

## Our Finite World

Exploring how oil limits affect the economy

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### Putting the Real Story of Energy and the Economy Together

Posted on [April 15, 2015](#) by [Gail Tverberg](#)

What is the real story of energy and the economy? We hear two predominant energy stories. One is the story economists tell: The economy can grow forever; energy shortages will have no impact on the economy. We can simply substitute other forms of energy, or do without.

Another version of the energy and the economy story is the view of many who believe in the “Peak Oil” theory. According to this view, oil supply can decrease with only a minor impact on the economy. The economy will continue along as before, except with higher prices. These higher prices encourage the production of alternatives, such wind and solar. At this point, it is not just peak oilers who endorse this view, but many others as well.

In my view, the real story of energy and the economy is much less favorable than either of these views. It is a story of oil limits that will make themselves known as *financial limits*, quite possibly in the near term—perhaps in as little time as a few months or years. Our underlying problem is diminishing returns—it takes more and more effort (hours of workers’ time and quantities of resources), to produce essentially the same goods and services.

We don’t measure our investment results with respect to the quantity of end product produced (barrels of oil produced, liters of fresh water produced, kilos of copper produced, or number of workers provided with sufficient education to work in high tech industries), so we don’t realize that we are becoming increasingly inefficient at producing desired end products. See my post “[How increased inefficiency explains falling oil prices.](#)”

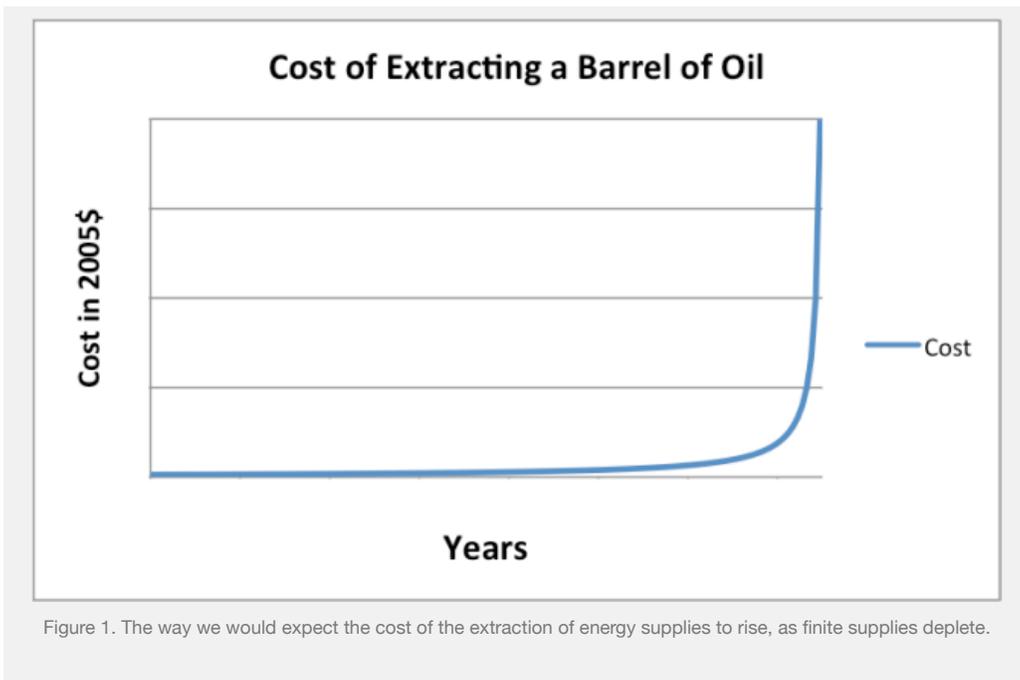


Figure 1. The way we would expect the cost of the extraction of energy supplies to rise, as finite supplies deplete.

Wages, viewed in terms of the product produced—oil in this case—can be expected to decrease as well. This change isn't evident in usual efficiency statistics, because some of the workers are providing new kinds of services, such as fracking services, that weren't required before.

