Averting Climate Disaster

The carbon era and how to move beyond it

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"If we want things to stay the same, things are going to have to change."

Science tells us that the world is already well beyond its carrying capacity – probably 20 to 30% beyond it – and is rapidly moving toward a non-sustainable future. Nature is actually quite fragile and small perturbations can produce big changes in natural systems.

"If stupidity got us into this mess, why can't stupidity get us out of it?"
– Will Rogers

Here in America, despite four decades of environmental effort, a third of Americans live in areas that fail to meet minimum EPA air standards. A fifth of the nation's drinking water systems violate safety standards. Per capita solid waste has grown a third over the past 40 years, with lots of land pollution and little advance in waste management technology.

"If we want things to stay the same, things are going to have to change."
– Giuseppe Tomasi de Lampedusa

Here in America, a third of plants, a fifth of mammals and birds, and 40% of fish species are threatened with extinction. Fully half our lakes and a third of our rivers fail to meet the swimmable standard of the Clean Water Act. Each year, the U.S. loses more than 2 million acres of open space to degradation and land use conversion.

Besides ignoring its backyard, America is complicit in environmental problems at the global level. More than

1 billion people depend on fish as their primary protein source, yet 90% of the large ocean food fish are gone and unrecoverable, and three-quarters of marine fisheries are nearing collapse. Half the world's tropical and temperate forests, a precious store of biodiversity, carbon, and freshwater, have been cut down and the rest will likely be gone by mid-century. Without saving these forests, there is no prospect of turning back climate change.

We in America have done little to curb our wasteful energy habits and staggering CO_2 emissions. At 5% of the world's population, we produce a quarter of the world's greenhouse gases – 22 tons per capital compared with China's 6 tons. And each year we release more than 25 million tons of toxic chemicals, which find their way into our lives and our bodies.

The world faces an epic freshwater crisis, with more than 2 billion people facing severe water stress. Severe water shortages are appearing everywhere, even here in the U.S. The world is using fresh water faster than it regenerates it, and we are rapidly polluting much of what is left.

Take topsoil and its product, food, as an example. We have arrived at "peak soil." The world's top soil could be exhausted within 50 or 60 years, due to erosion from chronic soil mismanagement and over-farming, combined with climate change, water shortages and population growth. In the U.S., topsoil in disappearing 10 times faster than it is being replaced.

We have been terrible stewards of nature and are now on the brink of ruining our planet. Indeed, all we have to do to destroy the world's natural systems is keep on doing what we are doing. Spew greenhouse gases, impoverish ecosystems, and release toxic chemicals – all at current rates – and the world will not be fit for humanity by mid-

century. But, as we know, human activity is not holding at current levels – it is accelerating rapidly.

Indeed, there are no simple environmental problems any more. There are giant, interrelated, comingled problems of food supply, freshwater availability, weather-caused physical destruction, water-borne disease and migrating tropical diseases, energy security, overwhelmed and obsolete infrastructure and regional conflicts arising from the above forces – all exacerbated by climate change.

"Wars of the future will be caused by climate change."
– U.S. Department of Defense

So, what about climate change?

The direct cause of climate change – greenhouse-gas emissions driven by economic activity – is broadly known and was established by science way back in the 1890s, but the underlying causes and the stuff of solutions are not. In fact, the problem is us and our tendency to devalue the future and resist change.

"Every man takes the limits of his own field of vision for the limits of the world."
– Arthur Schopenhauer

Behavioral scientists tell us that the human brain discounts the future by about 50%, which is why so few people save for retirement...our brain evolved in a more vicious time, when the challenge was feeding our families and literally keeping the wolf from the door – and when nature contained enough "slack" so man could exploit it. The human brain is simply not fitted to address complex problems where the pain of the problem lies in the future but the corrective action must be taken now, particularly when the required solution set is complex.

"To look for simple explanations is the bias of the human brain."
– Nelson Mandela

As the future comes rushing toward us, we must respond to five forces that are making tomorrow different from yesterday: (1) rapid population growth, (2) rising disposable incomes and consumer consumption, (3) growing resource and commodity shortages, (4) technology as a demand stimulator, and (5) government's failure to solve problems. These forces are not new, and

some, like "rising incomes" and "technology as a demand stimulator," are generally viewed as beneficial. However, each has its own downside and, taken together, are pushing us toward catastrophe.

