



Presents



A Framework for Effectively Communicating Climate and Earth system Science to Business

This report is intended to be a wake-up call for the business and investment communities alerting them to:

- The very real risks to their asset bases that are now arising due to the escalating impacts of climate change and to the immediate need for concerted action without which there is the very real potential for the collapse of civilization prior to midcentury.
- The very substantial business opportunities that arise as a result of taking the necessary remedial actions to restructure and retool the management of global energy and the planet's resources.
- The overly optimistic projections that arise from the one dimensional consensus science-based assessment structure as opposed to a multi-dimensional businesslike approach to risk management.

To help communicate this effectively, the report is framed in business terminology and language, conceiving modern civilization as a multi-divisional corporation called Earth Inc.

April 2016

Earth Inc.

Is it a viable investment opportunity?

Introduction

Earth Inc. appears to be in very serious trouble:



The scientific and governmental communities that have examined our current circumstance have concluded that our modern civilization is in extremely serious trouble as a result of the accelerating pace and extent of climate change, sea level rise, and ocean acidification.

But these important conclusions have not been successfully communicated to the business and investment communities. As a result, the majority are failing to respond to the very severe threats to their asset bases, or to take advantage of the very real business opportunities that are arising.

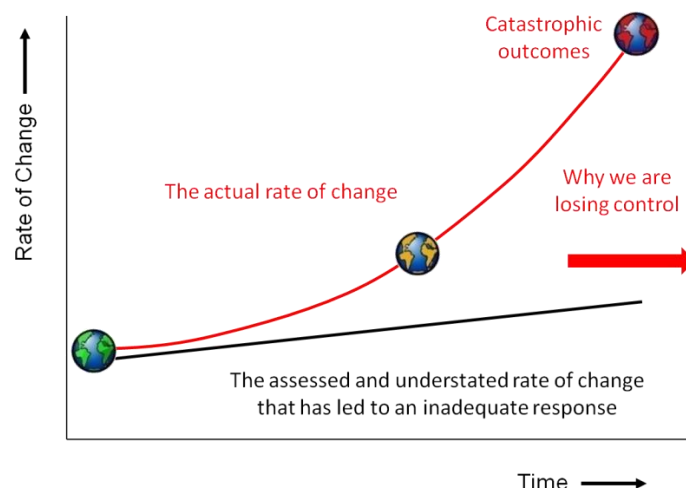
Using the first business principle of identifying a market need, the corporate community should recognize that **there has never been a greater emerging market demand than that being brought about by climate change**: namely, the desire for food, water, shelter and security of every individual on the planet, together with a viable future for their children.

To address the failure of communications, in this report we aim to overcome the roadblock by framing the situation in business language and terminology, thereby allowing the business and investment community to fully assimilate what the scientists have been trying more and more desperately to convey to society.

To reduce it to basic components, the approach is as follows:

- Modern civilization, and its relationship with the planet that hosts it, is considered as a single, gigantic multi-divisional corporation, known as *Earth, Inc.*
- A group of investors is considering a substantial investment in Earth Inc. and has hired a team of business analysts to evaluate:
 - The current state of the business and its present return on investment potential.
 - The potential of the business and its assets if it is substantially restructured.

What follows is a short version of the analysts' hypothesized report as delivered to the investors of Earth Inc.



And this is why we are losing, and eventually will lose, control; quite possibly by mid-century. The majority of official assessments are of linear change and the response at best is shallow linear in nature; the reality is the rate of change is increasingly non-linear. The consequence is that the linear response and the non-linear reality are progressively diverging. This compresses the time to respond effectively – in other words, we have already lost decades and are suddenly well behind the curve.

The Envisionation report to the Earth, Inc. investment consortium

Review of the forward financial prospects of Earth, Inc.

Our first step was to conduct extensive due diligence on the major characteristics of the subject, and then generate, in selective line-entry discursive format, 5-years of pro forma profit and loss statements for Earth Inc. Neglecting completely all other potential impacts on these projections, and focusing entirely on climate issues, our conclusion was that in the short term there is likely to be only marginal impact on P&L projections due to the size of the entity to absorb those impacts. We do however have specific serious concerns:

- The financial operating system of Earth Inc. is fiat and 'confidence' is critical in a fiat system. Based on other findings, that will be discussed later, confidence in future earnings potential could rapidly erode as the risks that the scientific community has identified and projected start to emerge.
- The standard business practice of 5-years of projections is entirely unsuitable for evaluating Earth Inc. This is due to the size of the entity and the cause and effect time lag; in particular, the potential risk timeframes, on the basis that course correction to avert severe problems will take many decades. We note that it is likely that very severe problems will arise within two decades if significant action is not commenced almost immediately. Research and development time to bring essential solutions to commercial readiness is already very short.
- Much of the current prevailing economic system appears to assume that there are infinite resources that can be utilized at an unconstrained rate. This is far from the reality, with the exception of solar (but restricted to certain areas), wind, hydrological and geologic power sources, as well as various emerging nuclear fusion technologies. Together these represent significant but as yet not fully recognized and utilized assets of Earth Inc. Nearly all other resources are strictly finite and in some categories those resources are already in a state of high stress; a perfect example would be fresh water.
- In particular, we draw your attention to the very significant unfunded liabilities that arise as a result of the failure to properly maintain the environmental assets of Earth Inc.

