Dear Reader,

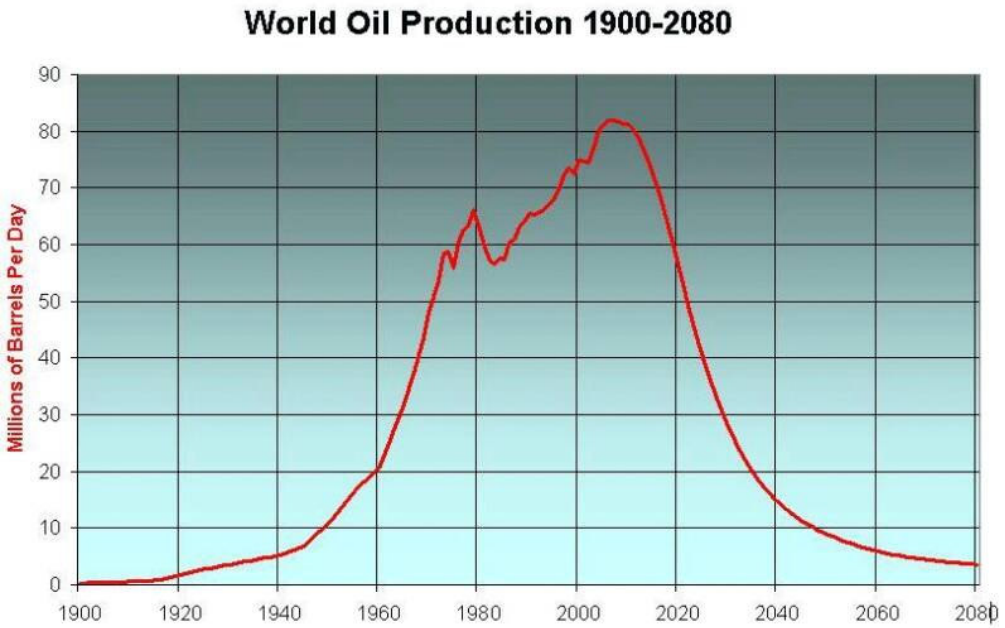
Civilization as we know it is coming to an end soon. This is not the wacky proclamation of a doomsday cult, apocalypse bible prophecy sect, or conspiracy theory society. Rather, it is the scientific conclusion of the best paid, most widely-respected geologists, physicists, bankers, and investors in the world. These are rational, professional, conservative individuals who are absolutely terrified by a phenomenon known as global "Peak Oil."

"Are We 'Running Out'? I Thought There Was 40 Years of the Stuff Left"

Oil will not just "run out" because all oil production follows a bell curve. This is true whether we're talking about an individual field, a country, or on the planet as a whole.

Oil is increasingly plentiful on the upslope of the bell curve, increasingly scarce and expensive on the down slope. The peak of the curve coincides with the point at which the endowment of oil has been 50 percent depleted. Once the peak is passed, oil production begins to go down while cost begins to go up.

In practical and considerably oversimplified terms, this means that if 2005 was the year of global Peak Oil, worldwide oil production in the year 2030 will be the same as it was in 1980. However, the world's population in 2030 will be both much larger (approximately twice) and much more industrialized (oil-dependent) than it was in 1980. Consequently, worldwide demand for oil will outpace worldwide production of oil by a significant margin. As a result, the price will skyrocket, oil dependant economies will crumble, and resource wars will explode.



The issue is not one of "running out" so much as it is not having enough to keep our economy running. In this regard, the ramifications of Peak Oil for our civilization are

similar to the ramifications of dehydration for the human body. The human body is 70 percent water. The body of a 200 pound man thus holds 140 pounds of water. Because water is so crucial to everything the human body does, the man doesn't need to lose all 140 pounds of water weight before collapsing due to dehydration. A loss of as little as 10-15 pounds of water may be enough to kill him.

In a similar sense, an oil based economy such as ours doesn't need to deplete its entire reserve of oil before it begins to collapse. A shortfall between demand and supply as little as 10 to 15 percent is enough to wholly shatter an oil-dependent economy and reduce its citizenry to poverty.

The effects of even a small drop in production can be devastating. Source For instance, during the 1970s oil shocks, shortfalls in production as small as 5% caused the price of oil to nearly quadruple. Source The same thing happened in California a few years ago with natural gas: a production drop of less than 5% caused prices to skyrocket by 400%.

Fortunately, those price shocks were only temporary.

The coming oil shocks won't be so short lived. They represent the onset of "a new, permanent condition". Source Once the decline gets under way, production will drop (conservatively) by 3% per year, every year. War, terrorism, extreme weather and other "above ground" geopolitical factors will likely push the effective decline rate past 10% per year, thus cutting the total supply by 50% in 7 years. Source

These estimate comes from numerous sources, not the least of which is Vice President Dick Cheney himself. In a 1999 speech he gave while still CEO of Halliburton, Cheney stated:

By some estimates, there will be an average of two-percent annual growth in global oil demand over the years ahead, along with, ***conservatively****, a three-percent natural decline in production from existing reserves. That means by 2010 we'll need an additional 50 million barrels per day.* Source

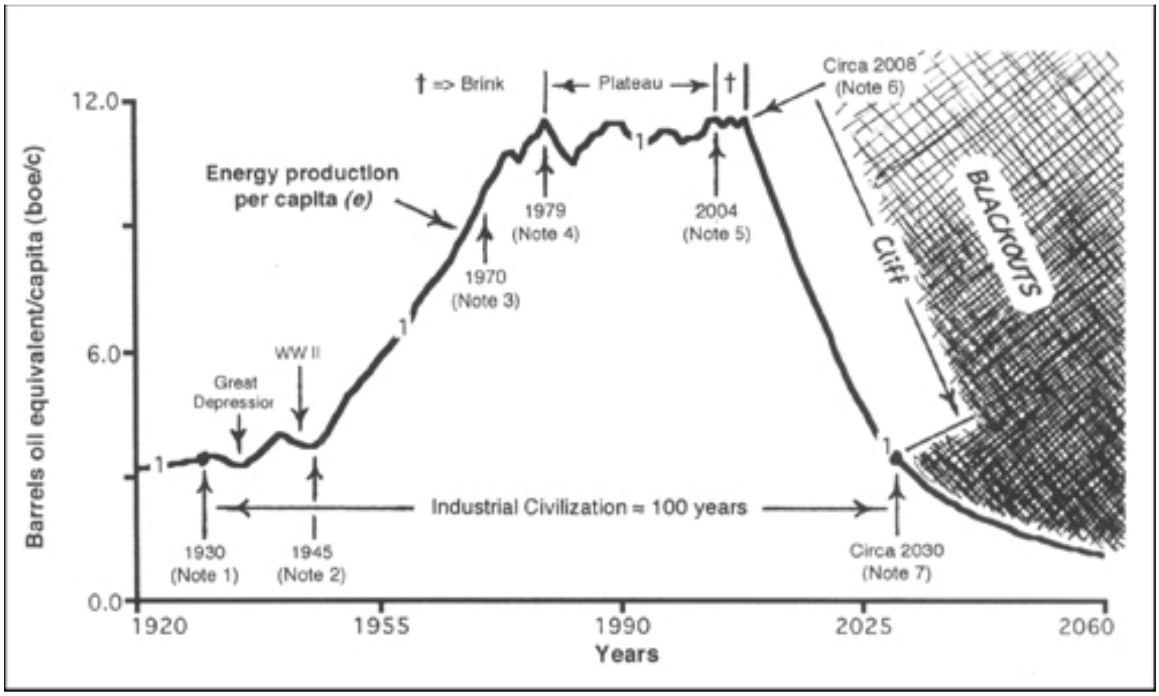
Cheney's assessment is supported by the estimates of numerous non-political, retired, and now disinterested scientists, many of whom believe global oil production will peak and go into terminal decline within the next five years, if it hasn't already. Source

Many industry insiders think the decline rate will far higher than Cheney anticipated in 1999. Andrew Gould, CEO of the giant oil services firm Schlumberger, for instance, recently stated that "An accurate average decline rate of 8% is not an unreasonable assumption." Source Some industry analysts are anticipating decline rates as high as 13% per year. Source A 13% yearly decline rate would cause gobal production to drop by 75% in less than 11 years.

If a 5% drop in production caused prices to triple in the 1970s, what do you think a 50% or 75% drop is going to do?

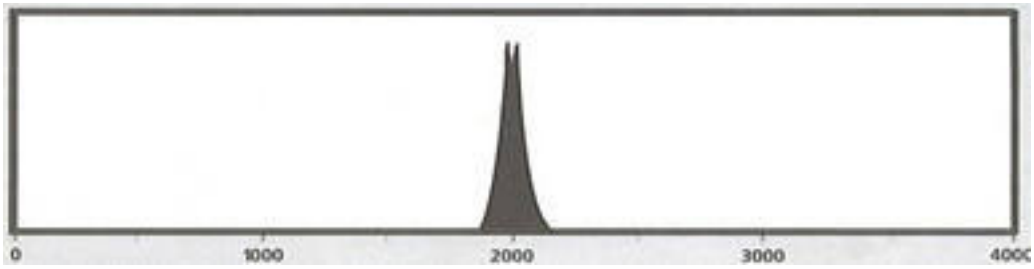
Estimates coming out of the oil industry indicate that this drop in production has already begun. Source The consequences of this are almost unimaginable. As we slide down the downslope slope of the global oil production curve, we may find

ourselves slipping into something best described as a "post industrial stone age." Source



Dr. Richard Duncan: The Peak of World Oil Production and the Road to the Olduvai Gorge (PDF Format)

Ultimately, the energy-intensive industrial age may be little more than a blip in the course of human history:



Graph: The Energy Curve of History?

Peak Oil is also called "Hubbert's Peak," named for the Shell geologist Dr. Marion King Hubbert. In 1956, Hubbert accurately predicted that US domestic oil production would peak in 1970. Source#1 Source #2 He also predicted global production would peak around the year 2000, which it would have had the politically created oil shocks of the 1970s not delayed it for about 5-10 years.

For more information:

A mere 15% shortfall in oil production will spike oil prices by 550%

Robert Hirsch on CNBC: Gasoline will soon be $12-to-$15 per gallon

"Big deal. If gas prices get high, I'll just drive less. Why should I give a damn?"

Because petrochemicals are key components to much more than just the gas in your car. As of the year 2002, approximately 10 calories of fossil fuels are required to produce every 1 calorie of food eaten in the US. Source The size of this ratio stems from the fact that every step of modern food production is fossil fuel and petrochemical powered:

Pesticides and agro-chemicals are made from oil;

Commercial fertilizers are made from ammonia, which is made from natural gas, which is also peaking in the near future. Source

Most farming implements such as tractors and trailers are constructed and powered using oil-derived fuels.

