

Chapter 8 What happens next?

The words written in this book describe a planet moving to the edge of the abyss were the momentum carrying it there is in excess of the braking ability that the systems of governance are able to apply. We should not be surprised, they evolved to optimise the environment to provide economic growth. It gives no pleasure to argue these points. The arguments in this book are emotionally hard to comprehend and challenge many of the concepts that we take for granted, but the facts are unavoidable - atmospheric CO₂ has reached such a high level that our ecosystem is already in uncharted territory and yet CO₂ continues to be added at an increasing rate; the new generations of nuclear weapon systems entering service and the proliferation of nuclear weapons to the most unstable parts of the planet are keeping the dreams of a nuclear weapons free world more distant than at any time since the height of the Cold War; the financial crisis of 2008 warned that the global economy was inherently unstable yet this has been masked by printing money, keeping interest rates artificially low and forcing the weakest into further poverty through a myriad of actions such as spending cuts, welfare cuts, student tuition fees, carbon trading and inflation. This is against a rash of increasingly violent wars amongst the people fuelled by ecological collapse and which are enabled by easily available technologies and a globalisation system that provides the tools for bad as easily as those for good.

It is hard to reconcile these facts with the normality of day to day life. Today, I can cross the road from my house and enter a superstore full of food at any time of the day and I never go to bed hungry. I come home and switch the lights on without worrying where the electricity comes from. I go to work and teach our next generation the pleasure of mathematics and they leave my care hopeful of jobs as satisfying as those that their parents had. The shops are full not only with food, but with new technology that would be in the realms of science fiction only ten years ago. The casual talk from my friends of their holidays at the other side of the world has normalised the technological miracle of aviation to the mundane. We can marvel at the latest scientific discoveries in quantum mechanics and string theory and peer to the beginning of time using the internet to access the latest images from the latest telescopes. We can be transported with music and literature to times and places that we can never get to physically. If this is not enough, we can go our local woods, forests or nature reserves and relax in the comfort of what nature provides for free. It is hard to believe that all this richness is at risk, but it is and we need to acknowledge it for what it is - a society at its height and primed to fall. Jarred Diamond provided a stark warning in his book *Collapse*, where his research on the anthropological records of past civilisations concluded that they collapsed at the peak of their power and when it came, it was nearly always rapid. We would be naive to think that the exponential growth we have accumulated since the beginning of the industrial revolution has not taken us to an unprecedentedly high and unstable peak.

When standing at the top of this peak and surrounded by the trappings of its success it is easy to be infected by hubris, and this comes out in the approaches

that we adopt to the converging crises we face. Instead of taking action on climate change, we hear deluded arguments such as mankind's inventiveness and strive for progress will ensure technological solutions emerge to tackle the CO2 overload in our atmosphere and all that is needed are market incentives to make it happen. Unfortunately, this is a false interpretation of human history. Virtually no sustainable technological developments were made until the start of the industrial revolution so life in the 7th century was not significantly different to life in the 17th century. The overwhelming history of mankind is not to innovate, but to remain stable. The explosive development that we benefit from today only started at the beginning of the industrial revolution and was based on the exploitation of the large reserves of energy that nature had built up under the ground over eons. Every single technological advancement and innovation since then has been reliant on exploiting this easily available energy, something we can no longer take for granted.

Initially this energy was supplied entirely by coal, then supplemented with oil around the turn of the 20th century as the oil fields in the Southern USA and Persia came on stream. Now other extreme energy sources are being added to the mix such as tar sands, fracking for gas and biofuels. These are so energy inefficient that they cannot drive sustainable economic growth, and at best they will merely preserve the status quo for a short time. In so doing, they all add catastrophically to the climate change overload, either directly or indirectly. So we should dispel the idea that technological innovation will resolve the crisis. Likewise, we should dispel the idea that the market will provide solutions as the market is blind, uncaring and unforgiving. The concept of using the market to drive innovation largely revolves around the concept of introducing policies such as carbon trading or carbon pricing. As argued previously, this simply ensures that the poorest remain priced out of society. Placing all of societies hopes with technological innovation and market mechanisms is basically arguing for inaction.

These calls for inaction are also supported by many who claim to be environmentalists by peddling the myth that the current model of business and politics as usual can be continued with a green economy powered by renewables or nuclear power. Events around the world are demonstrating the fallacy of this; expenditure for fossil fuel exploration continues to outpace that for renewables¹ and the nuclear disasters around the world combined with the legacy of out dated nuclear power stations provide an unmanageably high risk profile. If the market is a driver of rational decision making, as its proponents claim, then the balance of spending would surely have swung entirely towards renewables by now. The fact that it has not done so, either indicates that the market does not act rationally when faced with these challenges or the potential of renewables is not as great as its proponents claim. Thus despite the success of developing renewable industries such as wind and solar power, global demand for fossil fuel continues to strengthen and wars amongst the people requiring industrial

¹Fossil fuel subsidies outstrip renewables funding by billions
<http://www.dw.de/fossil-fuel-subsidies-outstrip-renewables-funding-by-billions/a-17465775>

warfare responses escalate. Even environmentalists at the highest level, such as Christiana Figueres who heads the UN Climate Change conferences, still perpetuate the fallacy of a green economy with business as usual which does not need to challenge the political status quo of today - despite her acknowledgements that current commitments on CO2 reductions are insufficient to prevent a 2 deg C warming scenario and the world looking to her to drive a global agreement on climate change.

So today we are trapped in a state of paralysis on the edge of the collapse, but unlike unlike societies of the past which did collapse, we do have things going for us. We now have the internet which provides a level of interconnectivity and societal intelligence that we have never had before. This allows ideas and communications to hurdle nation state borders with ease and to develop in the process. More importantly it can equip societies with the intellectual tools needed to challenge the destructive status quo and allow the populations of competing nations to set up their own dialogue, so bypassing the narrative of governments bent of war and competition in support of the pro-growth market states. Enabling this is the incredible rise of social media providing a constant news feed that is freer from the strictures of the main stream media which needs to secure advertising revenues and satisfy the customs of the societies it operates in. The exponential function that drives the economy and has caused such destruction now has an upside. If the intelligence of a society is driven by its interconnectivity and ability to exchange ideas, in the same way that the human brain derives its intelligence by the interconnectivity between the neurons, then unlike the human brain this is doubling every five years. Thus, in the next five years the intelligence that the global society accrues will equate to all the intelligence that it has ever accrued. It may be that if properly directed, this could provide the intellectual base to avoid the worst case scenarios.

But this interconnectivity has an equivalent dark flip side. It can equally be used to distract through trivia, to subvert through advertising, to enable further unsustainable trade and to spread messages of hate and intolerance. Without the internet, the most destructive multi-nationals would be unable to operate and Al Qaeda would not be able to hold the most powerful military forces in the world to protracted stalemates. Nor are the pro-growth market states allowing the challenges that the internet and associated new technologies can facilitate to go unchallenged. The NSA releases from Edward Snowden have shown the extent to which these can be subverted. It is not just in the US that this is happening; virtually all other industrialised societies have had to introduce something similar using what ever means necessary. China, Russia and the United Kingdom even used the cover of the Olympics, which is ironically one of the biggest symbols of the pro-growth market states, to introduce mass surveillance systems,². The danger we face is that without a vision for structural reform of our society we will not reap the reward of this interconnectivity that we have invested so much to achieve and it will be used destructively in the

²<http://www.newyorker.com/online/blogs/elements/2014/02/sochis-mini-surveillance-state.html>

favour of the pro-market states.