Our next step was to construct in overview form a simple pro forma balance sheet with the standard definition of ~ Assets – Liabilities = Stockholder Equity. Our findings were very disturbing:

- Certain assets, specifically various types of fossil fuels, have been used to convert what was formerly an agrarian based society into an industrial based society. The conversion from manual labor to mechanization, and in particular the development of mass agriculture, has allowed the customer base (the carrying capacity of the planet) to expand at an exponential rate. Please note our later discussed due diligence finding of the particular exposure of primary customer-based infrastructure located in coastal regions which are going to require protection from sea level rise or which may have to be abandoned and relocated.

That rate of growth must ultimately taper and plateau due entirely to the limits of associated resources required for its continuance, unless compensating technological advances are adequately funded to supply the needs of the growing population. Changes and anomalous variations in weather patterns will induce increasingly frequent, persistent, and widespread crop failures. With reduced food stores, increasing global demand, and the four to six-month period from planting to harvesting crops, critical shortages will be increasingly likely and last for extended periods. Given the daily need for food, periods as short as two years, could dramatically reduce the global customer base and trigger resource wars.

- The rapid growth of Earth Inc. has only been possible because full cost accounting has not been carried out. For example, the impacts from the extensive use of fossil fuels to propel growth are beginning to significantly disrupt the climate, moving it toward conditions that are becoming increasingly inhospitable to the continued successful operation of Earth Inc. The fundamental reason is that the burning of fossil fuels releases carbon dioxide into the atmosphere, and as the atmospheric concentration of CO₂ increases, the temperature of the planet increases, storm tracks and water resources are displaced, sea level is increased and ocean acidification disrupts the living marine resources.

Full cost accounting would have required the expense of the removal from the atmosphere of the carbon dioxide produced by the burning of fossil fuel to be recognized. This would have to be paid for by the person or entity responsible at an enormous cost and the continued growth

of Earth Inc. would only have been possible by developing alternative, and preferably, renewable, sources of energy.

- The consequence of ignoring full cost accounting is that the *pro forma* balance sheet of Earth Inc. has huge unfunded, and unacknowledged, liabilities. The liabilities are the forward cost of removing the excess carbon dioxide from the atmosphere, which is now deemed essential by many scientists. **This will require the creation of the biggest business, by orders of magnitude, Earth Inc. has ever seen**, literally dwarfing any former division. Moreover, this is required in a timeframe, that would appear nigh on impossible. Billions of tons of carbon dioxide have to be captured and removed from the atmosphere, and then sequestered indefinitely.

Those liabilities grow daily with the continued use of fossil fuels, and it is becoming increasingly evident that Earth Inc. is either on the verge of, or has actual entered, metaphorical bankruptcy. Metaphorical bankruptcy is characterized as the progressive inability of Earth Inc. to sustain its customer base until, at a minimum, its operations (i.e., modern civilization) collapse as the planet becomes increasingly inhospitable.

There are other unfunded liabilities that are increasing as a consequence of the current operating mode of Earth Inc. but carbon dioxide removal, termed CDR by the scientific community, is by far the largest.

Due diligence discovery:

To fully understand the forward viability of Earth Inc., in particular the operating characteristics, we conducted extensive due diligence. Our focus was on identifying the trends, supported by observable and documented changes, that characterize forward operating conditions as either favorable or unfavorable, and in particular the measures that would be required to correct unfavorable trends. In addition to identifying trends, we also sought to identify the rate of change where it was either available or could be derived - the rate of change for many factors is actually more important than the ultimate magnitude of the projected changes.

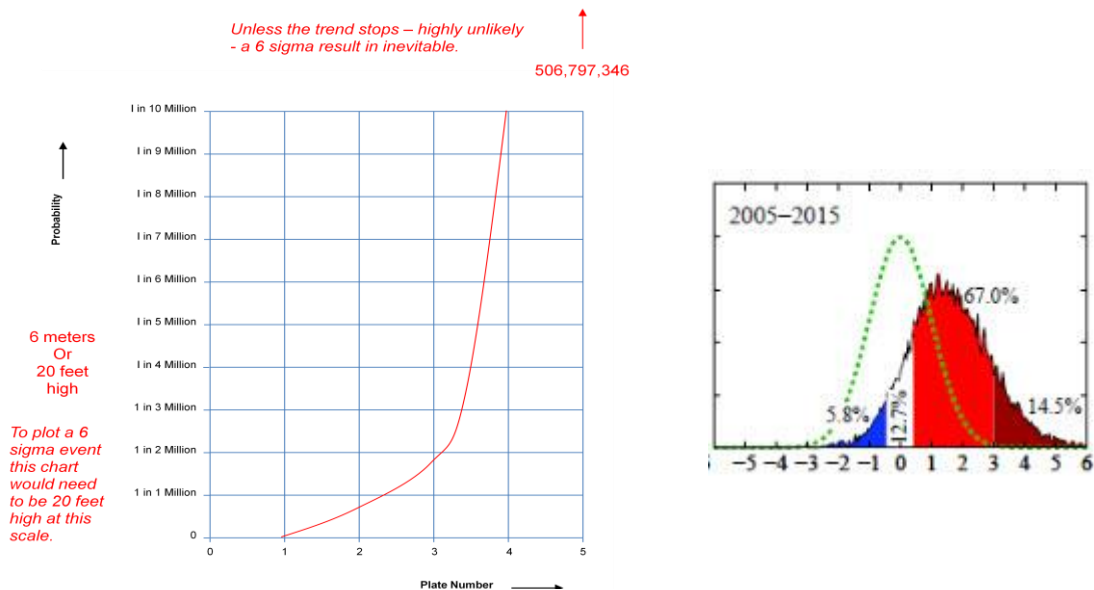
Two issues from our findings stood out above all others:

