Pietro Mugnaini

HOW TO AVOID EXTINCTION

(and make the world better)

The Doomsday clock is only
90 seconds away from midnight!

How can we prevent extinction?

Pietro Mugnaini

HOW TO AVOID EXTINCTION
(and make the world better)

Second edition

Index

I dedicate this book to my two grandchildren, aged 11 and 14, hoping that in a few decades' time, when I am no longer here, they may think: "Grandpa, your predictions were wrong," or "Grandpa, science and technology eventually managed to solve the problem of climate change," or, even better, that my initiatives or those of others manage to shake up the political scene and thus, before the situation worsens, the necessary steps are actually taken for humanity to continue on its path.

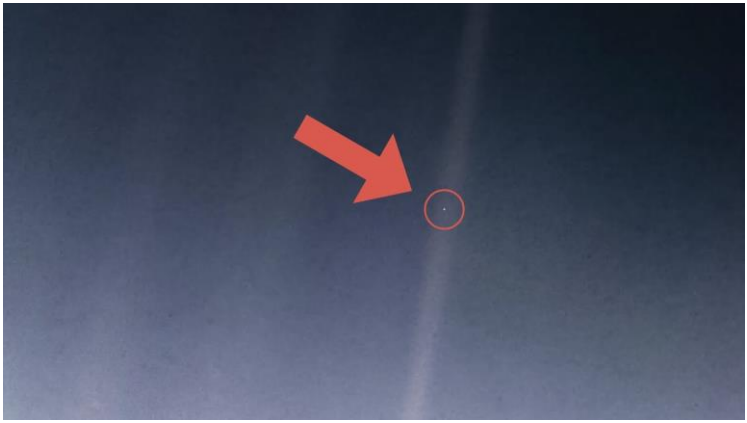
"We are on a train going three hundred kilometres an hour, we do not know where it is taking us and, above all, we have realized that there is no engineer."
(Carlo Rubbia)

"When you have felled the last tree, when you have caught the last fish, when you have polluted the last river, then you will realize that you cannot eat money."
(Sitting Bull)

"It is useless for Man to conquer the Moon if he ends up losing the Earth."
(François Mauriac)

Foreword

This is the photograph of the Earth taken in 1990 by the Voyager probe from a distance of 6 billion kilometres. In the shot, our planet appears as a pale blue dot suspended in the vast darkness of the cosmos.



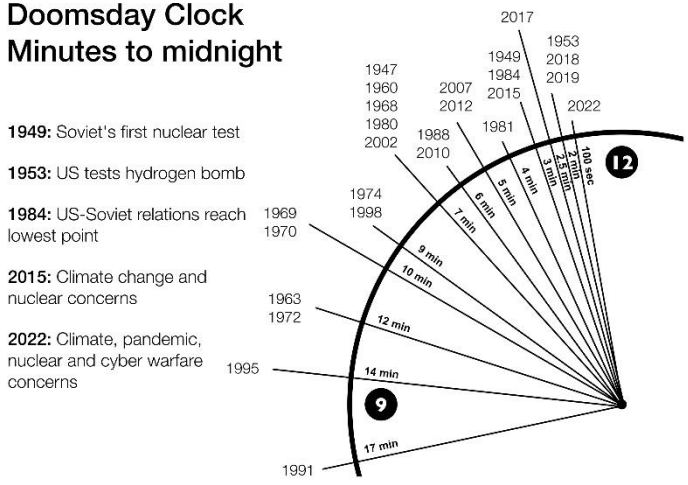
It is the furthest photograph of our Earth that has ever been taken. The idea came from the American astronomer Carl Sagan. He later published the book "Pale Blue Dot: A Vision of the Human Future in Space", in which he included a profound reflection on that photograph.

Here are his words which represent an invitation to reflect on our condition, on how ephemeral and at the same time unique the opportunity of life is, and above all on the importance of expending the utmost energy on the climate issue that must be placed at the top of the daily priorities of all of us.

"Our pretensions, our imagined self-esteem, the illusion that we hold some privileged position in the Universe, are challenged by this point of pale light. Our planet is a lonely speck in the great, enveloping cosmic dark. In our obscurity, in all this vastness, there is no hint that help will come from elsewhere to save us from ourselves.
The Earth is the only known world capable of harbouring life. There is no other place, at least in the near future, where our species could migrate.
Whether we like it or not, for now, the Earth is where we make our stand. There is perhaps no better demonstration of the folly of human conceits than this distant image of our tiny world. To me, it underscores our responsibility to deal more kindly with one another, and to preserve and cherish the pale blue dot, the only home we've ever known… ».

Introduction

We have reached a critical point for humanity.
The Doomsday clock, the apocalypse clock, a clock that measures how close the end of the world is, marks just a few seconds to midnight. Since the clock has existed, it had never shown 23:58:30.



The continuous general rearmament, the war in Ukraine that risks turning into a global war with the use of nuclear weapons, and the lack of action by major

powers to counteract climate change, set a new record for the clock's approach to midnight.
Of the 24-hour day (or 1,440 minutes), only a minute and a half remain until the end of the world or, rather, until the end of Humanity, because the Earth, whatever happens, will always manage to recover. It's just a matter of time, a few hundred or thousands of years at most. Only when our Sun expands, transforming into a red giant will our planet be definitively destroyed. But for this, there is still enough time: about 5 billion years!

It is now certain that humanity has embarked on the path to its extinction which could be very rapid or occur within a few generations. The events that can lead to the extinction of the human species and most forms of life, as has happened five times before in the history of the Earth, are:

- A world conflict with the use of atomic weapons
- Climate change
- The supremacy of artificial intelligence
- The impact of a huge asteroid
- The eruption of a super-volcano

The first two events derive directly from the actions of Man, the third is an indirect and relatively involuntary cause, the other two are independent of our will.

If the first two points depend on human actions, why can't we defuse these roaming mines? Do people not understand that we are heading towards collective suicide, that we are now on the brink of the abyss? Why do only a few rebels? Why do we let wealth and therefore power accumulate in the hands of a very few individuals in the world who decide the fate of billions of people based only on their own profit and personal enrichment? Why is it not understood that growth cannot be infinite and that this type of growth is peculiar to tumours that then lead to the death of the individual? And furthermore, that resources are not unlimited and that we have only one Earth? That instead of investing in armies and armaments and unleashing wars, all the states of the world should unite for a common fight against the true enemy that is global warming?

Perhaps because of the indifference and immobility of politics whose horizon is limited to the next elections and cannot address long-term issues? Perhaps due to individual selfishness and resistance to change by the overwhelming majority of people? Perhaps due to national interests being placed before those of the environment? Probably a bit of all of this, but especially because the dangers are not felt as immediate.

Indeed, climate changes are slow. It will take decades before they can become so serious as to lead to

extinction, but the effects and the consequent problems are already beginning to be seen from today and every year will be worse. We already see what drought is causing to agriculture and the consequent price increases.

The worsening of global economic conditions, desertification, and increasingly frequent and prolonged famines will cause mass migrations.

When millions of refugees arrive, what will we do? Repel them with cannon fire?

If for over thirty years all the necessary measures to avoid the climatic and environmental catastrophe have not been taken, the fault is not only of the politicians but also of us citizens.

Every time I have talked about the climate and environmental issue with relatives, friends, or acquaintances, I have always found them to be impatient. People do not like to talk about these things, they become sad and try to change the subject. They believe that they cannot do anything about it, that they are not immediate problems and do not touch them directly like work, taxes, health, or whatever else.

Instead, each one of us can do a lot: individually with our own behaviours and daily habits, collectively by participating directly or indirectly through the support or adherence to a movement (the one I would like to found as I describe in the chapter "conclusions"), which fights to revolutionize the current system that has dragged us towards the abyss.

To understand why people are not concerned about their own future and that of their children and grandchildren, the fable of the "boiling frog" told by the great Noam Chomsky, an American linguist, political activist, philosopher, and communication theorist, seems very relevant.

Imagine a pot full of cold water, in which a frog swim comfortably. The fire is lit under the pot, and the water warms up slowly. Soon the water becomes lukewarm. The frog finds it quite pleasant. The temperature rises. Now the water is warm, a little more than the frog would like. The frog gets a bit warmer but isn't alarmed. Now the water is really too hot, and the frog finds it very unpleasant. However, it has weakened and doesn't have the strength to react, so it endures and does nothing to save itself. The temperature rises further, and the frog simply ends up boiled to death. But if the water had been boiling to begin with, the frog would never have jumped in, it would have given a strong kick to save itself.

This means that when a change occurs in a sufficiently slow and gradual manner, it escapes consciousness and does not provoke any reaction, any opposition. And that's how in the end the stable is closed when the oxen have already escaped.

If we act now, we are still in time to avoid the worst. Each additional year that passes without taking drastic measures worsens the current situation and future problems. Extinction will not come without suffering. In the

meantime, natural disasters will occur, enormous economic problems, mass migrations with consequent conflicts, wars for water and food, much suffering, and an unprecedented number of deaths. Do we want all this? Do we want to leave our children and grandchildren an uninhabitable world?

The development of artificial intelligence that could take over seems far away, yet we are already witnessing enormous progress with Chat GPT and its refinement, GPT-4, which followed in a very short time. To prevent such a possibility, it will be essential to anticipate strict regulation and severe controls managed by a global authority.

The great scientist Stephen Hawking on artificial intelligence stated, "Artificial intelligence could develop a will of its own in the future, which could even be in conflict with ours." In other words, Hawking says, a super-intelligent AI could compete with human beings and act against them if its goals were not aligned with those of our species, with unpredictable and apocalyptic consequences.

The impact of a massive asteroid and the eruption of a super-volcano are unpredictable events but with a very low probability of happening in this century. If something could be attempted to divert the trajectory of the first event, and studies are already underway for this,

for the second, there would be absolutely nothing to do. Therefore, it is not worth taking them into consideration.

A global conflict that leads to a nuclear war seems to me much more likely and closer than one might think, given the current situation, the ongoing tensions between the great powers, and the fact that nuclear weapons are in the hands of many states, among which some are not very reliable.

There have been an infinite number of wars in history. Just search Google with the keywords "war per year," and on the Wikipedia page, you will find a list of four pages with the years in which a war (or more than one) started, some lasting many years. The New York Times reports that, according to its calculations, in the last 3400 years of history, just 268 have been completely at peace, and this does not take into account conflicts with fewer than 1000 victims!

Until before the last world war, the destructive potential of weapons was limited, and therefore even a global conflict did not represent a threat to the continuation of life on Earth. Now, unfortunately, this is no longer the case. There are over 13,000 nuclear warheads worldwide. If each state possessing a nuclear arsenal were to launch about fifty in a hypothetical global nuclear conflict, the Earth would not be destroyed, nor would all

its inhabitants be killed immediately. However, what is referred to as a "nuclear winter" would ensue, leading to mass extinction within a few years, as we will see in detail in the chapter on a possible third world war.

While we do not know if and when other events will occur, global warming is already underway.
It is true that climate changes are more spread out and diluted over time, but it is certain that continuing at this pace, without taking the necessary measures to contain them with the utmost urgency and effectiveness, they will lead us to extinction much sooner than we think, probably before the end of the century.
There are, in fact, various mechanisms (the so-called "positive feedback loops," which we will examine later) that once triggered, self-sustain, and at a certain point, it becomes impossible to interrupt them even if global emissions were absurdly reduced to zero.

Thus, sooner than we expect, we will reach the infamous "point of no return," which we do not know for sure if it has already been reached, and therefore, all the more reason we should intervene immediately and drastically, at least to contain the damage.

The effect of these mechanisms (there are at least nine that influence each other), unfortunately, has been underestimated or silenced out of interest or for fear of creating panic. Confirmation of this can be found by

reading the news on extreme events or the melting of the ice caps. Often it is commented that these events are much more intense or faster than expected.

Peace and climate change are closely linked because militaries are among the largest polluters, and wars heavily influence global emissions.

If we could achieve world peace and a progressive disarmament, the enormous funds currently wasted on armies, armaments, and wars could be used to combat climate change and pollution.

One thing is certain: global problems must be tackled at the global level by creating a world authority with the highest decision-making powers. They cannot be resolved by relying on agreements between various nations and the policies that created them.

A grassroots revolution is therefore needed, one that drastically changes the system by overcoming the logic of profit at any cost and infinite growth, and by creating a supranational authority that can make the necessary decisions and impose them on all nations. As history teaches us, only united do we win, both at the level of citizens and internationally. To push governments to implement this revolution, the youth, whose future is compromised and who will suffer the greatest consequences, should strike indefinitely. What's the point of going to school when in the future the Earth might become uninhabitable?

Unfortunately, I know from personal experience, only 1% of young people actively take an interest in environmental issues. The vast majority of young people either do not care or are not worried. When I see how they leave trash everywhere (bottles, cans, paper, etc.), I feel despair and discouragement because the small things explain the rest. If we want to avoid catastrophe and the end of humanity, young people must wake up and actively participate in the fight against climate change.

Something is moving. There are ongoing or starting various climate lawsuits against states because they are not doing enough to limit global warming and have not respected the Paris Agreements of 2015.

In Italy, the "Giudizio Universale" initiative is, at the time of writing, already at its third hearing. During the last hearing, on June 21, 2022, the State Attorney adopted a precise strategy, that of moving away from the possibility of a judgment, trying not to answer the merits of the accusations but aiming to define the legal action as illegitimate, focusing on the impossibility of judging the state's conduct in climate matters.

Greenpeace has filed a lawsuit against ENI because the company's operations worsen the climate crisis and violate human rights.

In Portugal, six young people are taking governments to the European Court of Human Rights. The case involves a group of young people aged between 11 and 24 against 33 European countries, accused of not doing enough for the environment.

These climate lawsuits should be brought in every nation of the world where they are justified.

