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## WANTED: FOOD, ENERGY, WATER — A FEW GOOD RESOURCES

— Michael Klare

Food, energy, water, and minerals – these are things that all humans need to survive and prosper. Fortunately, mother nature has provided us with a bountiful supply of these, and other vital materials.

For centuries, humans have been harvesting the earth's natural resources and building productive, well-supplied societies. But nature's bounty is not unlimited: many key materials have been so depleted that it is increasingly difficult to satisfy the needs of a growing, more affluent population.

As world temperatures rise, moreover, the supply of food and water is destined to shrink. Without changes in our approach to resource consumption, we will face scarcity, economic instability, and resource-driven conflict.

The need to bolster global resource stocks is undeniable. Simply to feed and house a population expected to grow by one-third between now and 2050 – jumping from 7.2 billion to an estimated 9.6 billion people – will require a massive increase in the supply of food, water, and other basic materials.

As societies modernize, urbanize, and grow wealthier, the demand for many of these things will grow at an even faster rate than population alone. Demand for energy, for example, is projected by the US Department of Energy to grow by 56 percent between 2010 and 2040, jumping from 524 to 820 quadrillion British thermal units (BTUs).

As in the past, we can turn to science and technology. Innovative drilling techniques, such as hydro-fracking and deep-water extraction, will allow the exploitation of oil and natural gas reserves once deemed inaccessible. Further gains will be achieved through the expansion of alternative forms

of energy: wind and solar at first; hydrogen, nuclear fusion, and other breakthroughs coming later.

Food supplies could be augmented by the development, through bio-engineering, of heat and drought-resistant crops.

But it would be a terrible mistake to rely on technology alone to meet the resource requirements of future populations. With the depletion of many existing, easily-accessible reserves of energy and minerals, we are being forced to seek new deposits in places much harder to exploit: the Arctic, the deep oceans, the innermost Amazon, and so on.

Oil and mining companies have learned to operate in such places, but the costs of doing so – both in monetary terms and the damage to fragile ecosystems – are rising rapidly. Growing reliance on genetically-modified crops, moreover, could result in a significant loss of biodiversity, reducing protection against parasite infestations.

Even under the best of circumstances, the task of generating sufficient resources to meet global needs will prove increasingly arduous. But climate change will make everything worse.

True, some northerly areas are likely to benefit from warmer temperatures – permitting farming in Siberia and oil drilling in the Arctic – but these gains are sure to be overwhelmed by the disappearance of water and arable land in more populated southern regions.

To give just one example: the International Fund for Agricultural Development (IFAD) predicts that as much as 50 percent of the agricultural land in Latin America may be subject to desertification by 2050.

Given all this, we can expect increasing stress and uncertainty regarding the availability of vital resources, leading to price spikes, civil unrest, and political turbulence. As suggested by a recent report from Chatham House, the combination of environmental degradation and climate change “may cause social instability, generate mass movements of human population and ultimately trigger political instability and conflicts over access to water and increasingly scarce resources.”

What is to be done in the face of all these challenges? Simply relying on technology is the height of folly.

Without substantial changes in the way we approach resource use, global supplies will prove increasingly constrained and contentious. Rather than employ increasingly desperate measures to extract what remains of the world’s non-renewable resources, we must conserve what is left and develop new materials that are renewable, versatile, and fully recyclable.

The first priority is to shift investment to improved resource efficiency. By substantially increasing the energy efficiency of our cars, homes, offices, and factories, we can sharply reduce our need for oil, coal, and natural gas.

A recent study by McKinsey and Company, “Energy Efficiency: A Compelling Global Resource,” suggests that a \$520 billion investment in efficiency measures could reduce US energy consumption in 2020 by 9.1 quadrillion BTUs – a reduction of 23 percent over projected consumption – and generate savings worth more than \$1.2 trillion.

At the same time, we should speed up the development of advanced materials and production techniques. The production of liquid fuels from algae is one promising approach; another is the development of household products made from agricultural refuse.

Our electrical grids should be expanded to permit increased reliance on wind, solar, geothermal, and other renewable sources of energy.

More water should be recycled, and greater effort made to enhance the efficiency of desalination technology. Wherever possible, machines and buildings should be constructed out of easily recyclable components, to reduce waste and the accumulation of toxic materials.

It is possible to meet the resource needs of a larger, more affluent world population – but not if we persist in a business-as-usual approach to extraction and consumption.

Only by developing new, renewable materials and preserving what remains of the earth’s resource bounty can we avoid acute scarcity and perpetual crisis.

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