- We detected several disturbing instances now exhibiting the start of non-linear trends. On the basis of De Bono logic, this suggests that the climate as a whole is now changing in a non-linear way. Scientists have not yet been able to fully agree on this conclusion, but, given the potential impact on Earth Inc.'s balance sheet ignoring the risk while waiting for confirmation puts substantial capital (i.e., Earth Inc.'s investments in communities, infrastructure and production capacity) at great risk. The current response to the emerging non-linear risks by management (read governments) is more appropriate to the characteristics expected to a shallow, linear rate of change. If this situation continues, the response will progressively diverge from that required, with the consequence that, year-on-year, Earth Inc. will fall increasing behind in making essential changes to its operating procedures.

Observed examples of non-linear areas are:

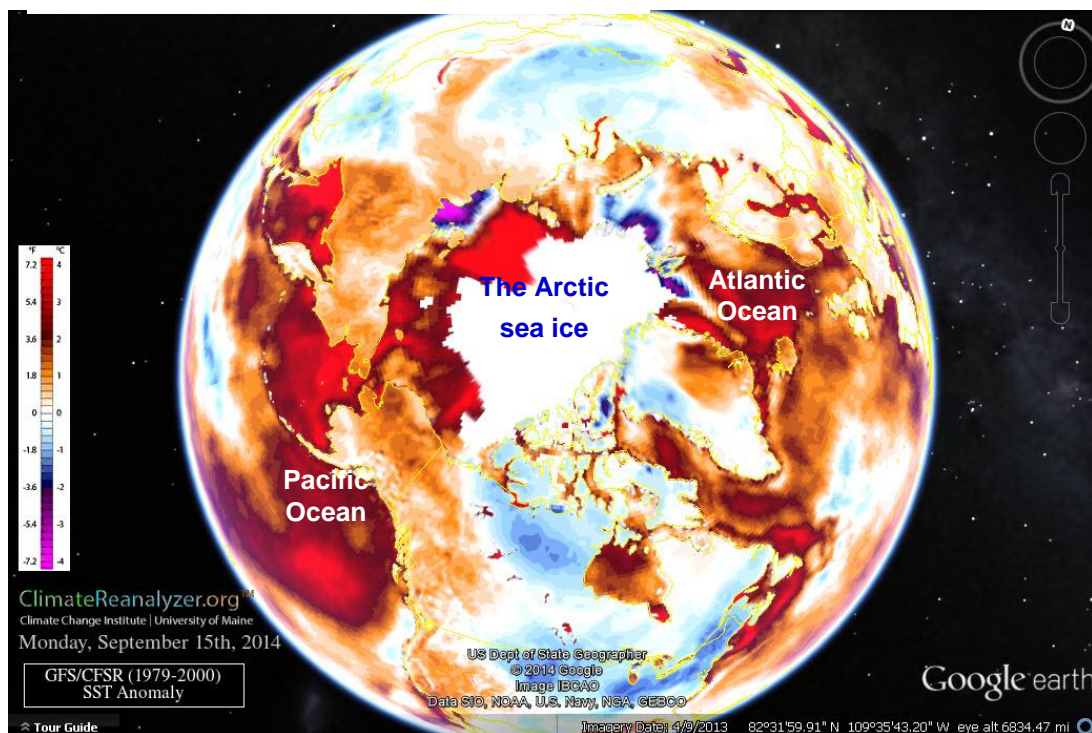
- the volume decline of Arctic sea ice, which is a critical operating characteristic;
 - the discharge of meltwater from Greenland, which has impacts on sea level rise and on ocean circulation patterns, which in turn alters weather patterns for Europe;
 - the discharge of meltwater from Antarctica, which further amplifies the rate of sea level rise; and
 - the rate of change of temperatures over land, which, when we reexamined the observations, indicated a shift to a severe exponential rate of increase, suggesting the Earth system may have already passed, or be passing, through a very significant 'tipping point' from which it will be difficult to recover.
- The consequence of the as yet not widely recognized acceleration in the rate of temperature change and its associated influence on the likelihood of weather extremes, is that the official bodies for setting and recommending forward policy, and the vast majority of the public and business leaders believe that serious impacts to Earth Inc.'s performance will not occur until around 2100. The reality is that the timeframe has shifted, and the changes now being identified will have grown by mid-century, or even before, to become dangerously disruptive.

This shift to a non-linear rate of change creates a significant problem for the directors of Earth Inc. because the shift will make the remediation needed to ensure the viability of forward operations much more difficult. The consequent compression of the timeframe for effective remediation will upend former plans rendering them inadequate.



This was the graph of our reexamination of the rate of change of Northern Hemisphere summer time temperatures – a severe exponential curve. We felt a 6 sigma event was inevitable.

*And, this is what happened next -
A 6 sigma or -
1 in slightly over 506 million year event*



And looking directly down on the Arctic, these are the sea surface and land temperature anomalies recorded on September 15th, 2014, against a baseline of 1971-2000. Note that if the baseline was the same as the one used to show the 6 sigma event, 1951-1980, they would be even more severe.

