



"Energy Resources and Our Future" - Speech by Hyman Rickover in 1957

Posted by [Gail the Actuary](#) on June 30, 2007 - 10:00am

Topic: [Policy/Politics](#)

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Rear Admiral Hyman Rickover gave a amazingly prescient speech in 1957, which every TOD reader should read, if they haven't already. Among other things, the speech talks about

- The relationship between fossil fuels and economic growth.
- The relationship between fossil fuels and military power.
- The fact that oil, natural gas, and coal are expected to peak, and the approximate timeframe.
- The responsibility of Rickover's generation to tell later generations about the fact that fossil fuels will deplete, so that they can start very early making plans for the difficult transition away from fossil fuels.

This speech was posted in December 2006 on the [Energy Bulletin](#). This speech was made available by the work of two people: Theodore Rockwell, author of *The Rickover Effect: How One Man Made a Difference*, who had this article in his files, and Rick Lakin, who sought out the article and converted it to digital form.

The text of Rear Admiral Hyman Rickover's May 14, 1957 speech to the Minnesota State Medical Association is available below the line.

I am honored to be here tonight, though it is no easy thing, I assure you, for a layman to face up to an audience of physicians. A single one of you, sitting behind his desk, can be quite formidable.

My speech has no medical connotations. This may be a relief to you after the solid professional fare you have been absorbing. I should like to discuss a matter which will, I hope, be of interest to you as responsible citizens: the significance of energy resources in the shaping of our future.

We live in what historians may some day call the Fossil Fuel Age. Today coal, oil, and natural gas supply 93% of the world's energy; water power accounts for only 1%; and the labor of men and domestic animals the remaining 6%. This is a startling reversal of corresponding figures for 1850 - only a century ago. Then fossil fuels supplied 5% of the world's energy, and men and animals 94%. Five sixths of all the coal, oil, and gas consumed since the beginning of the Fossil Fuel Age has been burned up in the last 55 years.

These fuels have been known to man for more than 3,000 years. In parts of China, coal was used for domestic heating and cooking, and natural gas for lighting as early as 1000 B.C. The Babylonians burned asphalt a thousand years earlier. But these early uses were sporadic and of no economic significance. Fossil fuels did not become a major source of energy until machines running on coal, gas, or oil were invented. Wood, for example, was the most important fuel until 1880 when it was replaced by coal; coal, in turn, has only recently been surpassed by oil in this country.

Once in full swing, fossil fuel consumption has accelerated at phenomenal rates. All the fossil fuels used before 1900 would not last five years at today's rates of consumption.

Nowhere are these rates higher and growing faster than in the United States. Our country, with only 6% of the world's population, uses one third of the world's total energy input; this proportion would be even greater except that we use energy more efficiently than other countries. Each American has at his disposal, each year, energy equivalent to that obtainable from eight tons of coal. This is six times the world's per capita energy consumption. Though not quite so spectacular, corresponding figures for other highly industrialized countries also show above average consumption figures. The United Kingdom, for example, uses more than three times as much energy as the world average.

With high energy consumption goes a high standard of living. Thus the enormous fossil energy which we in this country control feeds machines which make each of us master of an army of mechanical slaves. Man's muscle power is rated at 35 watts continuously, or one-twentieth horsepower. Machines therefore furnish every American industrial worker with energy equivalent to that of 244 men, while at least 2,000 men push his automobile along the road, and his family is supplied with 33 faithful household helpers. Each locomotive engineer controls energy equivalent to that of 100,000 men; each jet pilot of 700,000 men. Truly, the humblest American enjoys the services of more slaves than were once owned by the richest nobles, and lives better than most ancient kings. In retrospect, and despite wars, revolutions, and disasters, the hundred years just gone by may well seem like a Golden Age.

Whether this Golden Age will continue depends entirely upon our ability to keep energy supplies in balance with the needs of our growing population. Before I go into this question, let me review briefly the role of energy resources in the rise and fall of civilizations.

Possession of surplus energy is, of course, a requisite for any kind of civilization, for if man possesses merely the energy of his own muscles, he must expend all his strength - mental and physical - to obtain the bare necessities of life.

Surplus energy provides the material foundation for civilized living - a comfortable and tasteful home instead of a bare shelter; attractive clothing instead of mere covering to keep warm; appetizing food instead of anything that suffices to appease hunger. It provides the freedom from toil without which there can be no art, music, literature, or learning. There is no need to belabor the point. What lifted man - one of the weaker mammals - above the animal world was that he could devise, with his brain, ways to increase the energy at his disposal, and use the leisure so gained to cultivate his mind and spirit. Where man must rely solely on the energy of his own body, he can sustain only the most meager existence.

Man's first step on the ladder of civilization dates from his discovery of fire and his domestication of animals. With these energy resources he was able to build a pastoral culture. To move upward to an agricultural civilization he needed more energy. In the past this was found in the labor of dependent members of large patriarchal families, augmented by slaves obtained through purchase or as war booty. There are some backward communities which to this day depend on this type of energy.

Slave labor was necessary for the city-states and the empires of antiquity; they frequently had slave populations larger than their free citizenry. As long as slaves were abundant and no moral censure attached to their ownership, incentives to search for alternative sources of energy were lacking; this may well have been the single most important reason why engineering advanced very little in ancient times.

A reduction of per capita energy consumption has always in the past led to a decline in civilization and a reversion to a more primitive way of life. For example, exhaustion of wood fuel is believed to have been the primary reason for the fall of the Mayan Civilization on this continent and of the decline of once flourishing civilizations in Asia. India and China once had large forests, as did much of the Middle East. Deforestation not only lessened the energy base but had a further disastrous effect: lacking plant cover, soil washed away, and with soil erosion the nutritional base was reduced as well.

Another cause of declining civilization comes with pressure of population on available land. A point is reached where the land can no longer support both the people and their domestic animals. Horses and mules disappear first. Finally even the versatile water buffalo is displaced by man who is two and one half times as efficient an energy converter as are draft animals. It must always be remembered that while domestic animals and agricultural machines increase productivity per man, maximum productivity per acre is achieved only by intensive manual cultivation.

It is a sobering thought that the impoverished people of Asia, who today seldom go to sleep with their hunger completely satisfied, were once far more civilized and lived much better than the people of the West. And not so very long ago, either. It was the stories brought back by Marco Polo of the marvelous civilization in China which turned Europe's eyes to the riches of the East, and induced adventurous sailors to brave the high seas in their small vessels searching for a direct route to the fabulous Orient. The "wealth of the Indies" is a phrase still used, but whatever wealth may be there it certainly is not evident in the life of the people today.

Asia failed to keep technological pace with the needs of her growing populations and sank into such poverty that in many places man has become again the primary source of energy, since other energy converters have become too expensive. This must be obvious to the most casual observer. What this means is quite simply a reversion to a more primitive stage of civilization with all that it implies for human dignity and happiness.

Anyone who has watched a sweating Chinese farm worker strain at his heavily laden wheelbarrow, creaking along a cobblestone road, or who has flinched as he drives past an endless procession of human beasts of burden moving to market in Java - the slender women bent under mountainous loads heaped on their heads - anyone who has seen statistics translated into flesh and bone, realizes the degradation of man's stature when his muscle power becomes the only energy source he can afford. Civilization must wither when human beings are so degraded.

Where slavery represented a major source of energy, its abolition had the immediate effect of reducing energy consumption. Thus when this time-honored institution came under moral censure by Christianity, civilization declined until other sources of energy could be found. Slavery is incompatible with Christian belief in the worth of the humblest individual as a child of God. As Christianity spread through the Roman Empire and masters freed their slaves - in obedience to the teaching of the Church - the energy base of Roman civilization crumbled. This, some historians believe, may have been a major factor in the decline of Rome and the temporary reversion to a more primitive way of life during the Dark Ages. Slavery gradually disappeared throughout the Western world, except in its milder form of serfdom. That it was revived a thousand years later merely shows man's ability to stifle his conscience - at least for a while - when his economic needs are great. Eventually, even the needs of overseas plantation economies did not suffice to keep alive a practice so deeply repugnant to Western man's deepest convictions.

It may well be that it was unwillingness to depend on slave labor for their energy needs which turned the minds of medieval Europeans to search for alternate sources of energy, thus sparking the Power Revolution of the Middle Ages which, in turn, paved the way for the Industrial Revolution of the 19th Century. When slavery disappeared in the West engineering advanced. Men began to harness the power of nature by utilizing water and wind as energy sources. The sailing ship, in particular, which replaced the slave-driven galley of antiquity, was vastly improved by medieval shipbuilders and became the first machine enabling man to control large amounts of inanimate energy.

The next important high-energy converter used by Europeans was gunpowder - an energy source far superior to the muscular strength of the strongest bowman or lancer. With ships that could navigate the high seas and arms that could outfire any hand weapon, Europe was now powerful enough to preempt for herself the vast empty areas of the Western Hemisphere into which she poured her surplus populations to build new nations of European stock. With these ships and arms she also gained political control over populous areas in Africa and Asia from which she drew the raw materials needed to speed her industrialization, thus complementing her naval and military dominance with economic and commercial supremacy.

When a low-energy society comes in contact with a high-energy society, the advantage always lies with the latter. The Europeans not only achieved standards of living vastly higher than those of the rest of the world, but they did this while their population was growing at rates far surpassing those of other peoples. In fact, they doubled their share of total world population in the short span of three centuries. From one sixth in 1650, the people of European stock increased to almost one third of total world population by 1950.

Meanwhile much of the rest of the world did not even keep energy sources in balance with population growth. Per capita energy consumption actually diminished in large areas. It is this difference in energy consumption which has resulted in an ever-widening gap between the one-third minority who live in high-energy countries and the two-thirds majority who live in low-energy areas.

