

How much oil will be recoverable?

The world holds a huge amount of oil resources. Besides liquid oil, there is very heavy oil in various forms. There is also liquid oil trapped in oil shale, oil in very deep water, and oil that is not yet fully formed (still kerogen) in shale oil. Some would like us to believe that eventually, all of this can be extracted, so there is no issue with peak oil.

How do we explain that this cannot really happen? The way I think of the situation is that our resources are of varying “quality”, or ease of extraction. If we order them from highest quality to lowest quality, they would probably form something like a triangle (or perhaps the shape would be more like a rectangle, if the high quality resources are closer to equal in quantity to the low quality resources—it doesn’t matter too much for this discussion).

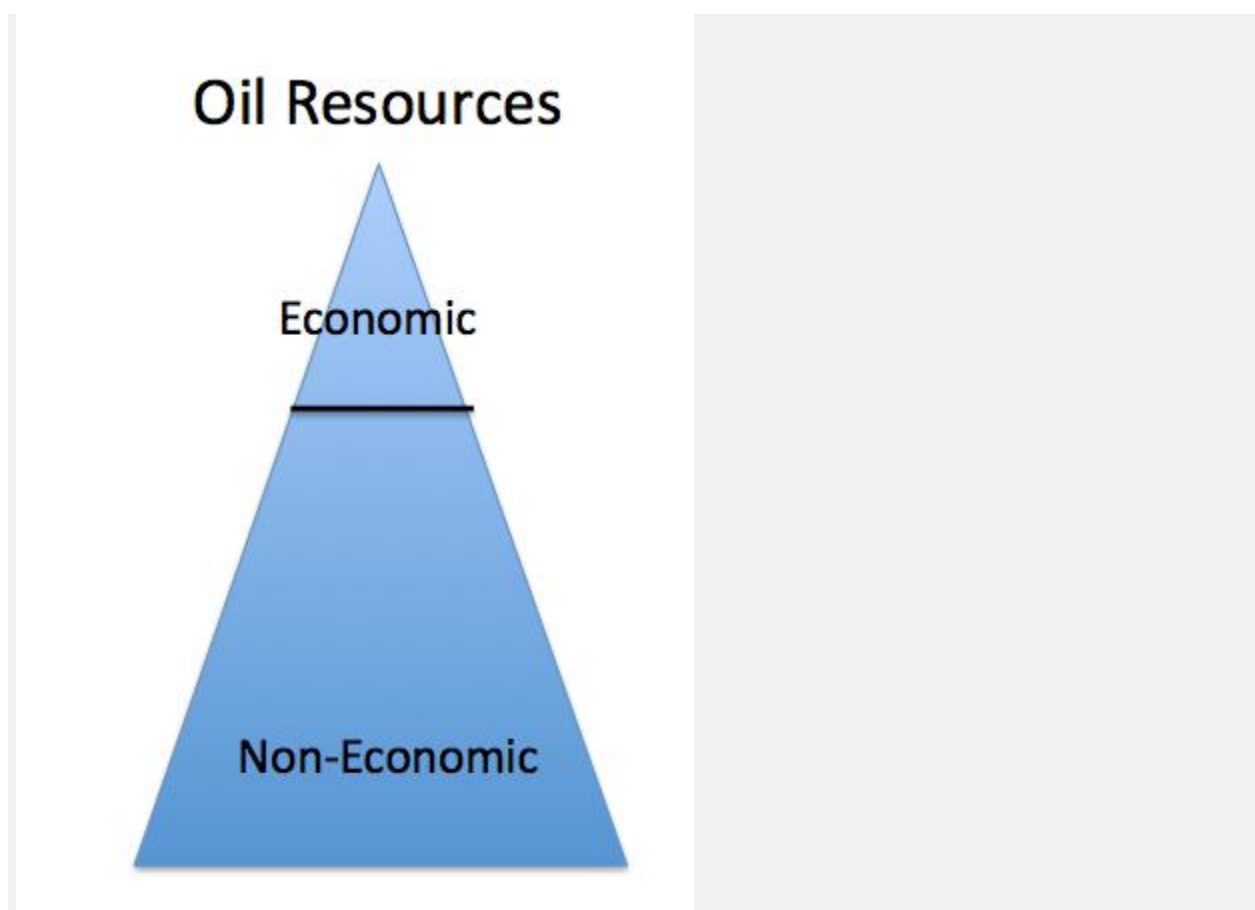


Figure 1. Schematic diagram of economic and non-economic resources

It seems to me that above some imaginary line, resources can be extracted and producers can make a profit selling them, and the economy can use them successfully. Below the imaginary line, the cost of production will be so high that if a price that is adequate for a producer to make a reasonable profit is charged, the high price will send the economy into recession.

