

FOUR VISIONS OF THE FUTURE IN 2058

*(With warm thanks to Robert Costanza)**

The world is at a critical turning point. There is a lot of uncertainty about how things will go in the next few years, but there is also growing acceptance that the decisions we in New Zealand make at this time, will determine the course of the future for many years to come.

To us in Project 2058, the most critical task facing humanity today is the creation of a shared vision of a sustainable and desirable society, one that can provide permanent prosperity within the biophysical constraints of the real world in a way that is fair and equitable to all of humanity, to other species, and to future generations.

This short paper therefore addresses the question: What policies are most appropriate for society now, given alternative visions of the future and the enormous uncertainty about the reality of the assumptions underlying these visions? Four specific visions are laid out as being representative of some important alternatives. The aim is to stimulate thought and discussion at this stage, prior to more detailed work to develop a strategy for sustainable development.

There is a tendency when thinking about the future, to simply extend past trends. If we have been getting materially richer in the past, then the future will be more of the same. If the environment has been deteriorating, then it will continue to do so. But one of the lessons we can learn from history is that trends do not continue smoothly. There are turning points and discontinuities that were impossible to predict from past trends. The dissolution of the Soviet Union, the Berlin Wall coming down, landing men on the moon and the rise of China and India as economic superpowers are obvious examples.

The challenge for the current generation of humans is to develop a shared vision that is both desirable to the vast majority of humanity and ecologically sustainable. This paper is an attempt to contribute to a broad discussion on what our vision of the future is, should be, or can be. As Yogi Berra once said, *"If you don't know where you're going, you end up somewhere else."* We have to decide where we want to go, and balance that with where it is possible to go. It is the only way to change the world.

What we are learning about the change process in various kinds of organizations and communities is that in order to move change in a particular direction, we must have a clear vision of the desired goal - one which is also truly shared by the members of the organization or community. One of the most effective ways to start the dialogue and move quickly to public judgment is to present complex issues in the form of a relatively small number of possible "visions," which lay bare the conflicts and inconsistencies often buried in technical information.

To enhance the process, we lay out four future visions of the planet Earth. Each is described as a "future history"; a history of the Earth over the first half of the 21st Century, written from the vantage point of the year 2058. In this way, some aspects of the visions can be articulated. The visions include desired and undesired aspects, hopes and fears, allowing a richer exploration of what the future may hold, and a conscious choice among complex alternatives.

*This paper has been edited by John Peet (with the author's permission) from the original: see Costanza (2000), *Conservation Ecology* 4 (1) 5, <http://www.ecologyandsociety.org/vol4/iss1/art5/manuscript.html>

The four visions derive from two basic worldviews, whose characteristics are laid out in Table 1. These worldviews have been described in many ways, but an important distinction has to do with one's degree of faith in technological progress.

The **Technological Optimist** world view is one in which technological progress is assumed to be able to solve all current and future social problems. It is a vision of continued expansion of humans and their dominion over nature. This is the "default" vision, commonly held by politicians and businesspeople in our current Western society. It is one that broadly assumes continuation of current trends into the indefinite future.

The **Technological Skeptic** vision is one that depends much less on technological change and more on social and community development. It is not in any sense "anti-technology." However, it does not make the assumption that technological change can solve all problems. In fact, it assumes that some technologies may create as many problems as they solve. The key is to view technology as the servant of larger social goals rather than the driving force.

Table 1. Some characteristics of the basic worldviews.

Technological optimist	Technological skeptic
technical progress can deal with any future challenge	technical progress is limited and ecological carrying capacity must be preserved
competition	cooperation
simple linear systems	complex, nonlinear systems
humans dominant over nature	humans in partnership with nature
everybody for themselves	partnership with others
market as central guiding principle	market as servant of larger goals

There are two versions of these visions, however: one that corresponds to the underlying assumptions on which it is based actually being true in the real world of 2058, and one that corresponds to those assumptions being false, as shown in Figure 1. The positive version of the Technological Optimist vision is called Star Trek, after the popular TV and movie series. The negative version of the Technological Optimist vision is called Mad Max, after the movie of several years ago.

Figure 1. Four visions of the future based on the two basic worldviews and two alternative real states of the world.

		Real State of the World	
		Optimists right	Skeptics right
World View	Technological optimist	Star Trek	Mad Max
	Technological skeptic	Big Government	Ecotopia

The version of the Technological Skeptic vision that corresponds to the skeptics being right about the nature of the world is called Ecotopia, after the book of the late 1970s. If the optimists turn out to be right about the real state of the world, then what we call the Big Government vision will come to pass: Roger Douglas's worst nightmare of overly protective government policies getting in the way of the free market.

Each of these future visions is described here from the perspective of the year 2058. The visions are described as stories with specific names and events, rather than as vague general conditions, in order to make them more real and vivid. They are, of course, only caricatures, but we hope they capture the essence of the visions they represent.