Food storage systems such as refrigerators are manufactured in oil-powered plants, distributed using oil-powered transportation networks and usually run on electricity, which most often comes from natural gas or coal. Like oil and natural gas, coal too is peaking in the near future. Source

In the US, the average piece of food is transported almost 1,500 miles before it gets to your plate. Source In Canada, the average piece of food is transported 5,000 miles from where it is produced to where it is consumed. Source

A recent article published by CNN documented just how much fossil fuel energy is used to produce our food. Emphasis added:

In the U.S., up to 20 percent of the country's fossil fuel consumption goes into the food chain which points out that fossil fuel use by the food system "often rivals that of automobiles". ***To feed an average family of four in the developed world uses up the equivalent of 930 gallons of gasoline a year - just shy of the 1,070 gallons that family would use up each year to power their cars.*** Source

According to the Organic Trade Association, the production of one pair of regular cotton jeans takes three-quarters of a pound of fertilizers and pesticides. Source

In short, people gobble fossil fuels like two-legged SUVs.

For more information, see:

Why our food is so dependent on oil

Will the end of oil be the end of the end of food?

How will we grow food after Peak Oil?

Hungering for natural gas

"Are all forms of modern technology actually petroleum products?"

Yes.

It's not just transportation and agriculture that are entirely dependent on abundant, cheap oil. Modern medicine, water distribution, and national defense are each entirely powered by oil and petroleum derived chemicals.

In addition to transportation, food, water, and modern medicine, mass quantities of oil are required for all plastics, all computers and all high-tech devices. Some specific examples may help illustrate the degree to which our technological base is dependent on fossil fuels:

Automobiles:

The construction of an average car consumes the energy equivalent of approximately 20 barrels (840 gallons) of oil. Source Ultimately, the construction of a car will consume an amount of fossil fuels equivalent to twice the car's final weight. Source

It's also worth nothing that the construction of an average car consumes almost 120,000 gallons of fresh water. Source Fresh water is also rapidly depleting and happens to be absolutely essential to the petroleum refining process as each gallon of gasoline requires almost two gallons of fresh water for refining. Source

Computers:

The construction of the average desktop computer consumes ten times its weight in fossil fuels. Source

Microchips:

The production of one gram of microchips consumes 630 grams of fossil fuels. According to the American Chemical Society, the construction of single 32 megabyte DRAM chip requires 3.5 pounds of fossil fuels in addition to 70.5 pounds of water. Source The Environmental Literacy Council tells us that due to the "purity and sophistication of materials (needed for) a microchip...the energy used in producing nine or ten computers is enough to produce an automobile." Source In his book "The Nine Nations of North America", author Joel Garreau explains in graphic detail just how much energy it takes to fashion a typical microprocessor:

. . . microchips are not made one by one. They are printed in a batch on a silicon wafer, say, four inches in diameter. Each time a layer of stuff is printed on this silicon wafer, the wafer must be treated so the stuff you've laid on will stay there. This process is achieved through the application of monumental quantities of energy. In effect, as each layer of the circuit is laid on, the whole wafer is "baked" at temperatures sometimes high enough to reach the outer limits of technology. Source

The Internet:

Contrary to popular belief, the internet consumes tremendous amounts of energy. Author John Michael Greer explains:

The explosive spread of the internet, finally, was also a product of the era of ultracheap energy. The hardware of the internet, with its worldwide connections, its vast server farms, and its billions of interlinked home and business computers,

probably counts as the largest infrastructure project ever created and deployed in a two decade period in history. The sheer amount of energy that's been been invested to create and sustain the internet beggars the imagination. Source

Recent estimates indicate the infrastructure necessary to support the internet consumes 10% of all the electricity produced in the United States. Source The overwhelming majority of this electricity is produced using coal or natural gas, both of which, as explained momentarily, are also near their global production peaks. Source #1 Source #2 Source #3 Source #4 Source #5

Concrete, Asphalt, Highways, and Modern Cities:

It is hard to precisely quantify how much energy is necessary to construct and maintain a modern city. Some of NASA's recent images of cities, however, hint that the volumes of energy invested in modern cities are almost unfathomably prodigious. Consider, for instance, the following NASA image of Los Angeles:

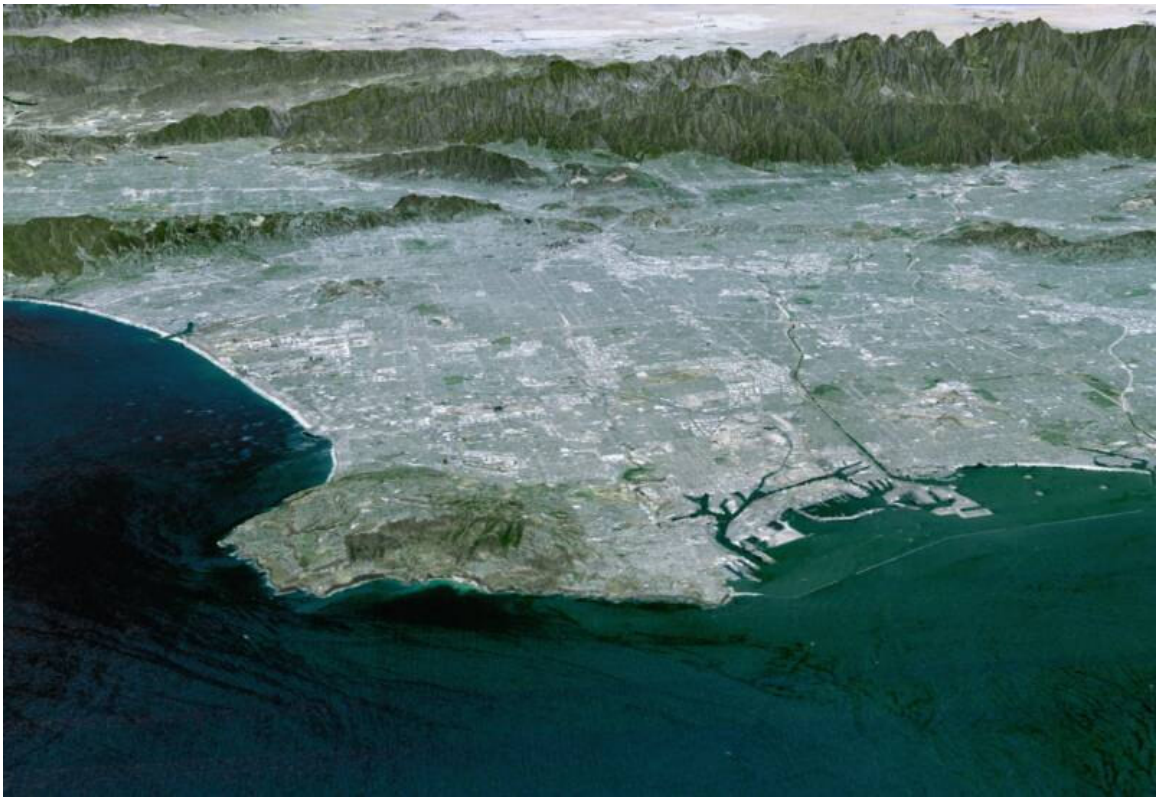


Image of Los Angeles, courtesy of NASA's Visible Earth Site

When studying the above image, keep in mind that the manufacturing of one ton of cement requires 4.7 million BTUs of energy, which is the amount contained in about 45 gallons of oil or 420 pounds of coal. Source

"What about alternative energy systems like solar panels and wind turbines? Are they also manufactured using petroleum and petroleum derived resources?"

Yes.

When considering the role of oil in the production of modern technology, remember that most alternative systems of energy — including solar panels/solar-nanotechnology, windmills, hydrogen fuel cells, biodiesel production facilities, nuclear power plants, etc. all rely on sophisticated technology and energy-intensive forms of metallurgy.

In fact, all electrical devices make use of silver, copper, aluminum and platinum, each of which is discovered, extracted, and fashioned using oil or natural gas powered machinery. For instance, in his book, *The Lean Years: Politics of Scarcity*, author Richard J. Barnet writes:

To produce a ton of copper requires 112 million BTU's or the equal of 17.8 barrels of oil. The energy cost component of aluminum is 20 times higher

Author Joel Garreau, in the same chapter of his book "The Nine Nations of North America" that was cited above, explains how energy-intensive the manufacture of aluminum is:

The manufacturing of aluminum requires inexpensive energy as its most important raw material. It takes twelve times as much power to create a pound of aluminum as it does to make a pound of iron. A good sized aluminum plant uses as much power as a city of 175,000 people. Source

Nuclear energy requires uranium, which is also discovered, extracted, and transported using oil powered machinery.

For more information on metals shortages and energy production, see:

Scarcity of aluminum, copper threaten solar installations

Scarcity of highly refined silicon threatens solar industry

Dwindling supply of rare metals imperiling innovation

World running out of platinum and other common elements

Global shortage of metals looming

Most of the feedstock (soybeans, corn) for biofuels such as biodiesel and ethanol are grown using the high-tech, oil-powered industrial methods of agriculture described above.

In short, the so called "alternatives" to oil are actually "derivatives" of oil. Analyst John Michael Greer offers the following rather lucid explanation of this often over-looked relationship:

. . . every other energy source currently used in modern societies gets a substantial "energy subsidy" from oil. The energy used in uranium mining and reactor construction, for example, comes from diesel rather than nuclear power, just as sunlight doesn't make solar panels. What rarely seems to have been noticed is the way these "energy subsidies" intersect with the challenges of declining petroleum

production to [preemptievely sabotage] the future of alternative energy production in industrial societies. Source

Without an affordable supply of oil coupled with healthy and robust financial markets to capitalize the transition, a non-chaotic adaptation phase is unlikely as the raw materials and investment capital necessary to fuel such a large-scale transition will have evaporated.

"Is the financial system entirely dependent on ever-increasing amounts of cheap oil?"

Yes.

The relationship between the supply of oil and natural gas and the workings of the global financial system is arguably **the key issue** to dealing with Peak Oil as robost and smoothly function global capital markets must exist in order to power an orderly (or semi-orderly) transition process. In fact this relationship is far more important than alternative sources of energy, energy conservation, or the development of new energy technologies, all of which are discussed in detail on page two of this site. In short, the global financial system is entirely dependent on a constantly **increasing** supply of oil and natural gas.

To illustrate, if home and business loans are issued with interest rates in the 7% range, the assumption underlying the loans is that the monetary supply will increase (on average) by 7% per year. But if that 7% yearly increase in the monetary supply is not matched by a 7% yearly increase in the amount of economic activity (goods and services), the result is hyper-inflation. **The key is this:** in order for there to be an increase in the amount of economic activity taking place, there must be an increase in the amount of net-energy (i.e. the net-number of BTUs) available to fuel those activities. As no alternative source or combination of sources comes even remotely close to the energy density of oil (125,000 BTUs per gallon, the equivalent of 150-500 hours of human labor), a decline or even plateau in the supply of oil carries such overwhelming consequences for the financial system. Dr. Colin Campbell presents an understandable model of this complex relationship as follows:

It is becoming evident that the financial community begins to accept the reality of Peak Oil. They accept that banks created capital during this epoch by lending more than they had on deposit, being confident that tomorrow's expansion, fuelled by cheap oil-based energy, was adequate collateral for today's debt. The decline of oil, the principal driver of economic growth, undermines the validity of that collateral which in turn erodes the valuation of most entities quoted on Stock Exchanges. Source

Commentator Robert Wise explains the connection between energy and money as follows:

It's not physics, but it's true: money equals energy. Real, liquid wealth represents usable energy. It can be exchanged for fuel, for work, or for something built by the work of humans or fuel-powered machines. Real cost reflects the energy cost of doing something; real value reflects the energy expended to build something.

