

“A Breath of Fresh for Economics”

A Review of

“Energy and the Wealth of Nations – Understanding the Biophysical Economy”

By Dick Burkhardt, March 15th, 2012

This very readable advanced college text by Hall and Klitgaard lays out a scientific approach to economics. This is truly a breath of fresh air for a profession mired in simplistic concepts and models that often defy common sense and that sometimes lead to equally wrong-headed predictions and policies. A prime example would be the financial crash of 2008, unforeseen by mainstream economists, and in defiance of Alan Greenspan’s belief in the magic of markets. Yet the crash itself and the current anemic recovery were no mystery at all to biophysical economists.

In fact, their dictum is that the best way to understand any geological or biological process, including the human ecosystems known as economies, is to first analyze the sources and flows of energy for that process. Markets are secondary. Since the current global economy is driven mostly by fossil fuels (around 85% of all energy), and since oil is by far the most critical of these, any good oil resource geologist is in a far better position to forecast the overall performance of the economy for the coming decades than all the Nobel Prize winning economists put together.

The most prescient of these geologists, such as Colin Campbell, understand that the first half of the “Age of Oil” (cheap oil, growing production) is now over and that we are entering the second half (expensive oil, stagnant then declining production). And that the global economy will decline in tandem. Thus the financial crash of 2008 was due in part by the failure of world oil supply to meet the demand caused by financial inflation (oil reached \$147 a barrel in July, 2008), radically decreasing the discretionary income available to the public. And now there is no more cheap oil to fuel the recovery. In fact a stronger recovery would be self-limiting, with demand once again overshooting supply. Indeed the CEO of Shell recently suggested that gasoline in the US could reach \$7 to \$8 a gallon by 2015, enough to cause severe recession.

This text looks not only at the current global economy but at historical economies and re-analyzes them from an energy point of view. For example, land was the primary source of wealth in agricultural economies because it was the primary way to capture solar energy, via photosynthesis. Long distance trade added to wealth because of the primary energy for wind-driven water transport was free. But major industry awaited the development of the ability to exploit fossil fuels (ancient sunlight). Studies of modern economies show that economic growth closely tracks energy usage, though sometimes you must include embodied energy, such as all the consumer imports from China to the US.

Looked at from the point of view of energy, the shortcomings of traditional theories of economics are also made clear. For example, the Cobb-Douglas production function of traditional macro-economics has far more validity if the arbitrary productivity factor is replaced by energy. But Hall and Klitgaard also point out that the neo-classical way to do economics, based on a paradigm derived from 19th century physics, is severely outdated. The simulations and scenarios of the limits to growth studies, incorporating non-linear feedback loops, need to be brought into the mainstream.

In this book, faith in markets is replaced by analysis of net energy, or “energy returned on energy invested” (EROI). This is simply the ratio of the useful energy obtained from a resource to the energy required for its production. This may be analyzed further in several ways. For example, the energy produced could be the energy if burned at the mine-mouth or well-head, or after processing (such as oil to gasoline), or conversion (such as coal to electricity). The energy of production could include the embodied energy of materials used in the production, as well as the direct energy. It could also include the energy required for transportation to the point of usage and other “downstream” energy costs of usage, such as infrastructure, insurance, and depreciation, yielding an “extended EROI”. Several studies lead the authors to conclude that modern civilization may require an “extended EROI” of around 10 to 1 or more. Renewables and unconventional fossil fuels typically aren’t up to the task.

Turmoil ahead is a foregone conclusion. Yet the authors hold out hope from the knowledge that people can react in creative and positive ways to crises if they understand what is happening. This book is in itself a sign of hope – that the fortress of neo-classical economics is starting to crumble from the escalating bombardment by real world economists and their allies. Let’s hope that Hall and Klitgaard now set their sights on a totally new Econ 101 text that will tell students how real world economies actually function (descriptive economics) and how they could function better (prescriptive economics), especially as economic growth turns toward contraction.