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The Coming Crash: Our Addiction to Endless Growth on a Finite Planet [With Photo Slideshow]

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This article was published in partnership with GlobalPossibilities.org [3].

If you want to understand how much energy costs, don't look at your electric bill; instead get a copy of the new book *Energy: Overdevelopment and the Delusion of Endless Growth* [4]. This massive coffeetable book contains hundreds of arresting images showing the effects of our energy choices, including oil spills, nuclear accidents, massive solar arrays, tar sands mines, fracking operations, transmission lines, and more. The photos are complemented by essays from leading writers like Wes Jackson, Wendell Berry, Sandra Steingraber [5], Douglas Tompkins, Bill McKibben, Lester Brown and many others, which put into context our growing energy problems and what we can do about them.

The book is a collaboration of great minds, including editors Tom Butler and George Wuerthner and contributing author Richard Heinberg. It's also a partnership between the Post Carbon Institute [6] and the Foundation for Deep Ecology [7], copublished by PCI and Watershed Media [8].

While the book delves greatly into different energy sources and their limitations, the heart of the book is really not so much about what kinds of energy we use but how much. To get a clearer understanding of this AlterNet spoke with contributing writer Richard Heinberg [9], a senior fellow at PCI and the author of numerous books including *The End of Growth: Adapting to our New Economic Reality* (June 2011), *Blackout: Coal, Climate, and the Last Energy Crisis* (2009) and *Peak Everything: Waking Up to the Century of Declines*(2007).

Tara Lohan: How did this book project come about? I know it started out as a book about tar sands, but then it evolved into so much more.

Richard Heinberg: The economy is all about energy. Almost all of our environmental issues relate to energy in one way or another. Certainly, climate change does. War and peace, it's all about energy. Upping the energy literacy of the American people and thought leaders is a pretty high priority.

TL: Explain a little bit more what you mean by energy literacy, because I know you talk about that in the book as well.

RH: Well, surprisingly few people have really looked at or thought about or studied what energy is. It's in all of our lives. We all depend on it for everything we do, but energy is pretty allusive. You can't hold a jar of pure energy in your hands. Useful energy comes to us in various forms. All of these different forms of energy, whether it's coal, oil, natural gas, wind, hydropower, nuclear, each has its own characteristics. Environmental characteristics. Economic characteristics. It takes a while to sort of wrap your head around all of that, and there are some basic concepts like the laws of thermodynamics. The ideas of energy density and return on energy investment that are absolutely fundamental to evaluating different forms and sources of energy.

Again, not too many people have really studied or given much thought to these. Well, over the course of the next few years, we're going to be making absolutely critical decisions about our energy future, our environmental future and our economic future. Unless we have these basic elements of energy literacy, unless more of us understand the criteria by which to evaluate these different sources of energy, we're going to get a lot of things wrong. We think energy literacy is really important.

TL: Right, it's not as easy as just replacing all the coal and oil with solar and wind, because they differ in terms of the energy returned on energy invested.

RH: There's actually a good article on that in the current issue of *Scientific American* that has some neat infographics. This becomes a real issue in energy sources that have very low returns like biofuels and also unconventional fossil fuels like tar sands and shale gas and tight oil. These sources of energy can be profitable in certain situations, especially if there are government subsidies or if Wall Street gets interested and attracts a lot of investment capital, but these are energy sources that are not going to be able to support an industrial society absent other sources of energy that have a higher return on investment.

If all we had to power society were tar sands, biofuels, shale gas and tight oil, society would basically come apart at the seams because we'd be having to put so much of our effort into producing energy that we wouldn't have much energy left over at the end of the day to do all the things we need energy for like education, healthcare, transportation, trade. All of those things use energy. They don't produce energy. We need a very substantial energy surplus from the energy that we do invest in getting more energy. These sources just aren't up to the job.

TL: It seems like there's an increasing industrialization in order to get there, too. I'm thinking about what the footprint looks like for a conventional natural gas well as opposed to a well that's being fracked.

RH: Right. It's a lower quality resource. The shale gas is produced from rocks with very low porosity. The gas just doesn't want to migrate to the wellbore. That's why they have to apply

technologies like hydrofracturing and horizontal drilling. That increases the contact between the wellbore and the resource, but at the end of the day, we may have changed technology, but we haven't changed the rocks themselves. What we get are very high decline rates. If you drill a shale gas well on January 1st, by December 31st of the same year, the rate of production of that well may already have fallen by 70 percent or 80 percent.

That means we have to drill and drill and drill in order to keep overall production rates flat or increasing. That means thousands, tens of thousands, even ultimately perhaps hundreds of thousands of wells. This is costly, of course, but it's also extremely environmentally risky. If we were only drilling a few wells, there would only be a few water tables to put at risk of pollution and probably only a few accidents. But if, let's say, 6 percent or 7 percent of well casings end up being faulty, which is according to research, a pretty fair estimate, we're talking about thousands of wells that are going to be leaking methane and other chemicals and toxics into water and air.

Unless this is understood, people really don't have a basis for making good decisions.