Nearly all the work done in the world economy, all the manufacturing, construction, and transportation, is done with energy derived from fuel. The actual work done by

human muscle power is miniscule by comparison. And, the lion's share of that fuel comes from oil and natural gas, the primary sources of the world's wealth. Source

Author Dmitry Orlov offers the following explanation of how the debt-based financial currency used in a modern economy is actually dependent on an **increasing** supply of energy. Emphasis added:

Although it is often thought that a [modern] economy produces value, as an empirical matter it can be observed that what it produces is debt. One borrows money in order to provide and to receive goods and services. ***Loans are extended based on the expectation that, in the future, demand for these services will be even higher, driving further economic growth. However, this economy is not a closed system: the delivery of these goods and services is linked to external energy flows.*** *Greater flows of energy, in the form of increased oil and natural gas imports, increased coal production and so forth are failing to occur, for a variety of geological and geopolitical reasons.* ***There is every reason to expect that the ability to deliver goods and services will suffer as a result of energy shortages, collapsing the debt pyramid...*** Source

In October 2005, the normally conservative London Times acknowledged that the world's wealth may soon evaporate as we enter a technological and economic "Dark Age." In an article entitled "Waiting for the Lights to Go Out" Times columnist Bryan Appleyard reported:

Oil is running out; the climate is changing at a potentially catastrophic rate; wars over scarce resources are brewing; finally, most shocking of all, we don't seem to be having enough ideas about how to fix any of these things.

Almost daily, new evidence is emerging that progress can no longer be taken for granted, that a new Dark Age is lying in wait for ourselves and our children...growth may be coming to an end. Since our entire financial order from interest rates, pension funds, insurance, to stock markets is predicated on growth, the social and economic consequences may be cataclysmic. Source

If you want to understand just how cataclysmic these consequences might be, consider the current crisis in the UK as a "preview of coming attractions." The London Telegraph recently reported:

The Government has admitted that companies across Britain might be forced to close this winter because of fuel shortages. "The balance between supply and demand for energy is uncomfortably tight. I think if we have a colder -than-usual winter given the supply shortages, certain industries could suffer real difficulties." The admission was made after this newspaper revealed that Britain could be paralyzed by energy shortages if the winter is colder than average.

The Met Office says there is a 67 per cent likelihood of prolonged cold this year after almost a decade of mild winters. That, coupled with high fuel prices, raises the fear that industry will not be able to cope. Source

In May 2007 the London Times published excerpts from a study about the future of Britain's electrical grid. According to the study, fears of a catastrophic energy crisis occurring within the next 10 years can no longer be dismissed as "apocalyptic fantasies", emphasis added:

Across Britain, cities are plunged into darkness. In London, the Underground grinds to a halt, leaving panicked commuters stranded in oppressively hot carriages. In office blocks, lifts stop operating and the air-conditioning shuts down. Employees swelter in stifling conditions.

This is not the post apocalyptic vision of some film-maker, but a realistic scenario as Britain grapples with a looming energy crisis. The statistics are frightening. *In only eight years, demand for energy could outstrip supply by 23% at peak times, according to a study by the consultant Logica CMG. The loss to the economy could be £108 billion each year.* Source

The severe consequences of these shortfalls have prompted the UK government to look into draconian energy conservation measures that would be enforced via house-to-house searches by a force of "energy-police."

Parts of the US are facing similarly dire possibilities. For example, US News and World Report recently published a six page article documenting the scenarios soon to unfold across North America. Source According to the normally conservative publication, people in the northeastern US could soon be facing massive layoffs, rotating blackouts, permanent industrial shutdowns, and catastrophic breakdowns in public services as a result of shortages of heating oil and natural gas. Source

For more information:

UK Guardian: "The age of technological revolution is coming to an end"

New Scienties: Pentagon Physicist, "We've entered a dark age of innovation"

"What does all of this mean for me?"

What all of this means, in short, is that the aftermath of Peak Oil will extend far beyond how much you will pay for gas. To illustrate: in a July 2006 special report published by the Chicago Tribune, Pulitzer Prize winning journalist Paul Salopek described the consequences of Peak Oil as follows:

…the consequences would be unimaginable. Permanent fuel shortages would tip the world into a generations-long economic depression. Millions would lose their jobs as industry implodes. Farm tractors would be idled for lack of fuel, triggering massive famines. Energy wars would flare. And carless suburbanites would trudge to their nearest big box stores, not to buy Chinese made clothing transported cheaply across the globe, but to scavenge glass and copper wire from abandoned buildings. Source

Journalist Jonathan Gatehouse summarized the conclusions of Oxford trained geologist Jeremy Leggett, author of *The Empty Tank: Oil, Gas, Hot Air, and the Coming Financial Catastrophe,* in a 2006 Macleans article as follows, emphasis added:

…when the truth can no longer be obscured, the price will spike, the economy nosedive, and the underpinnings of our civilization will start tumbling like dominos. ***"The price of houses will collapse. Stock markets will crash. Within a short period, human wealth -- little more than a pile of paper at the best of times, even with the confidence about the future high among traders -- will shrivel."*** *There will be emergency summits, diplomatic initiatives, urgent exploration*

efforts, but the turmoil will not subside. Thousands of companies will go bankrupt, and millions will be unemployed. ***"Once affluent cities with street cafés will have queues at soup kitchens and armies of beggars. The crime rate will soar. The earth has always been a dangerous place, but now it will become a tinderbox."***

By 2010, predicts Leggett, democracy will be on the run …economic hardship will bring out the worst in people. ***Fascists will rise, feeding on the anger of the newly poor and whipping up support. These new rulers will find the tools of repression -- emergency laws, prison camps, a relaxed attitude toward torture -- already in place, courtesy of the war on terror.*** *And if that scenario isn't nightmarish enough, Leggett predicts that "Big Oversight Number One" -- climate change -- will be simultaneously making its presence felt "with a vengeance." On the heels of their rapid financial ruin, people "will now watch aghast as their food and water supplies dwindle in the face of a climate going awry." Prolonged droughts will spread, decimating harvests.* Source
If you are focusing solely on the price at the pump, buying a hybrid car, or getting some of those energy efficient light bulbs, you aren't seeing the bigger picture.

For more information, see:

Peak Oil: The biggest event of the century is now upon us

The most important thing you don't know about "Peak Oil"

The unspoken role of Peak Oil in the current financial crisis

Washington Post: We're driving straight towards a disaster

Ken Deffeyes: By 2025, we'll be back at the Stone Age

"Was the Bush administration aware of this when planning the invasion and occupation of Iraq?"

Of course they were.

Significant elements of US national security apparatus have been aware of Peak Oil since at least 1977 when the CIA prepared a now-declassified report on it. Professor Richard Heinberg explains:

The 1977 CIA document shows clear and detailed awareness of oil issues, including depletion, extraction technologies, pipelines, areas of likely new discovery, the quality of existing reserves, and the dynamics of the global oil market. The CIA has obviously been studying oil very carefully for some time and must therefore understand the issue of global oil peak. Source

In 1982, the State Department released its own report which stated:
. . . world petroleum production will peak in the 1990-2010 interval at 80-105 million barrels per day, with ultimate resources estimated at 2,100 billion barrels. Source

As mentioned previously, in a speech he gave in 1999 while still CEO of Halliburton, Dick Cheney stated:

*. . . there will be an average of two-percent annual growth in global oil demand over the years ahead, along with, **conservatively**, a three-percent decline in production from existing reserves. That means by 2010 we will need on the order of an additional 50 million barrels a day.* Source

A report commissioned by Cheney and released in April 2001 was no less disturbing:

The most significant difference between now and a decade ago is the extraordinarily rapid erosion of spare capacities at critical segments of energy chains. Today, shortfalls appear to be endemic. Among the most extraordinary of these losses of spare capacity is in the oil arena. Source

In light of this information, Cheney knew the only way for Western oil majors to stay oil majors was to use force to grab what's left in the Middle East. Four years after the invasion of Iraq, this is **exactly** what is happening. U.K. Independent journalist Geoffrey Lean explains:

"So where is this oil going to come from?" Cheney asked His answer: the Middle East was "where the prize ultimately lies".

Lest there be any doubt about what was at stake, the man who was to become one of the most powerful proponents of the invasion of Iraq went on: "Oil is unique because it is so strategic in nature. We are not talking about soapflakes or leisurewear...The Gulf War was a reflection of that reality."

Well, seven years on, Mr. Cheney's solution to the impending oil crisis is well on its way to being implemented. In the aftermath of another war, Iraq's Council of Ministers is today expected to throw open the doors to the country's oil reserves - the third largest in the world - to private companies, the first time a major Middle Eastern producer has ever done so. Source

One of George W. Bush's energy advisors, energy investment banker Matthew Simmons, has spoken at length about the impending crisis. For instance, in an August 2003 interview Simmons was asked if it was time for Peak Oil to become part of the public policy debate. He responded:

It is past time. As I have said, the experts and politicians have no Plan B to fall back on. If energy peaks, particularly while 5 of the world's 6.5 billion people have little or no use of modern energy, it will be a tremendous jolt to our economic well-being and to our health — greater than anyone could ever imagine. Source
When asked if there is a solution to the impending natural gas crisis, Simmons responded:

I don't think there is one. The solution is to pray. Under the best of circumstances, if all prayers are answered there will be no crisis for maybe two years. After that it's a certainty.

In May 2004, Simmons explained that in order for demand to be appropriately controlled, the price of oil would have to reach $182 per barrel. Source Simmons explained that with oil prices at $182 per barrel, gas prices would likely rise to $7.00 per gallon.

A March 2005 report prepared for the US Department of Energy confirmed the dire warnings of the investment banking community. Entitled "The Mitigation of the Peaking of World Oil Production," the report observed:

Without timely mitigation, world supply/demand balance will be achieved through massive demand destruction (shortages), accompanied by huge oil price increases, both of which would create a long period of significant economic hardship worldwide. Waiting until world conventional oil production peaks before initiating crash program mitigation leaves the world with a significant liquid fuel deficit for two decades or longer. Source

The report went on to say, emphasis added:

The problems associated with world oil production peaking will not be temporary, and past 'energy crisis' experience will provide relatively little guidance. The challenge of oil peaking deserves immediate, serious attention, if risks are to be understood and mitigation begun. The world has never faced a problem like this. Without massive mitigation more than a decade before the fact, the problem will be pervasive and will not be temporary. ***Previous energy transitions were gradual and evolutionary. Oil peaking will be abrupt and revolutionary****.* Source

As one commentator recently observed, the reason our leaders are acting like desperados is because we have a desperate situation on our hands.

