

Environment and climate: Implications, reaction and response

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ABSTRACT

Economic growth has occurred because fossil fuels and shipping technologies allowed trade expansion. Now, with environment becoming a constraint again, and increasing concerns about climate change, new challenges are emerging for the global economy. Pressures to reduce environmental impacts are conflicting with concerns over energy security to create difficult challenges for world leaders and uncertainty for businesses. The presentation will include an overview of the implications of global environmental change, responses so far and likely, and how businesses may be affected. Environmental issues will lead to differing responses by governments, consumers and businesses. The timing and scale of those responses will affect the context within which sea transport businesses will prepare their long term strategies.

Environment

If you want to understand the future, it helps a great deal to understand the past. Environmental scientists spend a lot of time looking at tree rings and ice cores for that purpose. They are putting together an understanding of what has happened in the Earth's past in order to anticipate and navigate our future.

Economic history is also very relevant for understanding our future. Prior to the industrial revolution, the world's output was constrained by the nature of the physical environment and the technology used to exploit it. The relevant physical environment was agricultural land and the relevant technology was human or animal powered growing of crops. About 94% of people worked the land and the population would increase rapidly until, every 20 years or so, about 10% of the population would die from some combination of famine, disease and war. It was a very different world to live in.

All that changed about 200 years ago and I want to highlight two important aspects of that change. First, fossil fuels were used in agriculture to dramatically increase efficiency. Now, in developed countries, only 3% to 5% of the population is engaged in agriculture. The people released from the need to grow food have created an industrial society. The land, or environment, was the same; what changed was technology. The point I am making is that output depends on the physical land being exploited and on the technology used to exploit that land.

The second aspect of the change was what has been called “the discoveries”. Sea travel, initially using sail but then using fossil fuels, has facilitated a huge expansion of industrial output. Industrialised agriculture using fossil fuels for energy was exported from Europe to the globe. Ships used fossil fuels to enable huge growth of trade. The technology of fossil fuels has allowed the physical environment of the world to be exploited in a way that has led to the current position where nearly seven billion people are racing to grow their economies as fast as they can.

Industrialised agriculture allowed population growth and combined with fossil fuels to allow industrialisation.

The world shifted from a state where the environment, in effect, killed off 10% of the population each generation to a state where the environment available for exploitation became so huge that environmental limitations could be ignored. Modern conventional economics reflects this when it assumes “free gifts and free disposals”. In modern economics you ignore the environment; the constraints are capital and labour. Resources may have a price but the quantity available is assumed to be unlimited.

Climate

As the last ice age ended, around 15,000 years ago, the average temperature of the Earth was about 4 degrees Celsius lower, the atmosphere contained about 180 parts per million of carbon dioxide and the sea level was about 120 metres lower than it is today. Water was stacked on the land in huge ice sheets, kilometres thick. Four degrees Celsius is the difference between an ice age and today.

By the end of the agricultural era, around 1800, the carbon dioxide content was about 280 parts per million. Taking those fossil fuels out of the ground has led to an increase in the atmospheric carbon dioxide to around 390 parts per million today.

	2000	1800	-15,000 Ice Age
TEMPERATURE	Current	-1 degrees C	-4 degrees C
CARBON DIOXIDE	380 ppm	280 ppm	180 ppm
SEA LEVEL	Current	Current	-120 metres

Carbon dioxide is one of several greenhouse gases that increase the Earth’s temperature. Without carbon dioxide in the atmosphere, Earth would be frozen. Increase the carbon dioxide and you increase the temperature.

A little bit of climate change may be a good thing for many of us but a lot of climate change is bad for us all. I will highlight two problems.

The first is food supply. Fossil fuels gave us food in abundance but climate change alters growing conditions and increases floods, droughts, storms and fires that in turn reduce overall crop yields. It is already happening.

At the same time, ongoing population and wealth increases mean food demand is growing rapidly. Until about 2000 real food prices declined but they have almost doubled in the last decade. Food scarcity causes export bans that restrict trade and price increases that lead to unrest. Climate is not the only environmental constraint affecting food supplies, but it is already important and will become more important as climate change progresses.