These so-called underdeveloped countries are now finding it far more difficult to catch up with the fortunate minority than it was for Europe to initiate transition from low-energy to high-energy consumption. For one thing, their ratio of land to people is much less favorable; for another, they have no outlet for surplus populations to ease the transition since all the empty spaces have already been taken over by people of European stock.

Almost all of today's low-energy countries have a population density so great that it perpetuates dependence on intensive manual agriculture which alone can yield barely enough food for their people. They do not have enough acreage, per capita, to justify using domestic animals or farm machinery, although better seeds, better soil management, and better hand tools could bring some improvement. A very large part of their working population must nevertheless remain on the land, and this limits the amount of surplus energy that can be produced. Most of these countries must choose between using this small energy surplus to raise their very low standard of living or postpone present rewards for the sake of future gain by investing the surplus in new industries. The choice is difficult because there is no guarantee that today's denial may not prove to have been in vain. This is so because of the rapidity with which public health measures have reduced mortality rates, resulting in population growth as high or even higher than that of the high-energy nations. There is a bitter choice; it accounts for much of their anti-Western feeling and may well portend a prolonged period of world instability.

How closely energy consumption is related to standards of living may be illustrated by the example of India. Despite intelligent and sustained efforts made since independence, India's per capita income is still only 20 cents daily; her infant mortality is four times ours; and the life expectancy of her people is less than one half that of the industrialized countries of the West. These are ultimate consequences of India's very low energy consumption: one-fourteenth of world average; one-eightieth of ours.

Ominous, too, is the fact that while world food production increased 9% in the six years from 1945-51, world population increased by 12%. Not only is world population increasing faster than world food production, but unfortunately, increases in food production tend to occur in the already well-fed, high-energy countries rather than in the undernourished, low-energy countries where food is most lacking.

I think no further elaboration is needed to demonstrate the significance of energy resources for our own future. Our civilization rests upon a technological base which requires enormous quantities of fossil fuels. What assurance do we then have that our energy needs will continue to be supplied by fossil fuels: The answer is - in the long run - none.

The earth is finite. Fossil fuels are not renewable. In this respect our energy base differs from that of all earlier civilizations. They could have maintained their energy supply by careful cultivation. We cannot. Fuel that has been burned is gone forever. Fuel is even more evanescent than metals. Metals, too, are non-renewable resources threatened with ultimate extinction, but something can be salvaged from scrap. Fuel leaves no scrap and there is nothing man can do to rebuild exhausted fossil fuel reserves. They were created by solar energy 500 million years ago and took eons to grow to their present volume.

In the face of the basic fact that fossil fuel reserves are finite, the exact length of time these reserves will last is important in only one respect: the longer they last, the more time do we have, to invent ways of living off renewable or substitute energy sources and to adjust our economy to the vast changes which we can expect from such a shift.

Fossil fuels resemble capital in the bank. A prudent and responsible parent will use his capital sparingly in order to pass on to his children as much as possible of his inheritance. A selfish and irresponsible parent will squander it in riotous living and care not one whit how his offspring will fare.

Engineers whose work familiarizes them with energy statistics; far-seeing industrialists who know that energy is the principal factor which must enter into all planning for the future; responsible governments who realize that the well-being of their citizens and the political power of their countries depend on adequate energy supplies - all these have begun to be concerned about energy resources. In this country, especially, many studies have been made in the last few years, seeking to discover accurate information on fossil-fuel reserves and foreseeable fuel needs.

Statistics involving the human factor are, of course, never exact. The size of usable reserves depends on the ability of engineers to improve the efficiency of fuel extraction and use. It also depends on discovery of new methods to obtain energy from inferior resources at costs

which can be borne without unduly depressing the standard of living. Estimates of future needs, in turn, rely heavily on population figures which must always allow for a large element of uncertainty, particularly as man reaches a point where he is more and more able to control his own way of life.

Current estimates of fossil fuel reserves vary to an astonishing degree. In part this is because the results differ greatly if cost of extraction is disregarded or if in calculating how long reserves will last, population growth is not taken into consideration; or, equally important, not enough weight is given to increased fuel consumption required to process inferior or substitute metals. We are rapidly approaching the time when exhaustion of better grade metals will force us to turn to poorer grades requiring in most cases greater expenditure of energy per unit of metal.

But the most significant distinction between optimistic and pessimistic fuel reserve statistics is that the optimists generally speak of the immediate future - the next twenty-five years or so - while the pessimists think in terms of a century from now. A century or even two is a short span in the history of a great people. It seems sensible to me to take a long view, even if this involves facing unpleasant facts.

For it is an unpleasant fact that according to our best estimates, total fossil fuel reserves recoverable at not over twice today's unit cost, are likely to run out at some time between the years 2000 and 2050, if present standards of living and population growth rates are taken into account. Oil and natural gas will disappear first, coal last. There will be coal left in the earth, of course. But it will be so difficult to mine that energy costs would rise to economically intolerable heights, so that it would then become necessary either to discover new energy sources or to lower standards of living drastically.

For more than one hundred years we have stoked ever growing numbers of machines with coal; for fifty years we have pumped gas and oil into our factories, cars, trucks, tractors, ships, planes, and homes without giving a thought to the future. Occasionally the voice of a Cassandra has been raised only to be quickly silenced when a lucky discovery revised estimates of our oil reserves upward, or a new coalfield was found in some remote spot. Fewer such lucky discoveries can be expected in the future, especially in industrialized countries where extensive mapping of resources has been done. Yet the popularizers of scientific news would have us believe that there is no cause for anxiety, that reserves will last thousands of years, and that before they run out science will have produced miracles. Our past history and security have given us the sentimental belief that the things we fear will never really happen - that everything turns out right in the end. But, prudent men will reject these tranquilizers and prefer to face the facts so that they can plan intelligently for the needs of their posterity.

Looking into the future, from the mid-20th Century, we cannot feel overly confident that present high standards of living will of a certainty continue through the next century and beyond. Fossil fuel costs will soon definitely begin to rise as the best and most accessible reserves are exhausted, and more effort will be required to obtain the same energy from remaining reserves. It is likely also that liquid fuel synthesized from coal will be more expensive. Can we feel certain that when economically recoverable fossil fuels are gone science will have learned how to maintain a high standard of living on renewable energy sources?

I believe it would be wise to assume that the principal renewable fuel sources which we can expect to tap before fossil reserves run out will supply only 7 to 15% of future energy needs. The five most important of these renewable sources are wood fuel, farm wastes, wind, water power, and solar heat.

Wood fuel and farm wastes are dubious as substitutes because of growing food requirements to be anticipated. Land is more likely to be used for food production than for tree crops; farm wastes may be more urgently needed to fertilize the soil than to fuel machines.

Wind and water power can furnish only a very small percentage of our energy needs. Moreover, as with solar energy, expensive structures would be required, making use of land and metals which will also be in short supply. Nor would anything we know today justify putting too much reliance on solar energy though it will probably prove feasible for home heating in favorable localities and for cooking in hot countries which lack wood, such as India.

More promising is the outlook for nuclear fuels. These are not, properly speaking, renewable energy sources, at least not in the present state of technology, but their capacity to "breed"

and the very high energy output from small quantities of fissionable material, as well as the fact that such materials are relatively abundant, do seem to put nuclear fuels into a separate category from exhaustible fossil fuels. The disposal of radioactive wastes from nuclear power plants is, however, a problem which must be solved before there can be any widespread use of nuclear power.

Another limit in the use of nuclear power is that we do not know today how to employ it otherwise than in large units to produce electricity or to supply heating. Because of its inherent characteristics, nuclear fuel cannot be used directly in small machines, such as cars, trucks, or tractors. It is doubtful that it could in the foreseeable future furnish economical fuel for civilian airplanes or ships, except very large ones. Rather than nuclear locomotives, it might prove advantageous to move trains by electricity produced in nuclear central stations. We are only at the beginning of nuclear technology, so it is difficult to predict what we may expect.

Transportation - the lifeblood of all technically advanced civilizations - seems to be assured, once we have borne the initial high cost of electrifying railroads and replacing buses with streetcars or interurban electric trains. But, unless science can perform the miracle of synthesizing automobile fuel from some energy source as yet unknown or unless trolley wires power electric automobiles on all streets and highways, it will be wise to face up to the possibility of the ultimate disappearance of automobiles, trucks, buses, and tractors. Before all the oil is gone and hydrogenation of coal for synthetic liquid fuels has come to an end, the cost of automotive fuel may have risen to a point where private cars will be too expensive to run and public transportation again becomes a profitable business.

Today the automobile is the most uneconomical user of energy. Its efficiency is 5% compared with 23% for the Diesel-electric railway. It is the most ravenous devourer of fossil fuels, accounting for over half of the total oil consumption in this country. And the oil we use in the United States in one year took nature about 14 million years to create. Curiously, the automobile, which is the greatest single cause of the rapid exhaustion of oil reserves, may eventually be the first fuel consumer to suffer. Reduction in automotive use would necessitate an extraordinarily costly reorganization of the pattern of living in industrialized nations, particularly in the United States. It would seem prudent to bear this in mind in future planning of cities and industrial locations.

Our present known reserves of fissionable materials are many times as large as our net economically recoverable reserves of coal. A point will be reached before this century is over when fossil fuel costs will have risen high enough to make nuclear fuels economically competitive. Before that time comes we shall have to make great efforts to raise our entire body of engineering and scientific knowledge to a higher plateau. We must also induce many more young Americans to become metallurgical and nuclear engineers. Else we shall not have the knowledge or the people to build and run the nuclear power plants which ultimately may have to furnish the major part of our energy needs. If we start to plan now, we may be able to achieve the requisite level of scientific and engineering knowledge before our fossil fuel reserves give out, but the margin of safety is not large. This is also based on the assumption that atomic war can be avoided and that population growth will not exceed that now calculated by demographic experts.

