BP Data Suggests We Are Reaching Peak Energy Demand

Some people talk about peak energy (or oil) supply. They expect high prices and more demand than supply. Other people talk about energy demand hitting a peak many years from now, perhaps when most of us have electric cars.

Neither of these views is correct. The real situation is that we right now seem to be reaching peak energy demand through low commodity prices. I see evidence of this in the historical energy data recently updated by BP (BP Statistical Review of World Energy 2015).

Growth in world energy consumption is clearly slowing. In fact, growth in energy consumption was only 0.9% in 2014. This is far below the 2.3% growth we would expect, based on recent past patterns. In fact, energy consumption in 2012 and 2013 also grew at lower than the expected 2.3% growth rate (2012 – 1.4%; 2013 – 1.8%).

Recently, I wrote that economic growth eventually runs into limits. The symptoms we should expect are similar to the patterns we have been seeing recently (Why We Have an Oversupply of Almost Everything (Oil, labor, ...
It seems to me that the patterns in BP's new data are also of the kind that we would expect to be seeing, if we are hitting limits that are causing low commodity prices.

One of our underlying problems is that energy costs have risen faster than most workers’ wages since 2000. Another underlying problem has to do with globalization. Globalization provides a temporary benefit. In the last 20 years, we greatly ramped up globalization, but we are now losing the temporary benefit globalization brings. We find we again need to deal with the limits of a finite world and the constraints such a world places on growth.

**Energy Consumption is Slowing in Many Parts of the World**

Many parts of the world are seeing slowing growth in energy consumption. One major example is China.

Based on recent patterns in China, we would expect fuel consumption to be increasing by about 7.5% per year. Instead, energy consumption has slowed, with growth amounting to 4.3% in 2012; 3.7% in 2013; and 2.6% in 2014. If China was recently the growth engine of the world, it is now sputtering.

Part of China’s problem is that some of the would-be buyers of its products are not growing. Europe is a well-known example of an area with economic problems. Its consumption of energy products has been slumping since 2006.
I have used the same scale (maximum = 3.5 billion metric tons of oil equivalent) on Figure 3 as I used on Figure 2 so that readers can easily compare the European’s Union’s energy consumption to that of China. When China was added to the World Trade Organization in December 2001, it used only about 60% as much energy as the European Union. In 2014, it used close to twice as much energy (1.85 times as much) as the European Union.

Another area with slumping energy demand is Japan. Its consumption has been slumping since 2005. It was already well into a slump before its nuclear problems added to its other problems.

A third area with slumping demand is the Former Soviet Union (FSU). The two major countries within the FSU
with slumping demand are Russia and Ukraine.

Of course, some of the recent slumping demand of Ukraine and Russia are intended—this is what US sanctions are about. Also, low oil prices hurt the buying power of Russia. This also contributes to its declining demand, and thus its consumption.

The United States is often portrayed as the bright ray of sunshine in a world with problems. Its energy consumption is not growing very briskly either.
To a significant extent, the US’s slowing energy consumption is intended—more fuel-efficient cars, more fuel-efficient lighting, and better insulation. But part of this reduction in the growth in energy consumption comes from outsourcing a portion of manufacturing to countries around the world, including China. Regardless of cause, and whether the result was intentional or not, the United States’ consumption is not growing very briskly. Figure 6 shows a small uptick in the US’s energy consumption since 2012. This doesn’t do much to offset slowing growth or outright declines in many other countries around the world.

**Slowing Growth in Demand for Almost All Fuels**

We can also look at world energy consumption by type of energy product. Here we find that growth in consumption slowed in 2014 for nearly all types of energy.