At the time when we face the dilemma of how to use the knowledge and societal intelligence available to us, it is also the first time in the history of humanity that we have had such precise knowledge of our fate. We know precisely how fast greenhouse gases are building up in our atmosphere and we know precisely how much higher today's levels of gases are than at any time in the last one million years, even if we do not want to acknowledge this truth. We equally know that the population growth predictions for the planet are not sustainable and will be even less so in the future as climate change reaps its whirlwind of destruction reducing the planet's carrying capacity. These basic facts are understood by large numbers of people. From these facts and figures, we can calculate to an acceptable degree of accuracy how much longer our civilisation and life on the planet can survive. As argued in chapter 2, it is not long, yet this fact is not understood by as many.

Humanity must now grasp the magnitude of the crisis by using the knowledge available to each of us to appeal to reason and altruism rather than assuming all people are too selfish to implement the changes we need. This has been the foundation upon which civilisation has been built and which humanity has looked to in times of past crisis. There can be no more powerful example of this than the legions of young Allied servicemen who died on the beaches of Normandy in the D-Day landings to prevent the evil of fascism triumphing.

The changes that lie ahead are as daunting for our society as the D-day landings were for the Allied soldiers, but what many long-in-the-tooth campaigners have found is that often it takes only a couple of people with a strong vision and commitment to drive change. This is especially so if what they are advocating is right and just. These causes quickly pick up a momentum of their own. In moments of doubt we should take inspiration Jean Giono's legendary fable, *The Man Who Planted Trees*. In his allegorical tale a single sheppard devotes his life to transforming an ecologically desolate wilderness by planting one tree at a time until over his lifetime a full forest is established from which food, water, shelter and hope become freely available to the local communities. As well as a beautiful tale of the importance of preserving and enhancing our natural heritage it is also a tale of how much one person can achieve. To put it in perspective, the anti-aviation campaign groups in the UK total little more than a couple of dozen key influencers with little funds. Yet, their well targeted strategies jammed a stick firmly in the spokes of the wheels of the aviation juggernaut and stopped the development of the third runway at Heathrow. A much bigger stick now needs to be jammed in the existing systems of governance that allow the COP climate change agreements and nuclear non proliferation talks to continue indefinitely while protecting the concept of business as usual.

The plans that we must now consider can easily be dismissed as extreme, but we are in the most extreme of circumstances, so it should be no surprise that extreme plans are now needed. In our globalised, energy intensive and indebted world economy, if we do nothing the only thing in abundance will be nuclear weapons on hair trigger alerts. We prepare for this future against a background of atmospheric CO₂ growth that has become faster every year since the start of

the industrial revolution. Not only must we stop CO₂ emissions, but we need to find ways of sequestering CO₂ from the atmosphere and this can only be done in any significant way by restoring the ecosystem. This limiting factor to our economic development forces us to bring the nuclear weapons race to a close along with the industrial machinery and economic systems that supports it. Ironically, in these difficult times the best place to look for guidance on how to do this is at the events that led to the start of the current nuclear stand-off.

In 1946, with the dust settling around the world from the Second World War the United States was in a supreme position. Not a single bomb had fallen on its mainland, yet the rest of Europe and Japan lay in ruins. Its industry had benefited from the huge investment that the Second World War had brought transforming a nation that only ten years before was blighted by the great depression. Its oil and coal production were increasing year on year and injecting energy straight into the arteries of its economy, easing the difficult transition from war to peace. On the world stage it was the sole atomic power and the two hundred thousand dead in Hiroshima and Nagasaki were proof that the Americans were prepared to use it in war.

From this high vantage point, President Truman had the foresight to see that the combined power of the new atomic weapons and the military industrial complex could push mankind onto a path to oblivion. Ideas were already coming off the drawing board for combining the power of atomic weapons with the new technology the military industrial complex had learnt to deliver. A multitude of examples lay on the desks of policy advisers. In the United States, jet engines were about to revolutionise aviation and push strategic bombing into a new era. The massive B-36 bomber was already about to be superseded with the B-47, which combined with the atomic bomb and the mass production abilities of the American industrial machine ensured the Soviets could be bombed back to the stone age if required. Simultaneously, the rocket technology of Nazi Germany was being mated with the miniaturisation of the atomic bomb allowing for intercontinental ballistic missiles. What the Americans could do, Truman thought, the Soviets would eventually also be able to do. He rationalised that the world faced a decision; embark on an arms race the like of which it had never seen before or curtail it before it got going.

Truman commissioned Baruch, then the US ambassador to the United Nations, to sketch out plans for the latter option. He proposed to the United Nations in 1946 that the entire nuclear industry be put under the control of the Atomic Development Authority, from the uranium mines to future power plants. Under this scheme, the possession of atomic bombs would be made illegal as would interference with external inspections. Violations would lead to the seizure of facilities. The Atomic Development Authority would answer only to the Security Council, which would be charged with punishing those nations that violated the terms of the plan by imposing sanctions. The Baruch Plan would have stripped all members of the United Nations Security Council of their veto power on sanctions against nations that engaged in prohibited activities. Once the plan was fully implemented, the United States was to begin the process of destroying its nuclear arsenal.

Alas, the Baruch plan came to nothing. Despite being of noble intentions it was fatally flawed.

The Soviet Union could not agree to placing its embryonic nuclear weapons programme under an international body. Stalin had just lost 25 million in the Second World War and justifiably feared further foreign attack, especially with a nuclear capable US on its borders. Stalin had already cemented his place in history as one of the most psychopathically evil world leaders and his continuing control on the country was based on terror rather than legitimacy. The terms of Baruch plan would have meant that any nuclear developments of the Soviets would have to be turned over to an international community and be bound by legitimacy, something that he was actively engaged in undermining at home and abroad. The Soviets were not much inclined to have foreign visitors on its soil, let alone nuclear inspectors probing all the manufacturing bases of their military industrial complex. The plan also called for the personnel of the authority to be recruited on a basis of proven competence, which at the time meant that it would be made up exclusively of Americans.

From the American perspective things were not much better. They had just spent billions on the Manhattan project and were not willing to give up their lead lightly, especially if that meant sharing their new technology with a psychopathic dictatorship for promises that could not be guaranteed. The Baruch Plan committed the US to disarm, but only once the Soviets had committed to giving up their pursuit of nuclear weapons - the Americans would thus maintain their nuclear lead so long as there was any prospect of a threat and the Baruch agreement was structured to ensure this happened. Given that there was little chance of the Soviets agreeing to the main propositions in the plan, this final stipulation doomed any prospect of their acceptance. As well as debating the merits of the Baruch plan, there was much debate in Truman's cabinet about how long they expected the Soviets to take to build their own bomb, some reckoned on 10 years some on much less. In the face of uncertainty, Truman's administration played for caution and set the American industrial machine to the task of building not only more atomic bombs but the hardware to deliver them and fight the conventional wars that would be fought as a substitute for going to full blooded nuclear war. To ensure the message was clear to the Soviets, the Americans commenced their atomic bomb testing programme in the Pacific immediately after the Second World War. From a Soviet perspective, these actions made the prospect to agreeing to the Baruch proposals impossible.