War, of course, cancels all man's expectations. Even growing world tension just short of war could have far-reaching effects. In this country it might, on the one hand, lead to greater conservation of domestic fuels, to increased oil imports, and to an acceleration in scientific research which might turn up unexpected new energy sources. On the other hand, the resulting armaments race would deplete metal reserves more rapidly, hastening the day when inferior metals must be utilized with consequent greater expenditure of energy. Underdeveloped nations with fossil fuel deposits might be coerced into withholding them from the free world or may themselves decide to retain them for their own future use. The effect on Europe, which depends on coal and oil imports, would be disastrous and we would have to share our own supplies or lose our allies.

Barring atomic war or unexpected changes in the population curve, we can count on an increase in world population from two and one half billion today to four billion in the year 2000; six to eight billion by 2050. The United States is expected to quadruple its population during the 20th Century - from 75 million in 1900 to 300 million in 2000 - and to reach at least 375 million in 2050. This would almost exactly equal India's present population which she supports on just a little under half of our land area.

It is an awesome thing to contemplate a graph of world population growth from prehistoric times - tens of thousands of years ago - to the day after tomorrow - let us say the year 2000

A.D. If we visualize the population curve as a road which starts at sea level and rises in proportion as world population increases, we should see it stretching endlessly, almost level, for 99% of the time that man has inhabited the earth. In 6000 B.C., when recorded history begins, the road is running at a height of about 70 feet above sea level, which corresponds to a population of 10 million. Seven thousand years later - in 1000 A.D. - the road has reached an elevation of 1,600 feet; the gradation now becomes steeper, and 600 years later the road is 2,900 feet high. During the short span of the next 400 years - from 1600 to 2000 - it suddenly turns sharply upward at an almost perpendicular inclination and goes straight up to an elevation of 29,000 feet - the height of Mt. Everest, the world's tallest mountain.

In the 8,000 years from the beginning of history to the year 2000 A.D. world population will have grown from 10 million to 4 billion, with 90% of that growth taking place during the last 5% of that period, in 400 years. It took the first 3,000 years of recorded history to accomplish the first doubling of population, 100 years for the last doubling, but the next doubling will require only 50 years. Calculations give us the astonishing estimate that one out of every 20 human beings born into this world is alive today.

The rapidity of population growth has not given us enough time to readjust our thinking. Not much more than a century ago our country - the very spot on which I now stand was a wilderness in which a pioneer could find complete freedom from men and from government. If things became too crowded - if he saw his neighbor's chimney smoke - he could, and often did, pack up and move west. We began life in 1776 as a nation of less than four million people - spread over a vast continent - with seemingly inexhaustible riches of nature all about. We conserved what was scarce - human labor - and squandered what seemed abundant - natural resources - and we are still doing the same today.

Much of the wilderness which nurtured what is most dynamic in the American character has now been buried under cities, factories and suburban developments where each picture window looks out on nothing more inspiring than the neighbor's back yard with the smoke of his fire in the wire basket clearly visible.

Life in crowded communities cannot be the same as life on the frontier. We are no longer free, as was the pioneer - to work for our own immediate needs regardless of the future. We are no longer as independent of men and of government as were Americans two or three generations ago. An ever larger share of what we earn must go to solve problems caused by crowded living - bigger governments; bigger city, state, and federal budgets to pay for more public services. Merely to supply us with enough water and to carry away our waste products becomes more difficult and expansive daily. More laws and law enforcement agencies are needed to regulate human relations in urban industrial communities and on crowded highways than in the America of Thomas Jefferson.

Certainly no one likes taxes, but we must become reconciled to larger taxes in the larger America of tomorrow.

I suggest that this is a good time to think soberly about our responsibilities to our descendants - those who will ring out the Fossil Fuel Age. Our greatest responsibility, as parents and as citizens, is to give America's youngsters the best possible education. We need the best teachers and enough of them to prepare our young people for a future immeasurably more complex than the present, and calling for ever larger numbers of competent and highly trained men and women. This means that we must not delay building more schools, colleges, and playgrounds. It means that we must reconcile ourselves to continuing higher taxes to build up and maintain at decent salaries a greatly enlarged corps of much better trained teachers, even at the cost of denying ourselves such momentary pleasures as buying a bigger new car, or a TV set, or household gadget. We should find - I believe - that these small self-denials would be far more than offset by the benefits they would buy for tomorrow's America. We might even - if we wanted - give a break to these youngsters by cutting fuel and metal consumption a little here and there so as to provide a safer margin for the necessary adjustments which eventually must be made in a world without fossil fuels.

One final thought I should like to leave with you. High-energy consumption has always been a prerequisite of political power. The tendency is for political power to be concentrated in an ever-smaller number of countries. Ultimately, the nation which control - the largest energy resources will become dominant. If we give thought to the problem of energy resources, if we act wisely and in time to conserve what we have and prepare well for necessary future changes, we shall insure this dominant position for our own country.

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🗨️ [damfino](#) on June 30, 2007 - 10:47am   

1957...There was a prophet among us, and we did not know.

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🗨️ [Engineer-Poet](#) on June 30, 2007 - 10:59am     

We've had many. Farrington Daniels was in the nuclear business before he changed his focus to solar energy, and Vannevar Bush's post-WWII book was eerily prescient.

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🗨️ [Gail the Actuary](#) on June 30, 2007 - 11:05am     

I thought this speech was amazing when I first read it - passed along a link to several of my friends.

Rear Admiral Hyman Rickover is considered the father of the nuclear submarine. He had great influence on the development of US nuclear power generation. He felt that nuclear would be around significantly longer than fossil fuel.

He was also an advisor to Jimmy Carter.

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🗨️ [MicroHydro](#) on June 30, 2007 - 9:41pm     

Jimmy Carter was first a protege of Hyman Rickover, then later David Rockefeller on the trilateral commission. This explains in part the failure of his presidency. No man may serve two masters. On one hand, Carter recalled Rickover's lessons on the perils of fossil fuel dependence. On the other hand, the very oily House of Rockefeller backed his campaign. End result: The Carter Doctrine 1980

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🗨️ [Checkerboard Strangler](#) on June 30, 2007 - 1:08pm     

Nobody listened.

Of course nobody listened either when Carter told us in 1977 that "energy independence is the moral equivalent of WAR".

For all the things people lambast Carter for, that speech was the last and best warning we had.

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🗨️ [westexas](#) on June 30, 2007 - 12:08pm   

Not really relevant to Peak Oil, but the "Rickover Interviews" were legendary in the Navy. Rickover insisted on personally interviewing candidates for the Navy nuclear power program, and there was no way to predict what would happen.

At one time, I was on track for a Rickover interview, majoring in nuclear engineering, on a Navy scholarship at Texas A&M, and we heard lots of the stories of interviews with midshipmen and newly commissioned ensigns. (I decided to change majors and major in geophysics.)

In any case, one story we heard went as follows: ensign walks in and sits down. Rickover stares at ensign for a few moments. Rickover says, "Make me mad." Befuddled ensign says "Sir?" Rickover says, "Make me mad, or you are out of the program." Ensign scatters papers around Rickover's desk. Rickover: "You haven't made me mad yet." Ensign see prized model of the USS Nautilus (first nuclear powered submarine), grabs the model and breaks it in two. Rickover: "Now you've made me mad; get out of here." The ensign was accepted into the program.

There is wide disagreement in the nuclear Navy about the Rickover legacy, but it's hard to argue with the Navy's nuclear power plant safety record.

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🗨️ [Mad Max-Out](#) on June 30, 2007 - 1:20pm     

I went into the US Navy's nuke programme but washed out and ended up as a "hole snipe". Someone's got to operate the ship's powerplant system! Talk about wasting fossil fuel energy. I was on the USS Belknap (license plate:CG-26) for 4 years as it was used as the 6'th Fleet flagship.

One fine day, we did an "economy run" to check the optimum heating oil mileage. It got 15 miles per 1,000 gallons of fuel. It used F-76, or what we would call No-1 heating oil. But it could JP-5, jet fuel. Fun hint: The JP-5 was also used for diesel-driven liberty boats and emergency generators. This is why I frequently call jet fuel diesel.

Shortly before I left (April 2 1992 @ time 1600) the US Navy was starting to go "single-fuel". That is, use the one and the same fuel for diesel engines, the Tomcats, and the ships. This is why I consider jet fuel, diesel, and heating oil to be all the same substance. Also, I once knew a bloke from Michigan who mentioned that home heating oil works in diesel vehicles but is made red with a dye. That only verified what I already knew about the "JP-5". The US Navy sure will succeed.

Because the three fuels are effectively one and the same, I get to check the newspaper and look up "heating oil" and know what the airlines pay for their diesel to run the jet planes. Fun fact: The military will use "JP-4" which is a mix of petrol and diesel so it won't solidify in the cold of very high altitude. That is the stuff Steve Fossett used when he drove around the world in his plane on one load of fuel. (one "tank of gas")

The result? If I were to drive a Lear Jet or similar plane, I'd be liable to say "Fill 'er up with 800 gallons of diesel, mate!".

Petrol prices high enough yet? Just wait!

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🗨️ [The Chimp Who Can Drive](#) on June 30, 2007 - 5:07pm     

he probably figured if the kid could make him mad, he would not be likely to be they typical "yes man" just looking to get by and not make waves.

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🗨️ [mbnewtrain](#) on June 30, 2007 - 12:24pm   

Rickover was quite a vissionary genius. Only error in his predictions were being overly optimistic about our population and energy use situation. He predicted 4 billion people on earth in 2000, but it ended up as 6 billion.