If you've been wondering why the Bush administration has been spending money, cutting social programs, and starting wars like there's no tomorrow, now you have your answer: as far as they are concerned, there is no tomorrow.

In 2003, the BBC filmed a three-part, relatively apolitical, documentary entitled "War for Oil" about the role the Bush administration's knowledge of Peak Oil played in their decision to invade and occupy Iraq. As the documentary explains, in private the Bush administration sees the war in Iraq as "a fight for survival." In a purely Machiavellian world, they were probably correct in their thinking.

For what it's worth, Bush's Crawford ranch has been completely off-the-grid since 2002. The ranch is equipped with the latest in energy saving and renewable power systems. It has been described as an "environmentalist's dream home." Source The fact a man as steeped in the petroleum industry as Bush would own such a home should tell you something.

On a similar note, Dick Cheny's personal investments indicate his banker has been expecting an economic collapse since at least 2006. Source

Neither Bush or Cheney (or really, any administration) could be honest with the American people about the severity of what is unfolding. If they were honest with the country, half the nation would likely refuse to believe them while the other half would likely panic.

For more information, see:

Bloomberg: Dick Cheney's Banker Sees Market Collapse Looming

The Oil Drum: Did Dick Cheney Know About Peak Oil in the 1990s?

Financial Times: "Obama dare not speak the truth about the economy"

UK Guardian: Director of the CIA Acknowldeges "Peak Oil will produce horrors"

"Is Barack Obama's administration aware of this?"

While nobody has been able to confirm that Obama himself is aware of Peak Oil, key members of his administration certainly are. In an interview with the North Bay Bohemian, a former colleague of Obama's Secretary of Energy explains:

Fridley also believes assistance will not come from the world's leaders. Transition can only be a grass-roots revolution. He points out that Secretary of Energy Steven Chu was previously the director of Lawrence Berkeley National Laboratory, where Fridley has done much of his thinking about peak oil and Transition.

"[Chu] was my boss," Fridley says. "He knows all about peak oil, but he can't talk about it. If the government announced that peak oil was threatening our economy, Wall Street would crash. He just can't say anything about it." Source

Obama's Secretary of State is Hilary Clinton whose husband Bill Clinton (former president of the United States) has both A) acknowledged the magnitude of Peak Oil and B) insisted he was not briefed by the CIA about it during his time in office. Given his rather emotional reaction to becoming aware of the issue after reading "The Party's Over" by Richard Heinberg, it is hard to believe he has not discussed it with his wife. In a 2006 speech to the Aspen Institute, Clinton said:

I was reading a book the other day by a guy just bashing the living hell out of me, saying that he was certain the CIA briefed me once a week on how America was running out of oil and I did nothing serious about it. But that's not true.

To the best of my knowledge I never had a security briefing which said what some of these very serious but conservative petroleum geologists say, which is they think that either now or before the decade is out that we'll reach peak oil production globally . . .

There's a good chance that these people who made a living all these years studying petroleum deposits know what they're talking about, and we may not have as much oil as we think. Source

"Have government agencies been attempting to hide this from the public for fear of setting off a panic?"

"Have government agencies been attempting to hide this from the public for fear of setting off a panic?"
In November 2009, the UK Guardian reported that two insiders at the International Energy Agency (the agency tasked with figuring out how much oil is left in the ground) informed the paper that the agency has intentionally been covering up this crisis for fear of setting off a panic (emphasis added):
The world is much closer to running out of oil than official estimates admit, according to a whistleblower at the International Energy Agency who claims ***[the agency] has been deliberately underplaying a looming shortage for fear of triggering panic buying.***

*The senior official claims the US has played an influential role in encouraging the watchdog to underplay the rate of decline from existing oil fields while overplaying the chances of finding new reserves**.***

A bit later in the article:

*"Many inside the organization believe that maintaining oil supplies at even 90m to 95m barrels a day would be impossible but **there are fears that panic could spread on the financial markets if the figures were brought down further.***

A second senior IEA source, who has now left but was also unwilling to give his name, said a key rule at the organization was that it was "imperative not to anger the Americans" but the fact was that there was not as much oil in the world as had been admitted. "We have [already] entered the 'peak oil' zone. I think that the situation is really bad," he added. Source

A few days later, the Guardian published a follow up to the above article:

This all seemed pretty gigantic news to me but...did it cause headlines around the world? No, no, no.

The fear is that panicky markets can cause enormous damage – panic buying that prompts fights over resources, which in turn could lead to power cuts in some places and other such mayhem. *But so far in facing this huge challenge, our political/economic system seems unable to cope with reality. We are forced to carry on living in an illusion that we have so much time to adapt to post-oil that we don't even need to be thinking much about what a world without plentiful oil would look like. Reality has become too dangerous.* Source

Robert L. Hirsch was the lead author of a report on Peak Oil written for the US Department of Energy which was released in early 2005. Source In a 2009 interview with EV World, Hirsch explained the degree to which he and others were pressured by people high up in the agency to no longer talk about or work on Peak Oil, emphasis added:

Hirsch: *When the people at the DOE saw the final report, it shocked them even though they could see what was coming. Management really didn't know what to do because **the Peak Oil report was so shocking and the implications were so significant.** Finally, the director decided that she would sign off on it because she was retiring and couldn't be hurt, or so I was told.*

Question: *Under pressure from whom?*

Hirsch: *From people in the hierarchy of the DOE. This was true in both Republican and Democrat administrations. There is, I think, ample evidence, and some people in DOE have gone so far as to say it specifically, that **people in the hierarchy of DOE, under both administrations, understood that there was a problem and suppressed work in the area.** Under President Bush, we were not only able to do the first study but also a follow-on study that looked at mitigation. After that, visibility got so high that we were told to stop any further work on peak oil.* Source

"How do I know this isn't just fear mongering by loony-environmentalists and 'end is nigh' types?"

If you think what you are reading on this page is the product of a loony-left nut, consider what Representative Roscoe Bartlett (Republican, Maryland) has had to say in speeches to Congress or what billionaire investor Richard Rainwater has had to say in the pages of Fortune Magazine.

On March 14, 2005 Bartlett gave an extremely thorough presentation to Congress about the frightening ramifications of Peak Oil. During his presentation Representative Bartlett, who may be the most conservative member of Congress, quoted from this site extensively, citing the author (Matt Savinar) by name on numerous occasions, while employing several analogies and examples originally published on this site. You can read the full congressional record of Representative Bartlett's presentation by clicking here. You can view a video of Bartlett recommending the article you are now reading to Resources for the Future, an extremely influential DC think tank, by clicking here.

On April 19, 2005 Representative Bartlett was interviewed on national television. Again, he referenced the article you are now reading:

One of the writers on this starts his article by saying, 'Dear Reader, Civilization as we know it will end soon.' Now your first impulse is to put down the article. This guy's a nut. But if you don't put it down and read through the article, you're hard-pressed to argue with his conclusions. Source

On May 12, 2005 Representative Bartlett gave another presentation about Peak Oil on the floor of the House of Representatives, stating that this website "galvanized" him. On July 19, 2005 he had the following to say:

Mr. Speaker, if you go to your computer this evening and do a Google search for peak oil, you will find there a large assortment of articles and comments. Like every issue, you will find a few people who are on the extreme, but there will be a lot of mainstream observations there.

One of the articles that you will find there was written by Matt Savinar. Matt Savinar is not a technical person. He is a lawyer, a good one, and he does what lawyers do. He goes to the sources and builds his case. Matt Savinar could be correct when he said, "Dear Reader, civilization as we know it is coming to an end soon.'' I would encourage you, Mr. Speaker, to pull up his article and read it. It is really very sobering.

In subsequent speeches, Representative Bartlett read large excerpts of this site verbatim into the official US Congressional record. He has also frequently quoted a September 2005 report from the U.S. Army Corps of Engineers entitled "Energy Trends and Their Implications for U.S. Army Installations." The report explains:

*. . . energy consumption is indispensable to our standard of living and a necessity for the Army to carry out its mission. However, current trends are not sustainable. The impact of excessive, unsustainable energy consumption may undermine the very culture and activities it supports...*Source

A 2007 report commissioned by the Pentagon details the amount of fuel necessary to run modern military operations:

In World War II, the United States consumed about a gallon of fuel per soldier per day, according to the report. In the 1990-91 Persian Gulf War, about 4 gallons of fuel per soldier was consumed per day. In 2006, the US operations in Iraq and Afghanistan burned about 16 gallons of fuel per soldier on average per day, almost twice as much as the year before. Source

The report went on to explain the magnitude of the problem at hand, emphasis added:

Weaning the military from fossil fuels quickly, however, would be a herculean task -- especially because the bulk of the US arsenal, the world's most advanced, is dependent on fossil fuels and many of those military systems have been designed to remain in service for at least several decades. ***Moving to alternative energy sources on a large scale would "challenge some of the department's most deeply held assumptions, interests, and processes," the report acknowledges.*** Source

According to the December 26, 2005 issue of Fortune Magazine, Richard Rainwater, a multi-billionaire investor and friend of George W. Bush, reads this website regularly. In an article entitled "Energy Prophet of Doom" Fortune reporter Oliver Ryan writes:

"Rainwater," the voice on the phone announces. "Now, type L-A-T-O-C into Yahoo, and scroll down to the seventh item." Rainwater doesn't use e-mail. Rather, he uses rapid-fire phone calls to spread the gospel he discovers every morning on the web. One day it might be the decline of arable land in Malaysia. The next it could be the Olduvai theory of per capita energy consumption. "L-A-T-O-C" stands for LifeAfterTheOilCrash.net, a blog edited by Matt Savinar, 27, of Santa Rosa, Calif.. Source

The Fortune article goes on to quote Rainwater as saying:

The Fortune article goes on to quote Rainwater as saying:
The world as we know it is unwinding with respect to Social Security, pensions, Medicare. We're going to have dramatically increased taxes in the U.S. I believe we're going into a world where there's going to be more hostility. More people are going to be asking, 'Why did God do this to us?' Whatever God they worship. Alfred Sloan said it a long time ago at General Motors, that we're giving these things during good times. What happens in bad times? We're going to have to take them back, and then everybody will riot. And he's right. Source

"If this is all true, why has the price of oil dropped?"

Oil production peaked in late 2005 (source) even as global demand continued to soar. Consequently, the price rose almost 400% in only three years. By July 2008, the American economy could take no more and begun to buckle under the crushing weight of soaring energy and commodity prices. As food and fuel prices soared, more and more Americans - particularly those in the "subprime" category - were unable to pay their mortgages, By September 2008, the financial system began collapsing and oil prices began falling. Jeff Rubin explains in more detail:

Four of the last five global recessions were preceded by oil shocks. Yet the 2007-2008 spike in oil prices doesn't seem to get any credit for what's happening to the world economy now.