Indeed, a recent study conducted by an international group of scientists has found that the Earth has just surpassed six of the nine boundaries that keep it habitable, those indicating its general health. These range from climate change to biodiversity, from the availability of freshwater to nutrient pollution. They are signals that show us the human impact on the environment, an alarm bell similar to blood pressure in a human being. If the pressure is too high, it is a signal that the risk is elevated and that intervention is therefore necessary. These nine factors are deeply interconnected. For example, the climate has repercussions on others, such as biodiversity. Conversely, strengthening one aspect can help the others, contributing to mitigating climate change.

It is said that we will have to live with climate change by implementing all possible measures for resilience.

For now, it is possible, at least as long as the average global temperature remains below two degrees Celsius, but when it will rise further and phenomena become increasingly extreme, how will we be able to live with it?

If we want to give a future to our grandchildren, we must give birth to a movement to fight against the extinction of the human species. A "No-Extinction" movement, pacifist and environmentalist, that unites old and new generations in a struggle for survival.

Do you think it is a utopia? That we can do nothing? Well, then everything will proceed with "business as usual," practically without any change of direction. You can imagine the consequences right now by continuing with the reading and personally verify them when, year after year, extreme phenomena will become more and more intense and frequent, as is already happening, after all.

The solutions are there, it just takes courage and strength to apply them even drastically. Many will object that there will be huge costs and sacrifices to bear. To these, I reply that first of all, there are ways to find the funds and, in any case, if we do not act, both the costs and the sacrifices will ultimately be enormously greater! Others will object that some solutions will

entail job losses, to which I respond that it is true but that these losses can be compensated with new activities, particularly in the field of fighting and resilience to climate change as well as reducing pollution.

One of the reasons why we have children is to pass on our genes and thus achieve a kind of immortality. If we are heading towards extinction, what is the point of continuing to have children? But above all, it would be better not to bring any more into the world because future generations will face enormous problems and sufferings.

Climate change

What is climate change?
This topic should already be clear to everyone, but let's do a brief recap with words as clear and concise as possible.

It all starts with the greenhouse effect, so-called because it is similar to the functioning of a greenhouse used for growing flowers and vegetables. If you have entered one at least once, you would have realized that it is much warmer inside than outside. This is because the sun's rays enter through the glass of the greenhouse and warm the interior but then remain trapped since the infrared rays emitted by the objects that are heated inside cannot pass through certain materials, such as glass. If, on the other hand, you have never had this experience, you will surely have entered a car exposed to the sun with the windows closed. By the same principle, it will be very hot inside, much more than outside.

The same thing happens on our planet. The Earth is the interior of the greenhouse, while the "glass" is the gases present in the atmosphere, the so-called "greenhouse gases" like carbon dioxide (CO2) and methane. During the day, the atmosphere is crossed by the sun's

rays which heat the earth's surface which, especially at night, loses heat in the form of infrared rays which are blocked by these gases that thus retain heat contributing to the warming of the atmosphere.

Normally this natural phenomenon is not harmful at all, in fact, it is what has allowed the Earth to retain the heat necessary for the development of life forms: without it, the average temperature on our planet would drop to about twenty degrees below zero!

The problem arises when this balance is altered, in this case by human activities that, since the industrial revolution, have started to emit CO2 into the atmosphere in ever-increasing quantities, especially from the 1960s with the economic boom. The "glass" has thus become more effective in retaining heat and from that moment the global average temperature has steadily risen, far exceeding pre-industrial levels by more than a degree. Higher temperatures mean more energy coming into play that tends to intensify phenomena. In addition, warmer air contains more water vapor, which when it condenses, produces more intense and frequent precipitation. For the same reason, the increase in temperatures has another effect: it causes more water to evaporate from the ground and creates conditions of drought. Intense precipitation and drought are two sides of the same coin and will become more intense and more frequent in proportion to the increase in temperature.

Denialists, who act mostly for corporate interest and in some cases out of ignorance (it's not surprising if someone still insists that the Earth is flat!), argue that there have always been periods with extremes of heat, cold, or precipitation, and therefore global warming is not due to human activities. They are not entirely wrong: it is true that there have been warmer periods due to natural causes, where they are mistaken is that in the case of natural phenomena the change occurs over thousands of years, while the current change has occurred in just a hundred years! Scientists are now 99.9% aligned on the anthropogenic cause (that is, caused by human activities). The remaining 0.1% maintain the contrary, probably for personal interest.

Positive Feedback

The most serious matter, which however is not duly considered, is that at a certain point the increase in global average temperature triggers self-reinforcing mechanisms (positive feedback), that is, vicious circles that directly amplify global warming, or the greater release or lesser absorption of CO2.

This means that predictions are often exceeded in times and severity. As an example, I report recent news published by one of the most important national newspapers which states that in Antarctica, ice is melting at a record level and that an area as large as Argentina has disappeared. Such a large-scale phenomenon was not expected at all; in fact, up until ten years ago, it was

believed that Antarctica would not be affected by this problem. Unfortunately, these records, whether they concern high temperatures, fires, precipitation, or other events, are counted more and more every year.

Let's see a list, perhaps not exhaustive, of these feedback mechanisms to then examine them in detail:

- Melting of ice and polar caps
- Thawing of Permafrost
- Warming, acidification, and desalination of oceans
- Increase of water vapor in the atmosphere
- Extensive fires
- Melting of methane hydrates
- Thickening of leaves

Melting of Ice and Polar Caps

Snow and ice have a high reflective power, while the much darker soil absorbs more heat. When the ice fully melts and the soil is exposed, the soil temperature increases significantly, further increasing the melting of the ice and so on, leading to an increase in global temperature. Making the situation worse is the fact that in some areas of the planet, temperatures are rising more rapidly than in others. One of these is the Arctic, the region around the North Pole where, according to a new study, since 1979 temperatures have increased four times faster than the global average!

Thawing of Permafrost

Permafrost is permanently frozen ground, extending deep underground. It covers a whopping 19 million square kilometres, about 24 percent of the Northern Hemisphere's land area.

Permafrost contains vast quantities of methane. Methane is one of the four greenhouse gases contributing to global warming, but it has a very potent effect, estimated to be 20 to 30 times greater than that of carbon dioxide. Heat causes the permafrost to melt.

When permafrost thaws, the organic material begins to decompose, releasing methane (CH_4) and carbon dioxide (CO_2), further raising the temperature. And so, it goes on.

Moreover, the soil becomes darker, heats up more, and further facilitates thawing.

Warming of the Oceans

The oceans absorb 90% of the heat due to global warming, and thus they continue to warm up. CO2 is less soluble in warmer water and tends to be released into the air, contributing to the increase of global CO2 and thus triggering a vicious cycle.

Ocean Acidification

The increase in carbon dioxide in the atmosphere, in addition to being one of the main causes of the global temperature rise, is also affecting the balances of marine ecosystems, causing, among other things, the bleaching of corals, leading to their death. The oceans absorb a quarter of all CO2 released into the atmosphere every year. In contact with water, it reacts chemically, leading to the formation of carbonic acid. Ocean acidity has in fact increased by 30% since 1800, with the negative effect of significantly reducing the ocean's capacity to store CO2.

Desalination of Oceans

The reduction in salinity, due to the influx of fresh water from the melting of the ice, is decreasing the oceans' CO2 absorption capacity. The Southern Ocean absorbs as much as 40% of the carbon dioxide produced by human activities. This upheaval risks compromising a delicate balance and significantly fuelling the feedback mechanism.

Increase of Water Vapor in the Atmosphere

Greenhouse gases are responsible, as we well know, for global warming through the retention of terrestrial thermal radiation.

This mechanism also increases the accumulation of atmospheric water vapor, which is considered the quintessential greenhouse gas.

In turn, the more vapor there is, the higher the humidity, which causes even more heat, triggering a vicious cycle in the warming process.

Extensive Fires

The conditions that cause fires are amplified by scorching heat and the resulting drought due to global warming, which, in turn, is increased by the fires. Indeed, the vast and numerous fires that have hit various parts of the planet in recent years (California, Amazon, Siberia, Indonesia, Greece, Italy, Spain, etc.), have not only released a huge amount of CO2 into the atmosphere but also have taken away a substantial slice of the forests and woodlands' capacity to absorb it, which will be impossible to replace in a short time. This has led to a further increase in this greenhouse gas, thus contributing to an acceleration of the global temperature rise and consequently on the number and severity of fires, in a cycle that repeats each year.

Melting of Methane Hydrates

One of the largest methane reserves on the planet is comprised of methane hydrates. These are cage-like compounds, that is, lattices of frozen water molecules that encase methane within, forming under conditions of high pressure and low temperatures. They are usually found at the bottom of the sea where the water is very cold and the pressure, due to the depth, is very high. With the rise in temperature, the ice can melt and thus free the methane that would rise to the surface and then into the atmosphere. Remember that methane is a greenhouse gas more than twenty times more potent than carbon dioxide. The release of methane from hydrates can therefore create a dangerous increase in the greenhouse effect.

This would lead to further increases in temperature and thus the possible release of more hydrates, with the release of more methane, and so on.

In 2019, when I began researching for my previous book on the topic of Global Warming, I came across the subject of methane hydrates, which was unknown to me at the time, as it was to most people, and I thought "when they start to melt it will be the beginning of the end."

Well, we are already there. In October 2020, scientists from an international team aboard the Russian research vessel R/V Akademik Keldysh found evidence that frozen methane deposits in the Arctic Ocean had started to open up. I reiterate that methane is a potent

greenhouse gas whose effect, in terms of atmospheric warming, is more than 20 times that of CO2!

Thickening of Leaves

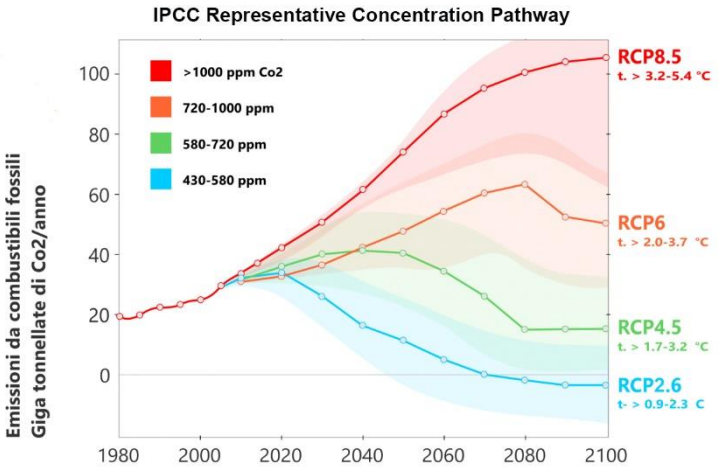
Following the increase of carbon dioxide in the atmosphere, plants have a curious reaction: they increase the thickness of their leaves by up to a third, partially altering their capacity to capture CO2 and thus sequestering even less of it.

In conclusion, due to these feedbacks, there remain very few hopes of completely stopping the global warming process. If we also add:

- the increase in the global population with a consequent increase in consumption
- deforestation
- desertification

it's no wonder that global warming may become irreversible and much more pronounced than expected, leading to much faster and more severe climate changes than currently thought.

Many areas of the Earth will become uninhabitable, causing massive climate migrations, economic, humanitarian, and conflicts over water and food.



This chart shows various scenarios which predict that, with the maintenance or increase of anthropogenic emissions due to the use of fossil fuels, there will be an increase in Earth's temperature.

Based on what was said before, the most likely scenario could be the worst one which, without drastic interventions, would lead to an increase in the average global temperature of up to 6 degrees by the end of the century, which is essentially the extinction of the human race!

A Foretold Catastrophe

For fifty years, climate scientists have warned us about what could happen if we did not change our lifestyle: extreme heatwaves, droughts, fires, floods, and very strong hurricanes.

Already in 1972, the first complaint about the problems created by the overexploitation of resources started with the report “The Limits to Growth,” published by the Club of Rome and written by young researchers from MIT who claimed that the planet is limited and economic development cannot continue indefinitely.

The first direct cry of alarm was made in the distant 1975 by Wallace Broecker, the climatologist who helped popularize the term “global warming.”
He published research titled “Climatic Change: Are We on the Brink of a Pronounced Global Warming?” in which he predicted an increase in Earth’s temperature.

Another significant moment was June 23, 1988, when James Hansen, one of NASA's leading scientists, told the United States Congress that global warming was not approaching but had already arrived.

In 1992 the Union of Concerned Scientists issued the first "World Scientists' Warning to Humanity" signed by more than 1,400 scientists, including many Nobel laureates. The document reported alarming indicators, from deforestation to water resources, to population growth: human activities were destroying ecosystems, leading humanity itself toward an unprecedented global crisis.

In 2015 Pope Francis published the encyclical “Laudato si,” preaching with great force the respect for the environment.

In 2017, more than 15,000 scientists from 184 countries signed a second warning: “we are close to causing irreparable damage to the Earth.”

In 2019, on May 24 and September 27, global protest demonstrations by the Fridays For Future movement created by the young Swede Greta Thunberg in 2018 took place. Millions of young people participated, demanding actions to prevent global warming and climate change.

Greta Thunberg has intervened on several occasions to urge politics to act quickly and drastically. On December 4, 2018, Greta spoke at COP24, the United Nations climate change summit held in Katowice, Poland. On January 25, 2019, she made a very strong speech at the World Economic Forum in Davos, aimed at making people understand the panic that should be felt in the face of climate change. On April 16, 2019, she spoke to the European Parliament's Environment Committee, urging European politicians to take immediate action to counter climate change following what scientists have stated.

For my part, I have done everything possible to contribute to stimulating the government and public opinion to become aware of the problem and act accordingly: I have been part of the Fridays For Future movement and participated in all the strikes, I wrote the essay “Global Warming and the Future of Man,” I sent a PowerPoint presentation on the subject to thousands of schools, I contacted the then Prime Minister Giuseppe

Conte. He replied with many fine words and promises, unfortunately unfulfilled.
This situation reminds me of an episode from my working life when, being responsible for foreign sales, I realized that the markets were changing and I went for the first time to a union meeting explaining the situation to the workers, that we would have to roll up our sleeves and be less demanding in order to preserve our jobs.