His depicting the energy resource holder countries as ones with power over those without is absolutely correct. The OPEC countries along with a few other energy suppliers (Russia, Kazakstan, Canada) will have economic advantage over the US, Japan, and most of Europe. Most of these energy suppliers/resource holders are also beginning to conserve their ennergy reserves as money in the bank, just like Rickover predicted 50 years ago. Too bad the powers to be can't even see these energy/power trends when the facts are soo obvious.

US is in the beginning of a long slow decline that it will never fully pull out of. We have lived the in the golden age and our gold is mostly gone. Only reason we haven't started declining faster is use of debt, both government and personal. Alternative & renewable energy sources are available, but the cost will be very high and result in lower standard of living and eventually lower life expectancy, putting both much closer to the world average.

Comments can no longer be added to this story.

🗨️ [BrianT](#) on June 30, 2007 - 12:33pm     

Mb: Awesome visionary, but I guess no one could have imagined the growth in effective power of the global elite over the next 50 years. When Rickover gave this speech in 1957, even the super-rich in the USA were to a certain extent submissive to the supreme power on

the planet, the USA government-thus Rickover envisioned a future where steps would be taken to protect that power. Now the facade remains, but the vultures have picked away most of the muscle.

Comments can no longer be added to this story.

🗨️ [writerman](#) on June 30, 2007 - 1:03pm     

One could of course choose a new course, and attempt to save the Empire from itself! Somehow one needs to inject or recruit 'new blood' into the very heart of socio/economic/political power in the United States, and reinvigorate the whole project by fundamental structural reform. One way would be to reorientate the economy away from militarism towards something else. The American economy should become a 'peacetime' economy once more, and reverse the policies of the last fifty years, which are leading towards disaster going forward. Simply put, this means breaking the power of the military/industrial complex and diverting resources towards domestic, civilian needs rather than the idea of Empire.

Comments can no longer be added to this story.

🗨️ [BrianT](#) on June 30, 2007 - 1:10pm     

Writerman: IMHO, as the USA integrates more tightly with Mexico it is not going to be easy to reinvent the place as a larger version of Germany, France or Sweden.

Comments can no longer be added to this story.

🗨️ [oilmanbob](#) on June 30, 2007 - 2:08pm     

Mexico has never had a foreign war except the French invasion and the US invasions in 1845, 1915 (Pershing chasing Pancho Villa) and 1920? when the Marines occupied Vera Cruz to help steal oil. Its a fairly peaceable place with pretty girls and great beaches and mountains.

Comments can no longer be added to this story.

🗨️ [BrianT](#) on June 30, 2007 - 2:34pm     

Oilman: The real estate is great- the life of the average Mexican isn't. Fantastic place if you are one of the top dogs (thus the push for US-Mexico integration).

Comments can no longer be added to this story.

🗨️ [mbnewtrain](#) on June 30, 2007 - 1:21pm     

The changes needed are not just political.

Admiral Rickover stressed the need for better education to meet the needs of a country where energy scarcity threatened its standard of living. Today we need more students interested in science and engineering and less in finance and law. The US schools still graduate far too many lawyers and not enough engineers. And increasing numbers of IT degree graduates won't help either - more people manipulating bits and inventing "iphones" won't save us.

Comments can no longer be added to this story.

🗨️ [BrianT](#) on June 30, 2007 - 1:28pm     

Mb: Hate to be redundant, but in 1957 the USA had an "us" mentality. Those days are long gone-you are on your own (just like in Mexico)-sink or swim.

Comments can no longer be added to this story.

🗨️ [Dryki](#) on July 1, 2007 - 11:07pm     

Yes, Moore's theme for SiCKO. The video is really about "we" vs "me" thinking. The health insurance industry is only one example. The U.S. as a nation cannot survive this transition. The nation will be in the way, a constant obstacle, both internationally and locally.

cfm in Gray, ME

Comments can no longer be added to this story.

🗨️ [Engineer-Poet](#) on June 30, 2007 - 6:05pm     

Energy schemes like "[Sustainability](#)" would be a good foundation for such a re-tooling.

Of course, if the USA cedes its military position in the world, a host of other interests will move into the vacuum. This will mean instability at best, most likely a number of hot wars.

Comments can no longer be added to this story.

🗨️ [Gail the Actuary](#) on June 30, 2007 - 3:23pm     

mbnewtrain-

Only reason we haven't started declining faster is use of debt, both government and personal.

It is hard to see how debt can expand much longer. Once people become aware of peak oil, it is hard to justify making a loan that is to be paid back 10 or 20 years in the future, since conditions are likely to be much worse in the future. The fact that our monetary system is so tied to debt is a real issue in my mind.

This is a link to a recent 47 minute video about our debt-based monetary system.

<http://video.google.ca/videoplay?docid=-9050474362583451279&q=%22money+a...>

Comments can no longer be added to this story.

🗨️ [Magnus Redin](#) on June 30, 2007 - 5:22pm     

Consumption debt can not expand forever counted in inflation adjusted money. But it will be worthwhile to invest in services and businesses that satisfies demand in a post peak oil world. Its easy to put together a list of such investments, small and large. Some parts of the economy will continue to grow when others shrink.

Comments can no longer be added to this story.

🗨️ [Don Sailorman](#) on June 30, 2007 - 6:07pm     

However, consumer debt in nominal (not corrected for inflation) terms can expand to indefinitely large levels as inflation goes from single to double to triple digits . . . and then up through hyperinflation as happened in Germany in 1923.

Hm, Germany in 1923, a debt burdened country, a country that had lost an expensive war, a country of disillusioned youth and frightened pensioners, a country of extremists on the left and right, a country plagued by racism, a country prone to blame foreigners for its problems, a country where democracy was not working to solve social and economic problems . . . Hm, now what does that country remind me of? ? ?

Comments can no longer be added to this story.

🗨️ [bruce from chicago](#) on July 1, 2007 - 8:55am     

France?

Comments can no longer be added to this story.

🗨️ [expat](#) on July 1, 2007 - 11:27am     

However, the Nazis rode to power on deflation - an interesting overview at <http://www.sehepunkte.de/2004/03/2066>

Basically, an overproud proud nation, having lost a war and having its economic institutions decimated by payments to external sources with nothing but short-term interests in transferring wealth to themselves, started to see a light at the end of the tunnel - which turned out to be the headlight of the Great Depression.

From the article -

'If Germany was to honour its obligations under the existing gold standard system, Germany

simply had no option but to engage in a brutal programme of deflation to turn around its balance of payments. To describe the deflation policy as Bruening's is to underestimate the external pressures acting on any German government after 1929. At the same time it provides a highly misleading characterization of the economic policy preferences of Bruening, who, as Ritschl makes clear, began his period in office in the summer of 1930 struggling to mobilize foreign funds with which to combat unemployment and ended his period in office, preparing for a work-creation programme much like that actually put in place at the end of 1932. The common view of Bruening's policy as a trade-off between the domestic economy and the objective of eliminating reparations is reductive. Bruening's real problem was a three-way trade-off between the desire to throw off reparations, the desire to prevent a domestic economic disaster and the desire to preserve Germany's long-term economic relations with the United States, the world's largest economic power. The desire to preserve creditworthiness in the largest capital market in the world was what prevented Bruening from adopting the ultra-nationalist programme of a unilateral default on Germany's foreign obligations. Interestingly, Ritschl also highlights American pressure as the chief reason why Germany did not follow Britain in devaluing the Reichsmark in the autumn of 1931. The Federal Reserve and the Hoover administration had expressed a strong preference that Germany should not devalue and should instead continue to honour its long-term foreign debt, whilst using capital controls to protect its balance of payments. Given the outstanding size of debts to the United States and the importance of US pressure to a final resolution of the reparations question, Germany could not afford to go against this American "advice".'

Comments can no longer be added to this story.

mididoctors on June 30, 2007 - 2:25pm   

Hyman wasn't the only admiral in on the act. Forrestal was there as well..thou rather more gung ho. A host of names appears in the post war period ranting on about depletion geopolitics. Note not just access to resources but the actual effect depletion would have. what is it with Navies and oil?

an old PO.com post

A Hindsight into the macro dynamics of oil depletion geopolitics

The aspect of hindsight is that if we intend to understand how depletion impacts geopolitics and vice versa we need some broad macro overview of what happened and how oil depletion was a factor.

I have decided that starting such an ambitious endeavour , (and this is for me in relative terms , I should really be doing something else) I will break up my take on the impact of oil depletion into manageable chunks or more honestly into areas I feel I have some insight worth reading.

WW2 and post war changes in geopolitical influence:

WW2 has been described as a oil war in that the victors where powered by oil to a greater degree than the losers and access or lack of it to this single resource more than any other hastened the defeat of the axis powers. How much this is true is a separate argument but what is true is the US elite and the policy organs from the President down saw control and access to oil as fundamental to the projection of geopolitical influence and Saudi Arabia was seen as central to this aim as early as 1945 ...

Due to shrewd manoeuvring and lack of colonial reputation in the region the US had bought into the house of Saud before the UK and was better positioned at the war's end to gain influence in the kingdom

What is surprising from our perspective at this forum is the degree in which thinking in the US was dominated by long term views of depletion and by depletion I mean depletion and not just access. It is also surprising that the US analysts considered Saudi control and stability a potential trigger for WW3 at this time before the war had come to an end

US Navy secretary James Forrestal wrote:

"The prestige and hence the influence of the US is in part related the wealth of the government and its nationals in terms of oil resources, foreign as well as domestic."

