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by Richard Heinberg

In my book *Powerdown: Options and actions for a Post Carbon World*, I outlined four scenarios for the oil-constrained future: Last One Standing (a fascistic battle for the world's remaining resources), Powerdown (government-led radical proactive conversion to energy frugality), Waiting for the Magic Elixir (denial of the problem until it's too late for proactive responses), and Building Lifeboats (small communities coming together to build a survivable, sustainable future for themselves and, ultimately, for the rest of humanity). I closed the book by suggesting that, while the current trajectory is toward the first and third options, we should work on the second and fourth because these offer the greatest hope.

After a few years of further thought, it seems to me that my description of these options could stand some modification. I would now say that our future options consist of three broad scenarios.

Before outlining these, it seems important to review the circumstances that will shape them. Because of the impending peaks in the global extraction rates for oil, gas, and coal, the future almost certainly holds less available energy, in total and especially per capita. That in turn means that society will be less mobile. Coal and gas declines will produce widespread and enduring electrical grid outages. Energy constraints coupled with water scarcity and topsoil depletion also ensure higher food prices and likely widespread food shortages. Because powered machines will lack fuel, there will be substantially more need for human labor in agricultural production, as well as in the energy-efficient retrofitting of existing buildings and urban infrastructure. At the same time, there will be need for massive relocation of people away from areas where temporarily increased carrying capacity, established by cheap fuels, has vanished (think Los Angeles or Phoenix, or the massive squatter settlements on the outskirts of any number of huge cities in the global South): somehow, many of these people must move, or be moved, to where they can be near soil and water. As if all of that weren't enough, we also face environmental catastrophe from climate chaos and loss of biodiversity. All of these necessities and trends will pose enormous challenges to every organized society. How to deal with them?

Here are the three scenarios that I see as most likely.

1. Feudal fascism. This is basically similar to the Last One Standing option in *Powerdown*, though now I would frame it somewhat differently. A strong central government will organize work - though not in a way that many people will enjoy. Think agricultural work camps and slave-labor factories. The main selling point for the Fascist option (sorry for the word fascism, but while it's loaded with historical baggage it's also handy, familiar, and probably fairly accurate) would be the maintenance of order in a time of increasing social disintegration. If you were a member of an upper middle-class family clinging to its home, with a bit of gold or cash put aside and a few cans of food in the larder, wouldn't you fear marauding gangs going door-to-door stealing food and money? Wouldn't you welcome police patrols - even if they had a shoot-to-kill policy and about as much self-restraint as a Blackwater contractor in Baghdad? For the truly wealthy as well, protection of property would provide a powerful motive to support the repressive apparatus of state power - which, to be efficacious, would need to be both brutal and omnipresent: troops on street corners; total surveillance; torture and summary executions for dissidents. Forget freedoms of expression or assembly. Naomi Klein's book *Shock Doctrine* describes how the groundwork for feudal fascism is already being laid via disasters like Katrina, which open the way for massive privatization and the shredding of civil liberties. The disaster ahead will be on a far greater scale, offering the ultimate opportunity for that doctrine's fullscale implementation.

However, several decades down the line, energy shortages will grow so severe that it may become impossible to sustain centralized fascistic governmental authority over a continent-scale geographic area.

At that point, fascistic national governments might break down into feudal regionalism featuring local warlords presiding over post-industrial serfdom.

I won't bother to point out the drawbacks of pursuing this scenario; I trust these speak for themselves.

2. The Eco Deal. Economist Susan George calls this option "Environmental Keynesianism" (see her essay at http://www.globalnetwork4justice.org/story.php?c_id=313). For a snapshot image, think of the 1930s New Deal revisited in the context of global ecological crisis.

Like Feudal Fascism, this scenario assumes a strong central government. But in this case, government applies itself to the transformation of societal infrastructure using an inclusive strategy that entails economic re-distribution and the fostering of a culture of democracy. In the New Deal, government created work programs and rebuilt infrastructure; there were even some interesting experiments (on the part of Arthur Morgan, when he worked for Roosevelt as head of the Tennessee Valley Authority) in the creation of self-sufficient small communities. Similarly, governments implementing an Eco-Deal might create the financial capital with which to build electric streetcar systems in every city of 100,000 or more; super-insulate millions of homes and commercial buildings and provide them with geothermal heating; and reorganize agriculture on small-scale, organic model - creating millions of jobs along the way.

