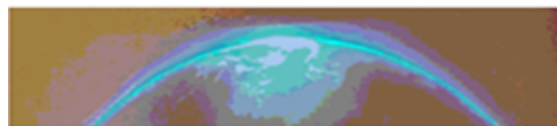
### QUALITY of LIFE and CLIMATE CHANGE

In the current phase of climate change, the negative effects of climatic changes on humans are argued in a cumbersome and unregulated way, based on the provisions and considerations of the COP (The Conference of the Parties). This is a UN enactment body for the management and synthesis of climatic effects. COP managers and coopertors including, at least, 1000 environmental operators among scientists and researchers, do not make direct research but use many environmental research bodies and organizations. The intervention of the young Swede Greta Thunberg has created a series of movements and demonstrations at an international level. By moving young people to pay attention to the negative effects of Climate Change as described and directed by the COP (e.g. COP1, ..., COP24, COP25 etc.), Greta has achieved enormous popularity. Two basic scientific movements have arisen, the positivists born from the drives of the scientists associated with the various COPs, which are precisely called "positivists" because they believe in the 100% "human or anthropic" origin of climate change. In contrast, there are classic, serious and Galilean scientists – called negationists - who have analyzed and

studied natural phenomena for centuries and who instead associate a percentage higher than 50% of the causes of climate change with purely natural phenomena and causes. Other positions have been created under the shield of the "scepticims".

Regardless of the victory of one or the other faction, and of the agreement on the percentage of effects due to anthropogenic causes, the quality of life  $Q_L$  requires that all the operations deemed necessary and sufficient must be carried out worldwide for maintaining the Earth's climate and the biosphere within optimal natural values for human health and life. Precisely on this operational aspect, at the last COP25 Congress in Madrid, there was no agreement between the representations of all the Nations of the Earth. All postponed to Glasgow. The President of the European Community Ursula von der Leyen has done well in relaunching nuclear power plant applications in Europe.

**All the planets of the Solar System having atmosphere have also greenhouse effect and Climate Change.**



**Fig. 6a Earth with Biosphere**

We need to change course and strengthen corrective actions regardless of the causes. In Italy, these problems cannot be continued to be managed by over-the-top catastrophists without any concrete sense of the real nature of environmental phenomena or of the management of the

quality of life between renewable and clean energies.

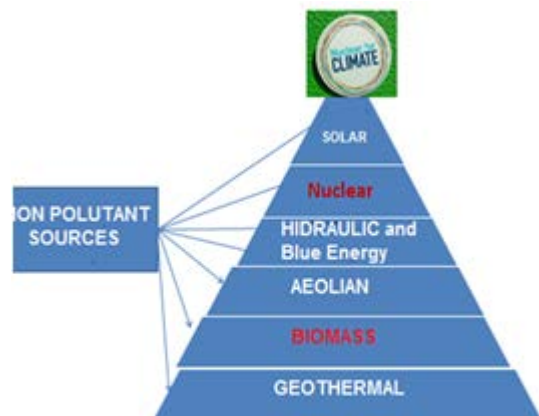


Fig. 7 Scale of Non Pollutant Energy Sources  
(giusepegmquarteri@gmail.com)

In fist environmentalist approach, these catastrophists to the bitter end were called "dummy ecologists" which, personally, I used to translate and transpose as "ecologists and/crackpot or beaten catastrophists".

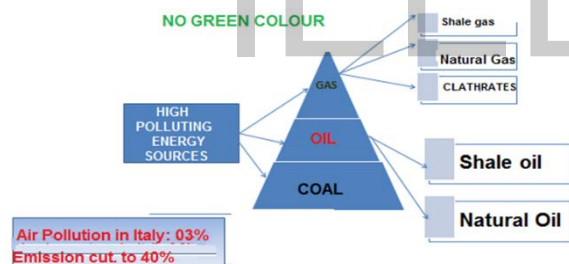


Fig. N° 7a High Polluting Energy Sources

For denialists (negationists), however, the negative effects produced by Nature, as has happened during the millions of years of past history, man can do little or nothing. Instead, for Positivists, man must do his utmost to stem the negative effects of climate change. In other words, while someone else defines himself as a precautionary (AMIS, CACR and other colleagues), the current dispute between Positivists and Denialists has come to a standstill because the denial ideology is

about to reach theological and teleological aspects of the mind. not only childish but above all based on "fear of cowards" such as that which directed the known little people against the application of the Nuclear Power Plants, at that time. Precautionists could be placed inside the sceptic approach too. For precautionary measures, corrective actions, both preventive and "post factum" must be taken independently of the various philosophical positions immediately (hic et nunc).

### POLLUTION vs QUALITY of LIFE

Meanwhile, as is well known, the environmental factor  $F_e$  more important and more harmful for the quality of life  $Q_L$  is the pollution of the air in the atmosphere which makes it irrepressible. The discussion is now widespread and generalized on the relationships between carbon dioxide  $CO_2$  and other greenhouse gases with the pollution of the biosphere (Fig. N °5) and therefore of respirable air. The correlation between the amount of carbon dioxide  $CO_2$  and the increase in the temperature of the Earth's crust is considered the primary cause of pollution and, therefore, of the reduction in the quality of life  $Q_L$ . The reduction of the greenhouse effect and the  $CO_2$  carbon dioxide concentration must go hand in hand with decarbonisation if the reduction in temperature rise intrinsically related to the increase in  $CO_2$  carbon dioxide is to be obtained (Fig. 6).

As is well known, pollution affects all 5 platonic energy and environmental subsystems (Fig. N °10). In other words, environmental pollution can produce anticipated diseases in humans, in a way to

decrease the average healthy way and to anticipate entry into the final part of the average life as a patient.