In Jan 1945 Dean Ascheon Under-Secretary of State received from W Murry, head of the Near Eastern and African Affairs office, a secret memorandum in which Murry stated

"The government should consider what positive steps it must take immediately in order to afford adequate protection to this {Saudi} interest"

What he went on to say quite extraordinarily prophetic or perhaps self prophetic in its meaning

"If the Saudi economy should break down and political disintegration ensue, there is a danger that ether great Britain or Soviet Russia would attempt to move into Saudi Arabia to preserve order and thus prevent the other from doing so. Such a development in a country strategically located and rich in oil as is Saudi Arabia might well constitute a "causa belli" threatening the peace of the world"

This was in Jan 1945 when Saudi was producing barely 21 million barrels a year! Yet its importance even before the discoveries of the 1960s was foreseen. (One wonders if this potentiality mentality still exists about western Iraq?)

Here we can see that oil is playing its part in positioning the US as a replacement of UK colonial interests and Murry identifies Saudi oil as focal point for conflict. While US power was clearly seen as a stabilising force between Russia and the UK colonial legacy, (in a state of embarrassing decline), it is interesting to note the areas the US considered vital to gain influence in. There was no comparative strategic interest in India compared to the house of Saud.

This early post war period is not so much the start of the Cold War proper but also a phased replacement and petty spates between the UK and the US which would cumulate in the Suez crisis.

Moreover it is in this time period that some extraordinary claims are made, that a macro geopolitical decision was made concerning hemispheres of oil.

This theory is that a decision was made to exploit/deplete ME oil before western hemisphere oil so that depletion would be phased to fall back on a "festung Americana"

Venezuelan, Mexican and Gulf of Mexico oil would be ready to replace depleted Saudi oil! This extraordinary long term strategy is argued by Robert Baer a ex CIA case officer without any real evidence AFAICT and whether it was true or not it certainly did not work.

Is it possible that US policy is planned in such a fashion and time scale with that degree of megalomania.? That is grand strategy indeed. It is effectively a systematic phased planned depletion of the worlds resources for US ends starting in 1945! A bit too 'Illumanti Babylon' for my taste but heh", you never know.

Whatever the truth of it its has not come to past because depletion and production realities turned this plan (real or not) inside out.

So essentially at this stage we have a minor controversy as either access to oil is seen as strategic or access and ultimate depletion was?

The Cold War:

Forrestal's comments on prestige come back into play as we look at the ideological struggle that was the Cold War developing out of the Berlin crisis of 1948 though clearly foreseen by Wallace and many others

The ability of western democracies to support high living standards through access to oil be it Saudi or Texan relates to a internal tension within the Soviet bloc as its citizens increasingly will come to envy western living standards. How much of the West's greater freedoms and living standards are a result to energy access is hard to quantify and examples of an energy rich state not developing decent economies are legion. Though it does appear they are, in the main, victim to some drawing off there oil wealth by the world market. An area of huge controversy. What is clear is if we look at oil producers such as Iraq it would need to consume its entire

production of oil itself to have a per capita consumption equivalent to the US and that doesn't include the fact Iraq has to use oil for nearly all its energy needs rather than concentrate in the transport sector... I digress

This imbalance in possible development is only now becoming apparent to the public

The Cold War was effectively a long term siege of the Soviet Union, encircled geopolitically and starved out by the weight of its own inept economic mismanagement and arsenal of absurd proportions. However the comparative example of the freedom-loving West as inspiration for the former Soviet bloc masses is a dilemma as post Cold War the lifestyle has to be delivered and bizarrely the success of the Cold War seems to be a challenge the US finds too great.

The interplay of US gulf involvement and attempts by the Soviets to gain influence through Arab nationalism is well know and understood as is the rather tricky conundrum of the US being brokers to the formation of Israel and the attending problems of shoving that square box into the round hole of Saud/Arab acceptance. the growth in importance of the ME oil was blatant for all to see by the time of the 1973 Yom Kippur war and the 5 month embargo that followed...

We were looking at the seed of a new geopolitical dynamic with the House of Saud gaining unbelievable influence on world affairs due to its swing producer status we all know about. In hindsight the Cold War is almost a side show to the main game to come when OPEC control of supplies will be totally dominant. What is less clear or apparent is how depletion itself would intervene in the long term geopolitics creating a shift in power that was decisive in all our lives!

The 1979 oil shock the Iranian revolution and the Iran-Iraq war had devastating consequences for OPEC oil production and it's a pivotal time period

As the body count went up and the war dragged on the long term strategic power of the USA ebbed away! That's an extraordinary claim

Essentially non-OPEC oil and OECD production was ramped up to offset OPEC shortfalls the North Sea being the classic example of aggressive exploitation.

What this did was to leave OPEC oil in the ground (though not Saudi) and depleted OECD oil at a faster rate

When we look at graphs of OPEC loss of production and OECD coverage of this time period the area defined by the difference between the two roughly equates predictions on the area of OPEC dominance to come. in essence the Iran-Iraq war saved OPEC production for a later day and committed OECD production to premature depletion

<http://www.mnforsustain.org/images/encircling%201.gif>

there is no better example of depletion effecting geopolitics than this . Its effects are profound a mismatch of depletion curves creates a shift in power towards OPEC and away from the US. It just underlies the detail of the current situation and also I think should be seen as a precursor to today's situation and a understanding of how long things can take to play out. We need to look back further than we think.

Had OPEC and OECD (OECD also includes non-OPEC for ease) depletion followed similar curves in time, ..., the 'what ifs' are endless.

Current US endeavours to secure supplies stem from a urgency they find hard to manage or sell...

Forrestall's commen, ("The prestige and hence the influence of the US is in part related the wealth of the government and its nationals in terms of oil resources, foreign as well as domestic."), comes back to haunt us as now the US suffers this imbalance and it will become clear that the US lifestyle is just not going to be delivered as promised by the collapse of the Soviet Union and instead the US must meet its own needs from the "other" hemisphere.

And we come back full circle with the aspirations created by US prestige have laid the ground for US encirclement by a resentful world incapable of achieving this way

of life. Thus the circle completes, ..., reversing the geopolitical dynamic of the Cold War, when the US was laying siege to the Soviet Union with many nations helping, to one of being under siege in a progressive fashion by former allies!

The reality of this present dynamic was hidden in the apparent success of the 1991 Kuwait war and the collapse of the oil price that further deepened the crisis to come

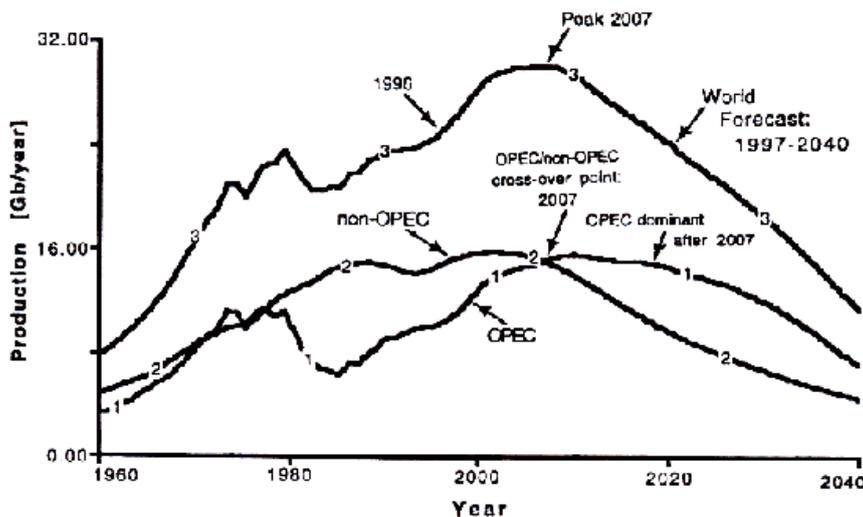
Boris
London

Comments can no longer be added to this story.

 [Gail the Actuary](#) on June 30, 2007 - 2:50pm     

Boris,

Interesting. I particularly like the graph you link to.



Any idea who did it and when? I see it is from the Minnesotans for Sustainability website.

<http://www.mnforsustain.org/>

Comments can no longer be added to this story.

 [mididoctors](#) on June 30, 2007 - 4:18pm     

The graph in a different form with the OPEC/OECD split was used by me in a forum pre Iraq war .. so at least 4 years old. who did it or when I do not know.

I see if i can trace it.. 2002 IIRC

IIRC I saw it in several different places in several different graphic styles.

the PO.com post above dates from 2005

<http://www.peakoil.com/fortopic14366.html+economic>

Boris
London

Comments can no longer be added to this story.

 [mididoctors](#) on June 30, 2007 - 4:33pm     

a very similar graph

http://gasprices-usa.com/GLOBAL%20PEAK%20OIL_files/image005.jpg

what is interesting is whether russia counts as part of OPEC in this geopolitical dynamic?

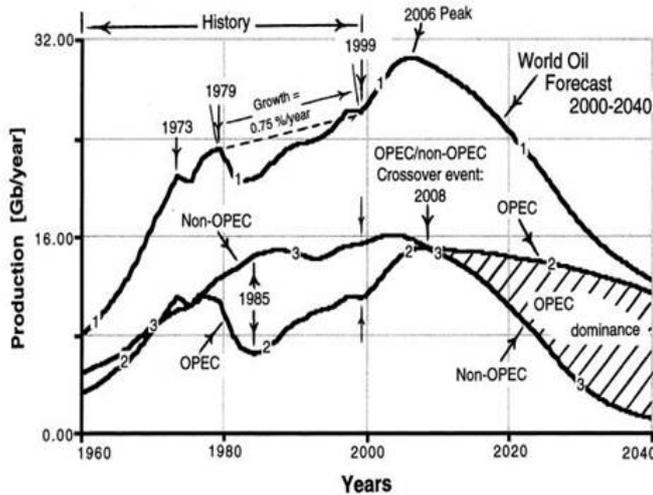
Does OPEC really have that capacity anyway?