What the Americans did not know at the time was that Soviets were a lot closer to their own bomb than they thought. In 1949 the first Soviet atomic bomb was test fired and with it the hopes of the Baruch plan lay in tatters. The Cold War started in earnest and both sides embarked on the massive arms build up that future survivors on the planet plagued with its legacy will wonder at its stupidity. The race brought the world to the brink of nuclear war, both deliberately during the Cuba Crisis and many times accidentally. Today, the competing military blocks remain locked in suspicion and competition making the co-operation we need on climate change impossible.

The starting premise of this book is that nuclear weapons must be "*put on*

the climate change negotiating table” and failure to do this will doom the planet to either runaway climate change, nuclear war or both. The implications of putting nuclear weapons on the climate change negotiating table will change the face of the political system and be a modern day echo of the failed Baruch plan, so will the things that caused it to fail in 1946 prevent it from working today?

Its failure at the beginning of the Cold War was in an environment that is very much different to today’s. In 1946, there was optimism of a grand new technological future and nations wanted to be free to exploit their radically differing visions of this. Principally, the Soviets communist system was based on the entire population acting like cogs in a machine towards some to overarching societal goal and the Western vision was to maximise individual opportunity to bring industrialisation through an anarchic pursuit of self interest. Ultimately both visions were about finding the way to most quickly industrialise. The optimism that the opportunities new technology could bring lasted into the 1970s and populations were indoctrinated with this from cradle to grave. Excited children watched Thunderbirds were benevolent super technocrats who had converted a presumably uninhabited tropical paradise into a rocket base were on standby to solve any crisis anywhere. At the same time, adults were denied information of the emerging catastrophes such as Britain’s nuclear disaster at Windscale and Russia’s equivalent at Mayak³ while simultaneously being told that nuclear power would provide electricity too cheap to meter. Corporations rushed to capitalise on the myriad of new opportunities that technology would unleash from jet powered aviation, to the green revolution, to nuclear power and everything in between. Today we live with the unintended consequences of the blind optimism and the subservience that was essential to early industrialisation, irrespective of the method used to implement it.

It has left us with a future were we face the mutual threat of runaway climate change, and despite the failures of technology the only solutions being offered are Thunderbirds style technological fixes such as renewables, nuclear power and electric cars. While all these may have a place in the final solution they are not solutions themselves. People are perhaps coming to realise this and there is a mood for change that did not exist in the past and the age of innocence has now passed. Populations struggling to cope with problems from radiological pollution, to local environmental degradation to global environmental collapse are increasingly cynical about technological quick fixes. This has driven society to a place that could never have been imagined in 1946.

The final question for those still convinced the status quo can be maintained by our advancing technology is why did the global finance markets collapse so dramatically in 2008? Despite all the day to day noise, their job is to price the expectation of future growth and they generally do a good job of this. Our society relies on then doing this so returns can be made on investments. A crash of the size that happened can only do so if the myriad of sensors contributing to

³Will Standing, Review of the Current Status and Operations at Mayak Productions Association (Osteras: Norwegian Radiation Protection Authority, 2006), <http://www.nrpa.no/dav/1fbb52ea04.pdf>

its assessment of future growth had convincingly determined this was impossible.

While the mood is becoming increasingly cynical and the outlook darkening, large proportions of populations in competing nations are realising they have more in common with each other than they do with the parties that govern them, democratically elected or not. Thus the anti coal demonstrators in the US, Australia and elsewhere find a strong kinship with their counter parts in China who staged protests of a size that only the Chinese can manage against further coal fired power plants⁴. In all major industrialised nations, the environmental movements are the centre of true government opposition. This can be seen from China to the US where environmental organisations can be equally branded as terrorists or criminal and in all nations they are on the ascendancy. This shared realisation of the fragility of the environment and the common goal to preserve it is an essential prerequisite to success that a modern day Baruch plan can capitalise upon. By contrast with 1946, the global population was still recovering from the aftermath of the Second World War and had been indoctrinated on a diet of nationalism to sustain the fight over previous years. Though the rise in common environmental opposition around the world is a positive step forwards, on its own it does not offer a guarantee of success; as has been argued in previous chapters nation states in the process of collapse will be seduced by nationalism with its false promises of security. One of the best way of preventing this is to have a common vision of an alternative, at present there is nothing.

So there are many questions before us today. Could a modern day Baruch plan create a strong and credible enough vision to counter the pull of nationalism? What would a Baruch Plan look like today? What parts of the previous plan are essential and what needs to be added to take into account the new realities of today which are the huge legacy of nuclear weapons, the military industrial complexes which have become essential parts of the global economy, runaway climate change and an unstable finance system that cannot equitably distribute critical resources? It is a much more difficult landscape today than in 1946, but these same difficulties also make implementation of the plan more likely now because there is now no other option as everything else has demonstrably failed. The interconnectivity of issues also means that the modern day equivalent to the plan must tackle climate change, nuclear disarmament and financial reform simultaneously. This time the bullets loaded into the breach of the climate change gun and the ticking clock to which it operates mean that the process must not be allowed to fail.

As well as the 1946 populations and governments still being relatively immature in the learning process of industrialisation, the other reasons why the plan failed was that its implementation was to take place on a big bang basis. This was despite the text of the agreement saying that it “*should proceed by separate stages, the successful completion of each of which will develop the necessary confidence of the world before the next stage is undertaken.*” However, it was an all

⁴Move Beyond Coal,
<http://www.sierraclub.org/international/beyond-coal/global-movement-beyond-coal-report-2013.pdf>

or nothing option in the midst of increasing tensions brought about by the race between the Soviets and United States for the possession of the atomic bomb and moral superiority for the respective systems of governance. There were no clear stages stipulated, nothing was offered in return at each of the stages and the political system would stay as per the status quo allowing for unfettered industrialisation competition. In today's world with many nations nuclear armed a more precise phased introduction is necessary which allows confidence to be built up as nations move to a clearly articulated end vision and which offers something in return at each stage while preserving security as they make their way along the difficult journey to the new paradigm needed to tackle the climate change crisis.

We suggest the following phases, which constitute the basis of a modern day Baruch Agreement. Like the Baruch Agreement of 1946, when sticks as well as carrots were used, today is little different. Sanctions would need to be imposed on those nations that do not comply.

Stage 1 - Signing a No First Use agreement on nuclear weapons.

It is proposed that all nuclear weapons states sign a No First Use (NFU) Agreement to minimise the real risk of accidental nuclear war in the event of increased international tensions brought about by climate change.

During the Cold War, the Soviet Union and China both claimed to operate NFU policies, in contrast NATO was prepared to use nuclear weapons to respond to a large and overwhelming conventional attack in Western Europe. However, since the ending of the Cold War the situation has become more serious. With Russia taking over from the Soviet Union, it dropped its commitment to a NFU policy, driven by the weakness of their conventional forces in relation to those of the West. China's position has become ambiguous with their 2013 white paper on defence making no mention of a NFU policy⁵ in contrast to their previously clear positions on this matter. This comes amid much debate on the expansion and development of their nuclear forces.