- As indicated above, other elements of the climate system are also showing highly disturbing trends that are progressively impacting Earth Inc.'s operating efficiency, and driving it headlong towards bankruptcy. These elements include:

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- PIOMAS Yearly Minimum Arctic Ice Volume**
- The main graph displays the yearly minimum Arctic ice volume from 1979 to 2020. The y-axis represents ice volume in 1000 km³, ranging from 0 to 20. The x-axis represents years from 1979 to 2020. The data is shown as black dots connected by a line, representing PIOMAS data. A red line indicates the estimated trend, and a light blue shaded area represents the 95% confidence interval. The trend shows a steady decline in ice volume over the period.
- Inset Graph: Residuals**
- The inset graph shows the residuals of the trend line from 1980 to 2019. The y-axis represents residuals, ranging from -3 to 4. The x-axis represents years from 1980 to 2019. The residuals are plotted as black dots connected by a line, showing the deviation of the actual data from the trend line.
- Legend:**
- PIOMAS Data (Black line with dots)
 - Estimated Trend (Red line)
 - Limits of 95% Confidence Interval (Light blue shaded area)
- Data Source:** Data: PIOMAS (Zhang and Rothrock 2005)
 Provided by: https://www.jamstec.go.jp/frc/research/ice/ice_data/ice_data.html 2019 Oct 18

- An estimated 40% of phytoplankton has disappeared from the oceans since 1970; it may be more. The consequences at a minimum are: a significant reduction in the capacity of the oceans to absorb carbon dioxide from the atmosphere; a reduction in the amount of biomass that is at the base of the oceans' food chain; and a reduction in the production of oxygen by the oceans.



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projected that more frequent food disruptions are likely to result in more and more serious consequences over the next few decades, with worldwide impacts. Sir David King has projected the initiation of resource-based wars, leading to a bunker-based mentality, seriously threatening Earth Inc.'s global-based operations in ways that could lead to financial chaos. A sequence beginning with increasing starvation, leading to food riots, displacement, conflict, deaths, and the progressive breakdown of societies.



Starvation



Food Riots



Conflict



Displacement



Death

It's only going to get worse – much worse as we lose control

To underscore this consider that the UN has projected the migration of 50 million people (i.e., "customers" or "consumers") from the sub-Saharan territory by 2020 due to crop failures caused by a complete collapse of the ecological system and terrorism in that region. The majority are heading north to the Middle East territories, which are already highly stressed and also suffering from terrorism. Ultimately the majority of these people plan to seek relocation to Europe, further extending the disruption and creating a completely untenable situation.

The current management of Earth Inc. has no discernible plans to deal with the overall situation, even though it is becoming increasingly obvious that severe economic and societal disruptions could erupt across a wide range of territories and populations encompassing a significant fraction of the operations of Earth Inc.

- Floods and droughts are increasing across the planet with considerable societal costs, disruption of businesses, and escalating costs for the insurance divisions.
- Storms are increasing in frequency and intensity, with considerable economic and societal costs, disruption of businesses, escalating costs of insurance, temporary or permanent displacement of the customer base, and the disruption of supply lines (e.g., note the recent billion-dollar hailstone damage from a few-hour sweep of a thunderstorm system in Texas). Dr. James Hansen has asserted that on the current trajectory of climate change, Earth Inc. will begin to experience 'super storms' on a scale that will induce severe disruptions to operations beyond the scale of anything seen so far.
- Sea level rise continues to be revised upwards. Unchecked it will lead to massive disruption of coastal operations, including: the displacement of millions of people; inundation of many of the world's great river deltas that are major food providers for millions of people; loss of coastal property at an immense cost to investors and the insurance divisions; contamination of sewer systems rendering impacted areas uninhabitable; loss of drinking water from contaminated aquifers; the increasing stress on

major coastal cities, at least some of which simply cannot be defended due to underlying geology; and the loss, and thus displacement, of whole island based nations.

- Ocean acidification is reaching a level that is already changing, and disrupting, marine and aquaculture production of fish and shell-food products. As fossil fuels continue to be burned, this disruption will intensify. Major impacts on operations include: large areas of the oceans that are becoming progressively inhospitable for crustaceans; and the bleaching and death of coral reefs, which are the nurseries and feeding grounds for 35% of fish stocks. Scientists have projected that by mid-century there could be no harvestable fish, eliminating the daily source of protein for 2-3 billion of Earth Inc.'s customer base.
- Heat waves, in tandem with weather pattern changes, are causing increasing rates of disease and death from heat stress disrupting and reducing productivity.

There are other factors that we discovered in our due diligence review that are already impacting the performance of Earth Inc. Projections of forward trends indicate that these impacts will intensify.

The final stage of our business analysis is a **sensitivity analysis**, or 'stress test'. As opposed to varying a selection of line entries to the pro forma P&L's through a given range, we chose to examine the sensitivity of the entity to changes in the most integrated and critical operating variable; namely, the forward projected temperature increase.

It should be noted that the associated problems of increasing water scarcity may also be correctly identified as an additional major forward stress on Earth Inc.'s forward operations.