Boris
London

Comments can no longer be added to this story.

☞ [Gail the Actuary](#) on June 30, 2007 - 7:01pm     

This is the second graph displayed.



The formula I use for displaying images is

{img src= "Put URL Here" height= "300" } except use < instead of { brackets. Test on preview to see if graph is the right size. If not, increase or decrease 300.

Comments can no longer be added to this story.

☞ [DIYer](#) on July 1, 2007 - 12:03am     

Instead of height="300" try width="75%" or some such. That way if my computer has a teensy little 640x480 display, it'll still only take up 75% of the available column.

Then if I want to download the image or click on it and show it actual size, I can do that, but if I want to just scroll on down, it won't be slopping off the page or taking up too much space.

Comments can no longer be added to this story.

☞ [GreyZone](#) on June 30, 2007 - 11:02pm     

Richard Duncan, of Olduvai theory fame (or infamy), did that graph. See [this article](#).

[Ghawar Is Dying](#)

The greatest shortcoming of the human race is our inability to understand the exponential function. - Dr. Albert Bartlett

Comments can no longer be added to this story.

☞ [mididoctors](#) on July 1, 2007 - 2:59am     

yes glaring obvious if you trace back.. 1999. he called that well.

Boris
London

Comments can no longer be added to this story.

☞ [Mad Max-Out](#) on July 1, 2007 - 12:37pm     

What is it with navies and oil? That's easy. The warships run on oil! What Rickover and Forrestall were saying is that come the oil peak is that the oil to run the ships will get scarce and expensive. That is a major reason for Rickover's push to make nuke-driven ships and subs.

Rickover made his speech only a year after M King Hubbert made his speech about the Lower 48 oil peak. He must have listened up when Hubbert made his speech about oil peaks.

Now, imagine yourself in Rickover's or Forrestall's shoes. You command a navy that has ships that run on diesel. You would want ships to run on U-235 instead, because oil is going to run out. They were motivated by wanting to keep in power. Commanding a navy of ships you can't have run is no fun. It's a case of "bigger the general the smaller the child".

When it comes to submarines, Rickover was fully right in the case of a sub that can drive underwater for months at a crack. Fossil fuel is no good for that. That's because of the fact that fossil fuel takes oxygen to burn. Using a nuke plant doesn't need the oxygen. Instead, a nuke plant can be used to make electricity to electrolyse water to make oxygen for the inhabitants to breathe. THAT was his being a genius more than being right about the obvious with oil peaks. The invention of the USS Nautilus proved that point. Prior to that invention, all subs had to surface (or go to periscope depth) to run a diesel to charge batteries. During WW 2.0, we used that fact to advantage, causing German submariners to all but go on suicide bomber missions.

What Rickover did was to take a nuke plant which does not require oxygen to run is put it in a submarine so as to make it so it need not surface in order to run. This made a sub that does not have the limitation of the German subs. A nuke plant is the ONLY method of making a sub that needs not surface to run. THAT was Rickover's ingenious thing.

Petrol prices high enough yet? Just wait!

Comments can no longer be added to this story.

mididoctors on July 1, 2007 - 1:46pm     

Yes, I was alluding too previous "naval power connects with oil" historical moments

eg 1941 and British early 20th cent ME policy.

bit of a ongoing saga.

Boris
London

Comments can no longer be added to this story.

polytropos on June 30, 2007 - 2:26pm   

I wonder if Hyman ever hung out with M King Hubbert?

Anyone want to develop a methodology to prove / disprove
Matt Simmons \$10,000 bet that oil = \$200/barrel in 2010?
Does anyone know who took the other side of the bet?

Comments can no longer be added to this story.

westexas on June 30, 2007 - 2:53pm     

It was a reporter/columnist with the New York Times, and I think that the widow of Julian Simon (?) took half of the bet. I think that the \$200 price is indexed to 2005 dollars.

Edit:

More info: http://www.williampolley.com/blog/archives/2005/08/john_tierney_pu.html

Comments can no longer be added to this story.

ThatsItImout on June 30, 2007 - 2:33pm   

"Today the automobile is the most uneconomical user of energy. Its efficiency is 5% compared with 23% for the Diesel-electric railway. It is the most ravenous devourer of fossil fuels, accounting for over half of the total oil consumption in this country. And the oil we use in the United States in one year took nature about 14 million years to create. Curiously, the automobile, which is the greatest single cause of the rapid exhaustion of oil reserves, may eventually be the first fuel consumer to suffer. Reduction in automotive use would necessitate an extraordinarily costly reorganization of the pattern of living in industrialized nations, particularly in the United States. It would seem prudent to bear this in mind in future planning of cities and industrial locations."

Alan and Kunstler, ya' gotta' love it! :-)

RC

Remember, we are only one cubic mile from freedom

Comments can no longer be added to this story.

🗨️ [Mad Max-Out](#) on July 1, 2007 - 1:12pm     

You sure got that right! Just yesterday while on a bus I was thinking in terms of passenger-miles per gallon of that bus. A CTA (Chicago) bus on average gets only 3.5 mpg. But, if it carries 7 passengers on average, the mpg equivalent is around 20 mpg, what I get with my car when I drive. I leave the car at home and not drive if I'm going on a drinking mission. :)

A semi gets about 6 mpg at full freeway speed, surely less in normal city traffic. Someone posted a picture of a semi turned bus in Cuba. If a semi hauls 100 passengers on average, it'll get great passenger-miles per precious gallon. HINT: Use a refrigerated trailer to convert into a semi-bus.

Even cars that get good mileage, flying solo to and from work is about the most energy-intensive economic activity I can think of. That's because of the fact that the passenger in the car is also the pilot. A motorcycle gets better gas mileage than a car but it causes the user to be exposed to the weather. Also, a motorcycle is a balancing vehicle, making it more dangerous in winter, with ice. That serves as the deterrent to its use. (plus some people are not coordinated enough)

The optimum vehicle for one owned by the commuter is a recumbent motorcycle if it's going to use fossil fuel at all. That's because of the fact that aerodynamics come into play at full freeway speed. A recumbent motorcycle would have a smaller cross section than a normal motorcycle. While a normal motorcycle might get 50 mpg, a recumbent might well get 70 mph. Nobody invented one yet. That's sure better than the 20 mpg I get with my car! Of course, if you live close enough to work, a bicycle gets infinite miles a gallon. (not including gallons used in its manufacture)

Petrol prices high enough yet? Just wait!

Comments can no longer be added to this story.

🗨️ [phineas gage](#) on June 30, 2007 - 4:07pm   

As a physician, I find it interesting that this speech was delivered to a group of physicians. Back then, physicians took a general interest in such matters, and I suspect that most physicians in that crowd would have been able to perceive the truth in Rickover's speech. Physicians were renaissance men.

I shudder to think how such a speech would be rejected by a group of physicians today. For various reasons, my cohorts take little interest in anything beyond their investments, SUV's and country club memberships. It's hard to get any of my fellow physicians to talk about anything deeper than medicine, golf or caribbean resorts. The AMA does little more than lobby for the narrow financial self-interest of its members (all under the guise of defending patients' rights of course). Most physicians are not members of the AMA and don't see themselves as a group that has any collective responsibility.

Comments can no longer be added to this story.

🗨️ [MicroHydro](#) on June 30, 2007 - 10:01pm     

Basically, the golden age of US medicine as a profession was mid 20th century - Flexner report through 1970. Your modern physician is a narrowly educated technocrat trained to maximize profit for HMOs, insurance companies, GE/Siemens/Hitachi, and big Pharma. She graduates deeply in debt and has a future as a lifelong employee of a major corporation with all the brainwashing and powerlessness than implies. Despite drawing an impressive nominal salary, her buying power and independence will never approach that enjoyed by the 1950s and 1960s doctors.

At least US medicine had a golden age. In the British commonwealth, physicians are not even university educated people and have very low social status. They are (at best) average students who go directly from high school into vocational medical training. No use in filling up their little heads with history, philosophy, basic science or anything else.

Comments can no longer be added to this story.

↳ [Laurie](#) on June 30, 2007 - 11:36pm     

"In the British commonwealth, physicians are not even university educated people and have very low social status."

An astonishingly ignorant assertion. Let's take one prominent example. Canada is a part of the Commonwealth, and physicians here are all university graduates -- by definition, since the MD is a university degree. Virtually all (outside the province of Quebec, which runs a slightly different system) also have undergraduate degrees. These are usually in science, but not always, and often not exclusively -- for example, my own brother-in-law studied (and taught) English, as well as biology, before going to med school.

Nor is Canada unique among Commonwealth countries in this regard. Some of the brightest students I have ever met, in any discipline, were medical students at Oxford -- articulate, well-read, sophisticated. It would certainly have come as a surprise to them to learn that they were "average" students engaged in "vocational" training.

MicroHydro, where ever did you get such a weird idea?

Comments can no longer be added to this story.

↳ [andyh](#) on June 30, 2007 - 11:46pm     

Yes weird comment. Here in my small town in NZ my local GP actually has more degrees than me (and thats saying something).

Comments can no longer be added to this story.

↳ [MicroHydro](#) on July 1, 2007 - 3:12am     

I beg to differ. Most of the NZ GPs I have met are dull slobbs who would have to struggle to get admitted to a good nursing school in the US. Basic science knowledge level is high school.

Comments can no longer be added to this story.

↳ [ThatsItImout](#) on July 1, 2007 - 6:42am     

(references below refer to comments in both Drumbeat and here...

Yes, today's strings have been full of weird comments....in a post in Drumbeat, nbnewtrain says...

"Alternative & renewable energy sources are available, but the cost will be very high and result in lower standard of living and eventually lower life expectancy, putting both much closer to the world average."