The USA, UK and France continue with the Cold War stance and refuse to commit to a NFU policy. The USA effectively threatened Iraq with nuclear weapons in the Gulf Wars should Saddam Hussein attack allied forces with chemical weapons, thus having no NFU actually enabled a large scale conventional war and has set a dangerous precedent that other nuclear powers can employ to further their ambitions.

The refusal to sign a clear NFU policy is reflected in the technology of the nuclear weapons systems being deployed. The Trident system is considerably more accurate than its predecessor, Polaris, allowing smaller nuclear warheads to inflict precision destruction on military targets, making it a perfect first strike weapon. This is completely counter to the claims the US and UK governments

⁵The Diversified Employment of China's Armed Forces
http://news.xinhuanet.com/english/china/2013-04/16/c_132312681.htm

make in support of its deployment which is that it is a second strike weapon of last resort and to be used only in the event of nuclear attack on either the US, the UK or another NATO ally. This dangerous change in strategic position has been highlighted by Robert Aldridge, a senior engineer for Lockheed on the Trident missile programme in the 1970s who resigned his position over this issue. This trend towards developing first strike weapons continues; today huge investments are currently ongoing in the USA to combine low yield nuclear weapons with the high precision targeting technology to allow nuclear attacks on hardened military targets.

The situation is no better with the new nuclear nations. Both India and Pakistan refuse to sign a clear NFU policy and both are prepared to use nuclear weapons first. India's commitment to only use nuclear weapons against another nuclear armed nation, which in their case means Pakistan or China, offers little reassurance. Pakistan, which responded to India's violation of the NPT by developing its own bomb programme, has actively threatened first use of nuclear weapons against India. North Korea behaves in a similar way with regular threats to use nuclear weapons against South Korea, Japan and the USA.

Israel's policy of ambiguity on nuclear weapons prevents it from making any clear statement on NFU. In the 1973 Yom Kippur war, Israel allegedly readied atomic warheads for use, and today Israel makes threats to Iran as frequently as Iran makes threats to Israel. On its doorstep is the ongoing Syrian crisis with chemical weapons still in the battle theatre and Israel's potential response to threat from these could well be nuclear, despite the damage of nuclear being orders of magnitude greater than chemical weapons.

As previously argued, in a world plagued by nuclear proliferation and where attacks can be launched that cannot be traced back to any single nation state, not having NFU agreements dangerously escalates the risk of nuclear war. This is especially serious given the common mode impact of climate change which will cause interconnected flash points to occur simultaneously around the world, significantly increasing the risk of catastrophic miscalculation. While nations collectively continue to migrate away from a NFU policy while simultaneously becoming more nationalistic, more threatened by climate change and having more overlapping issues, the chance of achieving any form of nuclear disarmament will be impossible. To believe so is naivety. Thus implementing a NFU policy and justifying it against the risks posed by climate change offers the prospect for a change in the existing narrative. It forces debate on relevance of nuclear deterrence and challenges the misguided concept that the security of all industrialised nations can be enhanced by all of them racing to upgrade their nuclear weapon systems. As importantly it forces acknowledgement of the severe risk of war and ecological destruction that the planet faces.

In common with this should be limitations on conventional forces. While so far attention has always been on implementing limitations on nuclear weapons, it is as important to impose limitations on conventional forces. The targets that industrial infrastructures offer such as a nuclear power plants and chemical factories, along with the fragility of industrial democracies, means that attack

by large scale conventional forces can be as destructive as a small scale limited nuclear exchange. Also, conventional force superiority can be as intimidating to a prospective enemy as nuclear weapons, simply because it is more likely to be used. Faced with the overwhelming NATO superiority of conventional forces, Russia is now implementing of a policy which they call de-escalation and is based on preemptive nuclear attack in the event of facing defeat in a conventional theatre of war⁶.

Stage 2 - Cessation of strategic military exercises, removal of weapons systems from high states of readiness, development of joint climate change plans

All signatory parties must agree to prohibit the staging of strategic military exercises using bombers and rocket forces capable of delivering nuclear weapon systems against each other.

As well as being provocative, history has shown that these are also prone to misinterpretation and with the escalating threats from climate change, the risk of misunderstandings that this will create is unacceptable. History is replete with examples, one of the most notable is the NATO Operation Able Archer in Western Europe in 1983. This was so realistic that the Soviets thought they were under attack and placed their nuclear forces on high alert, bringing the world almost as close to nuclear war as during the peak of the Cuba Crisis. At roughly the same time, Americans were flying the F-14s off aircraft carriers over the Kamchatsha peninsular and other US spy planes were flying on the edge of Soviet airspace to monitor Soviet missile tests. These events increased tensions and nervousness to such a degree within the Soviet military that when a Korean 747 strayed off course it was immediately shot down.

Even at the height of the Cuba Crisis, with the world on the brink, both the USA and Soviet Union continued to conduct missile tests which more by luck than good judgement were not interpreted as hostile missile launches. The list of near disastrous misunderstandings as a result of misinterpretation of exercises goes on. Yet, despite ending of the Cold War all the world's major nuclear armed nations still continue with provocative exercises that have the potential to be misread by either side, especially in times of high tension.

Large scale exercises whose intent is to demonstrate threat to other nations must come to an end. As part of this, strategic forces must be stood down by all parties as their proactive peace time use is covered under the guise of military exercises. Thus all nations would keep ballistic missile submarines in port, nuclear capable bombers grounded and intercontinental ballistic missiles would be taken off alert.

If states feel threatened by rogue nations that do not sign up to the agreement, then forces can be kept on standby subject to inspection by other signatory nations to ensure that they are not being targeted.

⁶Why Russia calls a limited nuclear strike "de-escalation"
<http://thebulletin.org/why-russia-calls-limited-nuclear-strike-de-escalation>

As well as defusing tensions, this demonstrates serious intent to engage in the mutual cooperation needed on climate change in preference to protecting self interest, and this is the primary objective to be achieved. This is a far more effective demonstration of real intent than negotiating climate change agreements that up to now have been false promises obfuscated by complex jargon.

In conjunction with this, nations must commit to publishing auditable plans for making substantial emissions cuts of greenhouse gases and proposals for how the environment can be restored to allow the sequestration of CO₂. These plans need to cover how fossil fuel extraction is reduced to as far as reasonably practical, how over consumption is curtailed, how debt based finance systems are replaced with stable means of exchange and how environmental protection and restoration becomes the primary goal of nations. To achieve these objectives, industrial contraction will be needed. This is the antithesis of the economic growth politicians vie for today. The initial proposals that nations make at this stage to achieve these objectives will form the basis of future progression through the next stages.

Stage 3 - Implementation of a new security council and form of global governance

The initial Baruch plan proposed a supra-national security council that would have ultimate control of all nuclear materials and ensure compliance with the objective to keep the world free from nuclear weapons. Implementation of a similar council must form the basis of an equivalent plan today, but it needs to reflect the reality of today's world which is far more complex and interrelated than that of 1946.