Sensitivity analysis findings:

- The ultimate equilibrium warming that will be induced will continue to be driven higher and higher as long as CO₂ emissions from fossil fuel combustion continue. Stabilizing the atmospheric concentration of CO₂, and thus halting further warming and ocean acidification, will require moving to zero emissions, not just stopping the ongoing growth in emissions. This will require replacing the source of approximately 80% of the world's energy. By not dealing with the problem forcefully over the five decades since the scientific community agreed on the consequences of the fundamental physics and chemistry of the situation, Earth Inc. has placed itself into a predicament that will require drastic and immediate action.
- The current projections of forward temperature are based on the slowly rising temperature (known as transient), rather than the final expected temperature (known as equilibrium) - the several-decade delay being caused as a result of the time that it takes to warm the oceans. The reality is that temperatures will eventually be much higher as transient temperatures approach equilibrium because the entire ocean-land-ice system controlling the planetary temperature only regains its balance once CO₂ emissions are ended. It would appear that current management is relying on taking sufficient actions to ensure the transient (i.e., immediate) temperature never rises to the equilibrium value, as specified in certain courses of action known as RCP's (Representative Concentration Pathways). What is hidden in this presumption is that doing so will require the deployment of considerable systems for the sustained removal of CO₂ from the atmosphere using as yet unknown industrial and natural resource management techniques, at an unknown, but likely huge, cost.
- The response in temperature to injecting CO₂ into the atmosphere is a major factor in projecting forward operating temperatures. For the past 35 years, the central estimate has been that a doubling of the atmospheric CO₂ concentration would, at equilibrium, lead to a global warming of 2.5 to 3.5°C. However, increasing evidence is suggesting that the central estimate for the sensitivity may be higher, therefore underestimating the change that lies ahead, and how much more must be done to reduce such a very significant warming.
- At the most recent management meeting of all major divisions of Earth Inc. in Paris, called COP21, various national divisions submitted plans to address the overall situation by progressively reducing their emissions from the burning of fossil fuels. Following a calculation by organizers of that meeting, it was concluded that the forward projected temperature increase would be limited to 2.7°C if these proposed measures were implemented. However, further examination of this analysis reveals that:
 - Management had formerly agreed that the forward temperature increase should be limited to no more than 2°C. But then in Paris, they recognized that 1.5°C should really be

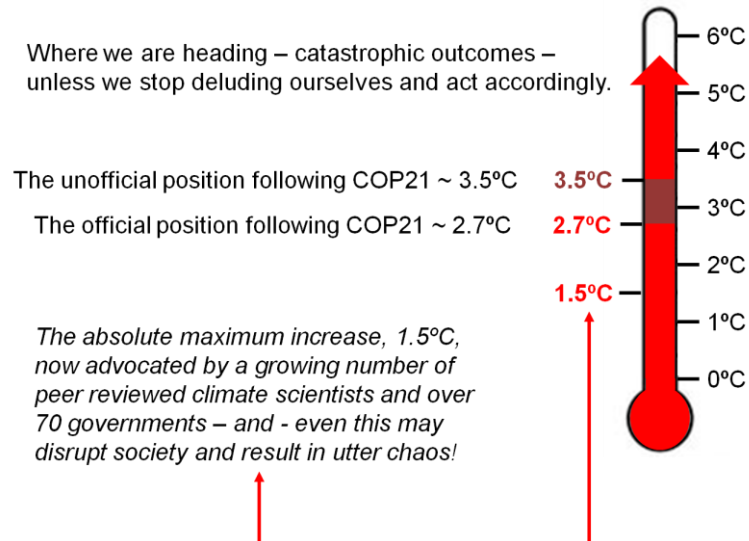
the goal. Present warming is about 1°C, and the inferred equilibrium warming were emissions of CO₂ to be ended now is already close to 2°C.

- In their last major assessment, scientists confirmed that there is no 'safe' forward temperature increase and that we may be close to, or already exceeding, the maximum increase that can, with confidence, be expected to adequately limit severe disruption of Earth Inc.'s operations.
- We judge the response of current management as unacceptably divorced from reality and utterly inadequate for ensuring sustained and prosperous operations of Earth Inc. because of the potential disastrous to catastrophic impacts as CO₂ emissions continue and the temperature increases further.

It should be noted that containing warming to 2.7°C will only be attained if the submitted divisional plans are implemented perfectly, and that fulfillment of current pledges would only limit global warming to about 3.5°C. Past performance indicates that fulfillment of all pledges is highly unlikely. Prudence suggests that a warming greater than 2.7°C should be anticipated to result from present policies.

External analysts to the COP21 meeting have virtually no confidence that the plans submitted will limit the forward temperature increase to 2.7°C. They have concluded that the plans must be augmented by the deployment of as yet unknown technological advances that would reduce emissions beyond those "planned" Their view is that the proposed emissions cutbacks remain highly speculative, and that Earth Inc. should be developing plans for emissions reductions and adaptation assuming that the actual temperature increase will be ~3.5°C.

- Present plans do not account for all of the potential amplifying feedbacks. For example, forest scientists submitted a report to the head office of the UN in 2009 that suggested that warming could lead to the longstanding natural carbon sink created by the Earth's forests becoming a net source of carbon dioxide if the global temperature increase exceeds 2.5°C. Similarly, thawing of the permafrost and release of the tied up carbon could lead to much greater warming: potentially 4°C or more.