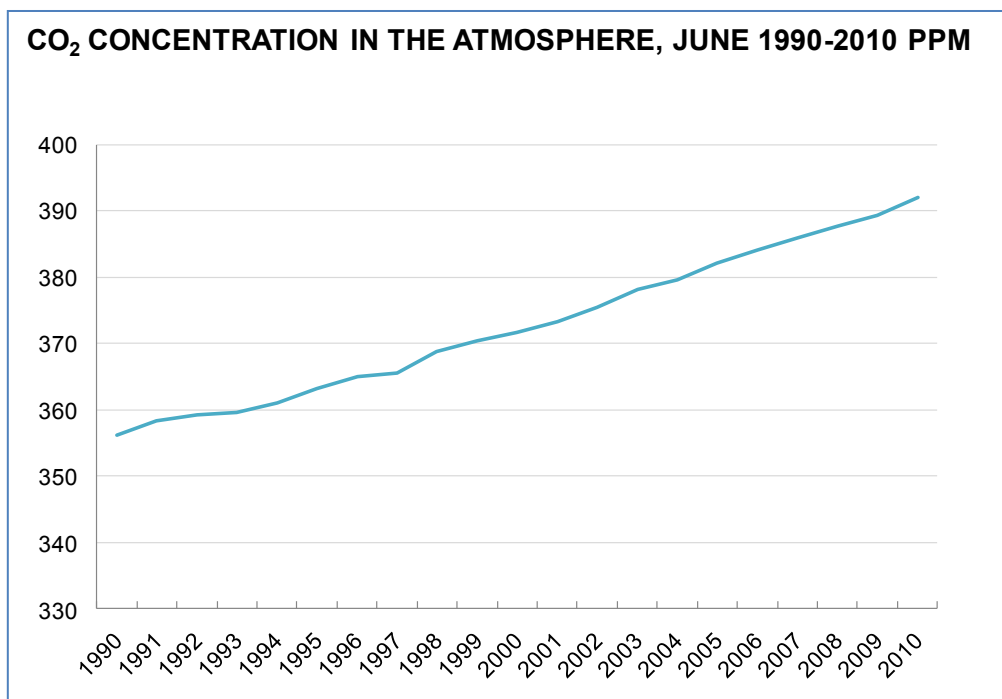
The second problem is the risk of abrupt climate change. We tend to think of change, including climate change, as gradual. It is not always so; the record shows that climate can change very quickly, in years or decades, and it can have periods of instability when it flickers from one state to another.

Most of the research you will have seen reported, for example the International Panel on Climate Change research, is based on climate models that omit what are called feedback effects. There are several of these effects but I will just illustrate two – one that is already happening and another we should anticipate. The one already happening is albedo, or reflectivity. If you melt the ice covering parts of the Earth you reduce the amount of energy reflected back into space so more heat is absorbed and the planet warms.

The second is the carbon sink provided by Amazon rainforest. The Amazon contains a large and increasing amount of carbon dioxide in its trees. But when the Earth gets hot enough, the rainforest will burn, the carbon dioxide will be released and the Earth will warm further.

It is feedback effects, and these are just two of several, that have led climate scientists to fear abrupt climate change and in turn led to the widely publicised target of restricting global temperature increase to no more than 2 degrees Celsius. That translates back into an atmospheric carbon dioxide target that was initially 450 parts per million but more recent research has reduced it to 350 parts per million.

The recent history of carbon dioxide composition is shown on the chart.



United Nations and others argue that, to avoid what they call an unacceptable risk of abrupt climate change, emissions need to be reduced by 25% to 40% relative to 1990 levels by 2020. You can see from the chart that we are not slowing atmospheric change yet.

Implications

My point is that our future will not be a linear extension of our past. The world is changing already and we should expect much more change. If economic growth continues on its current course and population grows as expected then output will roughly triple in the next 40 years. Our environment is already under pressure and it will be under a lot more pressure if output is tripled.