This dramatic change in national priorities will require the provision of public information. Currently, the commercial media promote consumerism; instead, a conserver message will be needed, motivating one and all to work together for the common good. There is a historic precedent here as well: in the New Deal and World War II, Hollywood and the advertisers pitched in (to some degree anyway) in the national effort, galvanizing the masses for collective effort.

In this case as well, when shortages deepen the maintenance of a central national authority will become more difficult; but here - if authorities have attempted to seed a culture of democracy (again as in the 1930s) - the nation organized around a centralized state might break down into some form of decentralized bioregionalism.

3. Bottoms Up. There is a strong likelihood that, at least in some nations or regions, strong central government will not survive the end of cheap energy - especially if electrical grids fail. In that case, neither the Feudal Fascist nor the Eco-Deal strategy would play out; instead, localities would be on their own. Local governments and citizen groups would have the task of maintaining order and flows of basic necessities. When hurricane Katrina devastated New Orleans in 2005, locals had a foretaste of this: it was mostly up to ad-hoc citizen groups and what was left of city government to rescue stranded families and deal with thousands of emergencies throughout the area. Yet that disaster occurred in the world's wealthiest nation, which maintained elaborately equipped disaster-relief agencies. Imagine a hundred Katrina-scale local disasters occurring intermittently in the context of an international economic crisis and protracted regional grid failures. What chance would there be, then, of a successful large-scale response effort?

There are those who will find the bottoms-up strategy appealing even in the absence of necessity - anarchists, libertarians, and other advocates of localism and opponents of state power. Here would be an opportunity to escape the oppressive, corrupt domination of the many by the few that has characterized every state, indeed every civilization, since the Pyramid Age. As societies come to have less energy available for transportation and communication, they are bound to decentralize anyway eventually; why not proceed directly to localism and bypass both of the big-government solutions outlined above, which are destined to fail eventually in any case?

The central challenge of the bottoms-up approach is that communities are ill equipped to provide even the most basic services (food, water, power, security) to their citizens absent a working nexus of complexly interconnected regional or national support systems. Even a century ago, communities were much more self-sufficient. Today, few cities in the industrialized world produce much in the way of food, clothing, or other necessities: hospitals depend on the constant delivery of medicines and a wide range of other supplies; grocery stores are continually restocked with food from hundreds or thousands of miles away; even water and electrical power may arrive by aqueducts and long-distance transmission lines. A temporary interruption of these services would certainly be survivable, but a town or city cut permanently adrift would quickly devolve into chaos. In that case, reorganization of society from the grassroots up would take time; meanwhile, an immense human tragedy would ensue.

Thus it would be unwise to give up prematurely on efforts at the national and international levels, even if the long-term goal is a society organized according to bioregional principles. Every nation has its own likely trajectory with regard to these scenario-options. Some countries may initially respond to scarcity with a law-and-order clampdown that seeks to preserve existing power relations at all costs; then, as it becomes clear that there isn't enough social support or resource availability to maintain a massive machine of repression, the latter could give way to a Bottoms-up scenario or perhaps even a brief episode of Let's Make an Eco-Deal. Other countries may start with all the best Keynesian intentions, only to see the unfolding of scarcity so dire that it leads to social unrest that can seemingly only be quelled by heavy-handed authoritarianism.

In the US, China, and Russia, authoritarian solutions appear to be the default responses for the moment. This makes international conflict more likely in the years immediately ahead.

So: Where shall we focus our efforts? As I suggested in *Powerdown*, there is important work to be done at all levels of social organization.

Individuals and families should take to heart the advice given prior to every commercial airline flight: "Secure your oxygen mask before helping others." In other words, see to your own survival prospects first. This is not necessarily selfish behavior: communities and nations in which individual members are prepared and relatively self-sufficient will fare much better than those in which everyone is dependent and unequipped. If no one is prepared, who can teach others what to do? Learn the life-skills of the pre-fossil-fuel era; know how to use and repair hand tools; know where your water comes from and how to compost wastes; grow food.

Communities must begin now to redevelop their local support infrastructure - especially local food systems. City officers should be thinking about how to sustain emergency services, water delivery and wastewater treatment, and communications, given a prolonged scarcity or absence of fuel and electricity. Plans should be under way for the dramatic expansion of public transit services. Individuals can help jump-start all such efforts by speaking to elected and appointed officials, by volunteering for relevant community service work, and also simply by getting to know their neighbors.