It is proposed that the Permanent (P-5) Security Council of the United Nations is disbanded. At present the P-5 members of the council are all nuclear armed, they have the largest military expenditures, the largest industrial complexes and are the largest sellers of arms abroad. Maintaining these interests is totally contradictory to the actions needed to tackle climate change. It has forced all these nations to use their power of veto in the UN security council at various stages to support their interests or those of their closest allies and against the interests of the rest of the planet and natural justice.

This group also does not reflect the make up of the planet; membership is granted purely on the basis of being an industrialised nations on the winning side of the Second World War. Thus, there is no representation from the African nations despite African nations such as Egypt and Libya being the scene of some of the most destructive fighting in the Second World War, because they were not industrialised at its end. There is no representation from the Indian sub continent despite the mass famine they suffered during the Second World War and the huge numbers lost fighting on behalf of the British Empire, because they were under British rule at the end of the War. Equally seriously, there is no representation from global indigenous communities who have always been in the vanguard of the fight on climate change and environmental destruction because to acknowledge their rights would be to curtail industrialisation and

economic growth. The P-5 is a group whose purpose is to preserve the power in perpetuity of the industrialised groups that won the second world war. As such it is fundamentally anti-democratic and racist. Thus the group that determines the legitimacy of the possession of nuclear weapons has no legitimacy itself that is relevant to today. As such, it is not able to make the argument that the nuclear weapons they hold are legal. In a supreme irony, which is little commented on, is that permanent membership to the world's most elite legal club is guaranteed by the possession of nuclear weapons systems whose use and possession is illegal under any circumstance.

Membership of the P-5 drives perverse incentives as Britain and France both demonstrated with their race to acquire nuclear weapons. Britain's race resulted in the Windscale disaster, the irradiation of Aborigines in Australia and thousands of conscripts on Christmas Island during the atomic bomb test programmes. The French programme was as bad. Atomic bombs were tested in Algeria and the Pacific releasing large quantities of radiation on other countries. To defend this programme against legitimate protest they sunk the Rainbow Warrior in New Zealand with a terrorist attack ordered from the highest level killing one of the crew members and then threatened New Zealand with economic sanctions when they attempted to bring the captured French agents to justice. The spoils of this terrible race have been granted in perpetuity to both Great Britain and France. Perverse behaviour continues to this day with the British government using membership of this group to justify its decision to replace the Trident missile system.

Thus as the P-5 group is constituted, it has no legitimacy to claim moral leadership of the planet. Each member of the P-5 has failed to curb CO2 emissions and have implemented policies that either directly or mendaciously have ignored the science of climate change. The P-5 has outlived its initial purpose of preventing large scale nation state warfare and is totally ineffective against the new wars amongst the people. It is no longer relevant to the main security challenge of today which is preventing ecological collapse and ensuring fair access to increasingly scarce staple supplies. On the contrary, its very existence is an impediment to the progress that is needed. It encourages other nations who aspire to have an equal say in world politics to acquire nuclear weapons and is thus inherently proliferatory. It embeds racism and nationalism into the world's political system providing the fuel for racist and nationalistic elements to emerge at local levels.

It is therefore vital that an alternative group replaces the P-5. The primary purpose of a new group is to represent the interests of the global population rather than the interests of the nation states and their individual rights to continue industrialisation. It is proposed that this group will be appointed by popular election and its remit is to ensure the environmental integrity of the planet. To avoid a single large nation having too much power, the constituencies would be based on a given population size, say 500 million. This may require a single constituency to span several national borders to achieve the population size needed, or a single large country such as China or India may have to have more than one constituency within its borders.

The remit of this group is to ensure that interstate disputes are resolved through due legal process, to prevent despotic and tyrannical regimes from emerging as climate change intensifies, to ensure co-ordinated responses to the humanitarian and environmental crises that will emerge from climate change, to take control of the entire nuclear supply chain and to have ultimate control of military forces.

An essential part of the climate change solution will be to introduce alternatives to the current debt based system of finance for resource distribution, the solution that participants could choose could be carbon rationing, carbon taxation, some hybrid of the two or something entirely different. A key objective of this group is to ensure that it is extended equitably to the entire population that is represented by the security council.

Stage 4 - Bringing nuclear weapons under legal control.

With very few exceptions it has proven impossible for nuclear armed nations to give up these weapons. Only South Africa gave them up voluntarily, Iraq gave up its quest for them after its infrastructure was blown apart in the first Gulf War and Libya gave them up after having seen what happened to Iraq in the second war and the ex-Soviet states such as Ukraine gave up those that had been left behind for security guarantees. As discussed previously despite the pressure in Western countries for unilateral disarmament, not a single campaign has been successful and all nuclear armed countries retain nuclear weapons on permanent standby and ready to launch on warning.

It is proposed that once nations have stood their nuclear weapons down as per Stages 1 and 2 of this agreement, any remaining weapons systems are put under joint command answerable to the security committee as envisaged in Stage 3. This would see nuclear submarines, bombers and missile silos with international crews drawn from signatory nations. As per the initial Baruch agreement it would be illegal for any nation to maintain nuclear weapons under its own command.

As well as significantly reducing the risk of an accidental launch, it will provide protection against any rogue nation that does not sign up to the agreement and sets about pursuing its own nuclear weapons programme. Once no threat exists then these weapons systems must be taken from service.

Stage 5 - Decommissioning the military industrial complex

All signatories would have to start decommissioning the industrial infrastructure they use to build strategic weapons and other weapons of mass destruction. These are deeply embedded into the the global economy and the decommissioning will result in loss for shareholders, governments and staff and this must be managed carefully.

Of particular concern is the impact that this causes to existing staff and there is a basic humanitarian objective to ensure that the transition they are forced to make is made as smoothly as possible and they and their communities are given

help and support as necessary. There is also a serious security issue to ensure that this is done. The collapse of the Soviet Union provides a warning of the dangers inherent with this when highly skilled technicians were forced through poverty to sell their services to any state or non state agents desperate to get their hands on weapons technology ranging from rockets, nuclear warheads, chemical and biological weapons.

The decommissioning process must initially focus on infrastructure and operations that have no dual civilian use such as nuclear submarine building facilities, nuclear weapons fabrication sites, submarine bases, rocket manufacturing facilities and nuclear warhead manufacturing facilities.

Following this industries that have dual use would be subject to regulation by the security council set up in Stage 3 to ensure that their output is strictly controlled. Any military hardware that is subsequently built must done under the control of the security council.

Many nations will be unwilling to dismantle these industries as they are strategic and once dismantled will be virtually impossible to resurrect. However, as has already been argued in this book these are incompatible with a zero carbon economy. They require huge amounts of energy to operate, they must be subsidised with contracts in the civilian sector forcing expansion of this sector and they require an expanding economy to raise the taxes. Thus, their continued existence is incompatible with the concept of a zero carbon economy and the elimination of these industries is essential so nations can make the transition to this safe from the threat of warfare.

The expenditure that is tied up with the military industrial complex is a parasitical drain on all economies and on any nation that it is used against. It delivers no societal benefit in the same way that health care improves the health of the working population and education provides an enlightened work force. On the basis that there has been no successful application of military force in the new era of war amongst the people, yet it is able to threaten disproportionately and destroy totally, then it is essential that its industrial base is diminished to as low as practical.