If the science is even approximately right then we must either dramatically restructure our economies soon or we had better start preparing for a much less benign climate. Most likely it will be both.

So what should we expect?

Many of the changes are already beginning. As the world's population and economy grow, shortages are anticipated. Some countries are already taking steps to secure long term supplies of food, energy and minerals. They are making investments and developing alliances.

New technologies are being developed to expand and secure supplies and reduce environmental damage; renewable energy and genetically modified crops are examples. Technological development is continuing and is likely to accelerate. But do not be fooled by this; we should not expect that technologies will allow humanity to escape the arithmetic of the environment. Food comes from plants grown on suitable land, not from supermarkets or laboratories.

We will also have to make some very difficult choices. The world needs fossil fuels to feed the economy but if we burn all the oil, gas and coal then abrupt climate change is the likely result. Climate risks and energy security are still managed separately but they are inextricably entwined.

Climate may be the most important emerging risk we face but it is only one of many emerging environmental risks. Water security, land degradation, losses of important biological populations, like bees, and resource shortages will be important too. We have a lot of navigation to do.

We may be entering a period where we have to manage climate change, higher energy costs, food shortages, unrest and migration.

Reaction

That seems serious. Serious enough to warrant a vigorous reaction so that these emerging risks are reduced quickly and we can navigate towards the best possible future for us all. Reduce climate change, expand food supplies, develop and share technologies, restructure economies, change behaviour, et cetera. And you would expect some urgency too as it is well known that it is easier to make changes if you start sooner.

If you ask people if they understand all this, many do. Perhaps not all the detail but enough to be concerned, enough to think that something should be done, enough to be willing to make some personal sacrifices.

But the collective reaction has been very limited so far. Our leaders are not exhorting us to change our behaviour. They are not changing their own behaviour. Regulations are being changed and technologies are being developed but the pace of change is slow. Many

countries still subsidise fossil fuels, for example. Carbon dioxide concentrations continue to grow on a straight line.

Why is the reaction so limited? There are many reasons and I will highlight just a few of them.

Perhaps the most important reason is that the sun continues to rise every morning, just as it always has. Life goes on as it did, and change is very slow. The changes I am talking about seem theoretical and are not affecting our everyday lives. Not yet anyway.

The second reason is that people are not reading the science. The tendency is to rely on media reports which provide a fragmented picture; a change here or there, a point debated, but little pattern. I recommend you all take a few hours on a Sunday afternoon and explore on the Internet for yourselves. Form your own opinion.

Media reports are affected too by the influence of sceptics, some of whom are in the pay of interest groups with good reasons to resist changing the status quo.

The third reason for a limited reaction is that many people are completely captured by the economic rules developed within the last 200 years to successfully exploit an unconstrained environment. According to those rules the purpose of governments is to maximise economic growth and the purpose of individuals is to maximise their consumption. The alternative, which might be called the ecological paradigm says that in the 21st Century governments should pay a lot more attention to the management of long term risks and individuals should consume in a sustainable way. There is an undeclared war in progress between the economic and ecological paradigms.

Economic	Ecological
<ul style="list-style-type: none"> • Economy is small relative to environment 	<ul style="list-style-type: none"> • Economy is large relative to environment
<ul style="list-style-type: none"> • With limited exceptions, resources can be taken from the environment and wastes can be released to the environment without adverse consequences 	<ul style="list-style-type: none"> • Resource and waste sink constraints, and accumulated environmental damage threaten output growth and human well-being
<ul style="list-style-type: none"> • Environmental issues resolved by substitutes, technologies and market instruments 	<ul style="list-style-type: none"> • Environmental threats increasing and responses are insufficient
<ul style="list-style-type: none"> • The future will be an extension of the past 	<ul style="list-style-type: none"> • The future will be different from the past
<ul style="list-style-type: none"> • Societal objective should be to maximise GDP 	<ul style="list-style-type: none"> • Societal objective should be to avoid risk

The fourth reason is that people think that by themselves they can do nothing so they might as well not do anything. The economic paradigm says each person should act in his or her own self-interest and it is rational to do so.