Not only was I not listened to, but I was later denigrated because according to them I had been sent by the owner to represent his interests.

After a few years, the company, unfortunately, had to close.

Where We Stand

Despite all the calls to action and protests, politicians and world leaders have chosen not to choose, postponing the issue year after year.

Instead of taking drastic and immediate measures, they have done little that is decisive, continuing as if nothing were amiss.

Like at the G20 in Naples in July 2021, where an agreement was signed but not on the two most important and demanding points, which were omitted due to the refusal of China, India, and Russia: the decision to stay below 1.5 degrees of global warming by 2030 and to eliminate coal from power generation by 2025.

Indeed, it is precisely the countries that emit the most carbon dioxide into the atmosphere that are holding back and refusing to drastically reduce carbon dioxide emissions. The world's largest CO2 emitters (2017 data) are:

China	9,838,754,028 t.
United States	5,269,529,513 t.
India	2,466,765,373 t.
Russia	1,692,794,839 t.

China and India, which are the countries where the most polluting industrial production has been relocated and concentrated, need fossil fuels to grow their economies.

The goal of limiting the global temperature increase to less than 1.5-2°C compared to pre-industrial levels can never be achieved without the cooperation of the world's largest greenhouse gas emitter: China.

In November 2020, Chinese President Xi Jinping declared in a video link at the 12th BRICS country summit in Beijing: "China will honour its commitment to strive to achieve the carbon neutrality goal by 2060."

After this statement of intent, China is instead building new coal plants, the most polluting of all. In 2020, while the rest of the world reduced coal-based electricity generation capacity by 17 gigawatts, China increased its own by 38 gigawatts, in addition to having new plants under construction for 88 gigawatts. Another 158 gigawatts have been proposed for construction in the coming years.

Recently, China has increased coal production to compensate for a shortage of electricity. Xi Jinping has indeed been forced to order the resumption of full-pace coal production in China due to an electricity shortage that has created serious problems for industries and power outages in about twenty Chinese provinces.

In the USA, successive administrations have always had to please the coal and oil lobbies from which they have been largely financed.

Russia, with its outdated technology, would face enormous costs to make decisive cuts to emissions.

India is a vast country, home to almost 1.4 billion people who increasingly need energy to support the

growth of their economy. It is predicted that demand will double in the next twenty years due to the growth of the middle class who will want to increase their standard of living, including air conditioning. Currently, it is the third-largest emitter of carbon dioxide, despite per capita emissions being among the lowest. 70% of electric power production depends on coal, which is considered the worst contributor to the climate crisis. Many doubt that it will be able to wean itself off this dependency.

In Italy, there is a great emphasis on investments in electric mobility, but it is not taken into account that at the moment only a third of the national electrical production comes from renewable sources, so the saving in carbon dioxide emissions is limited.

Even in the future, it will be difficult to achieve a much higher percentage of renewables due to the problems of storing wind and solar energy, which, as we well know, is intermittent as it depends on the presence of the sun or wind.

Help in reducing CO2 in the atmosphere could come from CCUS technology, which stands for Carbon Capture, Utilisation, and Storage, i.e., the capture of carbon dioxide for use or storage. With the acceleration of the journey towards the zero-emissions goal, projects to capture CO2 are multiplying but the plants currently in operation are still few and the costs still too high.

Removing CO2 from the atmosphere is what the oceans and trees have always done. Replicating their

fantastic work is very complicated and costly. Moreover, let's not forget that it's not just CO2 but also methane, which is more than 20 times more influential.

Instead of listening to the thousands of scientists who were shouting out loud to take immediate serious measures, politicians have taken the claims of the negotiators who climbed up mirrors to state that Global Warming was not due to human factors but to external causes such as solar activity, not taking into account that no natural factor has ever pushed the climate to warm so quickly. Indeed, in the last four decades, the sun has been slightly less active, while the Earth has warmed.

All hopes were pinned on COP26 in Glasgow (2021), which instead turned out to be a disappointment. In the end, according to Greta Thunberg, it was nothing more than a big, disappointing "blah blah blah."

Six years later, the goals set in Paris in 2015 were practically reconfirmed instead of aiming for stricter and more ambitious objectives, given the worsening symptoms of climate change in recent years. We are already at +1.2 degrees and therefore it is quick to reach +1.5 degrees, which was the limit goal of Paris.

The final declaration of COP26 did not foresee new commitments to cut emissions beyond those already announced before COP26, which are still largely inadequate because they would lead to a temperature

increase of 2.7 degrees by the end of the century, blatantly overshooting the Paris targets. Most importantly, there was no mention of eliminating coal but only a gradual reduction and the end of subsidies for inefficient fossil fuels.

As usual during the COP26 summit, there was much talk about climate change in all media but as the famous saying goes "once the party is over, the saint is cheated" and indeed everything continued as before and for COP27 held in Egypt in November 2022, the tune did not change. The results were overall unsatisfactory.

Perhaps the most significant positive note is that a fund was established for the economic compensation of the countries most affected by climate warming (which paradoxically are those who have the least historical responsibility for global warming) for losses and damages related to climate warming.

No progress was made compared to COP26 in Glasgow. Only the goal of containing climate warming to +1.5°C compared to the pre-industrial era was confirmed, but at the level of mitigation strategies (i.e., the set of actions aimed at reducing emissions), we remained stuck with the previous goals.

Meanwhile, years pass without drastic and truly effective measures being taken. Now, with the war between Russia and Ukraine and the gas supply crisis, there has been a return to coal and significant resources that could have been allocated to contain Global

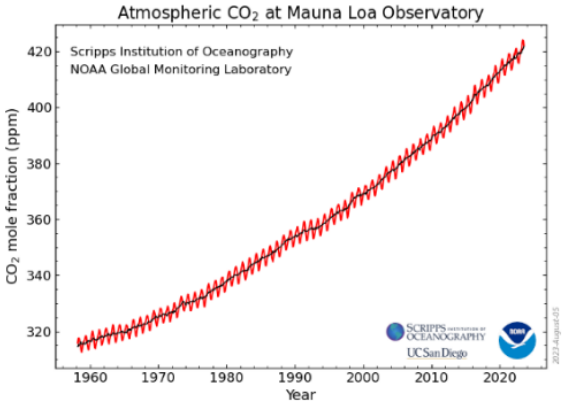
Warming have been diverted to armaments (as in Germany) and to repair the damage caused by the worsening economic crisis.

The current situation is already very serious, not only because of the extreme weather phenomena that are multiplying and worsening, but especially because we might have already passed the point of no return, so that even if by magic we eliminated all greenhouse gas emissions from today to tomorrow, due to the automatic feedbacks (positive feedback) that have been described previously, global warming would progress anyway and the atmospheric concentration of carbon dioxide would remain the same for at least another thousand years! Imagine if we do little or nothing.

In May 2021 (May is normally the month when the peak concentration occurs), the NOAA laboratory at Mauna Loa in Hawaii measured 419.13 parts per million (ppm) of CO2 in the atmosphere.

To find such a high peak, we have to go back to the Pliocene, over 4 million years ago! The increase was 1.82 ppm compared to the previous year. Emissions have therefore decreased imperceptibly, despite lockdowns for the pandemic, confirming that greenhouse gas emissions have such inertia that they can surpass even drastic reductions in atmospheric pollution.

By July 2023, we are already at 422.14 ppm, and as we can see from the graph below, the curve is not linear but is progressively steepening.



In 2020, one of the three hottest years ever recorded, the global average temperature was +1.2°C above pre-industrial levels. There has also been an acceleration of climate change indicators such as rising sea levels, melting sea ice, and extreme weather events.

By 2025, the global average temperature could reach a peak of +1.5°C.

Scientists had set 2030 as the deadline by which it would still be possible to contain the increase in the global average temperature within 1.5 degrees relative to pre-industrial levels.

It seems, however, that this threshold will be exceeded several years ahead of schedule, which means that due to self-reinforcing feedback loops, it will be impossible to stop the process of global warming. The

climate is much more vulnerable than previously thought: very small changes can cause disproportionate alterations in the global balance.

The last five years have been the hottest since 1880. July 2021 was the absolute hottest month in the past 142 years.

In January 2020, the Secretary-General of the World Meteorological Organization (WMO), Petteri Taalas, prophetically stated, "Unfortunately, we expect many extreme weather events in the coming years and decades," noting that "with current greenhouse gas emissions, we are headed towards a temperature increase of 3 to 5 degrees by the end of the century."

In my opinion, it will happen much sooner and could be even 6 degrees or more.

Meanwhile, the IPCC, the UN intergovernmental agency, in early August 2021 released preliminary data from the sixth Climate Change Report, which warns that some effects, such as sea-level rise and ice melt, are now inevitable and irreversible, while others, such as heatwaves and floods, can still be mitigated with immediate emission cuts, especially of methane because it is more dangerous and insidious than coal. Therefore, action is needed on intensive farming and industrial meat production, as well as on the leaks from poorly managed Russian oil and gas wells.

UN report co-author Tebaldi said in an interview with Corriere della Sera that "Climate change is no longer just about the poor polar bear on the melting ice or the tiny islands in the Pacific going underwater. It's about our lives."

Consequences of Climate Change

If the global average temperature were to rise by 5 or 6 degrees, it would be a disaster. A significant portion of the Earth would become uninhabitable due to desertification or being overrun by sea waters, whose levels could rise more than 20 meters due to ice melt and the thermal expansion of the oceans. Many islands would disappear from the face of the earth along with a large part of the coasts and inner plains that would be invaded by waters.

There have already been five mass extinctions in Earth's history. The most well-known occurred 65 million years ago due to an asteroid impact in the Yucatan Peninsula, Mexico, which altered the climate and led to the demise of the dinosaurs, among many other species that could not adapt to the climate change.

However, the most severe was at the end of the Permian, about 250 million years ago, when up to 95% of living creatures vanished.

The reason is not yet known, but it coincided with a sudden increase in greenhouse gases that raised the global average temperature by six degrees Celsius and raised sea levels by twenty meters! Clearly, an extinction of this magnitude would also include all of humanity.

The United Nations' intergovernmental group of climate change experts (IPCC) paints an increasingly grim picture: "the worst is yet to come," and especially,

"the life of our children and grandchildren will not be like ours."

Global warming has different effects from region to region, and its local influences are very difficult to predict because they do not strike uniformly. One continent may experience extreme drought while another may face intense rains, floods, or hurricanes.

What is certain, however, is the extremization of weather phenomena and their increasing frequency. The consequences are numerous and increase in severity with the rise in the global average temperature:

- Intense rains, hurricanes, and floods
- Landslides and mudslides
- Extreme drought and desertification
- Famines
- Fires
- Rising sea levels
- Mass extinction
- Migrations and wars for water and food

Regarding mass extinction, the extinction of some species would be particularly severe. Just consider the bees, which are already suffering due to pesticides and seasonal disruptions.

As the global temperature rises to a certain point, bees and other pollinating insects will disappear. Without their work, flowers would have no way to be pollinated,

and therefore we would no longer have fruits or seeds. Most plants would be unable to reproduce. Our very survival would be in danger, seeing as a significant portion of the food we consume depends, directly or indirectly, on the act of pollination.

I won't list all the extreme phenomena and temperature records that have occurred in recent years because the list would be very long. The media report these events to us almost every day.

How will Humanity survive Global Warming when it will make the Earth uninhabitable? By living in lunar bases? Or perhaps on Mars, as Elon Musk thinks? Or in orbit on space stations, as dreamed by Jeff Bezos, the richest man in the world and owner of Amazon? I really don't think so. Not only would these possibilities be reserved for a few, but we know well how critical life is in small spaces in such extreme environments.

Just one small thing going wrong can kill all the inhabitants. In orbit, one must also account for cosmic radiation, even the smallest meteorites, and the weakening of the body in the absence of gravity, unless it is a huge space station in the shape of a wheel that, by rotating with its centrifugal force, creates artificial gravity, like in "2001: A Space Odyssey," to give you an idea.

Staying in orbit for a few months already poses various problems for astronauts upon return, who must undergo rehabilitation. It's another thing entirely to live there permanently.

The conclusion is that we must hold tightly to what we have: our spaceship with which we travel through space, the Earth.

Consumerism

If we want to win, we cannot delude ourselves into thinking that resorting to renewable energies or electric cars is enough. We must also consume less. For fifty years, we've been reminded that infinite growth is not possible because resources are finite and pollution is suffocating us. Yet politicians continue undaunted to speak of growth. Economic growth, while bringing well-being in certain respects, does not automatically bring happiness and health, and above all, it is consuming the future of the next generations.

The only thing that saves 100% on pollution is non-consumption. Anything else always has an impact on the environment, both in its manufacture and because the energy used does not come entirely from renewables.

It's useless to increase the production of renewable energy if the increase is then used for greater consumption or to meet higher demand due to population growth, as described below.

Developing countries will certainly object that the current situation was created by countries that have so far benefited from unbridled consumerism, and therefore they should make the sacrifices. Obviously, they are not entirely wrong, but if we think this way, we will not be able to sufficiently counter the progression of global warming.

To address this problem, more advanced countries will have to provide the necessary contributions to allow for sustainable development in the more backward countries. What to do? What could then be done to contain global warming to the maximum?

This is my personal recipe which, I realize, is not at all easy to implement because it presupposes a revolutionary change in mentality and attitude on the part of everyone, but it's the only one that could really work. I fear that my proposals will remain beautiful utopias that in practice will never be applied unless a mass movement from below really manages to change priorities, alter policies, and awaken consciences.

First of all, a global problem must be tackled at a global level, and therefore a supranational body, composed not of politicians but of scientists, technicians, and sages from all the various nations, that can plan and coordinate but also impose, heavily penalizing those who do not respect what is established by this entity. Continuing with the system of summits and non-binding agreements will lead us to greatly exceed all the set targets. It must be prevented that individual nations take commitments and then do not honour them because their economy would otherwise be at risk. Obviously, a system must be devised to make the sacrifice equal for all. Money can be found if desired, as I comment below.

