



Responding to Climate Change

The Great \$90 Trillion Opportunity

It's time to grasp the colossal opportunity that the climate change crisis is offering us.

However much some people want to pretend that it is not happening, their ability to deny it, will evaporate at spectacular speed as the laws of physics, chemistry and biology, deliver impacts that will be increasingly undeniable and which if ignored will become relentlessly unsurvivable.

A controlling majority of us now need to align and make the giant mental leap of recognising that our current way of doing things must change. Fortunately, the accelerating pace of scientific knowledge is already preparing us to accept and expect rapid change; in fact, we are already rather good at accepting change, you could even say that we are now programmed to expect it, as we demand the next piece of upgraded technology. What is even better, is that many of the changes we need to make are going to be beneficial to the overwhelming majority of us. Yes, there are a few things that we will have to forgo, but on the plus side there are loads of 'very cool things' that are going to happen that will enhance our lives, like the new technology laden electric cars that we will be driving soon.

Facing up to our fears and kicking them into touch

At some level in the back of everybody's mind, depending on their own circumstance, resides a great fear of what the future holds. If we only took the time to think about it, every one of us should accept that the path that we are on is unsustainable. It seems just the other day that Earth's population reached 7 billion and now we have more than 7.5 billion people on the planet. Evidence of our fears has shown itself in the isolationist policies that have been voted for in Britain and America through BREXIT and Trump, with concerns about immigration being high in many 'leave' and Trump voters' minds. These fears are reflected around the world in the rise of right wing political groups and their isolationist policies, although we should of course recognise and give kudos to the French for fighting back against it. We also know that use of fossil fuel energy is unsustainable and guilt gnaws on our subconscious every time we step into a car or book another flight. We make plans for our children and pay into pensions which on our current course are most unlikely to be deliverable or to ever pay out.

We watch the news, but detach ourselves from the reality of the plight of the people being reported on whose lives have already been plunged into chaos and despair; some of us even try and blame those people and suggest that they are the cause of our concerns. Whereas deep down, in our subconscious we are recognising that our own turn is coming and that is what is driving our fear.

We humans evolved over the millennium to have a highly advanced sense of danger which stimulates us to react and move to safer grounds. Failure to react leads to stress and irrational behaviour. The reality is that we know that the storm is coming and thus our stress and fear progressively increases.

In times of threat, the human response is to look for leadership and so now is the time for leaders to emerge and take control, by presenting a global plan for a sustainable and prosperous future. A plan that we can have faith in, one that will alleviate our stress by delivering confidence in the prospect of a viable and desirable future for everyone, all 7.5 billion of us. Something that isolationism in an interconnected world where we all breathe the same air and are connected to the same hydrological cycles, can never deliver.

The plan must have a clear goal and a path to optimise the available resources for a sustainable and prosperous future for the generations to come. This requires a full appreciation of our predicament, which in turn requires detailed understanding of how the Earth system works and an analysis of the damage we have done to the system, so that it can be corrected.

It is absurd that we know how to accomplish this and yet presently, we vacillate, procrastinate and set up official bodies that through flawed consensus based systems tell us that it not that bad, thereby becoming modern-day Neros; fiddling while Rome burns.

So, what is the goal?

It is critical that we recognise that the elemental resources of the Earth are finite. We could if we wanted to, make a copy of the periodic table and produce a complete audit of Earth's component parts. At some point that audit places a cap on human population growth, we must learn to make much more efficient and far fairer use of our finite resources.

Very few of us are prepared to give up on what we have and at least two thirds of the world are extremely envious of the other third. So somehow, we must lift everybody up together. Interestingly those of us in the first world enjoying our prosperous lifestyles already have stable or even falling populations. Evidence that sharing the wealth provides a path to sustainable stable societies that is relatively painless.

Fortunately, we are blessed with near infinite supplies of energy, available from the sun, the residual heat in the Earth's core, the Earth's rotary momentum, as well as the various developing and much safer nuclear technologies, these must be made available to everyone. Our other infinite resource, is the ability of our own human minds, to advance science, technology and the arts. In the final analysis, continuously doing things better and more efficiently is how human wealth is created and knowledge invariably advances along an exponential path as disruptive technologies replace dated and inefficient ones and every new discovery opens glimpses of the next unknowns.

Understanding the system

Over billions of years life on earth has evolved and as it did it has Terraformed the planet by rearranging chemical elements to create and maintain an optimum environment for its continuance. It has been a resilient system capable of responding to major geological and astrological shocks, volcanoes and asteroids. It manages to adapt and self-regulate through the cyclical changes in the Earth's orbit packing away surplus energy delivered from the Sun. That surplus energy is locked up in the hydrocarbon and geologic carbon stores that have been laid down by the living carbon cycle year after year since the first life evolved.

Man, has disrupted that cycle, by reducing the overall amount of living things on Earth, on land and in the oceans to less than 50% of what it once was. On top of that we have raided the store of surplus energy that life has sequestered away by burning vast amounts of fossil fuels.

And the consequences; the carbon dioxide content of the atmosphere which is the main controlling mechanism for the planet's temperature has risen from 280 ppm to 406 ppm and is now rising ever

faster causing the planet to absorb much more heat energy, most of which resides unseen in the oceans like a colossal night-store heater. Additionally, a vast amount of carbon dioxide has been absorbed by the oceans which are becoming more acidic and increasingly hostile to many marine organisms; further depleting the overall amount of life in the oceans and reducing the supply of oxygen it produces. With half the amount of life on the planet it means that our environmental management system now only has half the capacity it once had, knocking the resilience out of the system just at a time when humanity is delivering a major shock.