Energy: Overdevelopment and the Delusion of Endless Growth [10]

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Environment

Selected photos from *Energy: Overdevelopment and the Delusion of Endless Growth* edited by Tom Butler and George Wuerthner.

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Tar sands development, Alberta, Canada. (George Wuerthner)

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TL: Unfortunately, most of the conversation seems to revolve around the economic benefits and the amount of job creation.

RH: Right and highly misleading information is being spread to the media and the American people. The companies that are engaged in fracking have a lot at stake. The price of their shares, the availability of investment capital and so they tend to overestimate future production fairly dramatically. We've done some independent research based on crunching numbers from about 65,000 oil and gas wells in the U.S. The result of that research is we see a peak and decline in shale gas production in the U.S. well before 2020. On one hand, you have the industry saying we have 100 years and in some cases they even say we have 200 years of cheap natural gas in front of us. The reality is production is probably going to start declining within the next very few years.

Again, when policy makers only listen to the voice of the industry, they get highly skewed information and make bad decisions.

TL: Is that looking at the production of what we're doing right now? Or does that include projections for areas we haven't hit yet, like parts of the Marcellus shale?

RH: The Marcellus, yes, has yet to be drilled out fully, but there are other shale gas plays that are already pretty much fully drilled out and already in decline, such as the Barnett in Texas.

TL: You wrote that our population is seven times larger now than it was before the Industrial Revolution, but even more troubling is that we use 30 times more energy. To me, that gets to the heart of what the problem is. It's not just the kinds of energy we're using, but how much we're using.

RH: Exactly. Using more energy gives us a lot of power as a species. We've developed the ability to extract and transform all sorts of other resources, including minerals and metals. We've increased our speed and scope of transport and trade, all because we've had cheap, concentrated, portable energy sources, primarily fossil fuels. We just have to figure out how to get more and more energy all the time and progress can go on indefinitely. The reality is we live on a finite planet.

Energy production has costs and tradeoffs. We won't be able to continue increasing the rate of extraction of fossil fuels much longer. Other sources of energy are in some ways seemingly, if not infinite, at least very, very large -- like the amount of sunlight striking the earth on an average day is virtually infinite in comparison with the amount of energy that we use. Our means of capturing sunlight and wind and other renewable sources of energy are themselves dependent

upon other finite resources. You have to build wind turbines out of something. You would have to use minerals and metals to make solar panels.

At the end of the day, we have to somehow make peace with the fact that the earth is not just a giant cookie jar that is going to give us everything we want. We have to moderate our demand for energy and everything else so that it's commensurate with Earth's ability to supply our wants and needs. Now, currently our energy consumption is vast in comparison with our energy consumption at any previous time in history. Also, it's extremely uneven. Americans use twice as much energy as people in Europe per capita, and 10 or 100 times as much as people in less industrialized countries.

First of all we're going to have to find ways of bringing energy consumption up somewhat in those countries where people are poorest, but in the wealthiest countries, it's extremely unlikely that we'll be able to grow energy production and it's in fact very likely that available energy is going to decline. We need to learn how to live with less energy, and that doesn't require so much inventing a lot of new gadgets as getting back to reality, getting back to normal. Accepting a lifestyle of less mobility and finding ways to use the energy that we do use in the most efficient way as possible.

TL: We talk about using less energy, having less economic growth -- what does that look like on a long-term scale? I mean, most people would associate less economic growth with recessions and depressions, which usually aren't very popular. How do we get people to move in that direction, not just individually, but as a society?

RH: Well, less economic growth translates to recession and depression in highly financialized economies, such as we have today where the economy booms and busts on a regular basis due to fads and manias in the financial industry. It wasn't always quite this way. Prior to the last 100 years or so, we really didn't anticipate constant economic growth. It just wasn't a feature of anyone's thinking. It's really only the last few decades when we've had such cheap energy that economists have gotten the idea that somehow economic growth is normal, and if it's not happening, there's something terribly wrong. We need to essentially get back to normal, and normal is a non-growing economy. A steady-state economy in which we pursue goals of human well-being, rather than goals of pure financial speculative enrichment.

There are a number of economists who have been talking about this for some time. The idea of a steady-state economy and a getting off of GDP -- of using alternative indicators, like gross national happiness or a genuine progress indicator. If we did that, I think we could have a way of life that is not only satisfying, but also secure and stable over the long term. Unfortunately, I think we sort of boxed ourselves into a corner in the last while by growing the financial industry to such a scale that it's just cutting it down to size. It's going to be a shock to the system.

TL: It makes so much sense to think, of course, we have to conserve more and we have to use less energy, but then I'm picturing what that actually looks like. I'm seeing a growing movement against climate change and forces coming out against the Keystone pipeline. I'm wondering how you translate that kind of public support for something like conservation.

RH: Right. Well, there are people all over the place who already understand the benefits of downsizing, cutting back, becoming more self-sufficient. Those benefits are both economic and

also psychological. If we're sharing more with our neighbors, that means we're consuming less. Now, that's bad for the economy because it reduces overall consumption and it shows up as a hit in GDP.