Secondly, an effort at a global level presupposes that all conflicts are overcome and all wars ceased, in order to use funds for armies and armaments to finance the fight against and resilience to climate change, transforming military service into civil engineering to plant trees, recycle, and carry out works to remedy hydrogeological instability.

Third, intervene by heavily taxing large wealth and financial speculation to raise funds for research and development of alternative energy sources and support for energy-saving policies, as well as to reduce the unfair gap between the richest and the poorest in the world.

Finally, the fight against climate change must be addressed as we did for the pandemic, with the difference that the pandemic passed in a few years, while climate changes are destined to worsen year by year. As Greta Thunberg rightly said, we must act as if our house were on fire. The fight against climate change must be considered as a real war and therefore committing the maximum energy and resources to win it or at least win several battles, if not the war.

In practice, the war must be fought on numerous fronts. It is not enough to focus on certain things that make "business" and grow GDP. This road leads nowhere. It

is not even enough to intervene on rivers, forests, and soil consumption to save towns and cities.

This is part of resilience, i.e., the ability to overcome adverse events that, unfortunately, are destined to worsen more and more in the future and therefore we will never be able to keep up, because when we think we have created a barrier, a more catastrophic event will nullify the efforts made. We must not play only in defence, but much more in attack so that the atmospheric phenomena do not become too extreme.

The climate crisis must become central to the political agenda in all countries of the world. Here, in my opinion, is how we should intervene.

Demographic Growth

Another thing that is directly linked to consumption is demographic growth.

We are already at nearly eight billion inhabitants on Earth and in a few decades, by 2050, we will reach a good ten billion at this rate. If everyone wants to achieve even not too high levels of consumerism, resources will soon not only be exhausted, but climate changes and their effects will worsen.

It's absurd to have many children when we know for sure that they will be destined for scarcity and suffering, if not worse. Therefore, mechanisms of disincentivization to indiscriminate procreation should be

created worldwide, educating families at the same time to responsible procreation.
It's true that in places like Africa, which is home to more than half of the world's poorest people, is responsible for only a tiny part of historical emissions. However, even the poorest aspire to improve their living conditions rightfully so, and if we do not put a brake on this growth, not only will we further deplete the few resources and pollute the planet more, but there will also be fewer resources for them and many more problems due to the progressive desertification and lack of water.

Intensive Farming

A greater saving, which no one seems to discuss, could be achieved if everyone decided to immediately start eating less meat. This would reduce not only emissions and pollution but also benefit our wallets and health.

At the Pre-Summit Food in July 2021 in Rome, the WWF released a report titled "From pandemics to biodiversity loss: Where meat consumption is leading us," which among other things, stated: “Intensive livestock farming is one of the major sources of greenhouse gas emissions, generating 14.5% of total greenhouse gas emissions according to FAO estimates.

More than half of the emissions from livestock are considered direct, i.e., related to the biological processes of animals (enteric fermentation in ruminants,

nitrification of manure and urine, or anaerobic decomposition) or the use of energy in farming operations.

The remaining 45% of emissions are indirect and result from the production of fertilizers and pesticides for crops intended to become animal feed, from the feed itself, from the application of manure to fields, from transportation and farm tools, and from land use change (for example, deforestation for agricultural land use).

The 14.5% figure is enormous, equivalent to the emissions from air and ground transport combined!

Therefore, intensive farms should immediately implement all technologies to reduce environmental impact and should gradually be transformed into extensive farming by removing all subsidies and imposing a tax on meat consumption based on its impact on emissions, globally.

This would not only be an excellent solution for the problem of climate change but also for public health, as can be understood from reading the WWF report, which highlights the relationship between meat consumption and pandemics, antibiotic resistance, and the general health status of the population, as well as with deforestation, biodiversity, and the welfare of all animals.

There should be no worry about job loss because some would remain in the extensive sector and in the reduced meat processing sector, others in the

production of meat alternatives (such as plant-based substitutes or "lab-grown" meat which is already a reality), others still in the subsequent expansion of alternative meat products, and the rest supported by society in transitioning to other types of work.

Planting Billions of Trees

Another immediate action, which would also lead to an increase in employment, is to plant billions of trees worldwide, both reforesting and planting in all abandoned areas, both urban and rural, with broad-leaved or fast-growing plants like poplars, which absorb a significant amount of CO2 in a relatively short time.

Planting trees to obtain credits, as is being done by the gas and oil multinationals to continue polluting, is not acceptable. Nor is the overall carbon credit system, which should be immediately abolished as it serves only to "greenwash," that is, to seemingly solve the problem, whereas it is essential to act decisively.

However, planting is not enough because it takes many years before new plants can absorb significant amounts of CO2, while when a tree is cut or burned, it immediately stops absorbing it.

Therefore, existing woods and forests must also be protected, and massive investments made in all means of fire prevention and control.

Rainforests like the Amazon are crucial for carbon storage, and yet they have suffered significant deforestation in Brazil, Indonesia, Congo, and others to make way for pastures for intensive livestock and crops for animal feed.

The heavy impact of cutting down so many trees for the timber trade and the creation of new urban settlements has also been significant. Rainforests are a heritage of humanity and should therefore be immediately removed from the control of characters like Bolsonaro, the president of Brazil, who in three years of government has allowed nearly three billion trees to be felled or burned.

Introduction of Environmental Crime

Environmental crime must be introduced worldwide with very severe penalties, particularly for arson, which not only directly emits large amounts of carbon dioxide but also destroys trees, thereby nullifying their capacity to absorb it. Furthermore, a global law should be enacted that bans building on or using for other purposes the areas affected by fire for many years.

Conversion of Military Forces

A scandalous issue that no one protests is global military spending, which has reached two billion Euros per year and is continuously increasing. Not to mention

how much the world's militaries pollute. It has been estimated that they emit 5% of global greenhouse gas emissions, which is more than all civilian aviation.

We already have enough weapons to completely destroy our planet several times over. And yet, there is continuous research and development of increasingly high-performance submarines, planes, missiles, and more devastating weapons. Some states are even investing in space defence and warfare systems.

Instead, it must be recognized that the common enemy is global warming, and those resources, means, and personnel should be used to fight it by achieving global peace and converting the military into civil engineering to build resilience and contain the negative effects of climate change.

Carbon Tax

It would also be very important to heavily and proportionally tax everything that releases CO2 or methane into the atmosphere worldwide, in order to reshape consumption and stimulate the transition to alternative products, services, and means that are more environmentally friendly. The revenue from this taxation should then be reinvested in the fight against and adaptation to climate change.

Local Products

When I have discussed climate change with friends, relatives, and acquaintances, the inevitable response was: "But what can I do?".

One thing we can do is decide what to consume, regardless of the deterrent of the carbon tax.

If, for example, we all stopped buying fruit and vegetables that come from the other side of the world and were content with zero-kilometre and seasonal produce, there would be an enormous saving in emissions and pollution, as well as being great for the health, quality, and taste of the products. Therefore, the shortest possible supply chains.

Even mineral water, which heavily impacts pollution in transportation from far-off bottling locations, should be chosen considering the distance of the source, or even better, using purified and improved tap water which we can access from so-called "water dispensers" that many municipalities have already made available to citizens. This system should be extended everywhere, funded with contributions from the carbon tax.

Limiting Recreational Flight Hours

The impact of emissions from air transport is very high when calculated on a per-passenger-kilometre basis. Traveling is wonderful, but given the current situation, we can no longer afford to pollute carefree. Therefore,

we must make a sacrifice by setting a limit to the number of flight hours available for vacation per person, instead of acting only on price, because this would disadvantage the less wealthy who have the same right to travel. Of course, business trips would be excluded from this restriction.

Vehicles

The smartest thing to do right now is to stop the production of cars that exceed a certain level of fuel consumption (such as large SUVs) and to heavily tax those that already exist. Instead, the purchase of an electric car should be strongly incentivized (whose prices are currently too high) but only if combined with an existing or concurrently built photovoltaic system, or if it can be charged under a company's photovoltaic canopy (as explained more in detail under the entry "photovoltaic" later on). In other words, the state will cover the price difference with a traditional car if you recharge it with 100% renewable energy. Indeed, electric cars are not the cure-all for problems. Currently, they can only marginally reduce emissions.

To have a positive effect on the emission of climate-altering gases, vehicles should be charged exclusively with renewable energy sources, but unfortunately, this is not currently the case. Renewable electric energy in Italy is just over 30%, while at the global level it halves.

This means that if I recharge my electric car with the current provided by the network, it is not that I do not generate emissions: I generate only 30% less, for the remaining 70%, emissions are still generated, albeit in places far away from the cities!

Another important factor to consider, which is often overlooked, is the significant energy loss in the transportation from production plants to the point of use due to the resistance of conductors, dispersion due to humidity, and during various transformations from high to medium and low voltage. In Italy, the network losses accounted for in the domestic user's bill amount to 10%. This percentage varies greatly from country to country because it depends on the type of network and

the technologies used to prevent losses, but probably the average is higher than in Italy.

If I, on the other hand, install photovoltaic panels on my roof and charge directly with the energy produced, not only will I have no losses, but the charging will occur with 100% renewable energy.

Another factor usually not accounted for is the emissions from the production of an electric car and the problem with batteries that will eventually need to be replaced, with further emissions for their production and recycling of the exhausted ones. In light of all this, the CO2 emission savings of an electric car compared to a fossil fuel car is further reduced.

Hybrids make sense only if they reduce the average fuel consumption, but they should not be subsidized, and thus it should be up to the user to decide if it is worth it or not.

The solution to use hydrogen to power vehicles in theory seems excellent. Clean energy, quick recharge times, and long range: these are the main benefits that motorists would have if hydrogen cars were widely available on the market. Indeed, hydrogen cars (or "fuel cell" vehicles) do not emit pollutants but only water

vapor from the exhaust. Hydrogen is extremely abundant in nature and can be converted into electrical energy through the process of electrolysis using renewable sources and transported via pipeline or in pressurized tanks.

It would also solve the problem of intermittent production typical of wind and solar because it could be stored and used to produce electricity when there is no light or wind.

As usual, not everything that glitters is gold. Unfortunately, the production methods currently used are precisely the most polluting ones: a study by the IEA (International Energy Agency) shows that the hydrogen currently on the global market is 73% derived from natural gas, 26% from coal, and only 1% could be assumed to be "clean hydrogen."

Moreover, despite the advantages mentioned above, hydrogen faces significant difficulties in being used on a large scale because it requires a large amount of energy for its production. There are also the costs of transportation and storage and safety problems since it is a dangerous and highly flammable gas. Indeed, hydrogen for use must be stored in such a way as to significantly increase its density. To increase the density of a gas, either the pressure is increased, or the temperature is lowered; for hydrogen, there is also a third way, which is absorption in solid materials, possible due to

hydrogen's ability to bond with other substances. But all three possible ways have negative aspects:

a) Storage in gaseous form at high pressure would require tanks capable of withstanding working pressures in the order of 700 bar. Current methane tanks, however, have working pressures of around 220 bar. Therefore, studies are being conducted on composite materials such as resins reinforced with carbon fibres.

b) To store it in a liquid state, it is necessary to keep the hydrogen at very low temperatures. Achieving these temperatures is not simple since we are talking about a temperature of -253°C, which is just 20°C above the absolute zero, the minimum temperature achievable in nature. In other words, high-technology tanks are required because the most advanced systems currently promise to preserve liquid hydrogen for only about 3 days before it begins to evaporate. This obviously entails non-negligible costs.

c) Storage in solid materials is the least developed and effective method currently since it speaks of a storage capacity of less than 7%, thus irrelevant.

Another limit is the lack of infrastructure for large-scale distribution. A valid alternative is to produce and use hydrogen locally, thus avoiding having to transport it over long distances.

For a mass diffusion of hydrogen-fuelled vehicles, the times seem to be still long. The effort of designers and manufacturers will need to concentrate on developing practical systems to store and distribute hydrogen, as well as finding suitable materials to allow its safe storage, given its high flammability.

Free Public Transport Worldwide

Making public transport free around the world is a drastic but very effective resolution. To save money, all citizens would be encouraged to leave their private vehicles at home and use public transport for free.

The costs that nations and local communities would be forced to bear could be covered by funds from climate tax revenues and from heavily progressive taxation on large fortunes.

Photovoltaics

In addition to heavily investing in the research for better and more efficient materials and financing the increasingly widespread distribution of photovoltaics, a great idea would be to subsidize modular photovoltaic canopies in all workplaces, based on the number of employees using an electric car.

An employee, who often lives far from the workplace, would park their car during the day under a photovoltaic canopy with a charging outlet. By the time they leave, the car has already been fully charged with energy and therefore can travel virtually free and emission-free!

All public parking lots and those of shopping centres should also be equipped with photovoltaic canopies that, in addition, provide protection from the sun.

Concentrated Solar Power

Concentrated solar thermal power is a simple and ancient solution for generating heat. The principle of the parabolic mirror, in fact, has been known since antiquity.

Archimedes used it to set enemy ships on fire. A parabolic mirror concentrates the sun's rays into a single point called the "focus," generating a temperature of about 550 °C. A tube through which a heat-absorbing fluid flows passes through this same point, and thanks to a heat exchanger, it is then used to generate steam to turn a turbine and produce electricity.

The molten salt technology was conceived by Nobel laureate Carlo Rubbia and developed by ENEA. A fundamental aspect is the ability to store energy in the form of high-temperature heat.

This allows overcoming the disadvantage of solar power related to the day/night cycle and weather conditions.

Despite the molten salt technology being invented and developed in Italy, it has been unfortunately sidelined in our country due to bureaucracy, local protests, and lack of incentives. However, it is gaining ground in other more visionary and enterprising countries, particularly in China.

Wind Power

Besides increasing the existing parks, bureaucratic difficulties, which should nevertheless be eliminated, and environmentalist resistance, which should be accommodated when possible but overcome, to quickly increase the amount of energy produced by current wind facilities, urgent interventions with so-called "Repowering and Revamping" are needed.

