When people read about a long-term forecast of world oil supply--say, out to 2030--they often believe that the forecasters are merely incorporating our knowledge of existing fields and figuring out how much oil can be extracted from them over the forecast period. Nothing could be further from the truth. Much of the forecast supply has not yet been discovered or has no demonstrated technology which can extract or produce it economically. In other words, such forecasts are merely guesses based on the slimmest of evidence.

Perhaps the best ever illustration of this comes from a 2009 presentation made by Glen Sweetnam, a U.S. Energy Information Administration (EIA) official. The EIA is the statistical arm of the U.S. Department of Energy. The following chart from that presentation will upend any notion that we know exactly where all the oil we need to meet expected demand will come from.

The chart shows that by 2030 world output of oil and other liquid fuels from current fields is expected to drop to 43 million barrels per day (mbpd), some 62 million barrels below projected demand of 105 mbpd. (Though prepared in 2009, the chart takes into account known projects expected to be producing by 2012.) This drop is consistent with the observed decline in the worldwide rate of production from existing fields of about 4 percent per year. Certainly, there will be more projects identified in the 18 years ahead. And, many people will say that we already have a large new resource of tight oil (often mistakenly referred to as shale oil) which can be extracted through hydraulic fracturing or fracking. But even if the optimists are correct--and there can be no guarantee that they will be--this source of oil will only add 3 to 4 million barrels of daily production. What Sweetnam's chart tells us is that we must find and bring into production the equivalent of five new Saudi Arabias between now and 2030 in order to meet expected demand even if the volume of tight oil reaches its maximum projected output. (The Saudis currently produce about 11.7 mbpd of oil and other liquids.)

Because Sweetnam's chart is for total worldwide "liquid fuel supply," it's worth noting that in recent years something called natural gas plant liquids (NGPLs) have been included in world oil supply based on the assumption that these hydrocarbons are 100 percent interchangeable with oil. NGPLs are components of natural gas other than methane such as ethane, propane, butane, and pentane, and their production grew recently with the natural gas drilling boom in the United States. Only a small portion of NGPLs can directly substitute for oil, and ramping up production of that portion independently is impossible since it is mixed in the methane.

But oil proper--defined as crude oil including lease condensate--continues to trace out a plateau in production that began in 2005.This makes the oil situation all the more concerning. It is true that rising and ultimately record high oil prices in the last decade have prompted oil companies to increase capital expenditures including those for exploration and drilling to their highest level ever. But, the vast effort represented by those expenditures has failed to boost true crude oil production definitively above the current bumpy plateau.

Some will point to vast deposits of so-called oil shale in the American West and suggest that production from these can fill the gap in the coming years. But right now commercial production of oil from this source is exactly zero. And, current reserves are also exactly zero since reserves are defined as those underground resources that can be produced profitably at today's prices from known fields using existing technology. (For a more detailed discussion, see my recent piece on unconventional oil resources.)

Perhaps most important is that Sweetnam's chart shows not how much oil we must discover, but the *rate of flow* we must achieve from any discoveries in order to match supply with projected consumption. Huge discoveries mean little if we cannot extract the oil profitably and at rates that are commensurate with our desired rate of consumption. With conventional oil in decline since 2006 according to the International Energy Agency, a consortium of 28 mostly importing nations, we will now be forced to rely increasingly on sources of unconventional oil such as the tar sands ofCanada and the heavy oil of Venezuela, both of which are difficult and costly to extract and refine. So far the flows of unconventional oil have only just offset declines in the rate of production of the cheap, easy-to-get, free-flowing conventional oil which has powered modern civilization to date.

The global economy is entirely dependent on continuous flows of energy and raw materials. Oil is absolutely central because it provides one-third of the world's energy and more than 80 percent of its transportation fuel. Unless oil production rises from here, global economic growth will eventually stall (if it hasn't already).

With the EIA projecting oil production from oil shale of 140,000 barrels per day by 2030, we should not expect to close Sweetnam's deficit of 62 mbpd from this source. Even if the EIA is too pessimistic on oil production from oil shale by a factor of 10, such production would barely put a dent in the anticipated supply gap by 2030.

It should be apparent that energy policy around the world is essentially based on the idea that Sweetnam's gap will be filled in time and comfortably. And yet, there can be no assurance of this. In fact, the ongoing plateau in the rate of world oil production in the face of record high prices ought to give us pause. If seven years of very high prices can only marginally move the rate of production of all liquids (which includes crude oil, natural gas plant liquids, biofuels, and refinery processing gains) up about 3.15 percent and if crude oil proper can only stay flat during the same period, how can we expect that the next seven years and the next seven after that will be filled with nothing but good news on supply?

If the answer to this question is that technology will unlock new resources and overcome the declines in existing fields, keep this is mind. *If that technology is not on the shelf and ready to deploy today, it will make almost no difference in the 18 years between now and 2030.* For those who point to hydraulic fracturing as a recent technological breakthrough, they need to do a little research. Hydraulic fracturing was first used in 1947. More than 30 years later in the early 1980s, building on government research, George Mitchell and his company Mitchell Energy and Development began pursuing natural gas in deep shale deposits. It took Mitchell 20 years of experimentation, government help and government incentives to perfect the type of hydraulic fracturing which is now used to release both natural gas and oil from deep shales. It took another 10 years for his methods to be widely deployed by the oil and gas industry.

So, here's the timeline on hydraulic fracturing. It took 60 years from the time the technique was first deployed until it was refined and widely adopted by the industry for the specific purpose of extracting natural gas and oil from deep shale deposits. Don't look for any new miracle technologies to make a significant difference in oil production between now and 2030 unless they are already in the field performing their magic today and have not yet been widely adopted.

The effects of hydraulic fracturing on oil production are already in evidence. And, while the technique has allowed us to recover oil from previously inaccessible deposits, it has not allowed us to grow oil supplies worldwide as declines in production elsewhere have offset increases in production of oil from shale deposits (properly called tight oil).

With high oil prices and the hottest new technique unable to move the needle on worldwide production of crude oil, we should look at Glen Sweetnam's chart with considerable concern. We should ask ourselves whether it is wise to base energy policy on the fantasies of industry and government forecasters. Perhaps we should focus instead on the trends and data we can verify and prepare ourselves and our economies for a world that may not have the copious amounts of oil that the industry is promising.