The fifth reason is that people elect their governments to be leaders and expect governments to sort out the problems. Conferences like the one in Copenhagen at the end of 2009 and more recently in Cancun are where world leaders get together to agree solutions. The problem is that our leaders are not agreeing solutions. They are playing a complex game where each country tries to impose the economic costs of change on the

other countries, minimising their own contribution. Each leader knows that if he or she brings home an agreement that imposes costs on their voters they will be likely to lose the next election.

President Obama used his political capital on health and he did not mention climate in his recent State of the Union speech. There is not enough left for climate change.

These constraints lead to gridlock.

Do not be fooled by the rhetoric coming from these conferences. There is a huge gap between what is being agreed so far and what is needed to have a meaningful impact on climate change risks.

Response

This is a business conference so I will begin with what this means for business risk management. We are also individuals so I will conclude with a comment on what it means for us.

The first and most obvious implication is that energy costs will continue to rise, and energy shocks will cause economy shocks. Economic difficulties will make it even more difficult to introduce agreements and regulations to slow emissions growth, and that will increase climate risks further.

Despite that, we should expect increased regulation. Regulations will impose costs on businesses and will mandate technologies. Energy efficiency will become more important and alternative energy sources will be introduced. Fuel costs are likely to continue to rise.

Increased fuel costs and governments' efforts to secure essential supplies and increase self-sufficiency will alter trade patterns and slow globalisation. Demand for shipping is likely to reduce relative to what it would otherwise have been.

There will be increasing demands for businesses to be sustainable. Consumers and governments will expect businesses to be responsible corporate citizens and the expectations will ratchet up. If a business does not meet the expected practice standards there will be consequences.

Volatility will increase too, permanently I think. The forces being unleashed are strong and there are many interactions. Risk management will be a more important corporate function than it is today.

There will be business opportunities created too. It would be a mistake to focus only on the risks.

The climate will continue to change, regardless of how effective regulations and behaviour changes are. There is a lot of momentum, we are a long way from an effective climate reduction response, and many modellers and commentators have concluded that global temperature will increase much more than 2 degrees Celsius.

Storms will increase shipping risks. More investment will be needed to manage the sea.

There will be surprises too. The future will not be a linear continuation of the past but it is not likely to be the future I have sketched out either. What I have done today is anticipate what is likely to happen based on current knowledge and plausible assumptions. I have described important forces in the world and I believe these forces will have big impacts on

our futures. But there will be other forces and events that will divert the course of the future in unexpected ways.

Emerging trends are not too difficult to spot but timing is much harder. Often we expect change and it takes a long time to arrive. The paperless office is still coming even though it was coming “soon” in 1990. But there are also timing surprises too. For example food shortages, export bans and unrest emerged quickly in 2008 and again recently. But it was not very long ago we were being told that food shortages could not occur because when prices rise, food production increases. That’s true, to some extent, but it ignores supply constraints and it hasn’t prevented shortages.

As individuals we have an even more difficult challenge. We would like our leaders, governments and others, to act on our behalf to reduce risks. However, as I pointed out above, our politicians are not leading as vigorously as we might like, for quite rational reasons. Politicians respond to what we want and if we are uninformed, complacent and demand increased consumption that is what they will provide.

There are two really effective things we can all do if we want to reduce the risks for ourselves and for our businesses. First, we can influence others so that sufficient pressure will be brought to bear on politicians so that they are sufficiently motivated to confront long term issues, form effective agreements and introduce effective regulations.

Second, we can make sure we are prepared for expected changes as well as for surprises. Who is we? We is our families, our businesses, our communities, our countries and the Earth.

When you first really realise that our future is likely to be difficult it can be daunting. But we should put our challenges in context. People have always faced difficulties. As managers and as individuals we must step up to the challenges. Get used to it and get on with it.

END

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