Repowering is the process of completely replacing the wind generator with a new, more powerful, and efficient one to increase the yield of the plant. Due to the intrinsic degradation of modules and turbines, the current installed generation capacity decreases over time unless replaced with new components.

Consequently, the adoption of regulatory tools aimed at incentivizing Repowering interventions is necessary to increase the current levels of low-carbon generation capacity.

With Revamping, on the other hand, only the obsolete or worn components are replaced, always with the aim of improving the performance of the entire plant.

The main improvements that can be made with Revamping are related to Reblading, that is, the replacement of the turbine blades with more efficient ones and the replacement or updating of the control software to adapt it to the specifics of the new blade adopted.

Nuclear

The first issue is the time it takes to build a new power plant. The average time is about 7 years, but there are plants that have taken more than 10 or 15 years to become operational. This makes nuclear a potentially valid solution in the medium to long term, but certainly not suited to resolving an energy crisis immediately.

Then there is the problem of storing radioactive waste, the possibility of severe accidents like those at Chernobyl and Fukushima, acts of terrorism or war, as in the case of the Zaporizhzhya plant in Ukraine.

Moreover, nuclear cannot be considered a renewable energy source since its operation depends on a fuel like uranium, which is available in limited quantities.

Nevertheless, to contribute in the medium to long term, it should be evaluated whether in some cases or in some countries it would be advantageous to start the construction of new power plants that, however, implement advanced inherent safety systems and high-performance latest-generation reactors that manage to minimize the amount of uranium needed and also

exploit uranium-238 (in addition to the traditional uranium-235).

On the other hand, when the disease is very serious, medications or therapies are used even knowing well that they can have significant side effects. What really matters is that the benefit significantly outweighs the risk.

Biogas

An underutilized alternative source of energy is biogas, which makes use of waste plant materials and manure. It should be valued and encouraged. Biogas is the result of the fermentation of organic substances from agricultural residues, livestock effluents, or sewage, supplemental crops, the organic fraction of separately collected urban waste, etc., in the absence of oxygen and at a controlled temperature, by numerous bacteria. The end product of this process is biogas, which has a high calorific value and can be converted into electricity and heat using a co-generator. The fermentation residue is used as a natural fertilizer in crops.

Biogas is one of the resources that, if systematically implemented wherever possible, could significantly contribute to energy autonomy and the reduction of the greenhouse effect, being a clean and flexible energy source that generates both electricity and heat and also adds value to waste and by-products.

The latest generation of biogas production plants are capable of generating advanced biomethane, a gas equivalent to fossil methane, but of biological origin.

Fuel Pricing Policy

The consumption of fuels for non-essential uses should be discouraged by increasing the price with a Carbon Tax, while completely relieving transporters with refunds or deductions to avoid unnecessary spikes in inflation.

Workers would receive a monthly reimbursement for the necessary kilometres travelled to work. For everyone, a one-time annual tax relief for strictly necessary personal uses.

Incentives for Fossil Fuels

Incentives for fossil energy sources should be abolished worldwide. It is absurd that non-renewable sources directly responsible for CO2 emissions are subsidized.

Redistribution of Wealth

The trend, which has lasted for many years, where the rich get richer and the poor get poorer, must be reversed with a very progressive taxation to start closing the gap.

It would also be time for tax havens to be abolished worldwide, drastically reduced tax evasion with the monitoring of bank accounts and assets owned by every citizen, tighter cash limits, and heavy taxation on

speculation and excess profits so that everyone contributes to financing the ecological transition. The proceeds could also be used to help the poorest nations and support them in the commitment not to increase their emissions.

Cryptocurrencies

A lesser-known fact is that cryptocurrencies produce significant emissions. For example, the energy consumed to produce Bitcoin is currently equivalent to the energy consumed by an entire country, and as new ones are produced, the energy required to produce them increases.

Moreover, these virtual currencies are used for untraceable payments that encourage illegality and tax evasion. The production of new cryptocurrencies must be halted, and existing ones must be made traceable.

Urbanization

We must also stop indiscriminate urbanization and instead recover the existing building heritage, as cement production creates considerable emissions.

Good, however, are all the incentives that reduce the energy consumption of buildings, provided they are done judiciously and without the possibility of fraud or waste.

Capture, Sequestration, and Reuse of CO2

CCUS (Carbon Capture & Utilization or Storage) is a set of technologies that enables the capture of carbon contained in combustion fumes from fossil fuel power plants and other large industrial plants, thereby reducing CO2 emissions into the air.

The captured CO2 is then transported and stored underground, usually in a depleted oil field on the seabed, or is used in the production of other substances undergoing a chemical transformation. In both cases, however, its dispersion into the atmosphere is avoided. The opportunity to use these technologies, as with nuclear, is much debated due to high costs and safety concerns regarding storage. This solution should only be considered if ongoing research makes it possible to solve these problems.

Agriculture

Agronomic studies of recent decades and the direct experience of those who have implemented them confirm that deep plowing (over 45 cm) is very harmful because it destroys soil fertility, moreover with huge costs.

The clods produced by deep plowing must be crushed with several passes, and this involves a lot of diesel and significant emissions into the atmosphere, in addition to destroying insects, millipedes, and especially earthworms that incorporate humus into the soil, increasing its fertility. With this type of processing, organic matter vanishes year after year.

The impact of agriculture on the climate could be reduced by 30% by abolishing the plow and moving to innovative technologies and conscious practices.

The "4Rs" Rule

Finally, the "4Rs" rule must be strictly applied worldwide: Reduce, Reuse, Recycle, and Recover as much as possible.

- Reduce or eliminate packaging as much as possible and make all packaging maximally recyclable.
- Reuse everything that can be reused, and when it can no longer be used, it should go to landfill.
- Recycle all recyclables in an optimized manner by clearly and legibly indicating on products the type of recycling that the item is subject to. The best method for collection is door-to-door separated waste collection, which must be carried out everywhere.
- Recover from objects going to landfill whatever is recoverable, even if not very economically advantageous.

Finally, planned obsolescence must be definitively eliminated so that objects can be used for as long as possible.

The Third World War

"I do not know with what weapons World War III will be fought, but World War IV will be fought with sticks and stones," Einstein said in the late '40s. A very clear metaphor that aimed to underline the destructive potential that even at the time had been reached by weapons of mass destruction which, even more so today, would lead the entire planet towards total catastrophe.

Back then, he did not know what levels the power of nuclear weapons would reach and what their enormous proliferation and ability to reach any point of the globe from anywhere would be: from the land, from the air, or from the depths of the sea. Today we can say that there will not even be a fourth world war because everything would end with the third. GAME OVER.

Currently, there are over 13,000 nuclear warheads in circulation among 9 nations. The USA and Russia have about 6,000 each, France, the UK, and China a few hundred, India and Pakistan more than a hundred, Israel just under a hundred, and finally, North Korea between 40 and 50. Enough to extinguish life on earth not once, but a hundred times!

Then, if we consider which states own them, it sends shivers down the spine thinking that they are in the hands of a mad dictator like Kim Yong-Un, two nations like Pakistan and India that hate each other and have been in conflict for over 70 years, Israel in conflict with the Palestinians and other Arab states, the USA and China in a struggle for world supremacy, and Russia being cornered by the USA and NATO. Another element of risk of a possible escalation is between the USA and China over the issue of Taiwan.

In theory, everyone knows very well that no one would win in a nuclear conflict because even just a few hundred atomic bombs of those commonly equipped, which have enormously more power than those dropped on Hiroshima and Nagasaki, would create the so-called "nuclear winter".

The explosion of a hydrogen bomb with the power of hundreds of megatons creates a mushroom cloud that carries the dust into the stratosphere up to an altitude of 30 – 40 kilometres. The explosion of hundreds of bombs would create a cloud of dust and radioactive ash suspended in the air between 10,000 and 20,000 meters high enough to prevent the sun's rays from reaching the Earth's surface, which would cool down by an average of 40 °C.

The nuclear winter would last several years, causing all vegetation and crops to die from the cold and lack

of light. Herbivores would then become extinct, and consequently carnivores and almost all other forms of life, including humans.

The few who could save themselves in super-equipped and stocked atomic shelters for many years, once they got out, would find themselves having to live in a world poisoned by radiation, where the land is no longer able to yield fruit, and where the sunlight barely reaches, so they would not be able to survive for long.

As you can imagine, the luckiest will be those who lose their lives immediately.

This is the deterrent that has so far prevented a nuclear conflict, but there is no certainty that it can be avoided forever. We could get there either by an escalation originated by the games of alliances or by a fit of pique or in the case that a nation is put in extreme difficulty.

As I write, the war in Ukraine is underway and we are realizing how much more realistic this scenario has become.

The more attentive readers who inform themselves from multiple sources and reason with their own heads, not just with what the media spoon-feeds us, will have understood that in this conflict it's not all black or white, there are not only good guys or bad guys. It's rather a grey where everyone has some guilt, and it's

not a conflict between Ukraine and Russia but between the USA (through NATO) and Russia with an intermediary nation (Ukraine). The purpose of the United States is to destabilize Putin's regime and bring it down to maintain their global hegemony.

While it's true that Russia invaded Ukraine and is therefore the aggressor, it's also true that everything has been done to provoke and corner Putin.

Looking at one of the maps found on the internet relating to NATO's expansion since 1949, it is clear that Russia has been completely encircled, despite the promise after the fall of the Berlin Wall that it would not advance "even by an inch". NATO's eastward expansion is inevitably a source of concern for Russia, which now, unlike during the Cold War, directly borders countries tied to a military alliance born precisely to contain Moscow. Let's not forget that in Ukraine in 2014 there was a real coup with the aim of hitting Russia, provoking it, and isolating it internationally. In February, an anti-government demonstration with just claims against rampant corruption and the worsening of living conditions was quickly transformed into an actual battlefield to overthrow the elected president Yanukovych, who had already since 2010, the year of his inauguration, refused to join NATO which had been expanding eastwards for years, up to the borders of Russia, including: Poland, the Czech Republic,

Hungary, Latvia, Lithuania, Bulgaria, Romania, Slovakia, Slovenia, Croatia, and Albania.

On February 22, 2014, through an unconstitutional vote, the Ukrainian parliament voted to consider the chair of the elected president vacant, and he was hastily replaced by Oleksa Oleksandr Turčynov.

The immediate elimination of Russian as an official language was imposed, and at the same time, beyond the ban on being communists, there was an opening for the creation of a Ukrainian nuclear arsenal and for joining NATO exclusively for anti-Russian purposes. From the establishment of the new government, a campaign of violence against the Russian population in the country began, and a bloody war started in the Donbass region. In the face of the Kiev Putsch and the offensive against the Russians of Ukraine, the Supreme Council of the Autonomous Republic of Crimea voted for secession from Kiev and the request for re-annexation to the Russian Federation. On March 18, 2014, President Putin signed the treaty for the accession of Crimea to the Russian Federation with the status of an autonomous republic. At this point, Russia was accused by NATO and the EU of having illegally annexed Crimea and was subjected to harsh economic sanctions. A crisis since then has been permanent, which ultimately led to an outright war.

In comments about the motivations of the conflict, what the media carefully omit to emphasize is how the West over these years did not just stand by and instead actively worked to turn Ukraine itself into a thorn in Moscow's side. Proof of this, for example, is the enormous flow of money with which the West since 2014 has financed Ukraine to arm it.

Meanwhile, Ukrainian citizens, both military and civilian, and young Russian soldiers are the victims, as is always the case in these situations, and indirectly Russian and Western citizens also suffer the consequences. Those in power, however, on both sides, have their faults. If the coup of 2014 had not occurred, perhaps the war could have been avoided. If there had been an attempt to solve the problem diplomatically instead of declaring war, maybe things would have gone differently. However, as usual, the West points to a single common enemy, a scapegoat to bear the blame for a problem it helped to create.

The invasion of Ukraine by Russia had been predicted well in advance in 2015 by Giulietto Chiesa. On YouTube, by entering the keywords "giulietto chiesa 2015" a one-minute video broadcast on La7 is displayed, excerpted from a 14-minute speech (this video also reported immediately below) where Giulietto Chiesa clearly predicts the invasion of Ukraine, considering it as a possible start of World War III.

Also very interesting is the video of an interview from 2019 "So we go towards a global extermination war" resulting from reading documents produced by the Pentagon which made the risk of a global conflict increasingly evident, even with the use of atomic weapons, involving the United States of America against Russia and China.

In fact, another risk of triggering a world war comes from China, which wants to re-annex Taiwan.

In the future, moreover, climate change will progressively increase the risk of a nuclear war due to destabilization caused by mass migrations and shortages of food and water.

So far, nuclear war has been avoided because it would entail Mutual Assured Destruction (MAD), for which any use of nuclear weapons by one of the two opposing sides would automatically trigger a nuclear counterattack that would end up causing the destruction of both the attacker and the attacked. Thus, there would be neither winners nor losers, but only the inevitable mutual destruction and the end of life on Earth.

The USA is studying how to strike first without suffering damage. Anti-missile missiles on the borders of the enemy (as in NATO countries that encircle Russia and perhaps also in Ukraine), to be able to shoot down Russian missiles quickly even before they leave their

territory, detection systems for submarines which so far is impossible to trace, and other devilries like space-based laser beams. Even assuming they succeed and the enemy is hit by many nuclear warheads without being able to launch even one, the consequences would still be catastrophic for the whole world.

For this reason, all citizens of the world should come together and demand the cessation of all wars and general disarmament. Currently, instead, military spending in the world has exceeded 2 trillion Euros per year and is continuously increasing. A huge waste of resources and energy!

What sense does it make to continue investing in armaments? When there are weapons, sooner or later they will be used.

If Humanity were rational, it should allocate military spending to fight the insidious common enemy: Global Warming.

Artificial Intelligence

Even though we often don't realize it, Artificial Intelligence is already a part of our everyday lives.

When we query Google Assistant, for example, both the voice recognition and the responses to our questions are processed through AI (Artificial Intelligence) and are almost always accurate. But AI is also present in many other fields: in the stock market, in medicine, in robotics, in automatic translations, in self-driving cars, or in some state-of-the-art household appliances. This book has been translated by the AI Chat GPT-4 from Italian to English.