Star Trek: the default technological optimist vision

The turning point came in 2012, when US and European scientists finally confirmed the reality of "warm fusion", that ultimately powered humanity to the stars. By that time, things were really starting to get dicey on Earth. Population pressure was mounting, because many people still held to the theory that more people were actually better for the planet, because of the increased brain-power available. Enhanced climate change, caused mainly by the use of fossil fuels, together with forest clearance, was beginning to cause major disruptions, but warm fusion allowed a rapid reduction of global fossil fuel burning to close to zero by 2030, with reversal of the greenhouse effect well on the way by 2058. Air pollution problems were essentially eliminated as cars were converted to hydrogen, produced with energy from warm-fusion reactors. Electricity came increasingly from warm fusion, so the old, risky nuclear-fission reactors were gradually decommissioned. Even some hydro stations were eliminated, returning some great rivers to their wild state.

Although clean, unlimited energy allowed the impact of humans on the environment to be significantly reduced, the world was still getting pretty crowded. The solution, of course, was space colonies, built with materials taken from the moon and asteroids, and with energy from the new warm-fusion reactors. The first space colonies were on the Moon, the moons of Jupiter, and in free space in the inner solar system. From there, it was a relatively short step to launch some of the smaller space colonies off toward the closer stars. By 2058, about 10% of the total world population of 20 billion are living in space colonies of one kind or another.

Because food production and manufacturing are mainly automated and powered by cheap warm-fusion energy, only about 10% of the population actually needs to work for a living. Most are free to pursue whatever interests them. Often the biggest technological and social breakthroughs have come from this huge population of "leisure thinkers." People also have plenty of time to spend with family and friends, and the four-child family is the norm

Mad Max: the skeptic's nightmare

The turning point came in 2012, when the world's oil production finally peaked, and the long slide down started. There were many who said at the time that it was all a hoax or another "invented" crisis like the Arab oil embargo of 1973, but this time it was for real. The easy-to-get, cheap oil was simply running short and the price rose rapidly. Long-

standing predictions about the rising price of oil causing new, cheaper alternatives to emerge never happened, because the alternatives were more expensive and most of them also highly polluting. There is still a lot of fossil fuel available in lower grade forms like coal and oil shale, but these sources are much more expensive to extract and use, and they could only slow the slide. It was similar with the use of food crops to produce liquid fuels such as ethanol, where wealthy countries were willing to pay high prices, which then caused even more suffering for the world's poor. Direct conversion to electricity using photovoltaics never achieved the price: performance ratios that would allow it to compete, because they were mostly constructed using fossil fuels anyway.

Once the financial markets figured out what was happening, the bubble really burst. The stock market crash of 2016 was an order of magnitude bigger than the 1929 crash, with the Dow Jones average losing the majority of its value. Although there was a brief partial recovery, it has been basically downhill ever since. Both physical infrastructure and social infrastructure have been gradually deteriorating, along with the natural environment. The human population has been on a long, downward spiral since the global "airbola" (airborne ebola) virus epidemic killed almost 25% of the human population in 2025-2026. Many populations were already weakened by the earlier "bird flu" epidemic, together with regional famines and wars over water and other natural resources, but airbola came as quite a shock, since the major pharmaceutical corporations had paid little attention to the poorer nations (from which the disease originated) for some decades and had no readily-available vaccines or other treatments. The world population peaked in 2020 at almost 10 billion. More than 2 billion died in the epidemic in the course of a little over a year and a half. Since then, death rates have exceeded birth rates almost everywhere, and the current population of 4 billion is still decreasing by about 2% per year.

National governments have become weak, almost symbolic, relics. The world has been run for some time by transnational corporations intent on cutthroat competition for the dwindling resources. The distribution of wealth has become more and more skewed. The few with marketable skills work for global corporations at good wages and lead comfortable and protected lives in fortified enclaves. The rest of the population survives in abandoned buildings or makeshift shelters built from scraps. There are no schools, little food, and a constant struggle just to survive. The majority of the world's population lives in conditions that would make the favelas of 20th century Rio seem luxurious. The almost constant social upheavals and revolutions are put down with brutal efficiency by the corporate security forces (governments are too broke to maintain armies anymore)

Big Government: Roger Douglas's worst nightmare

Even though "warm fusion" had been discovered in 2012, strict government regulations had kept its development slow while safety issues were being fully explored. No one wanted a repetition of the overly optimistic rush into nuclear fission energy that occurred in the late 20th century and that ended so disastrously in the meltdown of one of France's fission breeder reactors in 2010. Government regulators were also careful to require that the new fusion power plants bore the full financial responsibility for their liability (unlike the earlier fission power plants whose liability was heavily subsidized by governments). This caused a careful and slow development of the industry, with inherently safe reactor designs being the norm from the beginning.

Warm fusion's slowness in coming on line was balanced by high taxes on fossil energy to counteract climate change and stimulate renewable energy technologies. Global CO₂ emissions were brought to 1990 levels by 2020 and kept there with concerted government effort and high taxes, after which the new fusion reactors, along with new, cheaper photovoltaics gradually eliminated the need for fossil fuels altogether. The worst predicted climate change effects were thus averted, even though there were some significant costs associated with widespread droughts and devastating hurricanes.