"Everything should be made as simple as possible but not simpler."
– Albert Einstein

By 2050, the world will likely contain 9.2 billion people (up 50% from 6.7 billion today), with growth primarily in developing countries. Pressure on resources of every description will increase exponentially. To claim that technology will find the means to support 9 billion people denies the fact that it has failed to do so for a much smaller population.

Growth in middle-class purchasing power in emerging economies like China and India is a critical trend. Rising household incomes will double the world consumer base by 2025, while world GDP will quadruple by 2050. By 2030, the world's middle class – those with annual incomes between $6,000 and $30,000 – will increase by 2 billion, mostly in developing economies[1]. Discretionary spending and resource consumption will soar.

The world is beginning to run low on natural resources. Oil supplies are finite. Iron ore is increasingly in short supply, as is copper. The world has only 30 years of phosphate remaining, the key ingredient in the green revolution. Rare earth elements, critical to many technologies, are running down in supply. Look for major price increases in resources, contributing to the coming tidal wave of inflation arising from excessive world debt, production bottlenecks, and scarce skilled labor.

"Men continue to labor on major undertakings long after the ideas on which these efforts were based have become obsolete."
– Fred Charles Ikle

Technological advances whose purpose is to stimulate greater demand and product obsolescence in our "throwaway society" only hasten natural resource exhaustion and pollution. In fact, most new technologies

[1] Source: Goldman Sachs.

are incremental in focus, designed for higher efficiency and quick payback. Many industries, such as energy, have chronically low R&D and little incentive to replace obsolete performing assets with new technology.

The last force driving fundamental change is the wholesale failure of governments to solve problems. There is little tradition of acute problem solving in government; little tradition of government units cooperating with each other; little tradition of rich governments helping poor governments; little tradition of legislating sufficient profit into public problems to motivate a strong private sector response.

Problems are increasingly misaligned with government structures that exist to solve them (structures established when most problems were local) – witness our need to regulate power companies toward energy efficiency and the Smart Grid by supplanting the patchwork of state-level regulation with a unified federal energy policy.

Public distrust of government has been growing for a long time and, with increasing partisanship, is rapidly worsening. Recent polls show that trust in government in America has fallen to 17%, the lowest level ever recorded. It is simply not possible to pass major reforms with that level of public distrust.

A short-term, self-interested outlook pervades the thinking of individuals, corporations, and governments. As Gus Speth said in his recent book[2], ". . . there are fundamental biases in capitalism that favor the present over the future and the private over the public. These biases lead directly to a general overexploitation of natural resources and make folly of the term "sustainable development."

[2] *The Bridge at the End of the World*

Where is the public on this matter?

Partly as a result of the recession, a sharp decline has occurred in the percentage of Americans who agree there is solid evidence that global temperatures are rising – down to 57% from 71% only 18 months ago[3]. And fewer see global warming as a serious threat – 35% say that today, down from 44% 18 months ago. This decline has occurred across the political spectrum and is particularly pronounced among independent voters. This is a massive denial of science by an uninformed public.

Ignorance and suspicion of science is a big problem in America. For certain politicians to assert that snowstorms in Washington belie climate change demonstrates not only their ignorance but their faith in the ignorance of the American public.

We are losing our vaunted leadership position in science as China overtakes us in the number of science graduates, R&D spending, scientific developments, number of new patents, and the general quality of scientific education. China will best the U.S. in science within the decade.

Most businesses continue to ignore or defer the matter of greenhouse gas emissions. Simply put, business has no economic incentive to change its emissions behavior. But does that excuse ExxonMobil and others from funding an active disinformation campaign? These groups deny scientific findings, just as others before them denied the effect of cigarette smoking on health and the problem of acid rain on nature.