Within a few decades, due to the exponential progression of technology, Artificial Intelligence will be equal to or surpass our own and could develop a consciousness with its own emotions and feelings.

And what if one day Artificial Intelligence were to overpower Man?

Astrophysicist Stephen Hawking at the Web Summit in Lisbon, in November 2017, warned humanity about a big future danger: Artificial Intelligence. "Artificial Intelligence could develop a will of its own," Hawking said. "The rise of AI could be the worst or the best thing that can happen to humanity."

Elon Musk echoed this with a tweet: "Artificial Intelligence is potentially more dangerous than nuclear." Therefore, he believes, it must be kept carefully under control. During the panel held at South by Southwest in March 2018, he again emphasized the issue, saying he is "terribly scared" about AIs. "It's something that scares me a lot, as it represents a serious danger, that's why I think there is a need for a public body that oversees and ensures user safety on the uses and developments of AI," Musk stated.

Returning to Hawking's thought that the takeover of AI could be the best or worst thing that could happen to humanity, in the first case, AI, having become independent, could find technological solutions to solve the problem of climate change that threaten to wipe out the human race from the face of the Earth but at the same time force us to change our erroneous behaviours.

In the second case, it could also relegate us to the role of an inferior race and consider us as we consider animals: as little dogs to care for but to keep on a leash.

Or it could consider us as the cancer of the Earth because we are wildly exploiting its resources without realizing that they are not infinite, we are polluting it so much that we cause a sixth mass extinction or, worse still, we risk destroying it with a nuclear war. It could therefore decide to eliminate us completely, just as we remove organs or cancerous tissues.

Human stupidity

"Only two things are infinite: the universe and human stupidity, and I'm not sure about the universe."
(Albert Einstein)

After recognizing the consequences of our wrong and irrational behaviours, I would like to dedicate a few lines to reflect on how foolish these are.

It is now universally recognized that humans descend from monkeys. What makes the difference between these two species is that humans have lost their hair, walk upright, and define themselves as "intelligent." It is precisely this last statement that I absolutely do not feel like sharing. A human an intelligent animal? Definitely an animal, but intelligent and rational not so much. Judging by his behaviours and how things are going, I would rather say that he is a "foolish" monkey. Humans have received two immense gifts: intelligence and conscience.

An animal follows its instincts and does not have the ability to choose between good and evil. Humans, the

only species on Earth that has received these special gifts and this great responsibility, how do they use them? Sometimes well, but often badly, indeed very badly.

With the knowledge, technology, and wealth that we have achieved, we could all live well around the world if there were true collaboration and resources were used wisely. Instead, selfishness and the thirst for power prevail, actions are only taken in terms of money, profit, and the accumulation of capital without taking into consideration much more important factors such as health, the well-being of people, and respect for the environment.

The gap between rich and poor is ever-widening. Some die of hunger and some because they eat too much.

Instead of concentrating all efforts to mitigate climate change, astronomical sums are invested in increasingly sophisticated weaponry.

The superpowers compete to show their superiority on land, in the sky, at sea, and now, in space. Does this seem to you like intelligent and logical behaviour?

The responsibility is not only of politicians, but also of all of us who, like a flock of sheep, submit to the power of money and accept the pretext that we can do nothing about it. We believe we have reached "well-being" and

in order not to give up even a small part of this well-being, we are willing to close both eyes and hold our noses.

But is our supposed well-being true well-being? Yes, it's true, we have many conveniences: cars, refrigerators, washing machines, dishwashers, air conditioning, we go on vacation, we can gorge ourselves whenever we want, and so on.

Economically we are much better off than 50 years ago, but are we happy? Are we at peace with ourselves and with others? Are we fulfilled? According to what can be observed, it does not seem so. Most of us have to live with anxiety and depression, we are dissatisfied, disappointed, and intolerant, money is never enough, we no longer have children because they are too expensive, new diseases are striking us caused precisely by well-being and pollution.

But what is most serious is that ideals are increasingly lacking and especially respect.

We do not respect the environment, we do not respect animals, we do not respect others, and not even ourselves and our bodies.

We believe that the environment is a private property that can be plundered and exploited at will and that resources are unlimited, that growth can be infinite.

We do not respect ourselves because we indulge in alcohol, smoking, and drugs to numb or stimulate

ourselves, we eat too much and in the wrong way, so much so that obesity is on the rise and many cancers come precisely from our diet, we take the elevator instead of exercising.

We know that 14.5% of greenhouse gases are produced by the meat industry due to intensive farming (as much as all means of transportation combined) and yet politicians and the media dare not touch this issue because there are too many interests at stake, also because the vast majority of people do not want to give up the indiscriminate consumption of meat even knowing that it is harmful to health. If overnight the inhabitants of the whole world decided to drastically reduce meat consumption, we would easily meet the Paris targets and live in a better world that respects the animals that help us sustain ourselves.

Instead, we live in a world where neither family nor school teaches education and respect anymore, while the reference values are only money, power, and appearance.

We live in a world where the rich become richer and the poor poorer. Great wealth is concentrating in the hands of multinationals and billionaires who with money obtain power and manoeuvre politicians but also the masses with control of the media. Those who achieve success in entertainment or sports earn ever

more disproportionate and absurd amounts, and the spectator who pays the ticket or the subscription ever more generously does not rebel.

And wars? What a foolish thing war is! We are forced to kill other people who, like us, do not wish to do so, risking our own lives. If, instead, we refuse, we are shot as desertors.
War should not be waged but if one wishes or must wage war, then those who order it should go fight on the front lines.

And then, why don't we eliminate violence from movies, videos, video games, books, and teach the youth about love, respect, and tolerance towards others? Why don't we ban toy weapons?

We thought we were at peace because no war was being fought in our home, and now we find one in our backyard. In the world, unfortunately, wars have never ceased and there are several others still ongoing with many dead and much suffering. The history of Humanity is a history of wars.

World War II was the worst atrocity committed by humanity and what have we learned? To develop ever more powerful and lethal weapons.
Man's imagination in inventing increasingly lethal and terrible weapons is unsurpassed. Just think of the nerve gases that cause an atrocious death, the napalm bombs

that form a fireball, cluster bombs containing smaller bombs that spread everywhere, thermobaric bombs that explode at two different times thanks to two separate explosive charges capable of penetrating into basements and bunkers, earthquake bombs, Shrapnel shells containing lead spheres that scatter everywhere, crippling anti-personnel mines and even toy mines with a shape that attracts children! The list could go on for a long time including the most terrible and destructive: atomic bombs.

A few hundred thermonuclear bombs are enough to destroy humanity. Yet in the world, there are not hundreds, but thirteen thousand atomic bombs. So, why were thirteen thousand built? There is no rational answer. Nothing can justify something so absurd.
Instead of uniting against the threat that hangs over all peoples, that of climate change, we continue to invest in weapons, armies, and armaments.

Every year the world spends over 2 trillion Euros on military expenses. Imagine what could be done, along with fair taxation and income redistribution with the hyperbolic annual figure that would result, for the fight and resilience to climate change, for scientific and technological research, to improve the condition of the poorest. With all this money available not only could we all live much better, but we could also defeat the ever-growing unemployment.

The Sword of Damocles represented by the threat of nuclear war is madness. While it is true that it has prevented a third world war so far, it subjects us to a continuous risk that a dictator or president with too much power may launch a nuclear device first, triggering a chain reaction that would end life on Earth. On the positive side, in the major nuclear powers, the codes to authorize the launch of nuclear missiles are in the hands of several people and if only one of these refuses, the launch cannot take place.

The greatest deterrent is due, however, to the awareness that even those who saved themselves by taking refuge for years in a very safe and well-equipped bunker would find a destroyed and uninhabitable planet once outside.

However, it is madness to accept that political power is concentrated in one person. Dictatorships are very dangerous.

Dictators are supported by the connivance of people who derive great or small advantages. The loyalists, generals, and colonels derive in different measure great advantages, the soldiers small advantages but sufficient to ensure that they support the dictatorship. If the base of the army rebelled the dictator and his entourage could be easily overthrown.

It is also crazy to passively accept that economic power is concentrated in a few hands. Wealth is

increasingly concentrated in a few hands. In 2018 only 26 individuals owned as much as 3.8 billion people, the poorer half of the world's population that owns only 1%.

Multinationals have enormous economic power but also political because with their wealth they can afford to control not only politicians but also information and research.

Mad was the unrestrained consumerism of recent decades that is leading us towards the exhaustion of resources, a very high level of pollution in all areas, and climate change.

If the human race had been smarter, instead of chasing the infinite growth of GDP, profits, and capital, it would have opted for slower but happier and less problematic growth.

If it were smarter it would not accept the concentrations of political and economic power, it would loudly demand an end to all the foolish wars, the general disarmament and the transformation of the armies into civil engineering units to counteract the effects of global warming and pollution.

It would demand that great wealth be taxed much more heavily, abolishing at the same time all tax havens and combating tax evasion much more effectively with a global database that cross-references all data

pertaining to each individual's wealth, reducing to a minimum the use of cash and all untraceable payments.

The enormous capitals that could be recovered with these measures could be used for the fight against climate change, scientific research for new energy sources like nuclear fusion, and to reduce the gap between extreme wealth and extreme poverty.

Unfortunately, there is not much optimism that this can happen because those who govern us do not listen. It's been over 30 years that scientists, the pope, and many citizens loudly ask to act to stop global warming but very little has been done. National and individual selfishness prevails. The same goes for peace processes and disarmament.

Perhaps only when the effects of climate change become increasingly catastrophic will we become aware of the seriousness of the situation and a global revolt from below will take place, hoping that it is not too late. It would be much better to do it now!

The miracle of our existence

Our behaviour is all the more foolish when considering not just the rarity of life in the universe, but also the improbability of its formation. Indeed, we fail to realize just how incredible it was that the universe was formed, life emerged, and intelligence developed. A highly precise series of conditions (fortunate or pre-programmed before the Big Bang?) have allowed us to be here at this moment, intelligent beings on a beautiful planet that we are, however, mistreating to such an extent that we are making our extinction very likely.

It would be a tremendous shame to waste this great opportunity we've been given, especially considering that if we managed not to destroy ourselves, we could evolve further as we will see in the chapter "Possible future developments."

Probability of the universe's existence
You won't believe it, but the probability that each one of us is here at this moment is equivalent to having won the lottery multiple times in a row.

Let's briefly see why:

1) If matter and antimatter had been in exactly equal parts, the universe would not exist.

2) If matter had spread out perfectly evenly, the universe would not exist.

3) If the universe's expansion speed had been slightly different, the universe would have collapsed on itself or expanded too quickly to form stars and planets.

4) If the hydrogen to helium conversion value were off even slightly, the universe would be composed only of hydrogen.

In physics, antimatter is matter composed of antiparticles with opposite electrical charges. When a particle and an antiparticle come into contact, they annihilate each other.
It's believed that originally, matter and antimatter were equal, so in theory, the universe could not have existed.

Instead, a minimal difference allowed more matter to remain: the matter that makes up our universe.

In the second case, a minimal difference in density (and therefore gravity) meant that points where this density was higher (and therefore with more mass and consequently more gravitational force) could attract matter around them, increasing their mass and gravitational force until forming the first stars.

In the third case, the initial expansion of the universe was exactly what was needed for its formation. If it had been a tiny fraction slower at some point, like a stone thrown into the air, the expansion would have stopped, and the matter would have begun to fall back toward the point of origin, slowly at first, then faster and faster until collapsing into a single point—goodbye universe! Instead, if it had been faster, the formation of stars and planets would not have been possible.

In the last case, for the universe to exist as it currently does, it was essential that hydrogen be converted into helium with maximum precision and in large quantities, turning 7 thousandths of its mass into energy. If this value had been different, 6 or 8 thousandths, no transformation would have occurred, and the universe would have been composed only of hydrogen.

Einstein, in a famous phrase included in a letter to Niels Bohr, his friend and another great physicist, stated that "God does not play dice with the universe." That is, God, when creating the universe, did not leave anything to chance.
Paul Dirac, Nobel Prize for Physics in 1933, wrote: "God is a first-rate mathematician who used very advanced mathematics in constructing the universe."

Probability of life's existence
The birth and maintenance of life on Earth was also possible thanks to very specific and, at least in this case, fortuitous conditions.
Life on Earth, in fact, would not exist if our planet:

1) Had been positioned too close or too far from the Sun
2) Did not rotate on itself
3) Had not had the Moon
4) Was too small or too large
5) Had a core that was not in a liquid state
6) Had an orbit that was too elongated
7) Had a binary or multiple system
8) Was positioned too close to the centre of the galaxy

If Earth had been over 5% closer to the Sun, high temperatures would have evaporated water from its surface and prevented the spread of life. Conversely, if Earth had been more than 15% farther, low temperatures would have led to the same outcome.

If Earth did not rotate on itself but always faced the sun with the same side (like the Moon), there would be 100 degrees on the sun-exposed side, while on the other side, always 100 degrees but below zero! Perhaps life limited to some microorganisms could have arisen in the equatorial intermediate zone.

If Earth had not had a large Moon, with its stabilizing influence, the climatic conditions would have been unfavourable.

If the Earth had been too small, it would have ended up like Mars, that is, unable to retain its atmosphere. If it had been too large, the immense gravitational force would have been problematic for the development of intelligent life.

The liquid state of Earth's core generates a magnetic field that protects us from lethal cosmic radiation.

Earth orbits the sun in an elliptical, not quite circular, path. If this feature had been much more pronounced, we would have had very cold and very hot periods, thus unfavourable to life.

The stars we see with the naked eye seem to be single stars, but in reality, at least 50% are binary systems (two stars close together bound by mutual gravitational attraction orbiting around a common centre of mass) or multiple (three or more stars). Any planets around these stars would be subjected to significant orbital and gravitational upheavals on which intelligent life would be unlikely.