National leaders must begin to take seriously the enormous challenges ahead, and to think through the options available. They must quickly come to realize that any effort to follow economic plans based on projecting into the future past rates of growth in energy consumption will lead to systemic failure. Only a dramatic, rapid, systematic reorganization of the economy to function with declining rates of energy flow can avert breakdown. Careful thought must be given to the dire implications of fascistic solutions to the emerging energy crisis, so that those solutions are not implemented as a knee-jerk response to societal stress. Nations must initiate efforts to forge cooperative strategies toward sustainable interdependence (such as the Oil Depletion Protocol) rather than geopolitical resource competition. Individuals can help

foster these developments by educating elected officials and by actively opposing militaristic and fascistic measures.

Is there realistic hope for a broad-scale, peaceful Eco-Deal? While many current world trends bode ill, there is no justification for giving up and assuming the worst outcome. Even if some nations such as the US endure overtly fascistic regimes, the enormous societal pressures brought on by energy scarcity may fairly quickly undermine those regimes and open the way for more inclusive solution, which in the case of the US will draw on a deep historic resonance with the nation's experience during the 1930s.

In any case, two things are absolutely clear: business as usual is not one of the options; and the more we do now to prepare at every level, the better off we all will be.

As the World Burns

September is an equinoctial month - a time of momentary balance, instability, and change. Day and night are of equal length; however, the rate of change in the relative lengths of day and night is at its peak.

It's been an unusually busy and stressful month for me personally. Leonardo DiCaprio's enviro-doc "11th Hour" hit the theaters, featuring yours truly on-screen for a few seconds (though the producer and director decided against including a mention of Peak Oil). Early in September I gave a presentation at the UN at the behest of two organic agriculture organizations (the Soil Association of Britain and the Shumei Foundation of Japan). On Thursday the 13th, a CNN Money reporter called wanting information about Peak Oil; his story appeared the next day. The very first copies of my new book, *Peak Everything*, shipped during the last week of the month. A few days ago a Korean TV crew stopped by and filmed me at home for a three-part documentary to air in November. And a family emergency (aging parent) sent me off to the Midwest for a week. As the saying goes, there's no rest for the wicked.

The month was no less eventful for the rest of the world - though of course the scale of significance of the following items is approximately 6.7 billion times greater than for the preceding ones.

Maybe the best place to start is with a general comment. It's getting pretty damn obvious that the world is sliding head-first into the abyss at an accelerating rate, with most Americans as oblivious as ever. The latest indication of impending doom is a festering credit crunch brought on by the inevitable puncturing of a bubble puffed up over the past few years through the issuance of thousands of patently idiotic subprime, adjustable-rate, and interest-only mortgage loans.

The deeper story is that this is just the last of a series of bubbles that the US Federal Reserve has inflated in order to sustain for as long as was humanly possible a fundamentally unsound national financial condition.

As I explained in Chapter 2 of *The Party's Over*, the US got rich exploiting its own resources and labor. Its most valuable resource - oil - went into decline forty years ago; since then, we Americans have tried to *stay* rich by exploiting other nations' labor and resources, using leveraged trade rules, dollar hegemony, and military threats. All this time, we congratulated ourselves: *we* were living in a post-industrial information economy; *they* were doing the dreary, obsolete work of actually making things. *They* sweated and saved; it was up to *us* to spend and borrow. We served an indispensable function in the global economy as the consumer of last resort, as the engine of new debt creation (more debt equals more money in circulation - i.e., more GDP growth), and as the global cop keeping order in an unruly world (while also sneaking donuts and taking bribes). The Chinese burned *their* coal and poisoned *their* workers and! environment to make *our* stuff, enabling us to enjoy a cleaner environment by keeping our coal in the ground, while *they* loaned *us* the money to buy cheap Chinese stuff with. Such a deal!

Life in bubble world was grand while it lasted. First there was the Third World debt bubble of the '80s; then came the tech bubbles of the '90s; and finally the real estate bubble of the '00s. Along the way, Wall Street hoped for a little extra hot air from the privatization of Social Security, but even Americans weren't stupid enough to sign onto that particular leveraged buyout. All during this time, suburbanites got used to having more gadgets and bigger cars and houses, even if they couldn't actually afford them.

But now we're at the end of the line. At last the rest of the world is coming to realize that it doesn't really need Americans: the Chinese can consume, too, after all. And the Asians can't really justify loaning us more money; we're not going to pay it back - or if we do, it will be in devalued dollars. But those loans can also be looked at as investments: other nations have in effect bought US assets, which means that the wealth created from those assets will flow to the new overseas owners, not to Americans. What's left to buy - other than a lot of soon-to-be-foreclosed real estate? And how much wealth will those assets produce once the bubble deflates?