Stage 6 - Introduction of Mutual risk management programmes

As climate change takes its toll on the planet ecological disasters will happen with increasing rapidity and frequency. As these happen societies will be weakened economically and the tipping point will arrive where the magnitude of the disasters is greater than the ability of a nation to recover from it.

Massive hurricanes such as Sandy are warnings of what is to come on a destabilised planet and this is something that almost all thinking people are aware of. However the problem of climate change disasters is likely to become much more serious than even this great natural disaster.

As sea levels rise, many of the world's main cities and population centres will be flooded forcing mass evacuations. More seriously as sea levels rise and flood these areas, the huge industrial facilities such as oil refineries, nuclear power

plants and other dangerous chemical plants will be simultaneously inundated. If left unaddressed the pollution they cause will destroy what life is left in the oceans and leave society without the critical infrastructure, resources and energy needed to function. At the same time these are the very things that societies will be in desperate need of to allow adaptation to the crisis.

It is therefore proposed that the signatory nations should agree to come to each others aid in the event of natural disasters following a similar model that is used within NATO where an attack on one nation is considered to be an attack on all.

The aid that nations should provide can include logistics support, energy supply, food distribution and a safe haven for environmental refugees.

Stage 7 - Replace the System of Industrial Democracy with Direct Democracy

In chapter 5, the concept of industrial democracy was introduced as a way of describing the system of governance that has come to dominate industrialised nations. This system relies on limiting the choices and freedoms of citizens so industrialisation can continue and nations can remain competitive against each other. This is counter to the need to reduce the emissions of greenhouse gases and other pollutants associated with industrialisation, therefore the system will always operate at the expense of natural justice for humanity and the environment. This creates a dangerous conflict - industrialised democracy infers legitimacy on governments both nationally and internationally which they use to further the process of industrialisation and indoctrinate their populations accordingly, yet the limited choice that the electorate can make means the concept of democracy is at best a mirage and at worst a fraud.

The problem is accentuated by the inherent conflicts that Kenneth Arrow in 1972 identified with any voting system, (as discussed in chapter 5). These prevent the current system of industrial democracy from ever representing the true concerns that a population may have and it equally prevents elected representatives from acting on behalf of their constituents. When economies were still able to grow and the ecological crises had not yet become critical, these inherent conflicts were generally resolvable and industrial democracy could continue under the veneer it had created for itself. However, with the onset of climate change and peak oil, this falls away. The conflicts now become critical life and death issues that cannot be resolved to any satisfaction by elected representatives. Industrial democracy then becomes wholly incompatible with today's emerging crises of nuclear weapons proliferation, runaway climate change and energy shortages and the political system that it represents will, with near certainty operate in the worst interests of the majority of the population.

The only way these conflicts can be overcome is for the system of governance to move towards a direct democracy model, thereby resurrecting the structure used in Ancient Greece. In the ancient world, this was naturally limited to the size of a city state, but today with modern technology, in as much as it will continue to exist, it can be scaled to cope with the industrialised societies that

we have now created. A migration to direct democracy overcomes the critical conflicts that Kenneth Arrow identified by allowing the electorate to vote on one issue at a time. It would be clearly inappropriate that all the issues decided on by parliament be addressed through direct democracy, thus delineation would be necessary such that issues of strategic importance should be addressed through direct democracy and issues of day to day management become the domain of parliaments. In this model, parliament's role is limited to administration and managing the outcomes that are determined by popular mandate.

It is essential that we move to this form of governance to overcome the democratic deficit that we have endured since the beginning of the industrial revolution. This has had profound effects that has shaped societies development and this has always been for the worse. It becomes more serious with the march of technology. The history of the nuclear deterrence illustrates; in no industrialised democracy has there ever been public debate about becoming a nuclear weapon state, staying as a nuclear weapons state or allying with a nuclear weapons state. Thus the US dropped the atomic bomb on Japan with no democratic accountability and it is arguable that the decision to drop the bomb was as a result of the industrial momentum that the secret Manhattan Project built up rather than any military imperative. At the time, Japan was virtually finished and with Germany out of the war, it was only a matter of time before its fall, especially as the rest of the world was taking aim at it. While the decision will always be subject to debate amongst historians and it can possibly be excused as a being the result of the Second World War; in no way can the same be said for the US atomic weapons testing that commenced immediately after the war and culminated in the decision to detonate hydrogen bombs and convert Pacific paradises into radioactive waste zones. As with the dropping of the bomb on Hiroshima, this was done without the consent of the people. The Soviet Union, as the weaker competitor, then followed in the same footsteps and irradiated large parts of its interior in its equivalent atomic bomb testing programme. After this, the military industrial complex on both sides ramped up production and initiated the biggest arms build up the world had ever seen. By 1960, US bombers were on permanent airborne patrol armed with hydrogen bombs ready to be dropped on the Soviet Union at a moment's notice. Instigation of this strategy followed the trend of the previous critical decisions being made with no democratic debate - all the main political parties in the US and UK supported nuclear weapon deployment and in the USSR there was naturally no debate. This mutual silence was despite the unbelievably dangerous and provocative stance that the actions on both sides represented. As the Cold War progressed, huge sums were subsequently invested on the Polaris and Trident weapons systems, amongst others. The thousands of nuclear war heads held by these systems are all ready to be fired on warning, thus the ultimate decision to go to nuclear war and destroy the planet must inherently be taken without a democratic mandate of any kind. This nightmare represents the culmination of the lack of democracy in all preceding development stages from the introduction of nuclear weapons and it continues to this day.

The same arguments pertain to global climate change agreements. Elected

officials who inherently have competing objectives to satisfy are unable to make climate change agreements on behalf of their constituents and thus democratic accountability is removed from the process. Opportunities to take robust action on climate change have been consistently missed since the first warnings in the 19th century were made. Destructive stagnation is the result.

Once security agreements can be achieved as outlined above, the flawed concept of representative democracy must be abandoned and replaced with direct democracy. This is essential to prevent the rise of the industrial democracies with their destabilising drive to prepare for large scale warfare which they justify with popular nationalism. It is difficult to prove that this would become a deterrent to future war and a driver to rational decision making on climate change because no significant economic and military nation has ever been a true democracy. However, in a true direct democracy where the people are responsible for critical decisions on both war, the preparations for war and ecological stability rather than an elite of elected representatives, then the roads to war and ecological destruction becomes harder to slide down and the debates that any nation has on these subjects will be debates that will echo around the world. This will be potentially be of such magnitude that in the highly connected world of today, it will have the potential to destabilise autocratic nations, as such direct democracy has the potential to be a far greater threat to unstable regimes than nuclear weapons.

It is proposed that the concepts outlined in this book be the starting point. True democratic nations must collectively debate in open the three questions on nuclear weapons that are posed in chapter 4 and having had these questions presented, nations should collectively determine if they still believe that nuclear weapons should continue to be deployed in their name.

Though many things in this list of actions that society has to take appear futuristic, progress on most is already being made. Arms inspections and nuclear ceilings are the hallmarks of nuclear arms limitation talks and have been since the 1970s. This is something that could never have been envisaged when Baruch made his presentation to the UN in 1946.