Please think about that one for a minute.

So, exchanging our current fossil based fuels, which are finite and depleting, and in centralized locations that are often hostile to the United States and getting harder and harder to extract (lower and lower EROEI) for an energy based system that could be distributed, produce energy on site, reduce infrastructure waste, is low or no carbon, and non depleting with a rising EROEI would result in

" lower standard of living and eventually lower life expectancy"

It is easy to see why many can believe the type of stuff that was in another article quoted by a Drumbeat commentor, published by one of Huffington's contributors, Raymon J. Learsy, that the Peak movement is nothing but a thinly veiled mouthpiece for the oil industry. Some of the conjecture one finds here is almost psychotic in it's worship of oil.

It is interesting that an absolutely fascinating article which may have undercut the oil cult went without discussio,

"The True Cost of Oil: \$65 Trillion a Year?"

<http://www.energyandcapital.com/articles/oil-gas-crude/461>

The True Cost of Oil link was absolutely ignored by comment posted on Drumbeat, the posters instead veering off into such relevant topics as how many fast food restuarants various cities have, how much it would cost to fill up a Honda Civic in Iran, arguments over whether there was really a terroist attack in Glasgow.and finally, whether are not Zimbabwe was a hellhole before or after "peak oil", which no one knows for sure whether we are before or after. THANK YOU ALL FOR A WASTE OF FVCKIN TIME.

Of course, the True Cost of oil was actually about OIL! And of course, even if it is not correct on the exact numbers, it brings to the table a very real issue, that being that oil and gas are made to seem extremely cheap by virtue of externalizing so much of the costs involved in production/distribution of them. Why wouldn't folks here or folks in the boardrooms of the major oil producers or folks at OPEC want to think about that?

Simple: Because it could make a lot of alternatives seem much, MUCH more feasible.

Instead, we get the madness, as put forth by all the above parties, plus nbnewtrain, which can be distilled down to a simple message:

Alternatives to oil are bad, very bad. Always bad. They can destroy you.

Do not, whatever the bleedin' hell you do, accept the alternatives.

Slavery to overseas producers, yes, destruction of climate and environment, yes, massive destruction of our nation and it's wealth by balance of trade imbalance, yes, but do not believe that any alternative can work. Keep chanting, the alternatives, the renewables, always bad!

Sick, fvckin sick.

RC

Remember, we are only one cubic mile from freedom

(but really, we don't want freedom if it means abandoning our psychotic worship of oil...everybody sing...oil, "how great thou art, how great thou art...)

(edited for spelling and grammar)

Comments can no longer be added to this story.

 [BrianT](#) on July 1, 2007 - 1:16pm     

Roger: You said it. I know this site is titled TOD, but sometimes this worship of oil as the nectar giving lifeblood to all human advancement is a little ridiculous. You make a very good point in drawing attention to the true cost of the product. IMHO, eventually major issues will arise but the global economy can grow strongly with a lot less oil consumption than current levels. Trucking and American suburbia will be the first shoes to drop, against a backdrop of continuing strong global growth (IMO).

Comments can no longer be added to this story.

 [geek7](#) on July 2, 2007 - 7:49pm     

The True Cost of Oil is about the very large oil external costs which are not reflected in the market price. No doubt these costs exist, but in looking for substitute for oil one must compare market prices of oil and the substitute. The external cost reduction of moving from oil to some substitute is a social benefit that will not appear on the P&L accounts of any business or consumer.

Someone may suggest that we should change the law so that firms are forced to internalize these costs. But I think the time of crisis is too near to allow for fiddling with accounting systems and waiting for the hoped for benefit of the fiddling.

Comments can no longer be added to this story.

 [prole](#) on June 30, 2007 - 11:48pm     

Just watched Sicko in which a British doctor working for the national health service divulges his salary - 200K US per year.

Seems he was doing very well.

More importantly his bonus plan was based on improvements in preventative medicine as practiced by his patients.

The more people he convinced to quit smoking, exercise, eat better, etc. the more he makes.

Imagine such rational thought applied in the US.

Oh right, it will never happen here in right wing wacko land.

Comments can no longer be added to this story.

 [Dryki](#) on July 1, 2007 - 11:18pm     

The very best understanding and description of Peak Oil and its implications I've heard yet comes from a physician, Dr. Peter Montague of [Rachels Environmental News](#). He talks about it from a public health perspective and I was lucky to hear him at a small gathering in Farmington, Maine - UMF.

Who do you want running emergence management? The military or a public health wizard like Montague? That's a no-brainer to me. Cuba has it right; North Korea has it wrong. Cuba treats energy as public health issue; North Korea as a military issue.

cfm in Gray, ME

Comments can no longer be added to this story.

 [Gail the Actuary](#) on July 2, 2007 - 10:25am     

I'd be interested in reading a talk by Dr. Peter Montague. I wasn't able to find one from the link you gave, but they seem to be working on the web site.

Someone else who looks at peak oil from a public health point of view is Dan Bednarz, PhD. He has a number of articles on the web, including at least [one](#) on Energy Bulletin. One of his ideas is to expand existing public health coverage to cover new public health needs.

Comments can no longer be added to this story.

 [john macklin](#) on July 1, 2007 - 9:27am   

Gail,

Thanks for posting this speech. Its power to persuade those still unconvinced of the coming train wreck would be greatly increased if we were highly confident these words were actually spoken.

Anyone out there know if the words in this speech are accurate, i.e. so we don't find future sleuths from the dark side who show the work was annotated and informed by modern times.

If his words are accurate, what clarity of vision he had...

Comments can no longer be added to this story.

 [ricklakin](#) on July 1, 2007 - 6:41pm     

With regard to the veracity of the document, I must contribute here. I was the one who first read the Christian Science Monitor article and began the search for the speech.

I sent out emails to several of Rickover's biographers including Dr. Theodore Rockwell, who worked in Naval Reactors under Admiral Rickover from 1949 to 1964. Dr. Rockwell quickly responded and then sent me a copy of the speech from his research files. From him, I received a copy of an 18 page typewritten document dated May 14, 1957. A cursory look at the document led me to believe that it was manually typed, not printed and therefore I have no reason to believe that the date is not valid. Over his entire career, Rickover routinely distributed copies of his speeches to Congress and other interested parties so that would most likely be the origin of this document.

With the assistance of a student, I scanned and OCR'd the document and created a PDF. From there I posted on EnergyBulletin.net. I made only one editorial change. The Admiral used a word that would today be considered racially insensitive so I changed it to "Chinese Farm worker". That is the only change from the original document.

Admiral Rickover's clarity of vision was exceeded only by his tenacity and determination to see the vision achieved. Remember that this was a low-level Captain who single-handedly drug the United States Navy kicking and screaming into the nuclear age.

Rick Lakin

Comments can no longer be added to this story.

 [john macklin](#) on July 2, 2007 - 9:38am     

Thanks, Rick. I appreciate your comments and efforts to get the speech recognition. Forgive my concerns, but when someone sees the future so clearly, a reader must be cautious these were his words and vision.

Comments can no longer be added to this story.

 [geek7](#) on July 2, 2007 - 8:02pm     

"... a low-level Captain ..."

I think becoming a Captain in the Navy is a rather more significant accomplishment than a Captain in the Army. In fact its a rather big deal, especially for a foreign born Jew in that age.

Comments can no longer be added to this story.

 [ricklakin](#) on July 2, 2007 - 11:25pm     

My comment was meant to denigrate neither his achievements, his accomplishments nor his ethnic origins.

In military terms, an Army, Marine, or Air Force Captain is an O-4 and a Navy Captain is an O-6. In the fleet, an O-6 is normally commander of a large combatant such as a cruiser or carrier. a senior Captain is normally referred to as Commodore and might have a squadron of ships at his command. A Captain might also be found commanding a medium-sized shore facility.

For the last 40 years of his career, Rickover worked in Washington except for a few months at the end of the war when he was in charge of building a ship repair facility in the Pacific.

In Washington, an O-6 most always works in a facility that is under the supervision of one or more Flag Officers. The Captains are, in effect, middle management.

So, when I use the term low-level Captain in the context that I did, it is neither inaccurate nor denigrating but, most certainly, amplifies the point that the Admiral accomplished feats that might be considered astonishing for someone of his pay grade.

If you would have the opportunity to read any of his biographies, you would soon realize that, for Admiral Rickover, achievement of rank was not a significant accomplishment other than as a means to accelerate the accomplishment of his vision.

Rick

Comments can no longer be added to this story.

 [Mad Max-Out](#) on July 3, 2007 - 12:39am     

I spent 4 years of my time in. I was in the time of the damn first time around with the Iraq war. I had the original accent that belongs to the Iraq war. That is, the Australian accent. There is no other accent that even comes close to quite the Australian accent. I have had other accents, including a Southern one, but the Australian accent is unbeatable.

I get to enjoy the fact I can run an accent. I can do so at full power, enough that some people will say I'm an immigrant. Being an immigrant as a Yank is awful cool. Think of getting off the plane 15 years ago instead of 3 hours ago. A mission to Melbourne would be difficult and expensive. When I first got back, I underwent 2 weeks of being quite the damn immigrant.

Being an "immigrant" is sure an unusual thing. A cool thing is that I have the accent thing. An extremely rare thing is that Spanish is not used with a good accent. Spanish done with a good high-power accent sounds great. Espan"ol with a high-power Italiano accent sounds kick-arse.

]Petrol prices high enough yet? Just wait!

Comments can no longer be added to this story.

 [GreyZone](#) on July 1, 2007 - 10:55am   

Rep. Roscoe Bartlett [made the speech available in the Congressional Record](#) about six months ago.