If you're sharing more with your neighbors, you're actually happier. We've gotten ourselves into this bizarre situation where if we do what's actually good for us, which is to become more self-sufficient, to consume less and to share more, we hurt the economy. We have to make a fundamental choice here as to what the economy is for. Is it for growth at all costs? Is it all about consuming more and more until the day we die? Or is it about health and happiness and a sense of community?

TL: I remember a few years ago everyone talking about, "Oh, we're running out of fossil fuels, and this is going to be catastrophic unless we make a change." But now it seems like, "Well, yeah maybe we're hitting a peak at some point, but we have more than enough to do ourselves in."

How do we get companies to start leaving these fossil fuels in the ground?

RH: Well, I think what's going on with the Keystone XL pipeline is indicative of the pushback that is coming increasingly from citizens. There's a rapidly growing awareness that climate change is not a theoretical problem that we may have to deal with in a generation or two. It's a profound challenge to the very existence of civilization. If we don't do something about climate change, then future generations, if they even exist, will look back upon us with little kindness.

With that growing awareness, there's this pervasive sense that this is the issue of our times. Either we get off of fossil fuels as rapidly as we can or we may not have a future. The fossil fuel industry is made up of human beings, and they're engaged in work that seems to benefit society in so many tangible ways. It supports the economy. It provides the fuel for our cars and trucks. These aren't evil people, but it's an industry that has outlived its real usefulness to society. As a society, we have to find a polite way to say thank you, but no more.

TL: It's hard considering the strength of the lobby that they seem to have.

RH: Right. I know. There are some I know in the environmental movement who believe that it's necessary to demonize the industry. Frankly, it's an entirely understandable stance because the industry has invested large amounts of money in astroturf organizations and front groups to deny the existence of climate change or to fight off the idea of peak oil. There's a natural adversarial situation there, but in the end we are all in this together, and the CEO of Exxon's grandchildren are going to suffer just as much under climate change as anyone else.

TL: You guys do a fantastic job of pointing at how destructive so many different kinds of fossil fuels are, including things that probably a lot of people don't know about, like oil sands and tar sands and gas hydrates. You also don't give a free pass to renewables either or a lot of the things many of us consider clean energy sources. In that category of things, which do you think look like places that we should be focusing our attention and our resources?

RH: There are certain renewables like biofuels that just haven't made the cut because of the low

energy return, because it really doesn't make sense to turn food into fuel for cars. Biofuels are essentially a failure. That's not so much true with wind and solar. The energy return is relatively low compared to fossil fuels, especially in the past, but it's good enough to enable us to maintain an industrial society of some sort into the future. As technology advances, we may be able to get better energy returns. I don't know. We'll see. But these are certainly worth pursuing.

Now the question is, on what scale and in what way? If we develop renewables with the same kind of centralized industrial model that we have with coal and other fossil fuels, then we end up with unacceptable tradeoffs. We end up paving over deserts with solar arrays. We end up destroying natural scenery with wind farms. When what we could do is deploy renewables in a decentralized and distributed way that would preserve environments and maintain more citizen control of the power system.

Now if we do that, of course, we are going to have to accept a future of less energy, but we argue that that's a tradeoff that's worth making. We will have less energy in either case, but if we choose voluntarily to go down that path and opt for a distributed energy future, we have both more control and a cleaner environment.

TL: In all the research you've done for this book and the many previous books that you've written, what is it that scares you the most?

RH: First of all, just the speed with which climate change is happening, I think, has got to be the scariest thing. I mean, even just a few years ago we weren't anticipating the total loss of the polar ice cap in summer months so soon. It may be ice-free by 2015. The implications of that are so vast. I don't think anybody has really been able to process them.

The environmental impacts of producing lower-grade fossil fuels. As we deplete the higher-grade fossil fuels, the conventional oil and gas and the high concentrations of coal, energy prices go up. As the price of oil goes up, for example, then it becomes cost-effective to mine tar sands or to frack North Dakota.

The environmental consequences and risks are staggeringly high. It's turning neighbor against neighbor, community against community. As some win big by selling the drilling rights to their property and others lose by having their water and air contaminated, it's a pretty grim situation. We've seen boom towns before all through history and particularly in the early 20th century. There were lots of oil boom towns in the American South and Southwest, and those are ghost towns today. I think we're going to see the same process work its way out in very short order and some places that seem to be benefitting so much from drilling and mining right now are going to be pretty sad places in just a few years.

TL: What is it that gives you hope?

RH: What gives me hope is things like the transition town movement where people are coming together and finding ways to cooperate, to reduce their energy consumption, whether it's with local food or car share programs. Not waiting for government to tell them what to do or to pass legislation to make it easier to do what we need to do which is use less. There are small organizations all over the country that have risen up in response to fracking and pipeline issues. These are very often people who would never have thought of themselves as being environmentalists.

They're maybe responding to problems with their drinking water or air quality or hundreds of trucks rumbling past on their way to the drill pads, and they suddenly find themselves in harm's

way and they decided to fight. I think that's a very positive thing.

People are waking up and rising up and doing hard things because they realize that everything is at stake. It's really the most important moment in all of human history; if we consciously and deliberately move away from our dependence on fossil fuels, we have the opportunity of reinventing civilization. If we don't, civilization probably won't survive.

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