Steady As She Goes

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We will never run out of gas.

The argument that we are going to run out of oil, and of fuel in general, is essentially a Malthusian one. Malthus argued that, due to the fixed quantity of arable land and the law of diminishing returns, as population increased, we would one day be faced with a situation where there would not be enough food to support the world's population. In capitalist societies, Malthus has been proven wrong (Malthus' model actually works quite well for Communist societies; we'll discuss that later). The argument that we are running out of oil is based on similar logic. There is a fixed quantity of oil existing in the earth. If we keep using it, and especially if we accelerate our consumption of it, as we are doing, someday we are going to run out. In fact, the argument for oil would seem to be even more compelling than that for food, as it doesn't even need to rely on diminishing returns; there is simply a set amount of oil in the world, and once we use it all up, it's gone. And in a very narrow sense, this argument has some merit. There very likely *will* come a time when it will no longer be feasible to power our autos and homes with fuel refined from petroleum pumped from the earth. But that time will be much farther off, and the consequences will be much milder, than the alarmists predict. The reasons for this are essentially the same as the reasons Malthus was wrong about food.

The first reason is simply the nature of the price mechanism in a market economy. Basic economic theory states that as the price of a good increases, quantity demanded will decrease. This works in both a simple way: people simply use less of the good (in the case of oil, drive less, buy more fuel-efficient cars and energy-efficient homes, or move closer to their place of work; in the case of food, eat less or cheaper food and have fewer children because it costs more to raise them)—and in a complex way: people find substitutes for the good (natural gas, coal, or solar to power their homes; ethanol to power their vehicles. The analogy to food breaks down here somewhat, of course, because there is no substitute for food, but people will choose cheaper, more plentiful food—grain over meat, for instance). The substitution argument can even be carried a step farther: As the price of oil increases,

people will turn to substitutes that were previously too expensive to consider. In other words, the cost of producing the substitute did not justify the expense to the consumer, but as oil prices rise, that changes. Since there are often substantial economies of scale in fuel production, heavy purchasing of alternate energy sources will likely drive the price down as more is being produced—in theory, possibly even to levels *below* what oil had cost previously!

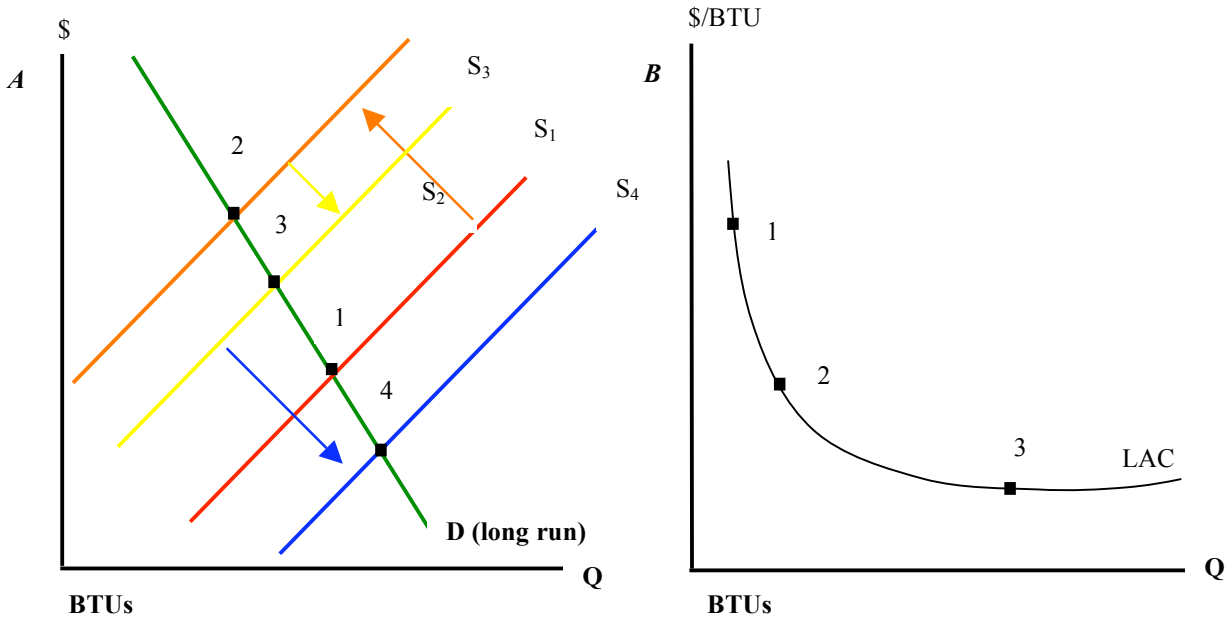
The second reason also has to do with the price mechanism, but more indirectly. Invention is often regarded as a happenstance activity: unpredictable, having really no causative factors except the population level and the previous state of the art. I disagree. Technological advancement, whether achieved by dedicated corporate R&D or the lone mad scientist or engineer, is primarily a function of incentives: the potential gain to the entity that invests its time, brainpower or money into developing a new idea. A market economy provides such incentives as-is, but a high price level in a particular area adds especial potency. This will nearly always result in new innovation and developments that simply weren't worth seriously pursuing previously. Depending on which area proves fruitful (and the most likely outcome is that *all* of these areas are improved), this could result in the reduction in price of substitutes beyond what increasing returns to scale would dictate; development of new feasible substitutes; or an improvement in oil discovery, extraction, and/or refinement techniques, which would cause the price of oil to fall again. This is happening now, and has been for years. For example, there is currently a plant in Missouri which is trying to change any organic material—turkey guts, for instance—into high-quality crude oil. This by itself, if developed sufficiently, could make the whole debate about oil depletion moot (see http://www.discover.com/issues/may-03/features/featoil/). Technology is the principal reason that Malthus was wrong about food. He was right, of course, about diminishing returns on land (although if it came down to it, we could build hydroponics farms in 50-story buildings, on the ocean, or even in space, overcoming even that obstacle), but he vastly underestimated the effect that technological development would have on the quantity (and therefore price) of food produced, to the degree that food prices have continually *dropped* since Malthus' time.

In capitalist countries, at least. This model only holds in a market economy. In Communist China, on the other hand, Malthus' predictions have seemed to come true:

population has exploded, and (at least until market reforms were initiated) food production and distribution could not keep up, causing vast famine in the ’60’s. Similar situations could conceivably derail the hopeful model for energy presented above. If, for instance, the U.N. or other übernational body took control of all or nearly all oil production, the alarmist’s predictions could easily come true.

Barring some sort of overarching governmental intervention or divine wrath, however, the “oil crisis” is almost certain to fizzle in the long term. The price of oil will drop once again, we will find new (and likely better) energy sources, or both. The world will never run out of gas, and it’s not likely to run out of oil anytime soon.

Graphs



Panel *A* shows the original supply curve for energy at S_1, the supply curve after oil supplies begin to dwindle at S_2, the supply curve after a large-scale shift to substitutes for oil at S_3, and the supply curve after technological development has matured in the long run at S_4. Panel *B* shows the industry cost curve for substitutes for oil at the various stages mentioned (except for period 4; technological development is not reflected in panel *B*).