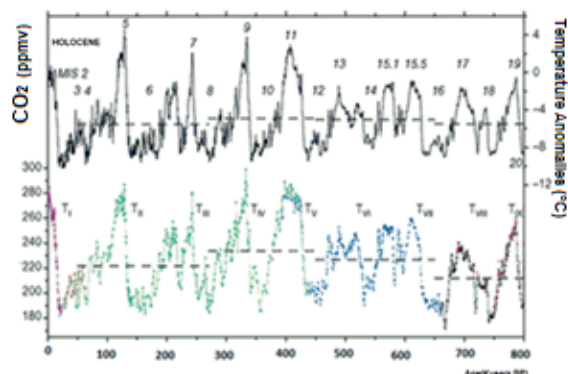


Fig. 9 Correlation between CO2 and Temperature Anomalies

In this systemic definition approach, the quality of life standard diagrams can be processed and drawn according to formula N°2 and reported in Fig. N°11 below. So, ob torto collo, we can finally try to give a sort of sense to the concept of "sustainability". One cannot hope to make it a greatness - e.g. physical - measurable but it can be considered to give it a more real and concrete sense for a more rational and less political but more social and, within certain limits, also - perhaps - economic applicability.

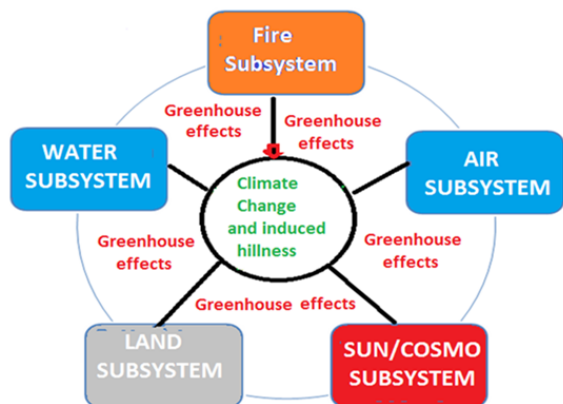


Fig. 10 Interaction among the 5 climate subsystem (Ecologic subsystem and induced illness)

In fact, with reference to the levels shown in Fig. N°9, a solution, a process, a system is

said to be "sustainable" if it has reached an operating state which in the growth curve presents an evolution at the level of "sustainable quality" as shown in the previous figures, that is, whether it has reached saturation or is close to it. In any case it should be ever remembered that.

*An economist is, in pectore, a userer!*

### The resulted curve

From the synthetic analysis reported above, Quartieri GGM has processed the applicable curve for the definition of the growth (positive and negative) of social, economic but above all the quality of life, reported in the next diagram Fig. N° 11, of the quality of life  $Q_L$ .

The growth is referred to the steps of the most important civilization of the World history.

Appropriately, the last part of the curve shows the quality decrease independent from any kind of eventual sustainability.

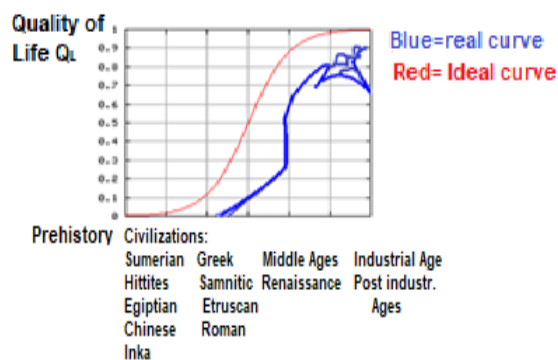
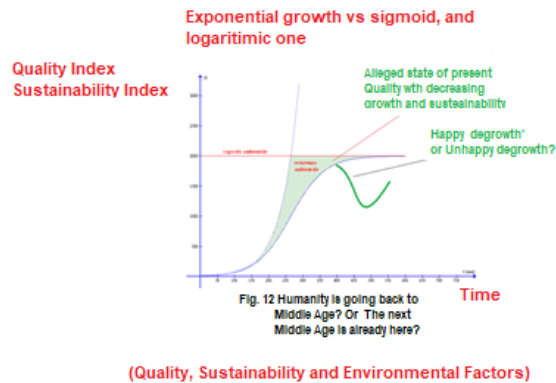


Fig. 11 Quality of Life  $Q_L$  in human history (source: Giuseppe Quartieri Ref.1)

It should be noted that, in this last post-industrial period, the quality of life has weighed down and shows significant reductions in level in an almost random way due to falls in civilization and/or safety.



In this way the extreme results of the models of modern environmental-ecological phenomena produced by population growth at the almost maximum limit were applied.

## CONCLUSION

The hope is of having highlighted in this first part of the quality, the basic concept of quality of life in elementary scientific concepts. It is used the system approach and its relative quality of life definition. Basically the system description has been implemented by using, first of all, scientific diagrams and very simple formulas.

The data are substantiated, rationalized and validated by a deeper analysis of few aspects such as the population increase, the effects

of climate change, the implementation of a more evolve math mode,

The Quartieri proposed math model is one of the most sophisticated and general one. However, it could be considered top complex and need much more work.

In this math approach, introduction of the indicators for implementing ranking has not got the priority a part the calculations reliability and higher level of confidence.

It should be point out that, generally speaking, there are a lot of fault concepts

and interpretations. Many of them are imposed by economic, financial and/or masonic interests. These topics are fully reviewed and deleted by a rational concept of quality of life. The comment is directed to the set of degraded international top finance and masonry. These top managers usually at the Government top levels do not guarantee any positive vantage for population.

Those economists have demonstrated to be able only to increase the degradation of the (Italian and so on) quality of life further to migration problems.

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