That's odd because it should. Curiously, an over 500% increase in the real price of oil gets ignored as a culprit behind today's economy, eclipsed by the crisis in financial markets. Source

Analyst Dmitry Orlov offers an explanation of the connection between the 2008 run up in oil prices and the subsequent economic collapse of 2008 to 2009:
There to be a consensus forming that last year's financial crash was precipitated by the spike in oil prices last summer, when oil briefly touched $147/bbl. Why this should have happened seems rather obvious. Since most things in a fully developed, industrialized economy run on oil, it is not an optional purchase: for a given level of economic activity, a certain level of oil consumption is required, and so one simply pays the price for as long as access to credit is maintained, and after that suddenly it's game over. Source

The extreme price volatility has also severely hamstrung our ability to make adaptations to a rapidly declining oil supply. Author Jim Kunstler explains:

Many were stunned this year to witness the parabolic rise and fall of oil prices up to nearly $150 and then back around $36 by Christmas time. Quite a ride. I said in The Long Emergency that volatility would be the hallmark of post peak oil because it was obvious that advanced economies could not absorb super high prices and would crash in response; that at some point after crashing, these economies would respond to the new lower oil price, resume their cheap oil habits, and build to another price rise. . . and crash again....in a declension of ever-lower industrial activity. Source

While the recent drop in prices is welcome by an already-overburdened consumer, the price drop will likely bring with it deleterious long term consequences for any mitigation efforts. Analyst Chris Nedler explains:

As oil prices crashed from $147 this summer to around $50 today, developers withdrew their commitment to drilling new wells and building new distribution and refining projects. Under a rule-of-thumb production cost for a new, marginal barrel at around $65 today, it simply doesn't make sense to throw millions of dollars at drilling new wells when oil futures are selling for $50. A second, more insidious factor is quietly eroding hopes for our future oil and gas supply however, and that is the continuing credit crisis. As banks remain reluctant to lend each other money — credit has also become hard to come by for anyone trying to start a capital-intensive project. And all energy projects need a great deal of capital.

Consequently, a growing drumbeat of news reports about energy projects of all kinds being delayed, cancelled, slowed, or otherwise curtailed has been issuing from the energy sector. Yet the Street seems not to have recognized that the slowdowns will limit supply in just a few years. But by focusing on near term supply, investment is already falling short of what is needed to ensure a future supply of those marginal, expensive barrels that everyone is counting on. Source

he drop in oil prices is also devastating the alternative energy industry as most alternatives tend not to attract large amounts of investment capital unless oil stays well above $125 for several (5-to-7) years. Source

For more information, see:

Time: How the 2007-2008 Oil Price Spike Set Off the Current Financial Crisis

New York Times: Economic Crisis Produces Headwinds for Alternative Energy

Washington Post: Steep Drop in Energy Prices Puts New Oil Projects on Hold

Wall Street Journal: As Oil Prices Drop, Money Dries Up for Renewable Energy

"Are Western governments preparing for this?"

Yes.

In January 2006, the Department of Homeland Security gave Halliburton subsidiary Kellogg, Brown, & Root a $400 million dollar contract to build vast new domestic detention camps within the United States. The camps are ostensibly being built to house and process an "emergency influx of immigrants", which is exactly what the U.S. will be facing between 2008 and 2012 as Mexico's oil production collapses.

See also: "Oil Depletion and Illegal Immigration"

This "emergency influx of immigrants" will almost certainly inflame domestic groups, leading to vigilantism and balkanization within the U.S. The expectation of this unraveling may be at least partially responsible for the Bush administration's drive to pass draconian police-state style legislation.

In June 2007, the UK Register reported that the Pentagon has been running "war games on the grandest scale" to simulate how billions of people will react to food and fuel shortages, including shortages on the U.S. homeland:

. . . the U.S. Department of Defense may already be creating a copy of you in an alternate reality to see how long you can go without food or water, or how you will respond to televised propaganda.

Called the Sentient World Simulation (SWS), the program replicates financial institutions, utilities, media outlets, and street corner shops. By applying theories of economics and human psychology, its developers believe they can predict how individuals and mobs will respond to various stressors.

Yank a country's water supply. Stage a military coup. SWS will tell you what happens next. Homeland Security is already using SWS to simulate crises on the US mainland. Source

According to a May 2008 investigation by Radar Magazine, the Department of Homeland Security has used artificial-intelligence powered "social networking analysis" tools similar to SWS to compile a list of 8 million Americans who may be detained during a national emergency:

According to a senior government official..."There exists a database of Americans, who, often for the slightest and most trivial reason, are considered unfriendly, and who, in a time of panic, might be incarcerated. The database can identify and locate

perceived 'enemies of the state' almost instantaneously."...One knowledgeable source claims that 8 million Americans are now listed in Main Core as potentially suspect. In the event of a national emergency, these people could be subject to everything from heightened surveillance and tracking to direct questioning and possibly even detention. Source

The Pentagon has also developed an "energy islanding" strategy in which the armed services and/or private contractors will seize large-scale domestic renewable energy installations once the crisis hits. Journalist Michael Kane explains:

The DoD plans to act in consort with utilities to implement "islanding strategies" for their domestic installations to deal with emergencies and fuel shortages. Think of this as an "energy island" that the military is on and you are not. When big wind and solar farms come online they are placed on the Pentagon's map, and when that energy is eventually neede for one of their installations or industrial producers they will simply take it through a well-orchestrated alliance with gigantic energy firms. Source

The British government appears to be making similar preparations. According to a military report leaked to the press in April 2007, the British government is preparing to control middle class citizen "flash mobs" as the economy collapses under the combined pressures of resource shortages and climate change:

Information chips implanted in the brain. Electromagnetic pulse weapons. The middle classes becoming revolutionary [and turning into] "flash mobs". Groups rapidly mobilized by criminal gangs or terrorists groups. This is the world in 30 years' time envisaged by the Ministry of Defense. Source

According to investigative reporter Wayne Madsen - who happens to be a former NSA analyst - key members of Congress were briefed in April 2008 that the U.S. economy would begin collapsing under the weight of crushing energy prices by September 2008 and that they should start preparing for citizen revolts:

WMR has learned from knowledgeable sources within the US financial community that an alarming confidential and limited distribution document is circulating among senior members of Congress and their senior staff members that is warning of a bleak future for the United States if it does not quickly get its financial house in order.

House Speaker Nancy Pelosi is among those who have reportedly read the document.

The document is being called the "C & R" document because it reportedly states that if the United States defaults on loans and debt underwriting from China, Japan, and Russia, all of which are propping up the United States government financially, and the United States unilaterally cancels the debts, America can expect a war that will have disastrous results for the United States and the world.

"Conflict" is the "C word" in the document

The other scenario is that the federal government will be forced to drastically raise taxes in order to pay off debts to foreign countries to the point that the American people will react with a popular revolution against the government.

"Revolution" is the document's "R word"

The origin of the document is not known, however, its alarming content matches up with previous warnings from former Comptroller General David Walker who abruptly resigned as head of the Government Accountability Office (GAO) in February of this year after repeatedly publicly warning of a "financial meltdown" disaster if America's $9 trillion debt was not addressed quickly. Financial experts have warned that the national debt, corrected for inflation, could reach $46 trillion in the next 20 years. A month earlier, Walker warned the Senate Banking Committee about the reaction of creditor nations in Asia and Europe if the U.S. did not address its debt problem. Source

For more information, see:

Energy-fascism will effect nearly every person on the planet

Pentagon says climate change could produce global anarchy

Britain's 2000 fuel riots offer chilling preview of America's future

NSA facing catastrophic electricity shortages

"How is the oil industry reacting to this?"

If you want to know the truth about the future of oil, simply look at the actions of the oil industry. As a recent article in MIT's *Technology Review* points out:

If the actions - rather than the words - of the oil business's major players provide the best gauge of how they see the future, then ponder the following. Oil prices have doubled since 2001, but oil companies have increased their budgets for exploring new oil fields by only a small fraction. Likewise, U.S. refineries are working close to capacity, yet no new refinery has been constructed since 1976. And oil tankers are fully booked, but outdated ships are being decommissioned faster than new ones are being built. Source

Some people believe that no new refineries have been built due to the efforts of environmentalists. This belief is silly when one considers how much money and political influence the oil industry has compared to the environmental movement. Do you really think Ronald Reagan and George H. Bush were going to let a bunch of pesky environmentalists get in the way of oil refineries being built if the oil companies had really wanted to build them?

The real reason no new refineries have been built for almost 30 years is simple: any oil company that wants to stay profitable isn't going to invest in new refineries when they know there is going to be less and less oil to refine.

In addition to lowering their investments in oil exploration and refinery expansion, oil companies have been merging as though the industry is living on borrowed time:

December 1998: BP and Amoco merge;
April 1999: BP-Amoco and Arco agree to merge;
December 1999: Exxon and Mobil merge;

October 2000: Chevron and Texaco agree to merge;
November 2001: Phillips and Conoco agree to merge;
September 2002: Shell acquires Penzoil-Quaker State;
February 2003: Frontier Oil and Holly agree to merge;
March 2004: Marathon acquires 40% of Ashland;
April 2004: Westport Resources acquires Kerr-McGee;
July 2004: Analysts suggest BP and Shell merge;
April 2005: Chevron-Texaco and Unocal merge;
June 2005: Royal Dutch and Shell merge;
July 2005: China begins trying to acquire Unocal
June 2006: Andarko proposes buying Kerr McGee
July 2007: BP-Shell "Mega Merger" rumored

While many people believe talk of a global oil shortage is simply a conspiracy by "Big Oil" to drive up the prices and create "artificial scarcity," the rash of mergers listed above tells a different story. Mergers and acquisitions are the corporate world's version of cannibalism. When any industry begins to contract/collapse, the larger and more powerful companies will cannibalize/seize the assets of the smaller, weaker companies.

(Note: for recent examples of this phenomenon outside the oil industry, see the airline and automobile industries.)

The Big Oil companies have also been (quietly) buying back their own stock at an alarming rate. According to an Bloomberg News article dated October 1st, 2007:

If Chevron Corp. keeps buying back its stock at the current rate, the company will have liquidated all its shares by about 2023. Exxon Mobil is buying back about $30 billion of its shares each year. If that continues, Exxon will have repurchased all its stock by about 2024.

By 2011 or so, these companies, including Royal Dutch Shell Plc and BP Plc in the U.K., France's Total SA and Conoco Phillips in the U.S., will no longer be able to increase their production...By 2014, their output will begin a long decline, says Maxwell, who has been involved in the industry for 50 years, mostly as an analyst. "They'll be in liquidation,'" he says. Source

If you suspect the oil companies are conspiring amongst themselves to create "artificial scarcity" and thereby artificially raise prices, ask yourself the following questions:

Question #1. Are the actions of the oil companies the actions of friendly rivals who are conspiring amongst each other to drive up prices and keep the petroleum game going?

Or

Question #2. Are the actions of the oil companies the actions of rival corporate desperados who, fully aware that their source of income is rapidly dwindling, are now preying upon each other in a game of "last man standing"?

You don't have to contemplate too much, as recent disclosures from oil industry insiders indicate we are indeed "damn close to peaking" while independent industry

analysts are now concluding that large oil companies believe Peak Oil is at our doorstep.