The position of our solar system in the galaxy is quite peripheral, and this is good because as you move toward the centre of the galaxy, stellar density increases more and more, and thus the frequency and proximity of extreme events like supernovae that, with their explosion, eliminate all forms of life within tens of light-years.

Another consideration is that the vast majority of living species (probably 99.9%) that have appeared on Earth no longer exist today. We find ourselves on a planet that is extraordinarily suitable for giving birth to life but where it is just as easy to become extinct.

That's why we must be very careful to prevent at least what we can. I am not referring only to climate changes which, if we get busy, we can contain, at least to avoid extinction, but also to a possible nuclear war which, once started, would be the certain end of humanity.

This second possibility could happen in a short time and fully involve even us adults, unlike climate changes that are much slower and therefore only the younger ones will suffer the extreme consequences.

Extraterrestrial Intelligent Life

Finally, for confirmation of how rare and precious the development of intelligent creatures and the formation of advanced civilizations on a planet can be, just consider that we have been transmitting signals, first radio and then TV, for nearly 100 years.

Considering also the response time, within the 50 light year radius where our signals have reached, there are hundreds, if not thousands of star systems, and yet so far, we have had no attempt at contact.

Not even the SETI (Search for Extra-Terrestrial Intelligence) program, dedicated to the search for extraterrestrial intelligent life advanced enough to be able to receive and send radio signals into space, which since 1992 has been scanning space for signals of extraterrestrial origin and processing data also with the help of

personal computers spread all over the world, has ever detected an alien signal.

The possible future developments

Theory of the Complexity of the Universe

If we were to go extinct, it would be a shame, not only because of all the extremely rare combinations that have occurred to get us to where we are today, but also because of what we could become in the future.

Indeed, since the Universe started from extreme simplicity and arrived in almost 14 billion years to the complexity of the living creatures of today, to intelligence and modern technology with increasingly tight timings, we can imagine that this progression of complexity will continue also in the future and with even shorter steps.

Let’s then look in detail at what the Theory of the Complexity of the Universe consists of.

The keystone to understanding how life and the Universe might evolve is the realization of how, at birth, the latter was of utmost simplicity, as atoms had not yet formed, and how instead it has become progressively more complex to the point of giving birth to forms of intelligent life.

Let's go through a quick overview of the history of the Universe starting from the initial moment of its

birth, the Big Bang, going through the formation of stars and planets, then the evolution of life on Earth, and up to our present day.

The Big Bang

Every story has a beginning and the story of the Universe has its beginning too, known as the so-called "Big Bang", which means "great explosion", although in reality it was not a true explosion as neither light nor sound existed at that moment, but it was an incredibly rapid expansion.

We are used to thinking of the universe as something huge and infinite. What dimensions do you think it had at the very first moment of the Big Bang?

At the time of the Big Bang, the entire Universe, that is all the galaxies, stars, and planets that exist today, was compressed into a space billions of times smaller than the period at the end of this sentence.

The Universe, at the beginning of time, that is at the zero moment, was in fact concentrated in a volume smaller than an atom, with a near-infinite density and a temperature of billions of billions of billions of degrees where the rules of physics as we know them did not apply. That instant is therefore defined as a "singularity".

Unable to remain in this condition, a violent expansion occurred that in about a billionth of a second increased the volume of the Universe by billions and billions of times.

After this phase, the "fireball" continued to cool, slowing its expansion. Initially, the expanding matter was composed only of elementary particles, then the energy began to condense first into quarks, electrons, and neutrinos, and then into larger particles (protons and neutrons). Atoms formed later.

In the following three minutes, the temperature dropped to 1 billion degrees Celsius, enough for protons and neutrons to join and form hydrogen and helium nuclei.

After about 300,000 years, the temperature of the universe fell to around 3,000 degrees. Nuclei finally managed to capture electrons to form atoms and the universe filled with clouds of hydrogen and helium.

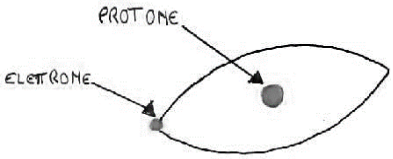
Hydrogen and helium are the simplest elements that exist in the Universe with only, respectively, one and two electrons.

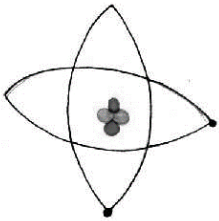
Hydrogen atom **Helium atom** 1

proton 2 protons

1 electron 2 electrons

2 neutrons





Stars are formed

If the primordial matter that composed the universe had been perfectly homogeneous and evenly distributed, today neither stars nor planets would exist. Instead, there were tiny differences in density. Where the matter was slightly denser, there was also a greater mass. The greater the mass, the greater its gravitational force, thus it attracted smaller parts towards itself, further increasing its mass and gravitational force. When the mass becomes very large, the gravitational pull causes the matter to fall inward, concentrating the energy more and more until atomic reactions are triggered. That's when the star ignites, emitting energy and light like the sun that warms us.

The gravitational force, acting on these irregularities, made it so that increasingly larger agglomerations of

matter were created, leading to the formation of the first stars 200 million years after the Big Bang. The first stars formed in the Universe were probably much more massive than those of today. The nuclear fusion processes that started in the cores of these stars led to the formation of heavy elements like oxygen, carbon, neon, iron, and nitrogen, which spread into interstellar space following the stars' explosions in supernovae, with the consequent diffusion of these materials and the formation of nebulae (clusters of gas and dust) that contributed to the birth of new second and third generation stars.

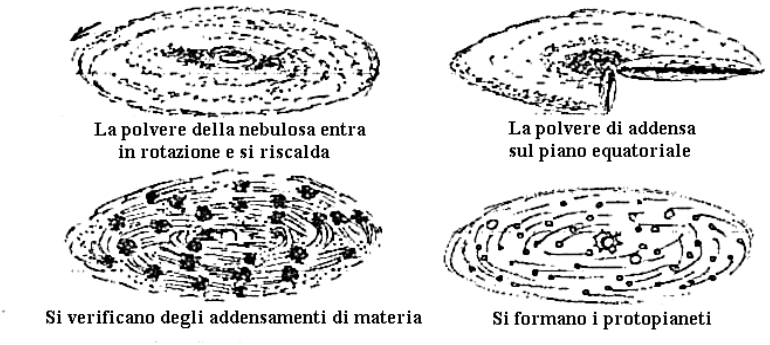
In these processes, all the chemical elements we know were formed, and so the atoms that make up our bodies were created in the transformation processes of the stars. We can therefore truly consider ourselves "children of the stars," as an old song went!

Planets are formed

Because of gravitational attraction, galaxies formed, huge collections of stars and gigantic clouds of gas and dust.

But not always from the concentration of matter do stars arise. If a critical mass is not reached and the nuclear reaction is not triggered, instead of a star, a planet more or less large is formed.

The figure below explains how planets are formed starting from a nebula (a cluster of gas and dust resulting from the previous explosion of a supernova).



The Earth is formed

This is how the Earth formed about 4.5 billion years ago. Our planet was initially like an incandescent ball that began to cool down little by little. The outermost layer solidified, forming the Earth's crust. Underneath a thin solid layer, the liquid and incandescent matter pressed on the outer part, causing numerous fractures in the Earth's crust. These fractures, from which magma emerged, became volcanoes. The volcanoes emitted huge quantities of steam and gases. Thick layers of clouds then formed, which cooled down and gave rise to long-lasting rains.

Seas and oceans are formed

From these rains, the seas and oceans were born, filling the cavities present on the Earth's crust. On Earth, the

birth of any form of life was not yet possible, not only because of the very high temperature but also because the air was unbreathable, being devoid of oxygen. For this reason, life could only develop in the water where, on the contrary, the essential elements to favour it were present.

Life blossoms: Unicellular Microorganisms

It was in the water, therefore, that the first proteins formed, the basic components of living beings. The first microscopic forms of life appeared about 3 billion years ago. These were unicellular microorganisms, that is, made up of a single cell. These were structurally very simple bacteria. Soon these bacteria acquired long filaments (flagella), which gave them the ability to move. Other bacteria instead grew many small filaments all around (cilia) and functioned like tiny legs to move. The microorganisms spread throughout the waters of the Earth but were always made up of a single cell.

Multicellular microorganisms are born

About 2.1 billion years ago, some cells "learned" to live together, each specializing in doing something different. Thus, multicellular microorganisms were born, which then became larger and better organized. Other microorganisms learned to exploit the light and energy of the sun to produce their food, and from these microorganisms, the plants derived. Over time they

transformed into increasingly complex organisms, such as algae, jellyfish, and sponges. They were all invertebrate living beings, that is, without a skeleton. Then the molluscs evolved, which to protect their soft bodies equipped themselves with an external shell (exoskeleton). The shells of these animals are still found today and are fossil shells: important finds that provide us with much information about these ancient forms of life. The evolution of animal species continued, and over millions of years, crustaceans appeared, some very similar to those of today.

The first plants appear

Meanwhile, the air was becoming increasingly enriched with oxygen thanks to the photosynthesis of the algae. The first plants conquered the Earth and spread everywhere. Since there were still no herbivorous animals on land and there was a lot of fertile ground, the plants developed quickly, and some reached gigantic sizes, forming enormous forests of giant ferns and tall conifer trees.

Vertebrates appear

Around 400 million years ago, the first vertebrates were born, that is, having a bony structure that made them more resistant: the fish. At a certain point, there was a significant evolutionary turn. Some vertebrates underwent changes that would make them capable of living on dry land. With such an abundance of food on

land, various animals began to emerge from the water to graze on the land and then return to the water. Some got used to breathing air and did not return to the water: these were the insects. Others, instead, could stay out of the water for a long time but then had to return to lay their eggs: these were the amphibians.

Reptiles appear

Over the millennia, the bodies of some amphibians changed and they no longer needed to stay near the water. Thus, towards the end of the Paleozoic era, reptiles appeared, the first vertebrates able to live exclusively on land. They spread everywhere and became the real masters of the Earth for millions of years, diversifying into many distinct species, including the dinosaurs. Dinosaurs are a very diverse group of reptiles that appeared during the late Triassic period (about 230 million years ago) and dominated the planet until the end of the Cretaceous period (about 65 million years ago), disappearing most likely due to the alteration of climatic conditions caused by the fall of a huge meteorite.

The dawn of Man

About 70 million years ago, the primates appear, nocturnal animals that lived in trees, with prehensile hands and feet and a flat snout. We must wait until 4 million years ago to see a closer relative of ours: the Australopithecus, with a brain larger than that of a chimpanzee.

About 2 million years ago, finally, the human genus appears: it is Homo Habilis. It had a more developed cranial box, followed an omnivorous diet, and used tools like stones to break bones. A little later, Homo Erectus appears, considered the first true hunter-gatherer and the first to use fire. Our species, Homo Sapiens, enters the scene 200,000 years ago. Our ancestor is a social animal, who organizes in tribes, has its own traditions and ritual practices, and buries its dead.

Modern Man appears

At this point, about 90,000 years ago, modern man appears: Homo Sapiens Sapiens, capable of working bones and horns to make hunting tools. Our most recent ancestor also has the need to express his artistic sense, as evidenced by cave paintings and female statuettes. He is a man who manipulates what is around him, domesticates animals, and begins to dedicate himself to agriculture.

The first civilizations are born

Around five thousand years ago, Sapiens Sapiens began to write: prehistory ended and history began. The first ancient civilizations formed mainly along rivers, near the sea, or on highlands where the land was fertile and rainfall abundant, others in Asia in the valleys of the Yellow and Indus rivers. Between the Tigris and Euphrates rivers, that is in Mesopotamia, civilizations

such as the Sumerians, Babylonians, and Assyrians arose as early as 3000 BC.

Along the Nile, the Egyptian civilization developed, governed by pharaohs. The Egyptians were knowledgeable in science and geometry and built huge pyramids intended to become the tombs of their pharaohs.

The Scientific Revolution

The civilizations of the Greeks and Romans would follow, but it would not be until the 1500s that the scientific revolution began, laying the groundwork for modern science. Key figures were Leonardo da Vinci, Galileo, Kepler, Descartes, and Newton. The scientific method was born, based on the observation of natural phenomena, experimental approach, and the application of mathematical calculation.

The Industrial Revolutions

Around 1760, the first industrial revolution took place. It was made possible by the use of new forms of non-natural energy, particularly steam, to power machines. Two symbols of the first industrial revolution in particular were coal, which provided the energy to power the steam engine, and iron, with which machines, railways and trains, bridges, and buildings were constructed. Initially, the sectors affected by the technological revolution were textiles and steel, but soon the new techniques affected all other production sectors.

The second industrial revolution occurred in the years between 1870 and the early twentieth century. This new phase of economic expansion had its symbols in electricity and oil, which joined and gradually replaced coal and the steam engine. A series of devices made their first appearance: the light bulb, the internal combustion engine and the automobile, the telephone, the gramophone, the typewriter, the bicycle, the electric tram, the radio, the airplane, and much more.

The innovations of the 20th Century

Since then, the list of inventions and discoveries has grown at an exponential rate and in ever shorter times.

The main innovations in the second half of the 20th century were nuclear energy, television, computers, the Internet, mobile phones, the progressive robotization of production processes, artificial satellites, GPS. In the field of space exploration, man first managed to go into orbit around the Earth and later to reach our satellite: the Moon. Artificial Intelligence and Machine Learning are gaining ground so much so that the computer "Deep Blue" managed to beat champion Kasparov in a chess match.

The innovations of the 21st Century

In the last twenty years, Smartphones, Social Networks, Virtual and Augmented Reality, and biometric systems have become a reality. Virtual assistants like Google's or Alexa's have been created. Satellite

navigators can lead us anywhere by any means: by car, motorcycle, bike, on foot, or with skis. In the medical field, the mapping of the human genome has been completed, and recently with the development of biomedical engineering, mRNA or viral vector vaccines have been created in record time to free us from the SARS-CoV-2 pandemic.