There is a growing international movement that is challenging the legitimacy of any holding nuclear weapons by any nations, and the ultimate end point of this argument must be the very existence of the UN P-5 security council.

Finally, critical decisions on the nation state are already being taken by popular mandate such as membership of the European Union and independence of Scotland. In the UK public consultations on critical decisions, such as airport expansion, are now common place though the final decision being made by elected representatives is still far from the ideals of the direct democracy model, but it is a step in the right direction and societies faces more complex issues this will increasingly be the trend.

Other critical issues

The main critical issues facing humanity can be summarised as over population and the introduction of future disruptive technologies. These contentious issues must be resolved within the framework described above.

The global population is already too high and currently on track to increase to 10 billion. The impact of this can be measured in a myriad of yardsticks, such as rising atmospheric CO₂, collapsing fish stocks, tropical rain forest destruction, resource depletion, soil erosion and habitat loss amongst many others.

Any one of these can be used as a gauge to estimate what the sustainable population of the planet is, but the most comprehensive is the rising CO₂ levels as everything ultimately feeds into this. This were already rising in 1958 when accurate measurements first began at the Manu Loa observatory in Hawaii. At this time there was less than 1 billion people living in the industrialised world and the energy consumption per person was less than today. Since then much of the planet's ecosystem has been severely degraded reducing its ability to sequester CO₂ and atmospheric CO₂ has increased 40% since then. Thus the long term sustainable population of the planet must be less than 1 billion if there is to be an aspiration for the survivors to maintain any of the benefits an industrialised society. If the planet's population stabilises at a higher level, then freedoms will have to be curtailed further and this will always be the balance to be struck. This is a hugely uncomfortable but unavoidable conclusion. It raises the frightening prospect of a population contraction coming through war or famine if nothing is done to reverse the catastrophic population expansion and explosion of consumption facing the world today.

The situation is only set to get worse, the longer we stay at the current population and consumption levels the lower the long term sustainable population and the greater the pull that natural forces will exert to make a return to equilibrium.

It is simply not possible to avoid the crisis of over population and what cannot be sustained will not be. Every person on the planet requires energy and causes CO₂ emissions and the more industrialised the society that supports them, the more the CO₂ emissions. Because so much of the ecosystem has been destroyed everyone is increasingly forced to live an industrialised lifestyle. The few indigenous communities left in the world have either been forced from their homelands or have had their food supplies destroyed by the encroachment of others who are backed by industrial strength. Their survival in most cases relies on assimilating themselves into the industrialised world. As a result it is increasingly difficult for the global population to avoid transitioning into a higher carbon life style. Compared with 1958 when CO₂ measurements were first recorded, many billions are now living in industrial societies.

Even if the best case future scenarios emerged of a completely successful transition to a zero carbon economy there is still no evidence to suggest the planet would be able to sustain a 10 billion strong population for any length of time. A zero carbon economy would mean limited travel and distribution of essential goods. With this diminished economy, it will be more difficult to

alleviate the effects of famine in one area of the planet by distributing food from other areas that have an abundance and a 10 billion strong population living in a zero carbon economy with no industrial fertilisers, depleted soil and a polluted ecosystem makes localised famines inevitable.

Some would argue that this need not be a problem, after all in some countries population is at or below replacement levels. This is especially so across many European nations, from those that are financially successful such as Germany to the those that are bankrupt such as Spain. In Japan, the urge to procreate has reduced to such an extent that the young people of Japan have given up sex, the sales of incontinence pads exceeds nappies and the population is set to fall to a third by 2060. It is no coincidence that Japan is also one of the most overpopulated and ecologically destroyed countries in the world and the disaster of Fukushima is making this far worse. In China the one child per family policy has prevented its population explosion from the 1960s having even more devastating consequences which would have necessitated further coal fired power stations and African land grabs. In a nation where the air condition is already so bad that it is difficult to have any positivity for the future of a new born child, keeping the population growth in check takes on an added sense of urgency. Ultimately, it may be that the forced one child policy may not actually be necessary as diminished future prospects caused by pollution does the job that state had to do.

Russia is also facing its demographic time-bomb. The life expectancy and birth rate is one of the lowest in the developed world driven by industrial pollution, a radiological legacy from nuclear accidents such as at Chernobyl and Mayak along with atomic bomb tests and violence that is essential to survival in an industrialised society. Life expectancy had become so bad prior to the end of the Cold War that the figures were a state secret. Should the nation continue on this path, it will be a shadow of its glory days at the peak of the Cold War and by 2050 its population will have fallen by upto 40%.

For those that continue with the argument that the population will control itself and we need not worry, it is tragically clear that it will and this is already starting to happen, but they are wrong to suggest that the we need not worry. For it is the combination of ecological and economic collapse driven by the over reach of industrialisation that is the predominant way population growth is being constrained. It is the Hobson's choice of birth control by allowing ecological destruction or birth control by coercion. It makes a mockery of the optimists claim that populations can be brought under control simply by better education, literacy programmes for women, improved child health care and economic development. These are the very things that drive industrial development and force societies up to and past ecological limits of sustainability. Nations such as Saudi Arabia, the African nations and India that have not yet choked themselves under clouds of industrial smog or irradiated their countryside are still in the midst of destructive population growth despite many of these social improvements. The lessons across the world suggest that nations only really limit their population growth once destructive levels of economic growth have been achieved.

It is therefore a tragedy that the governments of nations with declining birth rates are doing all in their power to reverse the decline and return their population back to previously unsustainable levels. Nations such as Russia and Iran fall into these categories and some European nations are trying to do likewise. The reason given is nearly always the same; the smaller numbers of young people in the future will not be able to support the needs of the elderly and with a declining and ageing population a nation cannot complete economically and militarily on the world stage.

The final problem comes when a society collectively decides to limit its family sizes to below replacement level, yet others don't. This can occur within a nation were one group, often religious, encourages larger family sizes, or were a nation with birth rates that it cannot sustain sees the problem solved by its surplus people emigrating to nations where the people are attempting to keep their population under control. This is happening in the United Kingdom. The indigenous population of the UK have moved towards having lower birth rates, yet they see no benefit from this sacrifice as immigration continues to remain high and first generation immigrant families tends to have larger family sizes. The result is increased tensions between the various communities along with the rise of extremist political parties such as UKIP in the UK and the equivalent elsewhere in Europe. Ironically, these right wing parties that climate change forced immigration is fuelling, are the least receptive to cooperating on climate change.

Despite the evident problems of overpopulation and its intimate link with rising CO2 levels our response has been to largely ignore it; it is simply too contentious. Even groups such as Population Matters shy away from giving a target that we should aim towards; instead they give only a bland statement that "*Our vision is of a global population size enabling decent living standards and environmental sustainability*".⁷ Likewise, the climate change talks (COP) have yet to raise the issue and agree on any targets, despite their aspiration to achieve legally binding CO2 levels by 2020. The only response that governments make to the population crises facing them is to impose increasingly harsh immigration policies with virtually every industrial nation going down this route while ignoring the root cause of the problem.