As the Bulletin of Atomic Scientists recently observed, even ExxonMobil is now "sounding the silent Peak Oil alarm." In their 2005 report entitled, "The Outlook for Energy", ExxonMobil suggests that increased demand be met first through greater fuel efficiency. The fact that ExxonMobil - one of the largest oil companies in the world - is now recommending increased fuel efficiency should tell you how imminent a crisis is at this point.

Equally alarming is the fact that Chevron has now started a surprisingly candid campaign to publicly address these issues. While the campaign fails to mention "Peak Oil" or explain how a drastically reduced oil supply will affect the average person, it does acknowledge that, while it took 125 years to burn through the first trillion barrels of oil, it will only take 30 years to burn through the next trillion. Source

For more information, see:

San Francisco Chronicle: Big Oil Faces Serious Threats to Future Oil Supplies

News.com: Cost of Extracting Oil has Increased Over 80% in Only Eight Years

David Strahan: Big Oil companies hold Secret Meeting to discuss Peak Oil Crisis

UK Independent: Oil companies Facing Devastating Rise in Oil Production Costs

"How do I know Peak Oil isn't Big Oil propaganda that is being used to create artificial scarcity & justify gouging us at the pump?"

If Peak Oil is "Big Oil propaganda" (as some claim), why did Sonoma State University's Project Censored declare it one of the most censored stories of 2003-2004? Surely, if "Peak Oil is Big Oil propaganda", Big Oil would have found a way to get it off the pages of under-funded publications like Project Censored and into the 24/7 television news cycle years ago.

Likewise, if "Peak Oil is a myth propagated by the greedy oil companies to justify high prices", why didn't any of the greedy oil company CEOs offer "the peaking of world oil production" as a partial justification for high gas prices when they testified before Congress about high gas prices?

Yet "Peak Oil" was never mentioned during the hearings by either the executives or the Senators questioning them. Given the obvious importance of the issue, any reasonable person can't help but to ask, "Why the heck not?"

The answer is simple: the true consequences of Peak Oil cannot be acknowledged in such a highly public forum without crashing the financial markets or begging the obvious yet politically-dangerous and "patriotically-incorrect" question:

Is the war in Iraq really a war for the world's last remaining significant sized deposits of oil?"

Although the answer to this question should be obvious, any member of Congress who were to broach the issue in such a highly public forum would likely face extreme consequences, both politically and personally.

Finally, if Peak Oil was just "Big Oil" propaganda ask yourself:

#1) Why is Exxon Mobil spending millions of dollars to convince people there is no such thing as Peak Oil? (See Exxon's anti -Peak Oil advertising campaign)

#2) Why is its CEO, Rex Tillerson, going on MSNBC and denying Peak Oil?

#3) Why is Shell doing likewise?

The answers to these questions are simple **if** you understand how publicly traded oil companies work. An oil company's share value is dictated first and foremost not by the price of oil but by how much oil that company reports having in reserve. A company can't admit its reserves are now in decline or it risks seeing its share price drop relative to other companies who report more abundant reserves. In a May 2008 article entitled "Why Exxon Still Denies Peak Oil", financial analyst Jim Kingsdale explains this in more depth:

The production sharing agreements between the major oil companies and various countries where they produce oil mean that as the price of oil rises, the share of production going to the major oil company declines. Thus, in accordance with their contracts, the oil company's production shows a decrease even though its revenues increase.

Oil companies don't like this because Wall Street analysts, in their wisdom, become discouraged by declining production. It causes the analysts to downgrade the stocks, which causes the stock prices to fall. Executives get a lot of their compensation (often most of their compensation) via stock options that are issued every year and sold every year by the executives when the stock price rises. So falling production levels caused by higher oil prices causes the executives' compensation to fall. Ouch. That's real money.

Executives, especially Exxon executives, have thought for some time that they could keep oil prices under control by pretending that Peak Oil is a left-wing myth. Or that it won't happen until we're all dead. Most executives (other than Exxon's) have stopped that foolishness by now.

*Yesterday, Exxon reported a "plunge" in oil production - in the words of The Financial Times. Revenues and cash flow, mind you, were pretty damn good. But the stock was downgraded by analysts because their oil production declined...*Source

Big Oil companies are thus motivated to over - not under - report how much oil they have in reserve. This fact, unfortunately, is lost on several commentators such as film-maker Alex Jones, talk-show host George Noory, and Minister Lindsay Williams who insist "Peak Oil is a scam by the oil companies to artificially raise prices." Source #1, Source #2 If these individuals' claims that "peak oil is just oil company propaganda to promote artificial scarcity" were true, then oil companies such as Exxon would not still be denying Peak Oil.

Companies such as Exxon have denied Peak Oil because they wanted to convey an atmosphere of abundance as this is conducive both to getting the public to keep on buying and to attracting investors. If people knew the truth, they would likely begin drastically curtailing their consumption of oil, which would drive the price down. which would impact the companies' ability to get loans for future projects. Private investors would likely take action similar to those taken by famed Texas multi-billionaire Richard Rainwater who pulled $500 million out of the financial markets after learning about Peak Oil. Source Other consumers and investors are unlikely to take similarly drastic actions so long as they perceive the current price spikes as just "more of the same old-same old."

For more information, see:

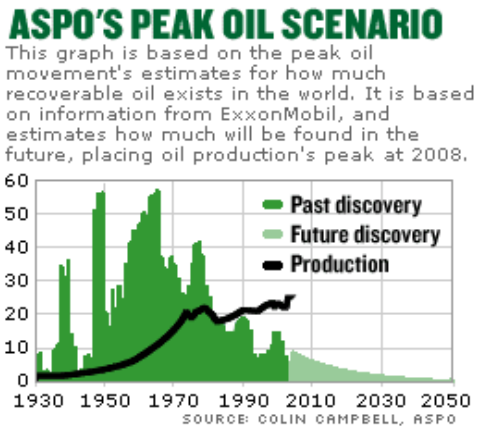
UK Telegraph: Shell fined $500 million for over-reporting gas reserves

Kuwait has likely grossly over-reported their reserves

Washington Monthly: Saudi Arabia has Drastically Over Reported Their Reserves

"Can't we just explore more for more oil?"

Global oil discovery peaked in 1962 and has declined to virtually nothing in the past few years. We now consume 6 barrels of oil for every barrel we find. Source



According to an October 2004 *New York Times* article entitled "Top Oil Groups Fail to Recoup Exploration Costs:"

. . . the top-10 oil groups spent about $8bn combined on exploration last year, but this only led to commercial discoveries with a net present value of slightly less than $4bn. The previous two years show similar, though less dramatic, shortfalls. Source

In other words, significant new oil discoveries are so scarce that looking for them is a monetary loser. Consequently, many major oil companies now find themselves unable to replace their rapidly depleting reserves. Source A June 2006 report indicated the world's biggest five oil companies are now "focusing on developing

existing reserves." That's a nice way of saying "there aren't enough significant sized oil fields Sourceleft to find to make it worth our time an d money to look for them."

Take a look at the above chart. During the 1960s, for instance, we consumed about 6 billion barrels per year while finding about 30-60 billion per year. Given those numbers, it is easy to understand why fears of "running out" were so often dismissed as unfounded, even by people who should have known better. Source

Unfortunately, those consumption/discovery ratios have nearly reversed themselves in recent years. We now consume close to 30 billion barrels per year but find less than 4 billion per year.

In light of these trends, it should come as little surprise that the energy analysts at John C Herold Inc. - the firm that foretold Enron's demise - recently confirmed industry rumors that we are on the verge of an unprecedented crisis. Source

"What about that giant oil find in the Gulf of Mexico? It's supposed to be huge."

Chevron's recent find in the Gulf of Mexico, nicknamed "Jack 2", is estimated to hold between 3 and 15 billion barrels of oil. Source Let's assume, for the sake of illustration, Chevron's most optimistic estimate of 15 billion barrels is the most accurate estimate. A fifteen billion barrel field puts the global peak (the halfway mark) off by 7.5 billion barrels. This is less than a four month supply at current rates of consumption. At projected rates of oil consumption for the year 2015 it's **less than a three month supply.**

This does not even account for the fact this "huge find" is almost 6 miles below the ocean (source) and thus much more expensive to develop than traditional oil fields where the oil typically bubbles up to ground level when first discovered.

The truth is the Jack 2 field is really a sign of how desperate Big Oil companies are getting when it come to replacing their rapidly dwindling reserve base. There is no reason to look for oil 270 miles off the coast and 6 miles below the ocean surface unless cheaper and easier to extract sources have already been exhausted. **This is the whole point Peak Oil commentators have been making for nearly 50 years:** once the peak is reached oil will still be available but only at prohibitive energetic and financial costs.

"What About the Oil Sands in Canada?"

Unlike conventional sources of oil, oil derived from these oil sands is extremely financially and energetically intensive to extract. Whereas conventional oil has enjoyed a rate of "energy return on energy invested" (EROEI) of about 30 to 1, the oil sands rate of return hovers around 1.5 to 1. This means that we would have to expend 20 times as much energy to generate the same amount of oil from the oil sands as we do from conventional sources of oil.

Where to find such a huge amount of capital is largely a moot point because even optimistic reports anticipate a peak production of 4 million barrels per day of oil coming from the oil sands around 2020. Source Even if the optimists are correct, a **peak** of 4 mbd in the context of global demand that is already 85 mbd and growing

at a rate of 2-to-5 mbd per year is not going to do much to offset the coming decline.

For more information, see:

Oil Sands Production Costs Skyrocket

Oil Sands Production Costs up 55%

"What About the Oil Shale in the American West?"

The huge reserves of oil shale in the American west suffer from similar problems. While Shell Oil has an experimental oil shale program, even Steve Mut - the CEO of their Unconventional Resources Unit - has sounded less than optimistic when questioned about the ability of oil shale to soften the coming crash. According to journalist Stuart Staniford's coverage of a recent conference on Peak Oil:

In response to questions, Steve guesstimated that oil shale production would still be pretty negligible by 2015, but might, if things go really well, get to 5 mbpd by 2030. Source

Disinterested observers are even less optimistic about oil shale. Geologist Dr. Walter Youngquist points out:

The average citizen...is led to believe that the United States really has no oil supply problem when oil shales hold "recoverable oil" equal to "more than 64 percent of the world's total proven crude oil reserves." Presumably the United States could tap into this great oil reserve at any time. This is not true at all. All attempts to get this "oil" out of shale have failed economically. Furthermore, the "oil" (and, it is not oil as is crude oil, but this is not stated) may be recoverable but the net energy recovered may not equal the energy used to recover it. If oil is "recovered" but at a net energy loss, the operation is a failure. Source

This means any attempt to replace conventional oil with oil shale will actually make our situation worse as the project will consume more energy than it will produce, regardless of how high the price goes. Plenty of money, however, will likely be thrown at attempts to develop the oil shale as most investors are as energy-illiterate as the general population.