![World Energy Consumption by Fuel](https://ourfiniteworld.com/2015/06/23/bp-data-suggests-we-are-reaching-peak-energy-demand/)

Looking at oil separately (Figure 8), the data indicates that for the world in total, oil consumption grew by 0.8% in 2014. This is lower than in the previous three years (1.1%, 1.2%, and 1.1% growth rates).
If oil producers had planned for 2014 oil consumption based on the recent past growth in oil consumption growth, they would have overshot by about 1,484 million tons of oil equivalent (MTOE), or about 324,000 barrels per day. If this entire drop in oil consumption came in the second half of 2014, the overshoot would have been about 648,000 barrels per day during that period. Thus, the mismatch we have recently been seeing between oil consumption and supply appears to be partly related to falling demand, based on BP’s data.

(Note: The “oil” being discussed is inclusive of biofuels and natural gas liquids. I am using MTOE because MTOE puts all fuels on an energy equivalent basis. A barrel is a volume measure. Growth in barrels will be slightly different from that in MTOE because of the changing mix of liquid fuels.)

We can also look at oil consumption for the US, EU, and Japan, compared to all of the rest of the world.
While the rest of the world is still increasing its growth in oil consumption, its rate of increase is falling—from 2.3% in 2012, to 1.6% in 2013, to 1.3% in 2014.

Figure 10 showing world coal consumption is truly amazing. Huge growth in coal use took place as globalization spread. Carbon taxes in some countries (but not others) further tended to push manufacturing to coal-intensive manufacturing locations, such as China and India.

Looking at the two parts of the world separately (Figure 11), we see that in the last three years, growth in coal
consumption outside of US, EU, and Japan, has tapered down. This is similar to the result for world consumption of coal in total (Figure 10).

Another way of looking at fuels is in a chart that compares consumption of the various fuels side by side (Figure 12).

Consumption of oil, coal and natural gas are all moving on tracks that are in some sense parallel. In fact, coal
and natural gas consumption have recently tapered more than oil consumption. World oil consumption grew by 0.8% in 2014; coal and natural gas consumption each grew by 0.4% in 2014.

The other three fuels are smaller. Hydroelectric had relatively slow growth in 2014. Its growth was only 2.0%, compared to a recent average of as much as 3.5%. Even with this slow growth, it raised hydroelectric energy consumption to 6.8% of world energy supply.

Nuclear electricity grew by 1.8%. This is actually a fairly large percentage gain compared to the recent shrinkage that has been taking place.

Other renewables continued to grow, but not as rapidly as in the past. The growth rate of this grouping was 12.0%, (compared to 22.4% in 2011, 18.1% in 2012, 16.5% in 2013). With the falling percentage growth rate, growth is more or less “linear”—similar amounts were added each year, rather than similar percentages. With recent growth, other renewables amounted to 2.5% of total world energy consumption in 2014.

**Falling Consumption Is What We Would Expect with Lower Inflation-Adjusted Prices**

People buy goods that they want or need, with one caveat: they don’t buy what they cannot afford. To a significant extent affordability is based on wages (or income levels for governments or businesses). It can also reflect the availability of credit.

We know that commodity prices of many kinds (energy, food, metals of many kinds) have generally been falling, on an inflation adjusted basis, for the past four years. Figure 13 shows a graph prepared by the International Monetary Fund of trends in commodity prices.
It stands to reason that if prices of commodities are low, while the general trend in the cost of producing these commodities is upward, there will be erosion in the amount of these products that can be profitably produced, and hence, that can be purchased. (This occurs because prices are falling relative to the cost of producing the goods.) If, prior to the drop in prices, consumption of the commodity had been growing rapidly, lower prices are likely to lead to a slower rate of consumption growth. If prices drop further or stay depressed, an absolute drop in consumption may occur.

It seems to me that the lower commodity prices we have been seeing over the past four years (with a recent sharper drop for oil), likely reflect an affordability problem. This affordability problem arises because for most people, wages did not rise when energy prices rose, and the prices of commodities in general rose in the early 2000s.