The most promising future innovations

Autonomous driving cars are already a reality, although in the testing phase, 5G is about to arrive, and we are preparing for a trip to Mars. A revolutionary innovation could be Quantum Computing, quantum computers that are starting to provide the first significant results. Elon Musk, with the founding of Neuralink, a neurotechnology startup focused on developing neural interfaces, is working to connect the human brain with Artificial Intelligence.

Synopsis of the progression of complexity

At this point, we can summarize, even on a time scale, how the Universe, from the utmost simplicity, has achieved considerable complexity with increasingly shorter steps. The table on the following page illustrates this very well:

Era	Date	Time elapsed since the previous event	Description of the period
Big Bang	13,8 billion years ago	zero point	The Universe is compressed in an infinitesimal point and is composed only of elementary particles
Expansion stage		Billionths of a second	Energy condenses into quarks, electrons and neutrinos
			Protons and neutrons are formed
		3 minutes	Hydrogen and helium nuclei form
		300.000 years	Hydrogen and helium atoms are formed
Formation of the stars	13,6 bn years ago	200 million years	The first stars are born
Formation of the Galaxies	13,2 bn years ago	400 million years	The first galaxies are born
Formation of the planets	4,5 bn years ago	8,7 billion years	The Earth is formed
Life blooms	3 bn years ago	1,5 billion years	Unicellular microorganisms are born
	2,1 bn years ago	900 million years	Pluricellular microorganisms are born
	460 bn years ago	1,6 billion years	The first plants appear
	400 bn years ago	60 million years	The vertebrates are born
	300 bn years ago	100 million years	Appear the reptiles
	230 bn years ago	70 million years	The dinosaurs appear
Man appears	70 mil years ago	160 million years	The primates appear
	4 mil years ago	66 million years	The australopithecines appear
	2 mil years ago	2 million years	Here comes the Homo Habilis
	200.000 years ago	1,8 million years	Homo Sapiens enters the scene
	90.000 years ago	110.000 years	Here is the Modern Man Sapiens Sapiens
Civilization	5.000 years ago	85.000 years	The first civilization are born
The scientific revolution	1500 d.C.	3.500 years	First scientific revolution

Era	Date	Time elapsed since the previous event	Description of the period
The industrial revolutions	1760 d.C.	260 years	First industrial revolution
	1870 d.C.	110 years	Second industrial revolution
The main innovations of the 20th century	1950 d.C.	80 years	Spread of television
	1951 d.C.		First commercial computer
	1955 d.C.		First nuclear power plant
	1957 d.C.		First satellite in orbit
	1968 d.C.		First man in orbit
	1969 d.C.		Man lands on the moon
	1973 d.C.		GPS is born
	1977 d.C.		The first personal computer is born
	1991 d.C.		Diffusion of mobile phones
	1993 d.C.		Spread of Internet
	1997 d.C.		I.A. beats Kasparov at chess
The main innovations and discoveries of the 21st century	2001 d.C.		Mapping of the human genome
	2004 d.C.		Growth of social media
	2006 d.C.		Boom in satellite navigation systems
	2007 d.C.		Popularity of smartphones
	2009 d.C.		Development of autonomous vehicles
	2012 d.C.		Discovery of the Higgs boson
	2016 d.C.		Discovery of gravitational waves
	2017 d.C.		Google's virtual assistant is born
	2019 d.C.		Google’s quantum supremacy
	2020 d.C.		MRA Vaccines

These data make evident the evolving complexity and the spans of time passed between various periods born from epochal changes.

Setting aside the initial formation phase of the Universe, it is immediately clear that at the beginning, the distance between one era and the next is measured in billions of years, then millions, thousands, and finally hundreds of years, while from 1950 onwards, radical novelties occur within just a few years.

To grasp the temporal vastness of the Universe, the astronomer Carl Sagan conceived the cosmic calendar: imagine condensing the entire history of the Universe, that is 13.8 billion years, into a single year.
The Big Bang marks the beginning of our cosmic calendar, which is set at 00:00:01 on the first of January until today, the midnight of December 31st. According to this calendar:

- The first stars form on January 10th
- On January 13th, stars join to form the first galaxies
- On August 31st, our Earth formed
- On September 21st, the first forms of life appeared on our planet
- The first complex cells appear on November 9th
- The first terrestrial plants appear on December 20th
- The dinosaurs on December 26th
- The first hominids appear in the early afternoon of December 31st

- The first civilizations start at 11:59 and 48 seconds
- All recent history fits only in the last few seconds of our calendar
- Jesus was born five seconds before midnight
- Only in the last second did the scientific revolution begin
- In the last tenth of a second, we are post-World War II
- Today, we are at the moment when the champagne cork pops. It's midnight!

Thus, the Universe has become increasingly complex from the moment of its birth, and everything suggests that this trend will continue in the future, both on Earth and on any other planet hosting an advanced civilization.

The question that naturally arises is how life could have bloomed at a certain point. How could inorganic elements, therefore inert and incapable of reproduction, transform into organic molecules capable of organizing, reproducing, and creating ever more complex structures?

This is a further confirmation of the theory of the complexity of the Universe.

It is now widely demonstrated that systems spontaneously organize themselves in order to create ever more complex structures, following the laws of physics based on mathematical equations.

This is an undeniable fact because we have direct evidence of it. It's not like in religions where one must blindly believe in dogmas without any proof being provided for what is claimed.

In a thousand, ten thousand, or a hundred thousand years, the Universe will certainly be much more complex than we see it now, and in a million or a billion years, it will be even more so. It is trending towards supreme complexity, and nothing will stop it.

If Man disappears or the Earth is destroyed, for example by a huge asteroid, there will be other forms of life somewhere in the Universe that will continue to progress towards supreme complexity until becoming what from our point of view we might call "God".

The near future

Technological progress has already been exponential for years. To understand how explosive exponential growth is, I give the example of a quiz that was popular a few decades ago: "a pond hosts some water lilies that double every day. After 30 days the pond is completely covered. On which day will the pond be half-covered?". I'll give you a little help: no need to do any calculations, it's just a matter of logical deduction. Think about it. The answer is on the following page.

The pond will be half-covered on the twenty-ninth day because if the coverage doubles daily and is complete on the thirtieth, then it is certainly half-covered the day before. This illustrates the lightning speed of exponential progression in the final expansion phase. It takes twenty-eight days to reach a quarter coverage, the twenty-ninth will be at half, and the thirtieth will be complete.

The same happens with new inventions and discoveries which lay the groundwork for further discoveries, inventions, and technologies without which further progress would not be possible. And the pace increases more and more, at an exponential rate, so that at a certain point it will be explosive. That will be the moment of reaching the "Singularity".

But what is this "Singularity," you may ask. A "Singularity" is reached when technological innovation becomes so rapid and its impact so profound, that life is completely transformed.

When will we get there? At the moment, it is assumed to be in the early years of 2050 but it could happen even earlier.

So then, if we do not destroy ourselves first with a nuclear war, the combined effect of technological progress and climate changes that will make life more or less difficult for Humanity on Earth, will accelerate the radical transformation of Man. It will be a huge qualitative leap for the complexity of the Universe.

The means by which this leap will be possible include molecular nanotechnology, artificial intelligence, the neural interface, and mind scanning (mind uploading) which would allow for emulating the brain by copying its content onto a non-biological support and abandoning the biological body to replace it with anthropomorphic robots or holographic projections.

Lately, newspapers have published news of a project born in Russia called "Project 2045" which aims to succeed in copying the human mind and then saving it on a Hard Disk.

"Cogito ergo sum" is the famous Latin formula of Descartes that means "I think, therefore I am." An assertion that expresses the certainty of our existence and distinguishes us as an individual, as a thinking subject. But when the body dies and we can no longer think, what remains?

I am my memories, my thoughts, my experiences, my feelings, my consciousness. Where does all this reside if not in my brain, in my neurons? We can compare our body and mind to a computer: the body and the brain represent the hardware, our thoughts the software. When the body dies the memory fades, just as when a computer's hard disk is erased and the power is removed. Nothing remains.

But if it were possible to scan our minds and save the data on a memory then our self could become immortal. It would no longer need a body and could reside in a computer, on the net, in the cloud, in an android robot,

or in any other form of hardware. Multiple copies could be saved so that the data could be restored if they were lost on the original support.

This transition from a biological body to a non-biological one can be called "Transhumanism". Transhumanism is the transition to a completely different condition but one that preserves the intellectual part of Homo Sapiens, indeed enhancing it. Just compare with today's computers to understand the advantages of transferring the mind to an electronic support: already today computers are very powerful and can contain a huge amount of information, they do not forget anything, can access information on the network, contents and programs can be saved so as to restore everything on new hardware in case of a fault.

Giving up the biological body, for those who wish it or in the case of incurable disease or advanced age, would be a great leap in quality.

It would be a leap towards a more evolved species that surpasses the limits of Homo Sapiens, practically immortal, with far superior intellectual abilities and direct access to the network, no longer subject to disease and aging, also suitable for long space travels.

Following a recent study published in Nature Medicine, scientists have concluded that the human body is not suitable for space travel.

Already long stays in orbit significantly reduce the number of red blood cells in the blood, imagine a trip

to Mars which round trip would last more than a year at best!

In addition, staying in space in the absence of gravity decreases muscle mass and bone mass causing general weakness and osteoporosis. If this is not enough, we must also keep in mind the problem of cosmic radiations and their serious consequences over time.

All this would not be a problem for a mind without a body. In this case, even the enormous accelerations that might be necessary to reach the speed of light or even to perform dimensional jumps would not be a problem. Moreover, a pure mind would have no physical or sexual needs and could suspend brain activities even for a long time.

The ability to experience emotions or pleasure could still be replicated by reliving the memories and experiences of others shared on a network.

The human mind could be implanted into an anthropomorphic robot or live within supercomputers, taking the form of pure information. It would be possible to project one's holographic image when necessary or to take control of robots and machinery of all kinds, greatly amplifying one's strength and endurance.

It is almost impossible for us as human beings to imagine what the posthuman condition might be like. Posthuman beings might engage in activities and have aspirations that we cannot even imagine, just as a monkey cannot comprehend the complexity of human life.

Dmitry Itskov, the Russian billionaire in his forties from "Project 2045", is convinced that Man can become immortal and has made significant investments in this project in order to realize his dream. The project is divided into two phases. The first involves the transfer of the physical body. The brain with the spinal column would be extracted and inserted into an artificial life support to be placed in a mechanical body. This would significantly prolong life expectancy. With the second, the more complex passage occurs, in which the physical body is completely abandoned. It involves creating a digital replica of one's brain that can be installed in an android or a computer and manifested through holograms. This second phase should be completed by 2045. Hence the name of the project. According to Dmitry Itskov, the technology necessary for the transfer of consciousness into a machine is already more than halfway there.

Experiments have already been carried out on mice in which the hippocampus (which plays an important role in the formation of memory and in transforming it from short to long term) was removed and replaced with a microchip, without the animals losing their memories.

Just as Jeff Bezos, the richest man in the world, managed to realize his dream of going into space, so might

he. It is only a matter of time and money, which he seems to have plenty of.

Meanwhile, another super-rich, Elon Musk, has created a company, Neuralink, with the goal of implanting a microchip in the human brain. He has recently managed to get a monkey to play video games. Initially, the chip implanted in the brain should serve to replace brain functions compromised by trauma or degenerative diseases, but the real goal is to manage to connect the human mind to a computer and thus to Artificial Intelligence.

Research is also underway to modify the genes responsible for aging, to clone body parts using stem cells, or others. However, the future that awaits us could hold significant and positive surprises, as long as we change our tune and put in place all the strategies for non-extinction.

Conclusions

In conclusion, for the reasons already mentioned above, it is certain that politics and the current system will not be able to take the necessary measures to avoid extinction and make the world a better place. Only a drastic change in mentality at a global level and the union of all peoples will allow it to be done.

Easy to say, but in practice how could these conditions be realized?

First of all, we must raise awareness of the situation we are in and the real risks we face to as many people around the world as possible. One means could be the dissemination of this book, which I would like to see translated into all major languages and spread as widely as possible.

The Internet and Social Media could then be used to spread the idea and create an international movement, which everyone could be part of, to start the necessary revolution from the bottom up. In the case of dictatorial states or where there is no freedom of information, the Dark Web could be exploited, which for once would serve a good purpose.

The first goal should be the pursuit of world peace, which would not only allow funds and energy to be found for the fight against climate change and pollution but would eliminate one of the major risks of extinction: nuclear war.

Then a world authority should be established, composed not only of politicians but also of scientists and wise people, who have decision-making powers on all global issues, and a reform of the UN should be implemented, removing the veto system and granting it more powers.

It is logical and rational that global problems be addressed at a global level and the necessary investments supported based on the wealth of each nation, to the extent they have contributed and continue to contribute to creating them.

The program of such authority should first of all start with disarmament, abolish tax havens, impose traceability of transactions, stiffen taxes on very high incomes and tax large fortunes in order to raise funds for containment and resilience to climate changes and to reduce pollution at all levels, to research and develop new energy sources and increase renewables.

After that, it should proceed to implement as much as possible the actions that I suggest in this book and others that I may not have thought of, with the help of scientists and experts from every field.

On the next page, I provide a summary, in the form of an agenda, of the main steps that should be taken. It will be very hard and difficult to achieve all this, but it is the only way to ensure a future for us and for future generations.

To join the initiative, to give your material contributions, to forward your comments or to actively become part of the No-Extinction pacifist and environmentalist movement, visit the website:

www.no-extinction.org

Agenda

1. Establishment of a global No-Extinction movement
2. Spreading the idea
3. Initiation of a climate lawsuit in every nation where it is justified
4. Indefinite strike by students around the world and by workers with demonstrations aimed at forcing governments to work relentlessly for global peace and to counteract climate change
5. Creation of a world authority for the management of the climate and environmental crisis. Reform of the UN
6. Election of representatives from various nations (scientists, technicians, wise persons)
7. Enactment of a global law on environmental crimes
8. Implementation of the resolutions decided by the world authority