Further problems with oil shale have been documented by economist Professor James Hamilton who writes:

A recent Rand study concluded it will be at least 12 years before oil shale reaches the production growth phase. And that is a technological assessment, not a reference to the environmental review process. If it takes 15 years to get an oil refinery built and approved, despite well known technology and well understood environmental issues, viewing oil shale as something that could make major contributions to world energy supplies in the immediate future seems highly unrealistic. Source

"What about the Bakken Oil Shale? I heard it's absolutely huge."

The Bakken oil shale field was discovered in 1953. In spring of 2008, a series of breathless reports regarding the Bakken shale began circulating the internet. Even if

the reports are true, the 4.3 billion barrels supposedly contained within it will push the global peak back by only 2.15 billion barrels. That amounts to about one month's worth of at current levels of global demand.

The reality is the Bakken "oil find" is not even actual oil, it is shale rock buried 9,000 feet underground that has a tiny amount of oil in it that **might** someday be extracted with extraordinary cost. An article in the Toronto Star explains:

Assuming all 4.3 billion barrels could be retrieved, it would represent nine months of oil consumption in the United States. Now, let's consider the nature of the Bakken oil. It doesn't sit in big underground pools where you can just pop in a metal straw and suck it out. This oil is trapped in layers of shale – a sedimentary rock – up to 3,000 metres deep. It will cost dearly to go after Bakken oil, just as Chevron will have to pay a bundle if it hopes to extract the 3 to 15 billion barrels it has discovered in the Gulf of Mexico, kilometers under the water at its "Jack" wells. The technology exists to get it – at least some of it. We can also have a manned mission to Mars if we truly wanted to pay for it. Source

If everything breaks just right, the Bakken oil shale might produce a maximum of a few hundred thousand barrels per day albeit at great cost. Oil industry analyst Dave Cohen explains further:

If other parts of the Middle Bakken are as productive as the drilled parts of Elm Coulee, and constant large investment in drilling activity in the western Williston Basin continues, we might see peak production somewhere in excess of 100,000 barrels per day. This is an educated guess, but this estimate is not off by an order of magnitude, i.e. we are talking about peak production rates in the very low hundreds of thousands, not millions, of barrels of oil per day. Source

An extensive independent analysis posted at the peer-reviewed oil industry site The Oil Drum came to similar conclusions regarding the potential of the Bakken Shale:

The Bakken shale has produced about 111 million barrels of oil during the last 50+ years in Montana and North Dakota. Total Bakken production is still rising, and producing at the rate of 75,000 BPD in October 2007. Because of the highly variable nature of shale reservoirs, the characteristics of the historical Bakken production, and the fact that per-well rates seem to have peaked, it seems unlikely that total Bakken production will exceed 2x to 3x current rate of 75,000 BPD. Source

This will, of course, make some money for the companies producing the oil but given the fact global supply will be dropping by 2.5 million barrels per day (or more) per year once the decline really gets under way, a couple hundred thousand barrels per day won't make much difference to the overall market.

To put 200,000 barrels a day in perspective, consider the fact the world now uses 1,000 barrels per second. Source What this means is that even in the most optimistic scenario the Bakken oil shale might provide the world with about 200 seconds - or just over 3 minutes - of additional oil per day. That commentators such as Jerorme Corsi have hailed it as a "bonanza" and "proof that oil supplies are nowhere near peaking" (Source) should tell you more about their motives than anything else.

"What About So Called 'Reserve Growth'"?

In recent years, the USGS and other agencies have revised their estimates of oil reserves upwards. Peak Oil "deniers" often point to this revisions as proof that fears of a global oil shortage are unfounded. Unfortunately, these upwards revisions are best classified as "paper barrels", meaning they exist on paper only, not in the real world:

A) USGS Poor Track Record

As recently as 1972, the USGS was releasing circulars that estimated US domestic oil production would not peak until well into the 21st century, and possibly not until the 22nd century. (See *Theobald, Schweinfurth & Duncan, U.S. Geological Survey Circular 650*)

This was despite the fact US production had **already peaked** in 1970, just as Hubbert had predicted. Richard Heinberg reminds us, "in 1973, Congress demanded an investigation of the USGS for its failure to foresee the 1970 US oil production peak."

In March 2000 the USGS released a report indicating more "reserve growth." Colin Campbell responded to the report by reminding us of the ludicrous estimates put out by the USGS in the 1960s and early 1970s:

Let us not forget that McKelvey, a previous director of the USGS, succumbed to government pressure in the 1960s to discredit Hubbert's study of depletion, which was subsequently vindicated in the early 1970's after US production actually peaked as Hubbert had predicted. It did so in a very damaging report that successfully misled many economists and planners for decades.,

These deeply flawed upward estimates were released because the USGS is a political organization and optimistic estimates are looked upon favorably by both politicians and the markets. Source

B) EIA Admits Cooking Its Books

In 1998, the EIA released a report showing significant oil reserve growth. In a footnote to report, the EIA explained:

These adjustments to the estimates are based on non-technical considerations that support domestic supply growth to the levels necessary to meet projected demand levels. (EIA, Annual Energy Outlook 1998, p.17)

In other words, they predicted how much they think we're going to need, and then told us, "Guess what, nothing to worry about - that's how much we've got!"

C) OPEC's "Spurious Revisions" AKA "Cooking the Books"

During the 1980s, several OPEC countries issued some rather "interesting" upwardly revised estimates of their proven reserves of petroleum. Ron Swenson, proprietor of the website HubbertsPeak.com explains:

Many OPEC countries have been announcing reserve numbers which are frankly very strange. Either their reported reserves remain the same year after year, suggesting

that new discoveries exactly match production, or they have suddenly increased their reported reserves by unfeasibly large amounts. Source

The table 1/2 way down this page graphically illustrates Swenson's points. How were such large increases in reserve size possible without correspondingly large discoveries? The answer is quite fascinating as it connects to the Reagan administration's amazingly simple strategy to collapse the Soviet Union: bring down the price of oil. Professor Richard Heinberg explains:

Soon after assuming office in 1981, the Reagan Administration abandoned the established policy of pursuing détente with the Soviet Union and instead instituted a massive arms buildup; it also fomented proxy wars in areas of Soviet influence, while denying the Soviets desperately needed oil equipment and technology. Then, in the mid -1980s, Washington persuaded Saudi Arabia to flood the market with cheap oil. Throughout its last decade the USSR pumped and sold its oil at the maximum rate in order to earn income with which to keep up in the arms race and prosecute its war in Afghanistan. Yet with markets awash with cheap Saudi oil, the Soviets were earning less even as they pumped more. Two years after their oil production peaked, the economy and government of the USSR collapsed. Source

While Reagan's strategy to collapse the Soviets was as simple as it was effective, it came with a catch: the amount of oil an OPEC nation such as Saudi Arabia could pump was tied to the amount of proven reserves it reported as compared to the other OPEC nations. The only way Saudi Arabia could continue to flood the market in support of Reagan's strategy was to dramatically revise its oil reserve estimates upwards. (If they had not done so, the Reagan administration would have withdrawn their military protection of the Saudi Royal family.)

In order to stay competitive under OPEC's proportional export rule, the other OPEC nations issued similarly bogus upward estimates. Thus most, if not all, of the so-called "reserve growth" in the Middle East is only on paper, not in the ground.

For more information, see:

Is there fraud in the House of Saud?

Saudi Arabia's oil production in a nosedive

Saudi Arabia's oil production close to collapsing

Kuwait's reported oil reserves overstated by 50%

OPEC's shocking reserve boondoggle

"If the environmentalists get out of the way, can't we just drill in ANWR?"

While some folks desperately cling to the belief that oil is a renewable resource, others hold on to the equally delusional idea that tapping the Arctic National Wildlife Reserve will solve, or at least delay, this crisis. While drilling for oil in ANWR will certainly make a lot of money for the companies doing the drilling, it won't do much to help the overall situation for three reasons:

Reason #1. According of the Department of Energy, drilling in ANWR will only lower oil prices by less than fifty cents;

Reason #2. ANWR contains 10 billion barrels of oil - or about the amount the US consumes in a little more than a year.

Reason #3. As with all oil projects, ANWR will take about 10 years to come online. Once it does, its production will peak at 875,000 barrels per day - but not till the year 2025. By then the US is projected to need a whopping 35 million barrels per day while the world is projected to need 120 million barrels per day.

"Won't the market and the laws of supply and demand address this?"

Generally, when a commodity becomes scarce the price goes up. This causes people to use less of the commodity and begin look for alternatives for it. Unfortunately, energy is not just any commodity. As it is the very basis for all economic activity, including the generation of alternative sources of energy, it is nowhere near as "elastic" as most commodities. Economist Andrew McKillop explains:

One of the biggest problems facing the IEA, the EIA and a host of analysts and "experts" who claim that "high prices cut demand" either directly or by dampening economic growth is that this does not happen in the real world. Since early 1999, oil prices have risen about 350%. Oil demand growth in 2004 at nearly 4% was the highest in 25 years. These are simple facts that clearly conflict with received notions about "price elasticity". World oil demand, tends to be bolstered by "high" oil and gas prices until and unless "extreme" prices are attained. Source

As mentioned previously, this is exactly what happened during the oil shocks of the 1970s - shortfalls in supply as little as 5% drove the price of oil up near 400%. Demand did not fall until the world was mired in the most severe economic slowdown since the Great Depression. The only thing that alleviated the economic crisis was the discovery of the world's last few "elephant" sized oil fields in the North Sea and Alaska as well as increased production from nations like Venezuela and Saudi Arabia. Once global oil production peaks (if it hasn't already) turning to new sources of supply won't be an option.

As affordable oil is necessary to power any serious attempt at an a switchover to alternative sources of energy, these extreme prices will severely hamstring if not - completely cripple - the ability of the market to handle these problems. The economic fallout from high prices will almost certainly geopolitical tensions (i.e. war) thereby futher hampering the development of large-scale alternative sources of energy. Worse still, in a global environment characterized by massive energy-wars, the bulk of the world's financial capital is likely to be disproportionately invested in weapons technologies over alternative energy technologies.

For more information, see:

Our highly-efficient economy is highly-susceptible to catastrophe

Fundamental errors of free market ideology in regards to energy

"Why isn't media sounding the alarm about this?"

For several reasons:

A. Most journalists are simply not aware of the magnitude of the problem

Even in the financial press, most people and institutions are simply not aware of the size or imminence of the problem. Investment banker Adam Cohen explains:

. . . Wall Street and the financial media are made up of human beings that are just no more interested in the Peak Oil issue than most people that you know. In my personal experience working with energy companies on stock and bond offerings during the last three years, I never heard any energy company employee or energy investment banker use the phrase "Peak Oil." The few times I mentioned the phrase privately to bankers, the response was "What's that?"