It's also clear now that there are alternatives to the dollar, including the euro, the yen, and the yuan. Not that the dollar won't be missed; when it tanks, there will be as many financial casualties in Mumbai as Manhattan. But currency traders are clearly heading for the exits, and the last one out gets the booby prize - a bag of wooden nickels.

Yes, the rest of the world still must fear America's awesome weapons of mass destruction: this mighty nation can certainly create an unholy mess when it means to, as it is demonstrating in Mesopotamia. But that doesn't mean that other nations actually have to obey it any more. The US can bomb to smithereens any country it chooses, but it can't always count on forcing that country to hand over its resources at gunpoint.

The dollar is hitting record lows. Gold and silver are hot commodities - always a bad sign for the reigning paper currency. There are rumors of possible bank failures (following a run on one British bank). If the Federal Reserve tries to solve the liquidity crisis by lowering interest rates, that just worsens inflation and exacerbates the dollar's problems. If the Fed raises rates to prop up the dollar, that forces the banks and hedge funds to confront their mountains of worthless paper and leads ultimately to defaults, bank runs, and bank failures. Clearly the Fed fears the latter scenario more than the former, so by lowering interest rates this month it effectively pulled the plug on the dollar. The Saudis are now preparing to de-link their economy from the US currency, while China is quietly selling off dollar-denominated assets. One way or another, Americans are going to soon see a rapid decline in their real standard of living.

Of course, another big event this month was oil's nose-bleed ascent to record-high prices, over \$82US per barrel. Part of the price hike resulted from the dollar's weakness, but - as Goldman Sachs has pointed out - the main reason was simply that demand is up while supply is down. The May 2005 peak for the rate of production of regular crude and the July 2006 peak for all liquids are still holding. It may be that the technical maximum global rate of flow for liquid fuels is still a couple of years away, but in effect the peak is here *now*.

As for Iran, "all options" are still on the table, and the pretext for a broad-scale air attack is apparently being patiently laid. Bush has vowed that he will not leave office with the Iran question unresolved, and France's new neocon leaders are running defense for Bush/Cheney, calling for "the most severe sanctions possible" and for war if those "don't work." Meanwhile, when Tehran actually complies with the International Atomic Energy Agency's requests, this is viewed as a provocation. This month, *Newsweek* revealed that Vice President Dick Cheney at one point considered asking Israel to launch air strikes on an Iranian nuclear site, so as to provoke Iran to lash out, thus giving Washington a pretext for more extensive attacks (a scenario I discussed in *MuseLetter* for April 2007, "Iran: We Will Know Soon"). Iranian President Ahmedinejad's appearances in New York (at the UN and Columbia University) seemed only to

give the US media an opportunity to whip up! further anti-Iranian public sentiment, while the Senate's passage of the Lieberman-Kyl amendment (which Hilary Clinton supported) provided a stamp of approval for any future military actions by the current administration.

But surely the single most important event of the month was the revelation that arctic sea ice is melting faster than even the most dire forecasts had predicted. This is significant because it shows the power of reinforcing feedback loops: as sunlight-reflecting ice melts, it leaves dark water in its place - which absorbs more heat, causing more ice to melt, and so on. This year's minimum extent of ice was about one million square miles (as of September 16); the previous record low was 1.5 million in 2005. The rate of melting this year was 10 times the recent annual average. This month the Northwest Passage was ice-free for the first time in untold millennia. At this rate, the north polar region could be ice-free in summer by 2015.

Altogether, it was an extraordinary 30 days. Yet so far there's been no instantaneous economic implosion, and there's not much blood in the streets (except perhaps in Myanmar), and so the mainstream media can safely focus on the truly vital issues like O.J. Simpson's current legal scrapes and Britney Spears's performance at the MTV awards.

Many writers who discuss the sort of stuff that interests me ("reality" I think it's called) wrap the unutterable sadness of it all in a crisp cellophane of cynicism. I'm guilty of that, too, from time to time - certainly in this little monthly summary. How else to make it somehow bearable?

Addendum: The latter brief essay is gloomier than my usual writing, and one early reader inquired whether I am personally okay. I suspect that the tone of the piece results partly from the stresses of recent travels and from an intense period spent caring for a declining parent. While clearly I was in a venting mood when I wrote these words, it was not my intention to communicate hopelessness. On the other hand, I refuse to be required always to play the role of cheerleader: it is important to identify solutions, but it is also occasionally essential to point out where we are collectively in our species journey, even when the facts call forth uncomfortable emotions.