- As was made very clear in analyses by the World Bank, a forward temperature increase of 4°C would be very likely to trigger inter-coupled reactions, including especially large impacts in the world's most highly populated areas (e.g., sharply reduced agricultural production in Africa; flooding of low-lying river deltas across southeast Asia; severe water shortages across southern Asia) as well as triggering significant amplifying feedbacks that would lead to even greater warming (e.g., increases in the release of CO₂ and methane from the Arctic). Indeed, there is a very real risk of the entire situation spiraling out of control with catastrophic consequences for Earth Inc.

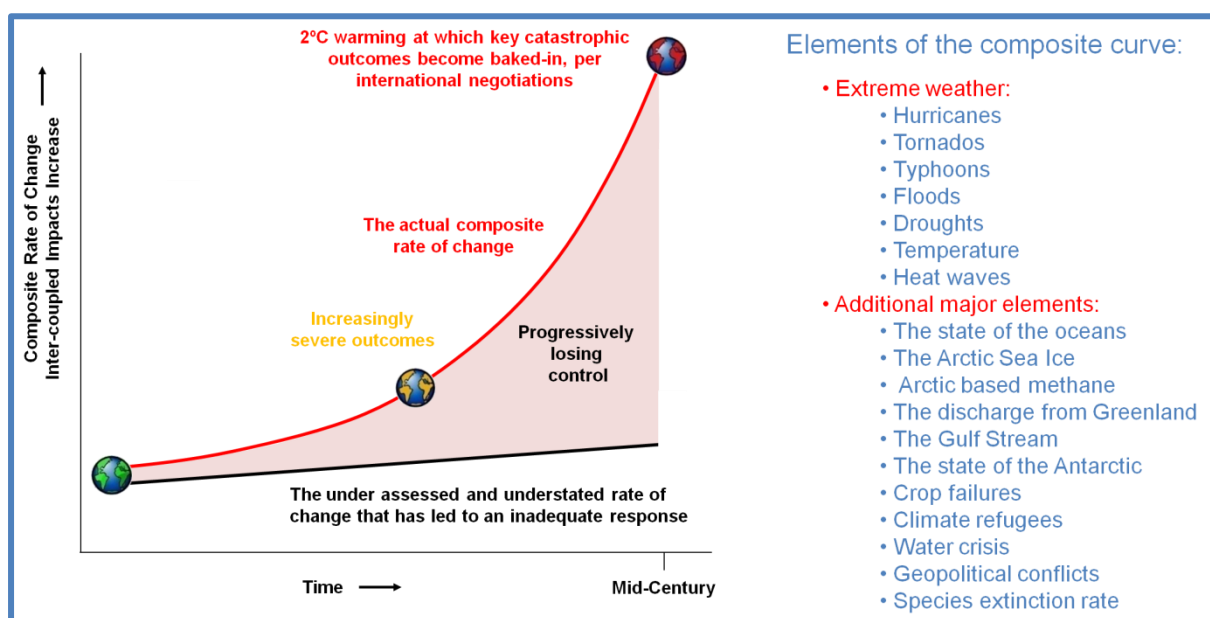
As the year has progressed the implications of outcome of the management meeting in Paris, known as the “Paris Accord”, have been thoroughly analyzed. One analysis in particular, by Sir Bob Watson et al, makes clear that even if the all the measures agreed in the “Paris Accord” are implemented perfectly then a mean planetary temperature increase of 2°C will be reached by 2050.

This is a very serious situation because international negotiators have agreed that at 2°C of warming key catastrophic outcomes become baked-in. It should also be noted that there is international leader consensus that even at a threshold of 1.5°C some key catastrophic outcomes may have already occurred or be baked-in.

As a final step in using a suite of standard business analytical techniques to translate the scientific findings of climate change into business terminology we developed a classic 3 scenario assessment of the forward operating characteristics of Earth Inc.

The objective was to define the “window of opportunity” to establish control of the overall situation and thus clearly identify the timing of the implied forward stresses on the operating characteristics of Earth Inc. In effect this amounts to a “stress test” of the entire situation relative to the consequence of the rate of countermeasures applied, or lack thereof.

We started with the full version of the graphic shown on page 1 as a representation of the composite rate of change and the increasing impact of inter-coupled factors discovered by due diligence.