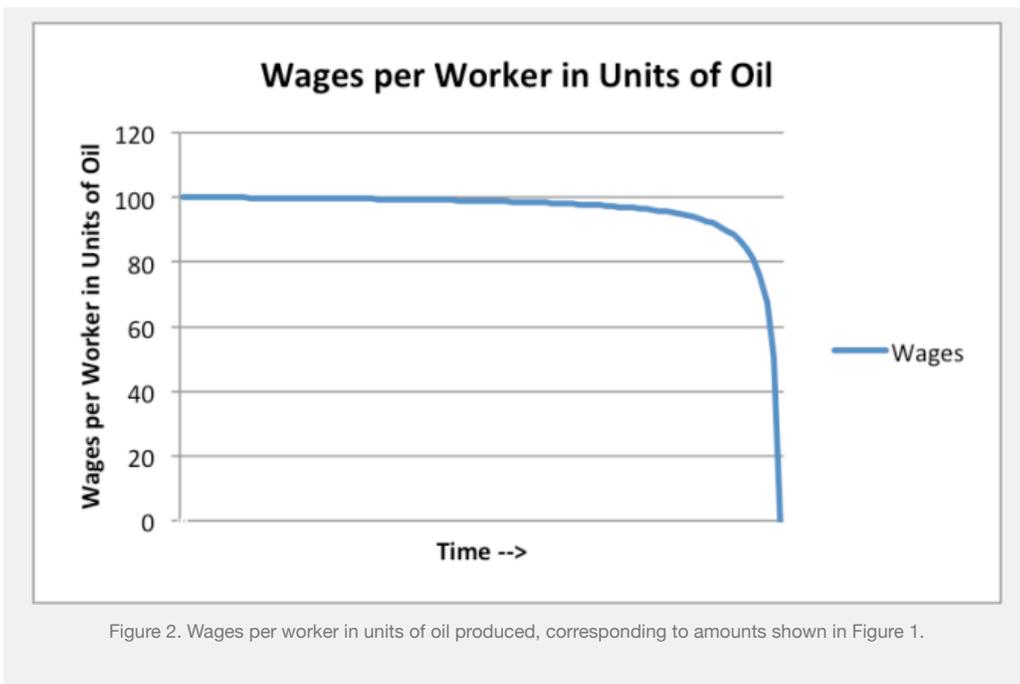


Figure 2. Wages per worker in units of oil produced, corresponding to amounts shown in Figure 1.

Even investment is becoming increasingly inefficient. It takes more and more investment to extract a given quantity of oil or other energy product. This investment needs to stay in place longer as well. The ultra-low interest rates we have been experiencing reflect the poor returns investments are now making.

The myth exists that prices of all of the scarce goods and services will rise high and higher, as the economy

encounters scarcity. The real story, though, is that the inflation-adjusted purchasing power of common workers is falling lower and lower, especially in the United States, Europe, and Japan. Not only can these workers afford to buy less, but they can also afford to borrow less. This means that their ability to purchase expensive goods created from commodities is falling.

At some point, this lack of purchasing power can be expected to affect the financial markets, and the prices of many commodities can be expected to fall. In fact, this already seems to be happening.

The likely impact of such a fall in commodity prices is not good. If low oil prices cannot be “turned around,” they will lead to debt defaults, and these debt defaults are likely to lead to failing financial institutions. Failing financial institutions have the potential to bring down the system, because it becomes very difficult for businesses to continue if they are not supported by a banking system that allows a company to pay its employees. Workers also need the banking system to pay for goods and to save for a “rainy day.”

A big part of what has allowed the economy to grow to the size it is today is increasing debt levels. These rising debt levels play many roles:

- They make high-priced goods more affordable to consumers.
- They create greater demand for goods, allowing more end-product goods to be produced.
- They create more demand for commodities required to make end-product goods, allowing the price of these commodities to rise, so that more businesses have more incentive to create/extract these commodities.

At some point, debt levels stop rising as fast as they have in the past (because of a lack of growth in purchasing power because of diminishing returns in investment), and the whole system tends to fall toward collapse. We seem to have reached this point in the middle of 2014. China was raising its total debt level rapidly up until the early part of 2014, then suddenly moderated its growth in debt level in mid 2014. At about the same time, the US scaled back and eliminated its program of quantitative easing (QE). Oil prices dropped starting in mid-2014, at the time debt levels started moderating. Other commodity prices started falling as early as 2011, indicating likely affordability problems.

We are now in the period when many people still believe everything is going well. Oil prices and other commodity prices are low—what is “not to like”? The answer is that the system is not at all sustainable—profits of oil companies and other commodity businesses are down, just as wages of common workers in developed countries are down in inflation-adjusted terms. Companies are cutting back in investment in oil production. Soon oil production will drop. With lower oil supply, the economy will face huge challenges.