What separates economic and non-economic resources? It seems to me that exactly where this line changes over time, depending on technology (tending to lower the line, as improvements are made) and tax rates (higher taxes tend to raise the line). Basically, the line separates what is **affordable** for the economy, and what is not.

What we think of as affordable seems to correspond in practice to what economists talk about as the level of **demand**. If there is high demand, then a high price seems affordable. But where does this high demand come from?

It seems to me that this high demand comes from wage-earners who have earned enough income and businesses that have earned sufficient cash flow that they can afford goods made with higher priced oil. In terms of Professor Charlie Hall's cheese slicer model of how energy is used, it comes from an economy that has fat red discretionary income arrows.

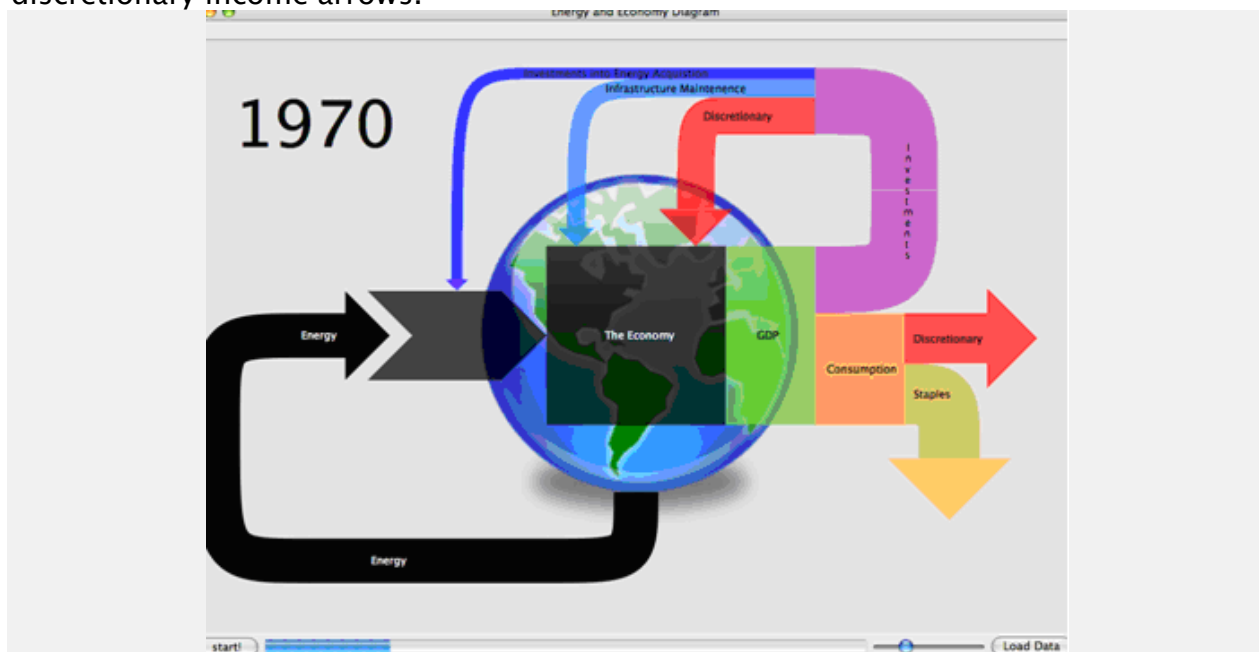


Figure 2. Charlie Hall's Cheese Slicer Model, showing arrows for various components of the reinvestment process. This version is theoretically for 1970.