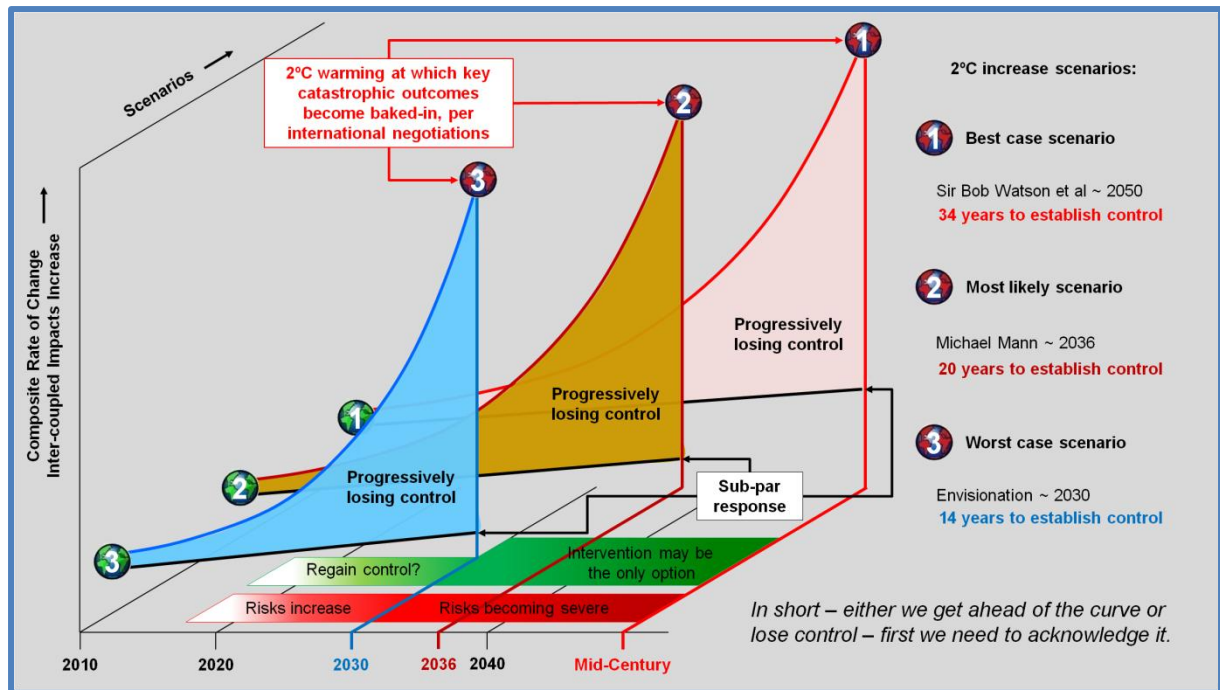


Due diligence findings expressed as rate of change vs. response

While we agree that there are uncertainties in our analysis that would tend to smear out our monotonically increasing smooth projections of global warming, Envisionation chose this depiction as a reasonable representation of a regression line through both the rate of change and the associated impacts, as is also implicit in the forward projection of impact costs by Munich Re. Frankly, whether global warming is smooth or has a lot of inter-annual variability, the actual shape of the curve is not really relevant; what matters most is the overall timing that it takes to reach the proposed temperature ceiling.

Then we specified 3 pertinent scenarios looking at the best (or longest), most likely and worst (or fastest) time-line on the path to 2°C of warming. That threshold is agreed upon by 97% of peer-reviewed science, and is the unanimous consensus of 190+ nations, as the level above which extremely dangerous and potentially unstoppable climate change disruption will occur, with escalating impacts to the components of Earth Inc., including societies, governments, investors, businesses, individuals and all existing assets.

It should also be noted that an increasing number of peer-reviewed studies suggest that, for at least some of the critical impacts, a threshold of 1.5°C or even less would be a considerably safer although this may already be unachievable within the available timescale. The fundamental reason is that even at this threshold, per international leader consensus, some key catastrophic outcomes may have already occurred or be baked-in.



Scenario 1 ~ Best Case - a 2°C increase by 2050.

This scenario is based on the projection of the 2016 analysis of implementing the “Paris Accord” by Sir Bob Watson et al; it should be noted that the team are all world recognized experts in their fields, that Watson was a former head of the IPCC, and that this report brings forward the previous best case scenario of the IPCC by as much as 50 years! Having said that, 2050 is the central estimate by the IPCC for reaching the 2°C threshold. And yet a detailed analysis of the report reveals that some elements should be considered optimistic (a specific example being the timely materialization of the \$100 billion adaption fund, which is highly unlikely due in part to the current US political landscape), and there are other major omissions discussed below in the Envisionation worst case scenario.

Scenario 2 ~ Most Likely Case - a 2°C increase by 2036.

This scenario is based on the projections of an ongoing situation analysis by Michael Mann and matches the IPCC's earliest estimate to reach the threshold (*Michael Mann is Distinguished Professor of Meteorology at Pennsylvania State University and author of The Hockey Stick and the Climate Wars: Dispatches from the Front Lines and the recently updated and expanded Dire Predictions: Understanding Climate Change*).

Mann's analysis is predominantly based on a statistical approach but, Envisionation believes that Mann's work, as with the Watson et al analysis, is understated.

Scenario 3 ~ Worst Case - a 2°C increase by 2030.

This Envisionation scenario is based on accounting for under-assessments in IPCC documents that we identified in our due diligence findings and it should be noted that the timing we project for reaching the threshold is becoming the central case for those considering the issue closely.

Examples of areas of under-assessment in IPCC documents include, but are not limited to: a potential that the climate has entered a non-linear mode, thereby accelerating the rate of change; permafrost thawing, causing increasing amounts of carbonaceous materials to be released to the atmosphere; natural carbon feedback from the Amazon jungle, in tandem with an under-assessment of worldwide tree mortality rates which has a considerable impact on allowances in all calculations related to CO₂ absorption by natural sinks; and the early melt-back of the Arctic sea ice, which at a minimum has been identified as a major factor causing weather pattern changes, ones that are essential for mass agriculture, and thus potentially impacting the world's food supply.

Reviewing the graphic one can identify that the “window of opportunity” to establish control is 14 years in the worst case and 34 years in the best case and that is for the 2°C threshold. To regain control

and stay under 2°C, at a minimum 80% of the world's power generation, and the fuel for the world's transportation systems, must be replaced; all with non-polluting energy. And where hydrocarbon fuelled transportation systems such as shipping and aircraft have to be maintained then the millions of tonnes of CO₂ they emit must be extracted from the atmosphere to even have a chance of avoiding a 2°C increase.