Many people believe that oil prices can bounce back up again, but this really isn't the case, because of growing inefficiency related to limits we are reaching—the need to use more advanced techniques to produce oil; the need for desalination for water in some places; the need for more pollution control equipment that doesn't really increase the finished goods and services we are producing but instead makes goods more expensive to produce.

Each worker is, on average, producing less and less of the finished goods we really need. Whether we like it or not, standards of living will have to fall. The amount of debt workers can afford decreases rather than increases. This new reality can be expected to manifest itself in debt defaults and increasing financial system problems.

Even if oil prices bounce back up again, it is doubtful that shale oil drillers will be able to again borrow at a sufficiently high rate to increase their production again—what lender will believe that oil prices will remain high indefinitely?

## The China Connection

I have been trying to put the real story of energy and the economy together over a period of years. Prof. Lianyong Feng of Petroleum University of China, Beijing, hired me to put together a short course (eight sessions, each lasting about 1.5 hours) on the nature of our current problems for students majoring in “Energy Economics and Management.” The course would be open to everyone choosing this major, including freshman, so I needed to assume a fairly low level of background knowledge. Actual attendees included a number of graduate students and faculty, attending the course without credit.

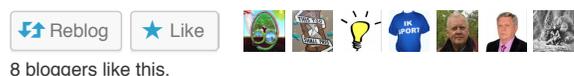
I put together a series of lectures, which I gave during the second half of March 2015. PDFs of my lectures are also now available on my [Presentations/Podcasts](#) page.

These lectures were videotaped by Prof. Feng’s staff, and I am in the process of making You Tube Videos from them, in addition to the original MP4 format. (YouTube videos cannot be seen in China.) My current plan is to give a brief discussion of these lectures, in future posts.

Following the lecture series, I visited several places in China, to see how the economic slowdown is playing out in China. This included visits to Northwest China (Hohhot and Hardin), Northeast China (Daqing and Harbin), and Southeast China (Wenzhou area). In Wenzhou, I visited three different companies attempting to sell electrical equipment on the world market.

From these visits, we could see how the world economic slowdown is affecting China, and how China’s own slowdown in debt growth is adding to the world slowdown. We could also see that the slowdown has not yet run its course China—growth in housing continues, even as the need for it seems to be slowing. College students are finding it difficult to find high-paying jobs in oil and other commodity sectors. The lack of growth in high-paying jobs will provide downward pressure on housing prices as well.

I plan to write a post about this situation as well.



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#### About Gail Tverberg

My name is Gail Tverberg. I am an actuary interested in finite world issues - oil depletion, natural gas depletion, water shortages, and climate change. Oil limits look very different from what most expect, with high prices leading to recession, and low prices leading to inadequate supply.

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## 486 Responses to *Putting the Real Story of Energy and the Economy Together*

### **Kulm says:**

April 22, 2015 at 2:32 pm

These are what the future will be.

> We're in a greater-moderation of no downturns and monotonically increasing growth, which will continue for what will seem like forever. Policy makers have conquered the business cycle; they have conquered the rate hike; and they have conquered the bear market. Next comes the type 1 civilization transition, the singularity, a theory of everything, mind uploading, a halo ring that will encircle the earth, space colonies, a matrix, and much more.

Actually, I do think these will be obtainable with what energy remaining now, after about 90% of the world's population is reduced to somalian refugee status requiring very little energy to maintain.

### **Tolstoy's Degenerate Grandson says:**

April 22, 2015 at 4:50 pm

When this hits you will be one of those people staggering around as if you'd been caught in a road side bomb blast, observing the misery and death around you, and wondering how you got your prediction so wrong.

### **Kulm says:**

April 22, 2015 at 5:45 pm

Actually there were two extremely famous Chinese poets who experienced something like this during AD 8th century, Du Fu and Li Bai(Li Po), when a rebellion shook the dynasty which was extremely rich and powerful.

Li Bai was a favorite poet of the Emperor, which means he was somewhat like Steven Spielberg or George Lucas of the day. Du Fu was a low-level govt employee, although because he was such a good poet he was acquainted to Li Bai.

Both survived the rebellion, which killed about half of the people alive in China at that time. When the rebellion ended the GDP fell to maybe 1/3 of what it used to be.