But how does an economy get fat discretionary income arrows? These are really affected by two things:

1. How much energy is used to make energy – the Energy Return on Energy Invested (or EROI) that we read about. The less energy that is used to make energy, the more energy there is for other purposes, and
2. How much energy is required by society to maintain its infrastructure. The more energy that is needed for maintenance, the less is available for other purposes.

What is happening now is that we are moving to lower and lower quality resources (lower EROI resources), so the red arrows are getting thinner and thinner, leading to a smaller proportion of funds for discretionary purposes, and hence lower demand. Also, our infrastructure is taking more and more off the top, because as we build more of it, it needs more maintenance.

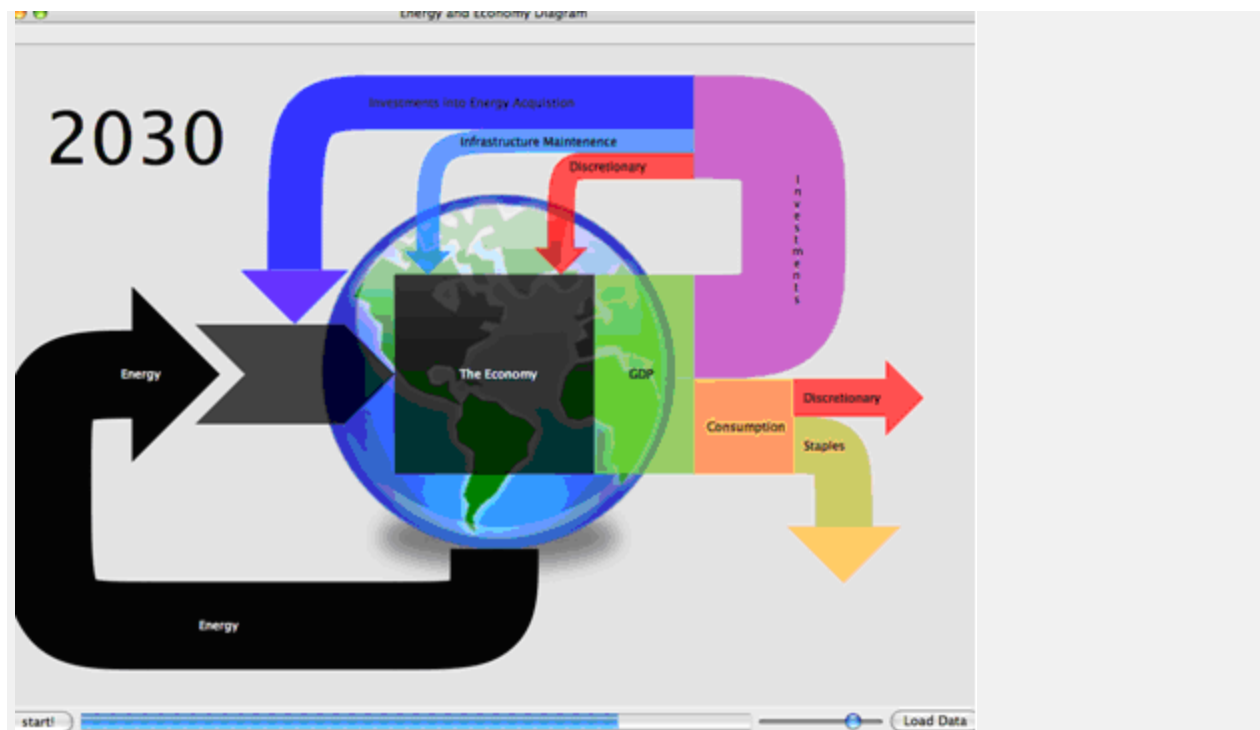


Figure 3. Charlie Hall's Cheese Slicer Model, as of 2030.

If prices could keep rising higher, say to \$500 a barrel, the dividing line between economic and non-economic resources in the triangle diagram at the top of this article would drop very low, and we would not have to worry about peak oil. Pretty much all of the resources in the triangle diagram would become economic.

It is the fact that demand is not high enough—that is, the red consumption arrows are not thick enough—that keeps prices from rising high enough to extract oil from all of

the types of resources. This is what acts to limit oil resource use, even though to the casual observer, there would seem to be no problem in using all of the low-quality resources that are available.

Source: <http://ourfiniteworld.com/2011/02/28/how-much-oil-will-be-recoverable/>