If, as seems likely, even this is insufficient then “intervention” will become essential and like any major risk we will need to prepare for it which will involve planning, research, testing and development: and all of this in just 14 to 34 years?

We therefore conclude, and recommend that:

- The investment and business communities strengthen bridges to the scientific community in order to verify our findings regarding the greatly increasing risk of very disruptive events and the precarious position of Earth Inc.
- Following the suggested verification, recognize that further, business-as-usual investment strategies will only worsen the situation, and increase the risks of loss of the investments.
- Slowly implemented CO₂ emissions reductions alone will not nearly solve the problems now facing Earth Inc.
- A restructuring of operations and a comprehensive plan is now required. This plan will need to include steps to significantly reduce energy demand through efficiency improvements and distributed energy systems, completely replace the world's fossil fuel-based energy system, rejuvenate the planet's severely depleted terrestrial and marine biomass, adjust and adapt existing infrastructure and resource systems to the changing climate and sea level, and, probably commit to long-term deployment of potentially audacious climate intervention technologies.
- Essentially, the only viable course of action is to immediately (albeit metaphorically) place Earth Inc. in the equivalent of US Chapter 11 bankruptcy (where debt and operations are reorganized under protection of the courts). Such reorganization will need to be attained by applying pressure on current management to take aggressive actions, whilst also taking control wherever possible to implement essential changes commensurate with the scale of the problems.
- Historically, the investment and business communities have led and management (government) has followed. This sequencing is now essential because government actions to date have been too late and far too inconsequential.
- A failure to recognize and implement necessary reorganization and actions in a traditional corporate framework would inevitably lead to the entity being placed under US Chapter 7 bankruptcy regulations, where the organization would be wound up and the remaining assets liquidated. This is not an option in the case of Earth Inc., at least if civilization is to survive.
- The leaders of the investment and business communities need to comprehend that money and privilege will not place anyone or any nation beyond the impact of the collapse of Earth Inc. Catastrophic impacts, totally unavoidable without considerable changes in operations, will reach everyone, and those who have some concept of ‘safe’ havens fail totally to understand the interconnectivity of the international system of resources, security, health, and more.
- The investment and business communities also need to recognize that the essential changes required to the operations of Earth Inc. are necessary to preserve the majority of their current, highly leveraged assets. In the final analysis, self-preservation and the protection of future generations (including specifically their children and grandchildren) has to be the driving factor.
- For everyone and every institution, a new operating paradigm is essential if Earth Inc. is to continue its operations and generate a prosperous and sustainable future for all its stakeholders. While the failure to act sufficiently poses severe risks, **changing the existing paradigm offers the largest economic opportunity in the history of our species as we must redesign, retool, and rebuild much of Earth Inc.** First movers will benefit the most.
- Our hope and recommendation is that, once the circumstances and associated opportunities are fully comprehended, business and investment communities will step forward and

demonstrate how to implement the transitions that the governmental, academic, and moral communities understand is needed, but simply do not have adequate capabilities to accomplish.

- We consider that within Earth Inc.'s asset base lies the technical and research capability to deliver solutions in a timely manner, subject to financial resources being made available.
- Key to a successful turnaround of Earth Inc. is the recognition that the necessary financial resources to complete the task exist and could be made available for deployment.
- We therefore conclude that under the right management, Earth Inc. can be restructured and therefore can deliver positive long-term ROI. By taking advantage of the infinite renewable energy sources available and working within the finite limits of Earth Inc.'s physical resources, further growth, in terms of efficiency and lifestyle improvement is entirely possible. However, this will be a revised approach to growth that takes on board the physical constraints to the size of the overall market participation.

Demand and opportunity

Above all else this report highlights the enormous commercial opportunities that will emerge, and the universal demand that is already arising, as the scale of the crisis we face dawns upon humanity. This is not something that governments will be able to cover up or ignore because the growing impacts of climate disruption are going to become completely obvious to every citizen on the planet.

Although thus far it's only in infancy, the first moves of retooling our global energy infrastructure towards a sustainable future have already begun. And, the growth in renewable energy of all types is beginning to track the same exponential curves. Demand for new and improved technologies for energy delivery is quite literally going through the roof.

Spectacular opportunities exist in the carbon drawdown sector both biological and mechanical

New markets will emerge supporting reforestation, afforestation, soil restoration, and ocean fertilization, for biosphere maintenance and food production.

Global transportation systems all need to be restructured and converted to nonpolluting power sources.

Every corporation needs to be assessing its exposure to climate change impacts and the opportunity as it relates to the corporation's existing assets, skill sets and capability. This is a time for change and skills transfer; a time for business and investment leaders to consider their long-term fiduciary duties to their shareholders and customer base; a time to grasp the opportunity and deliver a long-term prosperous future for humanity and all other life on earth.



Solar power stations ~ a worldwide smart grid ~ wind power ~ all represent substantial opportunities

Next steps

Envisionation acting in collaboration with Hope or Cope have already drawn up a restructuring plan branded the **Unity Plan** and promoted by the **Unity Group** that sets out the essential tasks to be undertaken in order to outflank business-as-usual and finance the necessary Global Environmental Restoration Program.

We are actively seeking those with the vision and courage to participate in this plan, and stating the obvious, first movers will benefit the most as they participate in setting the agenda for the next paradigm and the creation of a prosperous future for all the stakeholders of Earth Inc.

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