

THE PARTY'S OVER: Oil, War, and the Fate of Industrial Societies

By Richard Heinberg

SYNOPSIS:

When Mike Bowlin, Chairman of ARCO, said in 1999 that "We've embarked on the beginning of the last days of the age of oil," he was voicing a truth that many others in the petroleum industry knew but dared not utter. Over the past few years, evidence has mounted that global oil production is nearing its historic peak.

Oil has been the cheapest and most convenient energy resource ever discovered by humans. During the past two centuries, people in industrial nations accustomed themselves to a regime in which more fossil-fuel energy was available each year, and the global population grew quickly to take advantage of this energy windfall. Industrial nations also came to rely on an economic system built on the assumption that growth is normal and necessary, and that it can go on forever.

When oil production peaks, those assumptions will come crashing down.

As we move from a historic interval of energy growth to one of energy decline, we are entering uncharted territory. It takes some effort to adjust one's mental frame of reference to this new reality.

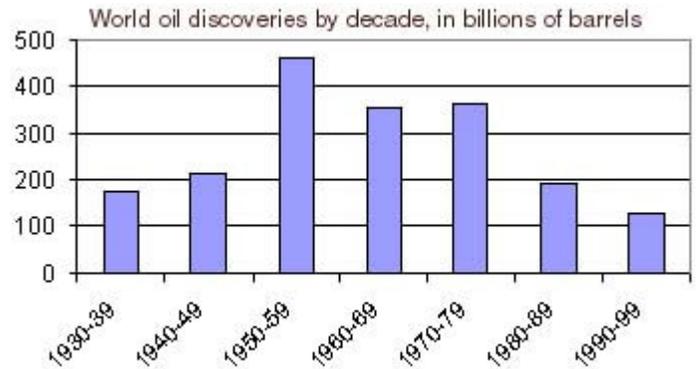
Try the following thought experiment. Go to the center of a city and find a comfortable place to sit. Look around and ask yourself: Where and how is energy being used? What forms of energy are being consumed, and what work is that energy doing? Notice the details of buildings, cars, buses, streetlights, and so on; notice also the activities of the people around you. What kinds of occupations do these people have, and how do they use energy in their work? Try to follow some of the strands of the web of relationships between energy, jobs, water, food, heating, construction, goods distribution, transportation, and maintenance that together keep the city thriving.

After you have spent at least 20 minutes appreciating energy's role in the life of this city, imagine what the scene you are viewing would look like if there were 10 percent less energy available. What substitutions would be necessary? What choices would people make? What work would not get done? Now imagine the scene with 25 percent less energy available; with 50 percent less; with 75 percent less.

Assuming that the peak in global oil production occurs in the period from 2006 to 2015 and that there is an average two percent decline in energy available to industrial societies each year afterward, in your imagination you will have taken a trip into the future, to perhaps the year 2050.

But how can we be sure that oil will become less abundant? Petroleum geologists like Colin Campbell (formerly with Texaco and Amoco) point to simple facts like these: Oil discovery in the US peaked in the 1930s; oil production peaked roughly forty years later. Since 1970, the US has had to import more oil nearly every year in order to make up for its shortfall from domestic production. The oil business started in America in the late nineteenth century, and the US is the most-explored region on the planet: more oil wells have been drilled in the lower-48 US than in all other

countries combined. Thus, America's experience with oil will eventually be repeated elsewhere.



Global discovery of oil peaked in the 1960s. Since production curves must eventually mirror discovery curves, global oil production will doubtless peak at some point in the foreseeable future. When, exactly? According to many informed estimates, the peak should occur around 2010, give or take a few years.

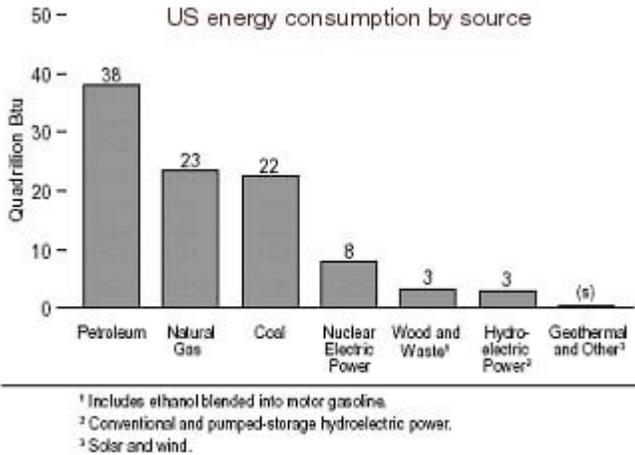
When the global peak in oil production is reached, there will still be plenty of petroleum in the ground - as much as has been extracted up to the present, or roughly one trillion barrels. But every year from then on it will be difficult or impossible to pump as much as the year before.