It is therefore vital that nations signing up to the modern day Baruch plan consider how they can protect the interests of nations that are actively attempting to reduce their population and comply with the agreements necessary in each of the stages above.

Disruptive technologies are those that cause a paradigm shift in society and drive political change. Past examples are James Watt's invention of the condensation chamber for the steam engine which propelled Great Britain and the rest of the world into the industrial age and latterly the development of the internet which has revolutionised not only our economic landscape but the political

⁷Population Matters Web Site and statement for the media.
<http://www.populationmatters.org/the-media/>

landscape and the means by which we wage war.

By their very nature, it is difficult to know what disruptive technologies are on the horizon, some may appear to be beneficial in humanities quest for survival against climate change and other may cause more problems than they solve.

Fusion power may turn out to be one of these technologies. The ITER project is already a model of global cooperation and even if it never produces electricity it would be a success for this. However, the range of technical factors acting against the ITER project makes it doubtful that it will ever truly contribute towards the global energy mix within the time scales needed. Even if it is made to work, the intense radiation it develops will require much of the reactor vessel to be replaced within a short period of operation and there is no secure supply of tritium to enable a global roll-out. However, there are claims of other break throughs such as a Lockheed Martin's claim of being able to develop a new type of miniaturised fusion reactor that does away with some of the ITER design problems. However, little has been released to substantiate these claims. If fusion does turn out to be successful or another solution materialises which does provide the nirvana of limitless cheap energy then far from assuming that all the world's problems will be solved we should consider carefully how this technology will be applied in a world racked by climate change such that it does not simply encourage further unsustainable growth. Other possible disruptive technologies are thorium nuclear reactors and fast reactors that have the potential to burn existing nuclear waste. These may well turn out to have the potential to revolutionise energy production, but even if successful they will not be able to solve climate change, simply due to the time needed for their introduction and the build up of CO₂ already in the atmosphere and nuclear waste issues will still arise. The potential of these needs to be carefully addressed within the structures outlined above the arguments presented elsewhere in the book.

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Final remarks

Some will dismiss the idea of putting nuclear weapons on the climate change negotiating table as an idealistic fantasy, especially those whose livelihoods are dependent on the existing status quo. It is not. The fantasy lies with those that believe the existing system can carry on when all critical ecological limits have been exceeded and we continue to go further past them. The evidence that the existing system cannot deliver is the litany of failures on climate change and nuclear weapons talks along with a financial system that incentives ecological destruction at a time when when it is overwhelmingly obvious that we need to do the opposite.

Some nations have reacted with concern on climate change and their governments have responded with progressive climate change legislation. There was much global excitement when Australia introduced a carbon taxation system and the UK government introduced legislation to make a legally binding 80%

cut in CO2 emissions. Both ultimately led to environmental levies on utility bills and both nations subsequently behaved exactly as the prisoners dilemma predicted. Australia elected Tony Abbot's government on a mandate of claiming that climate change was crap and carbon taxes would be scrapped. Even in the grip of a massive heat wave with Sydney surrounded by forest fires, Tony Abbot could still not accept that climate change was a problem he should deal with. The UK government's response was similar. Amid the predictable fury of increased utility bills, the British government is now proposing scrapping environmental premiums even after devastating climate change floods. These two actions taken almost simultaneously at opposite sides of the world perfectly demonstrate the failure of the existing political system. An economy and political system based on interstate competition will never makes the changes required.

We can debate endlessly about the power of corporations to impede change, about how they protect their self interests and profiteer at the expense of the planet. Though this is true it misses the bigger picture, which is that it is the competitive structures inherent with an industrialised society that we are all trapped in that nurtures them. It is also easier to target the fossil fuel companies rather than the challenge the basis of the nation state structure. But unless we do this, we will be permanently at the mercy of the corporations and the pro-growth market states that they have come to represent because the system of global governance that we have accepted and which is based on interstate competition, needs them.

Ultimately what this book is about is recognising the different phases of industrial evolution and considering the industrial fabric as a living being going through the normal phases of birth, infant-hood, adulthood, old age and finally death.

The birth of industrialisation upturned societies around the world as the global economy transitioned to steam and coal. Like any infant whose neurons are still plastic learning is quick and new ideas that are assimilated set the personality for the future. So it was with early industrialisation. Mathematicians in Paris and elsewhere developed the basics of thermodynamics upon which the industrial world would be based. Philosophers and poets pondered the danger that the industrialisation combined with hubris could do and great works such as Samuel Taylor Coleridge's *The Rime of The Ancient Mariner* beautifully portrayed the risks. But like any child, learning also happens by painful accidents. The first big accident for the infant industrialised world was the First World War which demonstrated that the power of the newly formed military industrial complex could become so powerful and its dynamics so unstable that nations could be forced into destructive wars against their collective will.

After this, industrialisation went through the troubled teenage years. The mathematical and scientific foundations already laid down paved the way to the nuclear age and the advancement of military technologies in the 1930s. But this was soon to be shadowed by the disaster of the Second World War were the battle for the best form of industrialisation either democracy, nationalism or communism, was fought at massive human and environmental cost.

And then industrialisation moved into adulthood. Just as an adult reaps the rewards of childhood learning then so did society. New technologies based on society's accumulated learning in the early days of industrialisation opened up advancements for civilisation and many became more tolerant and open. The pain from past accidents was mercifully learnt and further world wars were avoided, though sometimes from luck than judgement, but perhaps the lessons of past had been sufficiently learnt so the balance of probability just about favoured peace rather than war. But like an adult that does not look after their health well allowing arteries get clogged with cholesterol and pollutants build up in the body, then so industrialisation has done the same to the ecosystem that supports it.

Finally we must prepare for the old age of industrialisation and probably its death, for if we do not kill the current model of industrialisation it will kill the planet. If the last couple of years have taught us anything, it is that our industrialised society will be unsustainable in the future and is even unstable at its current level. The problems that we face today will magnify as the population soars towards the predicted 10 billion especially if the aspiration is that all people are to share the trappings of industrialisation. Preparing for old age is a different challenge than progressing through childhood and early adulthood. It is a time of consolidation where the lessons and experiences of the past are drawn down. It is a time when extra care needs to be taken of the body which is no longer as resilient as it once was. If this is not done and childish behaviour continues, the end is brought forward very much quicker. It is also a period of richness if time is spent with loved ones and sharing the accumulated rewards of life.

But the trauma of the death of industrialisation or the death of the planet is far more difficult to reconcile than the death of a person, even if it is a loved one or yourself. Death is normally reconciled with the knowledge that space has been made for birth and the circle of life continues, but the death of industrialisation offers no such hope. However, if we accept that the death of industrialisation is inevitable then we can at least prepare for it and hold off the moment of reckoning for as long as possible and perhaps preserve some life on the planet. This is not a good note to end on, but this book is about reality, not false hope and false promises. If we can carefully dismantle the structure of destructive industrialisation, then possibly life may continue on the planet and humanity can continue as the consciousness of the universe even if in a diminished state, for this planet is the only place where we know life exists and it came to intelligence by a set of unimaginably remote coincidences. If we have learnt anything with our experiment of industrialisation, it is that intelligent life is far more fragile and precious than we ever dared to realise at its start.