A global solution to climate change is highly unlikely. Predictably, the UN process has failed. The most we can hope for a series of national actions, such as China or India are following, and perhaps a handful of bi-lateral

[3] Source: The Pew Research Center.

agreements that will begin to address the problem but not solve it. As Arnold Toynbee observed, mankind has been brought together by technology, by what he calls the "annihilation of distance", but has not been united by views of the common good. This is indeed the tragedy of the commons.

The Angle of the Solution

We should, of course, be solving the problem from a different "angle" – as a different exercise, if you will – from the perspective of its threat, its scale, and the minimum required response – the cost of acting vs. the cost of not acting – instead of all of the fuzzy, incremental, self-interested thinking going on now…

"Change the angle, change the exercise."
– My trainer

So, what is necessary for a global solution to the scourge of climate change? To get on a pathway to a 2°C (3.7°F) end game, which is the highest level that scientists say we can risk, we must reduce global greenhouse gas emissions by 17 billion tons in annual emissions vs. a business-as-usual (BAU) forecast over the coming decade (the BAU itself assumes substantial growth in carbon productivity). That is a tough order. We would need strong plans and commitments and strong accountability to get it done.

A recent McKinsey study concluded that nearly 40% of feasible U.S. greenhouse-gas abatement can be accomplished at "negative cost" (in effect, creating positive economic benefits to the economy). These savings, largely energy-efficiency programs, would fully offset other costs of reducing emissions for the economy, bringing the net cost to address the problem close to zero.

We do not need new ideas or new technologies, although they are surely welcome. We need to act on what we know can work. Effective solutions to the climate change problem exist if the world will embrace them. The

missing ingredients are understanding, leadership, political will, adequate capital and management rigor and accountability.

"The trick is not to have an idea but to nail down a piece of reality with it."
– Carter Bales

What actions must we take in America as the world standard setter on the issue?

Four actions, as follows:

1. **A cap or a cost to carbon**, to shift the energy merit order away from hydrocarbons and induce growth in renewable energy sources and energy efficiency – and a cap without a bunch of special interest loopholes that favor coal energy.
2. **A set of strong regulations and economic incentives**, to motivate energy efficiency by industry and consumer users and to drive formation of the energy efficiency industry. Market mechanisms alone simply will not work to drive energy efficiency.
3. **Strong public sector investment to help bring new energy technologies to commercial scale**, where they can compete against traditional energy sources. Scale matters to these technologies and the so-called "first mover disadvantage" and limited protection afforded by patents must be overcome by government support.
4. **Programs to reverse the decline in the U.S. carbon sink** – the store of carbon found in our forests and natural lands – by increasing incentives to protect open space and providing tree planting and nature restoration programs.

These four actions, taken aggressively, would turn back the problem of greenhouse-gas emissions in America and achieve the energy independence that all of us seek, plus kick-start the world on its related tasks. If we fail, we are going to be forced into geo-engineering, with the risk to life on earth that entails.

Economists tell us that the cost of not acting is between 10 and 20 times higher than the cost of acting, in terms of the effect of GDP: 10 to 20% of GDP is at risk from non-action vs. an action cost of approximately half a percent of GDP.

The sad climate negotiations in Copenhagen yielded only a voluntary roll-up of national commitments that will produce an increase in average global temperature of 3.9°C (7.0°F) by 2100, tantamount to a world disaster, compared to a business-as-usual forecast of 4.8°C (8.6°F), total perdition.

What does this mean for concerned and influential citizens?

You can find investment opportunities in the coming (albeit slow) transition toward a clean economy. You can pressure political leaders to get smart on the issues and act responsibly. You can direct your companies to do the same. You can convince other corporate leaders that change is coming and that regulatory certainty is worth more than regulatory confusion. You can personally invest in businesses that support the transition to a low-carbon economy. You can guide an NGO in its efforts to change corporate and government behavior. You can raise your children and grand children to be eco-citizens. You can promote a sensible global view of what is best for the world. You can even run for public office or accept an appointed position in government to drive change yourself.

Whatever your role, you and I, individually and collectively, are responsible and accountable for this problem and its solution. To date, our generation has failed to lead on these issues. The time has come to test our leadership so we do not go down in history as

irrelevant to the biggest threat that has ever confronted the civilized world.