For a while, the lack of affordability could be masked with a variety of programs: economic stimulus, increasing debt and Quantitative Easing. Eventually these programs reach their limits, and prices begin falling in inflation-
adjusted terms. Now we are at a point where prices of oil, coal, natural gas, and uranium are all low in inflation-adjusted terms, discouraging further investment.

**Commodity Exporters—Will They Be Next to Be Hit with Lower Consumption?**

If the price of a commodity, say oil, is low, this is a problem for a country that exports the commodity. The big issue is likely to be **tax revenue**. Governments very often get a major share of their tax revenue from taxing the profits of the companies that sell the commodities, such as oil. If the price of oil or other commodity that is exported drops, then it will be difficult for the government to collect enough tax revenue. There may be other effects as well. The company producing the commodity may cut back its production. If this happens, the exporting country is faced with another problem—laid-off workers without jobs. This adds a second need for revenue: to pay benefits to laid-off workers.

Many oil exporters currently subsidize energy and food products for their citizens. If tax revenue is low, the amount of these subsidies is likely to be reduced. With lower subsidies, citizens will buy less, reducing world demand. This reduction in demand will tend to reduce world oil (or other commodity) prices.

Even if subsidies are not involved, lower tax revenue will very often affect the projects an oil exporter can undertake. These projects might include building roads, schools, or hospitals. With fewer projects, world demand for oil and other commodities tends to drop.

The concern I have now is that with low oil prices, and low prices of other commodities, a number of countries will have to cut back their programs, in order to balance government budgets. If this happens, the effect on the world economy could be quite large. To get an idea how large it might be, let’s look again at Figure 1, recopied below.

Notice that the three “layers” in the middle are all countries whose economies are fairly closely tied to commodity exports. Arguably I could have included more countries in this category—for example, other OPEC countries could be included in this grouping. These countries are now in the “Rest of the World” category. Adding more countries to this category would make the portion of world consumption tied to countries depending on commodity exports even greater.

My concern is that low commodity prices will prove to be self-perpetuating, because low commodity prices will adversely affect commodity exporters. As these countries try to fix their own problems, their own demand for commodities will drop, and this will affect world commodity prices. The total amount of commodities used by exporters is quite large. It is even larger when oil is considered by itself (see Figure 8 above).

In my view, the collapse of the Soviet Union in 1991 occurred indirectly as a result of low oil prices in the late 1980s. A person can see from Figure 1 how much the energy consumption of the Former Soviet Union fell after 1991. Of course, in such a situation exports may fall more than consumption, leading to a rise in oil prices. Ultimately, the issue becomes whether a world economy can adapt to falling oil supply, caused by the collapse of some oil exporters.

**Our World Economy Has No Reverse Gear**

None of the issues I raise would be a problem, if our economy had a reverse gear—in other words, if it could shrink as well as grow. There are a number of things that go wrong if an economy tries to shrink:

- Businesses find themselves with more factories than they need. They need to lay off workers and sell buildings. Profits are likely to fall. Loan covenants may be breached. There is little incentive to invest in new factories or stores.
- There are fewer jobs available, in comparison to the number of available workers. Many drop out of the labor force or become unemployed. Wages of non-elite workers tend to stagnate, reflecting the oversupply situation.
- The government finds it necessary to pay more benefits to the unemployed. At the same time, the
government’s ability to collect taxes falls, because of the poor condition of businesses and workers.

- Businesses in poor financial condition and workers who have been laid off tend to default on loans. This tends to put banks into poor financial condition.
- The number of elderly and disabled tends to grow, even as the working population stagnates or falls, making the funding of pensions increasingly difficult.
- Resale prices of homes tend to drop because there are not enough buyers.

Many have focused on a single problem area—for example, the requirement that interest be paid on debt—as being the problem preventing the economy from shrinking. It seems to me that this is not the only issue. The problem is much more fundamental. We live in a networked economy; a networked economy has only two directions available to it: (1) growth and (2) recession, which can lead to collapse.