Government population policies that emphasized female education and family planning managed to stabilize the global human population at around 8 billion by the middle of the 21st century. A stable population finally allowed many recalcitrant distributional issues to be resolved, and income distribution has become much more equitable worldwide. Some criticised this situation, arguing that it did not provide enough incentive for risk-taking entrepreneurs to stimulate growth. However, governments explicitly advocated slow or no-growth policies, preferring to concentrate instead on assuring ecological sustainability and more equitable distribution of wealth.

Stable human population also took much of the pressure off other species. The total number of species on Earth declined during the 20th century from about 3 million to a low of about 2.2 million in 2010. However, that number has stabilized and even recovered somewhat in the 21st century, as some species previously thought to be extinct were rediscovered, and some natural speciation of fast-growing organisms has occurred. The current estimate of the number of species on Earth is about 2.5 million and there are strict regulations in effect worldwide to prevent any further loss.

Ecotopia: The low-consumption sustainable vision

The turning point came in 2012, when ecological tax reform was finally enacted almost simultaneously in the United States, the European Union, Japan, New Zealand and Australia after long global discussions and debates, mostly over the internet. Coincidentally, it was the same year that what was formerly known as the Nobel Prize for Economics (actually, the Bank of Sweden Prize) was renamed the Prize for Human Stewardship, to reflect the obsolescence of 20th century economics. A broadly participatory global dialogue had allowed an alternative vision of a sustainable world to emerge and gain wide popular support. People finally realized that governments had to take the initiative back from transnational corporations and redefine the basic rules of the game if their carefully constructed vision was ever going to come to pass. The public had formed a powerful judgment against the consumer lifestyle and for a sustainable lifestyle. The principles of the new economics were embedded in the revised constitutions of many countries as the Three Goals:

- 1. Ensure that the scale of human activities within the biosphere is ecologically sustainable;*
- 2. Distribute resources and property rights fairly: within the current generation of humans, between this and future generations, and between humans and other species; and*
- 3. Efficiently allocate resources (as constrained and defined by 1 and 2), including both marketed and nonmarketed resources (especially ecosystem services).*

“Tax shifting” became the rallying cry to give the power of positive incentives back to sustainable activities and lifestyles, and to take it away from unsustainable consumer lifestyles. All depletion of natural capital was taxed at the best estimate of the full social cost of that depletion. Taxes on labour and income were reduced for middle- and low-income people, with a "negative income tax" for those below the poverty level. Ecological tariffs on goods produced in countries without ecotaxes were enacted simultaneously to level the playing field, along with major changes to national income accounting methods to allow a better assessment of the real quality of life. The GPI (Genuine Progress Indicator) came to replace the GNP as the primary measure of national performance. The reforms were brought on line gradually over the period from roughly 2012 to 2022, giving businesses ample time to adjust. The rest of the world followed soon after with almost all countries completing the reforms by 2058. The reforms had very far-reaching effects.

Fossil fuels became much more expensive, and this limited both travel and transport of goods and also encouraged the use of renewable alternative energies. Mass transit, bicycles, and sharing the occasional need for a car became the norm. Human habitation came to be structured around small villages of roughly 200 people, whether in the countryside or inside urban concentrations. The village provided most of the necessities of life, including schools, clinics, and shopping, all within easy walking distance. It also allowed for a real sense of "community," missing from late-20th century urban life. Other urban functions were within bicycle distance, and public transport connected communities to each other and to bigger centres where there were special functions like universities, specialized hospitals, and research facilities. Although these changes drastically reduced the GNP of most countries, they increased the GPI, reflecting real increases in human wellbeing.

Because of the reduction in consumption and waste, there was only moderate need for paid labour and money income. By 2058, the work week had shortened in most countries to 20 hours or less and most "full time" jobs became shared between two or three people. People could devote much more of their time to leisure, but rather than taking consumptive vacations far from home, they began to pursue more community activities (such as participatory music and sports) and public service (such as day care and elder care). Some of this time was exchanged using local community currencies such as time banks. Unemployment became an almost obsolete term, as did the distinction between work and leisure. People were able to do things they really liked much more of the time, and their quality of life soared (even as their money income plummeted). The distribution of income became an almost unnecessary statistic, because income was not equated with welfare or power, and the quality of almost everyone's life was relatively high.

Although physical travel decreased, people began to communicate electronically over a much wider web. The truly global community could be maintained without the use of consumptive physical travel

The reason for telling these short stories is not to invite the reader to choose between them, so much as to illustrate just how much our present-day assumptions about the way things are likely to be influence the policies we put in place for the future, and therefore their possible outcomes, 50 years down the track. Assumptions different from those of technological optimism or skepticism would of course give rise to other outcomes and perhaps different stories based on them.