The fix

We must start restoring the amount of life on earth and in doing so return atmospheric CO₂ content back down to 280 ppm. That requires adding about 600 gigatons of living carbon to the planet. Currently the total amount is believed to be around 4,000 gigatons whereas pre-anthropogenic impacts it would have exceeded 8,000 gigatons. We have the capacity do this!

There is a catch; the inertia of the system and feedback loops that are already in play, such as the rapidly melting Arctic sea ice and tundra, is leading to the release of carbonaceous materials, methane in particular which is accelerating the warming of the Arctic Ocean, a complex and finely balanced component of the Earth system. The consequence is that we almost certainly will have to provide a crutch to the Earth and develop technologies to temporarily cool the planet, while the biosphere recovers; in short, intervene or geoengineer.

In theory we can do this, but there is a massive amount of study and experimentation to be undertaken to develop these vital technologies. To do this in a safe and responsible way it is going to be essential to have greatly enhanced Earth system monitoring capability, so that we can understand and manage our actions. Think of this as the dashboard and controls of spaceship Earth. Fortunately, we have the technological capability of creating that dashboard.

Restoring the biosphere and living within the limitations of our finite resources

There is an enormous amount of work to be done, concurrently we must:

- Completely restructure all of civilisations energy generation systems, to make them non-polluting;
- Generate almost twice as much energy as we do now, to lift the poorer two thirds of the world's population out of energy poverty;
- Deliver the enormous energy requirements of emergency Arctic cooling, water desalination and climate change adaptation;
- Use energy much more efficiently with in-built systems for its global distribution and storage (think of it as the Internet of energy);
- And, restore natural nutrient cycles to enable more life and a larger living carbon cycle.

Engaging in this activity will deliver employment for millions.

The challenge is to restore the Earth's soils, forests and oceans, while at the same time increasing food production. This work should be regarded as essential life support services and the hundreds of millions of people the need to be employed in this activity and be remunerated appropriately for that service. To enable that to happen, nearly 2 billion people who are currently outside of the global banking system need to have access to bank accounts and be connected to the global economy.

Fortunately, technology and commerce are racing to take advantage of the opportunity and Blockchain based banking on mobile phones by companies such as Humaniq, are providing the necessary infrastructure. Initially this work will have to be funded by the polluter paying, an underlying

principle of the carbon markets. This will be expanded so that those who use the ecosystem services, predominantly people living in cities, will pay those that are providing, maintaining and restoring those ecosystems, for their services.

To enable these tasks to be effectively carried out, we need to change our global legal framework to make it fit for purpose. This will require the implementation of a fifth crime against peace, the crime of Ecocide, which will provide protection for all living ecosystems and make their destruction, degradation, or polluting thereof, illegal. Within this framework it should be recognised that agricultural activities that are not ecologically sustainable, are a cause of pollution; of necessity this will lead to a very rapid reduction in the amount of meat that is consumed.

To deliver on all of this, we are going to have to greatly up our efficiency and this means that the trend towards mechanisation will intensify. Many existing jobs will be lost and although hundreds of millions of new jobs will be created, overall, we must expect that human time spent in employment is going to reduce. For this to benefit everybody, we must share the wealth that mechanisation creates. This can be done by paying those that maintain the biosphere fairly for their vital services. Their work will be critical to the success and existence of those who are developing technologies and re-engineering our cities. Expect basic minimum incomes to progressively become the norm and for people generally to be able to enjoy much more free time for leisure, learning, arts and sports.

An ethical world

The pathway to the sustainable future is not going to be easy. Humanity has left it to the very last minute to affect the necessary changes. Global pressures that we are feeling now will intensify driven by drought, famine, and competition for falling resources. Global society needs to recognise that war is not an option; indeed, all wars are major polluters and destroyers of ecosystems.

The costs of war and armaments must be repurposed into funding environmental restoration, this can be achieved by making it a central tenet of peace treaties. The first world must recognise that terrorism is spawned by starvation and hopelessness, only by restoring war and climate change ravaged lands, can migratory pressures be stopped and security obtained.

In this respect, the first world must also accept that enormous debts are due to many parts of the Third World whose lands have been ravaged and stripped of resources to create first world wealth. The only route to stability and an end to mass migration is the restoration of local environments, so that the populace of those environments can have sustainable and prosperous lives. However, repaying that debt can be looked at as an investment in the creation of new markets and new opportunities. Also, the stability that it creates removes risk, creates confidence and adds to wealth.

Because we have left it too late, many coastal regions will be lost to rising sea levels and other areas will become uninhabitable; so, we will have to make space for displaced populations or face considerable unrest as a direct consequence.

To enable a successful global biosphere restoration, much of humanity needs to reset its thinking in respect of living things, all plants and creatures play their part in a balanced ecosystem and our civilisation is wholly reliant upon them. So, we are going to have to learn empathy for all living things and enshrining their right to life in law. This requires a reset of the idea that man has dominion over nature. We must learn to become the custodians and guardians of our natural environment and understand that it is the natural environment that nurtures us.

The \$90 trillion opportunity

All it would take is 0.1% of the global bond market leveraged 10:1 to adequately fund the tasks set out in this document per trillion dollar tranche of transitional capital . The returns from investment will be exponential not just in monetary sense but also because they will enable humanity to have confidence in the future and make further technological advancement possible. Eventually the Star Trek future that we'd been brought up to believe in, can become reality. Nature follows patterns of reproduction and disbursement. Life on Earth in the form of our interrelated DNA is no different, eventually we move on or perish.

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