**Conclusion**

What we seem to be seeing is an end to the boost that globalization gave to the world economy. Thus, world economic growth is slowing, and because of this slowed economic growth, demand for energy products is slowing. This globalization was encouraged by the Kyoto Protocol (1997). The protocol aimed to reduce carbon emissions, but because it inadvertently encouraged globalization, it tended to have the opposite effect. Adding China to the World Trade Organization in 2001 further encouraged globalization. CO2 emissions tended to grow more rapidly after those dates.

Now growth in fuel use is slowing around the world. Virtually all types of fuel are affected, as are many parts of the world. The slowing growth is associated with low fuel prices, and thus slowing demand for fuel. This is what we would expect, if the world is running into affordability problems, ultimately related to fuel prices rising faster than wages.
Globalization brings huge advantages, in the form of access to cheap energy products still in the ground. From the point of view of businesses, there is also the possibility of access to cheap labor and access to new markets for selling their goods. For long-industrialized countries, globalization also represents a workaround to inadequate local energy supplies.

The one problem with globalization is that it is not a permanent solution. This happens for several reasons:

- A great deal of debt is needed for the new operations. At some point, this debt starts reaching limits.
- Diminishing returns leads to higher cost of energy products. For example, later coal may need to come from more distant locations, adding to costs.
- Wages in the newly globalized area tend to rise, negating some of the initial benefit of low wages.
- Wages of workers in the area developed prior to globalization tend to fall because of competition with workers from parts of the world getting lower pay.
- Pollution becomes an increasing problem in the newly globalized part of the world. China is especially concerned about this problem.
- Eventually, more than enough factory space is built, and more than enough housing is built.
- Demand for energy products (in terms of what workers around the world can afford) cannot keep up with production, in part because wages of many workers lag thanks to competition with low-paid workers in less-advanced countries.

It seems to me that we are reaching the limits of globalization now. This is why prices of commodities have fallen. With falling prices comes lower production and hence lower total consumption. Many economies are gradually moving into recession–this is what the low prices and falling rates of energy growth really mean.

It is quite possible that at some point in the not too distant future, demand (and prices) will fall further. We then will be dealing with severe worldwide recession.

In my view, low prices and low demand for commodities are what we should expect, as we reach limits of a finite world. There is widespread belief that as we reach limits, prices will rise, and energy products will become scarce. I don’t think that this combination can happen for very long in a networked economy. High energy prices tend to lead to recession, bringing down prices. Low wages and slow growth in debt also tend to bring down prices. A networked economy can work in ways that does not match our intuition; this is why many researchers fail to see understand the nature of the problem we are facing.
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.

View all posts by Gail Tverberg →

This entry was posted in Financial Implications and tagged BP Statistical Review of World Energy, CO2 emissions, globalization, low oil prices, recession. Bookmark the permalink.

1,227 Responses to BP Data Suggests We Are Reaching Peak Energy Demand

Fast Eddy says:
July 7, 2015 at 11:01 pm
Thinking about the China markets.... seeing as the PBOC has unlimited fire power.... I cannot see how the market can run out of control....

The PBOC surely can stop this anytime they want ... all they need to do is blast a few hundred billion or even a trillion at this and the market will charge higher... the idiocracy will see that and sentiment will turn on a dime ... and back into the bull fantasy we go?

Could it be that they are just going to step this market down a few points per day until they feel it is at a reasonable level... then start the whole game over again?

Matthew Krajcik says:
July 8, 2015 at 1:32 am

They seem to have recently opened up short selling in China, which was previously limited to a few firms since ~2009. People can make money on the way up, and on the way down. Unless, of course, there is a short selling ban or trading is halted.

China is like 19th century London, on a much bigger scale. This will probably be their South Sea Bubble, but at 100 / 1000 times the scale. Will be interesting to see what they do to maintain order.

Rodster says:
July 8, 2015 at 5:47 am

The entire global financial/banking/economic system is nothing more than three card monte.