There do not appear to be any other references to the speech in Google aside from the Congressional Record, The Energy Bulletin, and here. However, Gail's introductory text makes it clear that this was stored away in the notes of someone who had previously written extensively about Rickover and interviewed Rickover, so that makes the speech plausible.

Additionally, he clearly underestimated our birth rate drastically. We hit 4 billion in the 1970s and 6 billion by 2000.

Other than those references, I am unsure how to further verify the speech at this time unless we could produce an eyewitness to it.

[Ghawar Is Dying](#)

The greatest shortcoming of the human race is our inability to understand the exponential function. - Dr. Albert Bartlett

Comments can no longer be added to this story.

 [john macklin](#) on July 1, 2007 - 2:35pm   

Thanks, GZ. I'll work on this further, as I believe the speech provides a foundation for what has been built, for example, here at the TOD and other such communities. A highly valuable resource to rebut MSM misrepresentations of the peak oil issue and those working to bring it to the forefront.

Have emailed Ted Rockwell, who worked for Rickover, has his own significant reputation in nuclear physics, and has written the several biographies on Rickover and referred to in Gail's post as source for finding the text. Hope to hear from him soon.

Dug up The Christian Science Monitor article, dated June 5 1957, that paraphrased parts of the speech with remarkable agreement. Thanks to <http://www.swans.com/library/dossiers/energy02.html> for steering me to this.

The original 1957 CSM article is here [Download CSM1957article.gif \(149.1K\)](#), and the text is reproduced at the [Energy Bulletin](#). Not looking to beat a dead horse, just want to get the fundamental stuff right.

Comments can no longer be added to this story.

 [Gail the Actuary](#) on July 1, 2007 - 2:54pm   

That Christian Science Monitor article is pretty good evidence that Rickover really said at least some of the important points from his speech back in 1957.

By the way, I have Rick Lakin's e-mail address as well.

Comments can no longer be added to this story.

 [john macklin](#) on July 1, 2007 - 3:03pm   

I agree, Gail, my concerns are probably overcaution. Will contact Rick Lakin after hearing from Ted Rockwell. Thanks.

Comments can no longer be added to this story.

 [Don Sailorman](#) on July 1, 2007 - 2:48pm   

I think Rickover probably overestimated death rates rather than underestimating birth rates.

The population explosion, of course, is not due to people breeding like rabbits all of a sudden; rather, what happened is that suddenly people stopped dying like flies. The extent of this drastic and sustained drop in death rates was not clear in 1957--which, coincidentally, was the year I took my first class in population and demographic trends.

Comments can no longer be added to this story.

 [BrianT](#) on July 1, 2007 - 3:53pm   

Don: World life expectancy increased dramatically up until its peak reached in 1998 of 67 yrs (life expectancy worldwide increased on average 4 months each year from 1970 to 1998). Contrary to MSM mythology, global life expectancy has been in a steady decline since 1998. Currently estimated at 65.82 years. IMHO, we have passed peak life expectancy globally.

Comments can no longer be added to this story.

🗨️ [Gail the Actuary](#) on July 1, 2007 - 4:12pm     

Do you happen to have a graph or a link?

While I am an actuary, my field is casualty actuarial. Most of my recent work has been in medical malpractice.

Comments can no longer be added to this story.

🗨️ [BrianT](#) on July 1, 2007 - 4:31pm     

Gail: The 67 yrs in 1998 is from here <http://www.worldbank.org/depweb/english/modules/social/life/>

the 65.82 in 2007 is from CIA Factbook. As I used two independent sources, the numbers might be off for comparison, but IMHO it is evident that global life expectancy has certainly hit a plateau, if not a decline (yet).

Comments can no longer be added to this story.

🗨️ [Don Sailorman](#) on July 1, 2007 - 5:06pm     

There are good reasons to expect global life expectancy to decline:

1. Spread of AIDs.
2. Increasing undernutrition and malnutrition among the rapidly growing numbers of the poorest of the poor in poor countries (mainly in Asia and Africa).
3. Disintegration of societies, such as the U.S.S.R. (drastic decline in male life expectancy), Zimbabwe (no decent statistics available), Iraq (pretty obvious), various African countries following more or less down the Zimbabwe road, genocides in places such as Rwanda and Darfur, and the list goes on.

Peak Oil, of course, will tend to accelerate the decline in life expectancies, first and most in the poorest countries. As usual, the poorest and most helpless people get hit the hardest from social and economic change.

Comments can no longer be added to this story.

🗨️ [geek7](#) on July 2, 2007 - 8:37pm     

I'm wondering what is the significance of all this discussion. The document appeared to you to be real. The wording of it seemed to me rather like other stuff that I've read that was attributed to him. But even if it were a total fake and were shown to be fake with certainty, would that 'disprove' peak oil? Peak oil is rather like Darwin's idea of natural selection. For both, once a rational person understands what is being said, the fundamental truth of the idea is obvious and undeniable.

On the other hand, reading early expositions of an idea does deepen ones understanding. His comments on the technical problems of nuclear power as a substitute for oil are interesting for their datedness. The world of NP was so simple before Chernobyl! (And would a fake document forged at a later time have included any comments on NP? I think not.)

Comments can no longer be added to this story.

🗨️ [SteveInNZ](#) on July 1, 2007 - 9:54pm   

Is it some odd effect of time, or was Rickover much more intelligent than any of our current leaders? If you look at the range of information that Rickover cites, history, physics, geology, biology, etc. he seems like a different species from our Washington rulers. It is bad enough that we ignore our best leaders, but then we replace them with morons.

Comments can no longer be added to this story.

🗨️ [Dryki](#) on July 1, 2007 - 11:23pm    

He was better educated and he predated the neo-liberal "consensus". When he was around, understanding mattered. A different species indeed.

cfm in Gray, ME

Comments can no longer be added to this story.

🗨️ [Steve001](#) on July 2, 2007 - 1:58pm    

Paging Al Gore...

Too bad Al was deemed by our illustrious corporate media complex to be a guy with whom one wouldn't want to have a beer. The problem of our times runs much deeper than the available candidates. There are many very smart people out there. It is the stinking self-interested system of Big Corporate Media (see: Murdoch, R.), now the handmaiden of corruption in high places, controlling public discourse in service of the interests of those comfortably ensconced within the "establishment." Peak Oil is the biggest challenge in generations to that establishment order. We need voices willing to shatter comforting orthodoxy in order to deal with the challenges that are approaching rapidly. We DONT need more Paris Hilton for flk sakes.

Thankfully, blogs are challenging the info-propaganda paradigm maintained by corporate media... hopefully before it is too late.

Comments can no longer be added to this story.

🗨️ [Engineer-Poet](#) on July 2, 2007 - 7:16pm    

Bloggers have taken the role of the 18th-century pamphleteers.

Comments can no longer be added to this story.

🗨️ [Alexis1956](#) on July 3, 2007 - 12:44am   

Admiral Rickover was an incredible genius, despite his personal shortcomings. He's a genuine American hero in every sense of the word. It is too bad that we have very few men of his courage, dedication, integrity and brains to help us in what may soon be an energy collapse in which none of us are truly prepared. Sure, Mr. Carter was a screw-up in many ways, but he learned a great deal from the wise old admiral. History will no doubt show that Carter was in fact right regarding our reliance on crude oil. If the Peak Oil theory turns out to be an undeniable fact, which many of us believe, the specter of Global Warming will soon fade giving rise to a world with a growing thirt for oil products that cannot be quenched.

As a former vice chairman of an international airline, I have been asked by several mothers what fields of endeavor I think their their children should study to become successful. Many are shocked when I do not mention law, finance, aviation, engineering, etc. I reply, the best fields in the future will be medicine, veterinary science, horticulture, agriculture, geology, hydrology and animal husbandry. Animal husbandry, they ask? It is quite simple I reply, these fields will be essential in a world with dwindling energy resources, increased risk of war and famine. Those who are prepared have the best chance of helping their own family and others in their respective communities with the most optimistic chance of survival.

Could it be that dire, I've been asked? Most certainly, when you consider the high degree of interdependency in the modern world's economy. Eventually, our sytem of a strong federal government with its managed central banking system, military and politicians will collapse leaving only those communities whose members will work together for the sake of the local folks. If Peak Oil has been reached, it is only a matter of time before the public awakens from its ignorant slumber revealing the truth that the standard of living for the average American will change forever. Other civilizations have disappeared after experiencing similar events, be that food, water, disease, etc. It seems logical that wars will soon engulf the entire Middle East area drawing in military forces from major nations to fight over the last remaining oil reserves on this planet. If all else fails, pray!

Comments can no longer be added to this story.

 [geek7](#) on July 3, 2007 - 5:27pm    

Let me outline what I believe to be a slightly more optimistic scenario for the US. US will get out of Iraq in the near future because of a revolt of our citizens, not because of any high brow arguments about Peak Oil. Iraq and Middle East will revert to the political turmoil that existed there during the Ottoman Empire after the battle of Vienna in 1683. Our airline industry will collapse for lack of fuel and, with it, the danger of another 9/11. We will be free to transition to a post-oil economy while rest of the world is in chaos, and will have plenty of incentive to do so. What technologies will we choose to work on? I think that needs some discussion. There are a lot of options to consider after one gets over hang-ups about competing with oil at today's prices. Important ideas are to get out of ME ASAP and stay out, no matter what! And, choose wisely which technologies we push. And pray, maybe, but quietly, and in private.

Comments can no longer be added to this story.

 [eredux](#) on July 4, 2007 - 10:33am   

[Check this Map out](#), has United States Interactive Carbon Footprint Map, illustrating Greenest States. This site has all sorts of stats on individual State energy consumptions, demographics and State energy offices.

<http://www.eredux.com/states/>

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[71 comments](#) on ["Energy Resources and Our Future" - Speech by Hyman Rickover in 1957](#)

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