Clearly, we will need to find substitutes for oil. But an analysis of the current energy alternatives is not reassuring. Solar and wind are renewable, but we now get less than one percent of our national energy budget from them; rapid growth will be necessary if they are to replace even a significant fraction of the energy shortfall from post-peak oil. Nuclear power is dogged by the unsolved problem of radioactive waste disposal. Hydrogen is not an energy source at all, but an energy carrier: it takes more energy to produce a given quantity of hydrogen than the hydrogen itself will yield. Moreover, nearly all commercially produced hydrogen now comes from natural gas - whose production will peak only a few years after oil begins its historic decline. Unconventional petroleum resources - so-called "heavy oil," "oil sands," and "shale oil" - are plentiful but extremely costly to extract, a fact that no technical innovation is likely to change.

The hard math of energy resource analysis yields an uncomfortable but unavoidable prospect: even if efforts are intensified now to switch to alternative energy sources, after the oil peak industrial nations will have less energy available to do useful work - including the manufacturing and transporting of goods, the growing of food, and the heating of homes.

To be sure, we should be investing in alternatives and converting our industrial infrastructure to use them. If there is any solution to industrial societies' approaching energy crises, renewables plus conservation will provide it. Yet in order to achieve a smooth transition from non-renewables to renewables, decades will be

needed - and we do not have decades before the peaks in the extraction rates of oil and natural gas occur. Moreover, even in the best case, the transition will require the massive shifting of investment from other sectors of the economy (such as the military) toward energy research and conservation. And the available alternatives will likely be unable to support the kinds of transportation, food, and dwelling infrastructure we now have; thus the transition will entail an almost complete redesign of industrial societies.



The likely economic consequences of the energy downturn are enormous. All human activities require energy - which physicists define as "the capacity to do work." With less energy available, less work can be done - unless the efficiency of the process of converting energy to work is raised at the same rate as energy availability declines. It will therefore be essential, over the next few decades, for all economic processes to be made more energy-efficient. However, efforts to improve efficiency are subject to diminishing returns, and so eventually a point will be reached where reduced energy availability will translate to reduced economic activity. Given the fact that our national economy is based on the assumption that economic activity must grow perpetually, the result is likely to be a recession with no bottom and no end.

The consequences for global food production will be no less dire. Throughout the twentieth century, food production expanded dramatically in country after country, with virtually all of this growth attributable to energy inputs. Without fuel-fed tractors and petroleum-based fertilizers, pesticides, and herbicides, it is doubtful that crop yields can be maintained at current levels.

The oil peak will also impact international relations. Resource conflicts are nothing new: pre-state societies often fought over agricultural land, fishing or hunting grounds, horses, cattle, waterways, and other resources. Most of the wars of the twentieth century were also fought over resources - in many cases, oil. But those wars took place during a period of expanding resource extraction; the coming decades of heightened competition for fading energy resources will likely see even more frequent and deadly conflicts. The US - as the world's largest energy consumer, the center of global industrial empire, and the holder of the most powerful store of weaponry in world history - will play a pivotal

role in shaping the geopolitics of the new century. To many observers, it appears that oil interests are already at the heart of the present administration's geopolitical strategy.

There is much that individuals and communities can do to prepare for the energy crunch. Anything that promotes individual self-reliance (gardening, energy conservation, and voluntary simplicity) will help. But the strategy of individualist survivalism will offer only temporary and uncertain refuge during the energy down-slope. True individual and family security will come only with community solidarity and interdependence. Living in a community that is weathering the downslope well will enhance personal chances of surviving and prospering far more than will individual efforts at stockpiling tools or growing food.

Meanwhile, nations must adopt radical energy conservation measures, invest in renewable energy research, support sustainable local food systems instead of giant biotech agribusiness, adopt no-growth economic and population policies, and strive for international resource cooperation agreements.

These suggestions describe a fundamental change of direction for industrial societies - from the larger, faster, and more centralized, to the smaller, slower, and more locally-based; from competition to cooperation; and from boundless growth to self-limitation.

If such recommendations were taken seriously, they could lead to a world a century from now with fewer people using less energy per capita, all of it from renewable sources, while enjoying a quality of life perhaps enviable by the typical industrial urbanite of today. Human inventiveness could be put to the task, not of making ways to use more resources, but of expanding artistic satisfaction, finding just and convivial social arrangements, and deepening the spiritual experience of being human. Living in smaller communities, people would enjoy having more control over their lives. Traveling less, they would have more of a sense of rootedness, and more of a feeling of being at home in the natural world. Renewable energy sources would provide some conveniences, but not nearly on the scale of fossil-fueled industrialism.

This will not, however, be an automatic outcome of the energy decline. Such a happy result can only come about through considerable effort.

There are many hopeful indications that a shift toward sustainability is beginning. But there are also discouraging signs that large political and economic institutions will resist change in that direction. Therefore much depends upon the public coming to understand the situation, taking personal steps, and demanding action from local and national governments.

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