. . . no major financial services company or media outlet would long tolerate any voice loudly proclaiming "Peak Oil! The economy is doomed!" because it would be pretty tough to market other investments or advertising alongside that shrill voice. Source

It's worth noting that most of the major mainstream media outlets are owned, in whole or in part, by large energy conglomerates or real estate investors. Some examples include:

It's worth noting that most of the major mainstream media outlets are owned, in whole or in part, by large energy conglomerates or real estate investors. Some examples include:

NBC, CNBC, and MSNBC are owned by General Electric. Source

CBS is owned by Westinghouse. Source

Fox News is owned in part by the Saudi Holding Company. Source

The L.A. Times is owned by billionaire real-estate mogul Sam Zell. Source

Most of the advertisements in any issue of the Wall Street Journal, New York Times or Washington Post are for large automobiles, large suburban homes, or high-priced [discretionary] consumer items. The financial interests of these companies and individuals would be severely impacted should any significant portion of the public come to understand the magnitude of the crisis at hand.

(For an in-depth explanation of how this self-censoring process happens "on the ground", see journalist George Monbiot's article)

B. The handful of journalists who are aware can't "go public" without creating a panic and/or losing their jobs:

Once the seriousness of situation is generally acknowledged, a panic will spread on the markets and bring down the entire house of cards even if production hasn't actually peaked. For this reason, the mainstream media cannot discuss this issue without largely whitewashing the dire consequences for the average person. If they told the truth, people would panic and the markets would crash. Market analyst Steven Laguvulin explains

Should the oil markets themselves begin to 'connect these dots', then all our lives are going to be impacted violently and immediately. This is why you'll never see "Peak Oil" covered by a respected media outlet. As soon as it is recognized that for all practical purposes the situation is upon us, then a vicious "resource grab" will be initiated.

The price of oil in the markets will begin to rise dramatically. This will initiate a circular hedging/hording mentality in large end-users, governments, and multi-nationals. This will then have a myriad of devastating effects, but all average Joe Consumer is going to notice is that the price at the pump will experience a brief and dramatic blip upward, gas lines will form for a short time at the corner-stations, and then suddenly the corner gas-stations will go dry for good.

Gasoline will simply not be available to individual drivers, as precedence is given to heating oil, critical government and commercial uses, public transportation, transport of food and goods, etc. How the situation unfolds after that you can imagine just as well as I can ...

If this scenario sounds over-dramatic, keep in mind that what I'm talking about is a dawning recognition of something that many analysts have already come to realize: that the "oil grab" is in fact already on. Source

C. The automotive and aviation industries would be destroyed by acknowledging the truth or any large scale mitigation program:

Most of the steps we need to take to deal with this, such as driving less or buying fewer consumer items, would severely hurt large sectors of the US economy. For instance, an aggressive fuel conservation program would lower the demand for new vehicles as people would be driving less, thereby increasing the life of their vehicles. This sounds like a perfectly reasonable and common sense mitigation plan until you realize that approximately one out of every 10 jobs in the US is either directly or indirectly dependent on the manufacture of new automobiles. Source Each job in the automotive industry creates between 2 and 9 jobs in other industries. Source

With automotive giants GM and Ford already on the ropes, any aggressive program of conservation would likely so blunt the demand for new cars that the two automotive giants spiraling into bankruptcy. This would produce devastating knock-off effects throughout the domestic economy and would almost certainly lead to the rise of extremists political movements not unlike those that arose in Germany during the 1920s when its economy collapsed.

A similar problem exists when it comes to the aviation industry. According to the International Air Transport Association, aviation is a $400 billion dollar industry that indirectly generates $1.3 trillion dollars in economic activity. Source Overall, it accounts for 9% of global GDP. Source Thus any plan to aggressively reduce air travel is likely to produce the same sort of unintended consequences that would be produced by an aggressive plan to reduce automobile travel: severe economic dislocations, followed by massive social unrest.

For more information, see:

The Wall Street Journal won't dare utter the words "Peak Oil"

Jeffrey Brown: Oil, the Iron Triangle and the "Enron Effect"

"What about this theory that oil is actually a renewable resource?"

A handful of people believe oil is actually a renewable resource continually produced by an "abiotic" process deep in the Earth. As emotionally appealing as this theory may be, there is absolutely no evidence for it. The world has 40.000 producing oil fields. Not a single one show any sign of refilling.

Moreover, the oil companies does not give this theory the slightest bit of credence even though they are more motivated than anybody to find an unlimited source of oil as each company's shareholder value is based on largely how much oil it holds in reserve. Any oil company who wants to make a ridiculous amount of money (which means all of them) could simply find this unlimited source of oil but refuse to bring it to the market. Their stock value would skyrocket as a result of the huge find while they could simultaneously maintain artificial scarcity by not bringing it to the market. But none of them are doing that.

Even if the theories of "unlimited oil" are true, they aren't doing us much good out here in the real world as production is declining in pretty much every nation outside the Middle East.

It certainly isn't doing us any good here in the United States. Our domestic oil production peaked in October 1970 at 10 million barrels per day. It has since declined a little bit each year and now stands at about 5 million barrels per day.

This is despite the fact that the US oil exploration companies have more money, more muscle, and more motivation to find oil than just about anybody. If oil is a renewable resource, why isn't it renewing itself here in the U.S.? (See "Show Me the Oil")

Furthermore, if oil fields really do refill themselves, why aren't advocates of the abiotic oil theory hiring themselves out to independent oil exploration firms? They could becoming fabulously wealthy by helping these firms locate and profit from the magically refilling fields. Perhaps the reason abiotic-oil advocates aren't hiring themselves out to oil companies is because the abiotic-oil theory is little more than clever oil company propaganda. Journalists Paula Hay explains

If millions of people got the picture that Peak Oil is imminent, they would surely begin to take steps to protect themselves and their families — to powerdown — and decline would be slowed as a result of all those peoples' aggregate actions. It would be a classic market response to new information.

Big Oil cannot allow this to happen if it intends to keep its profits sky-high. If people believe that oil is abundant forever; that they are being screwed by Big Oil; and that the government will step in any moment to save them, they have no incentive to powerdown.

Abiotic oil propaganda, coupled with finger-pointing at the oil industry, is a perfect ruse to ensure people don't start powering down. Peak Oil is not the oil industry's propaganda. Abiotic oil is the oil industry's propaganda. Source

Interestingly enough, five of the seven policy recommendations made by outspoken abiotic oil advocate Jerome Corsi in his book "Black Gold Stranglehold" sound like taxpayer funded giveaways to Big Oil: (commentary in italics added)

#1. Promote scientific research to investigate alternative theories.

#2. Expedite leases offshore and in Alaska to encourage oil exploration. *(Who benefits from this?)*

#3. Provide tax credits for deep-drilling oil exploration. *(Who benefits from this?)*

#4. Create an oil research institute to serve as a clearinghouse of oil industry information. *(Who benefits from this?)*

#5. Develop a public broadcasting television series devoted to the oil industry. *(Who benefits from this?)*

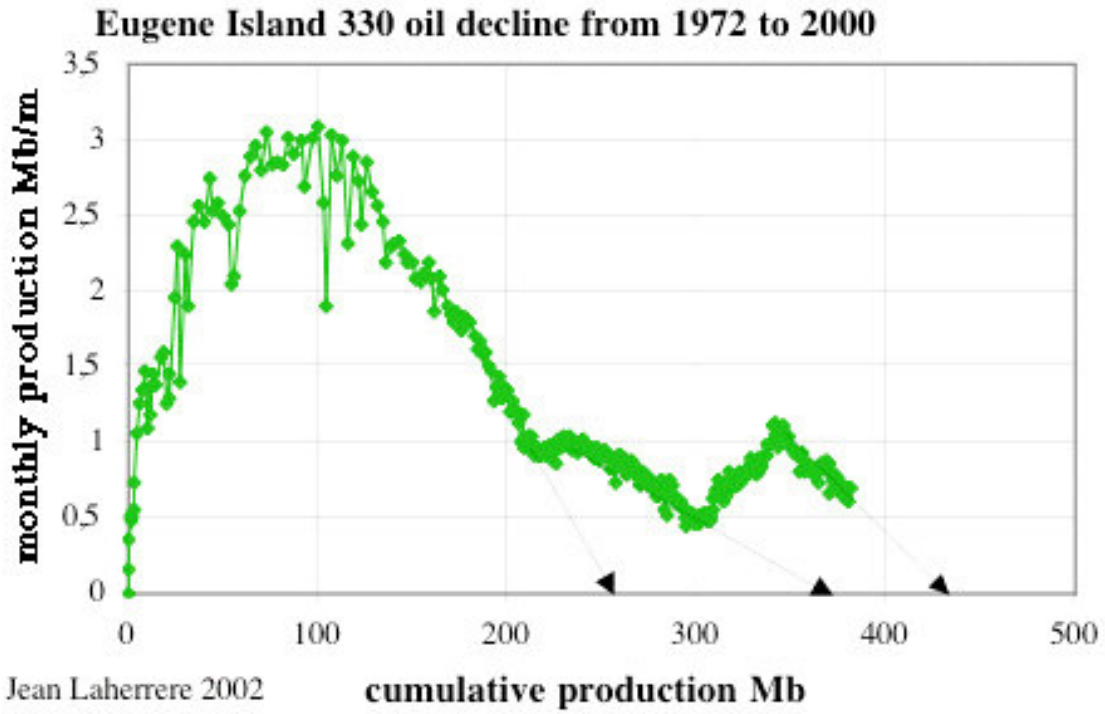
#6. Reestablish a gold-backed international trade dollar.

#7. Establish tax incentives for opening new refineries in the U.S. *(Who benefits from this?)*

With the exception of numbers one & six, Corsi's policy recommendations read as though they came from an oil-industry wish list. That Corsi would so vigorously advocate tax breaks for the oil industry should come as little surprise: in 2004, he coauthored the "Swift Boat Veterans for Truth" attack book that many believe helped the tax cut-obsessed and oil industry-backed Bush administration stay in office.

It is worth noting that Corsi - the primary media vector for the current incarnation of the abiotic oil theory - spent the bulk of his early professional career running covert operations for USAID, the U.S. government agency tasked primarily with destabilizing foreign governments not amenable to western oil interests. Source In 2005, he was personally thanked by George W. Bush for his recent work attempting to destabilize oil-rich Iran. Source

In his book, Corsi cites the Eugene Island 330 oilfield as proof that oil fields refill themselves. Apparently he or his research staff failed to do a google images search for "Eugene Island 330." If he had performed such a search, he would have come across the following graph which plainly shows Eugene Island 330's oil production in decline for the past 25 years. Corsi's primary example of a "refilling field" is only producing about 1/6 the amount of oil it produced at its peak:



As a long-time political hitman, Corsi knows the bulk of the American public is so disinformed that he can get away with this sort of blatant intellectual dishonesty. Source

For more information:

Richard Heinberg: The Abiotic Oil "Controversy"

Byron King: The "Deep Oil" Theory

Ugo Bardi: Where is the abiotic oil?

"Won't high oil prices motivate us to look for alternatives?"

To a certain degree, yes. Unfortunately, the situation is far too complex to be solved via alternative energy "plug-and-play" as is commonly believed. First, as explained in great depth later on this page, we really don't have any ready-to-scale alternatives that share oil's energy density, energy portability and high energy return on energy invested (EROEI).

Second, and **perhaps more importantly**, even if we did have alternatives that shared the characteristics of oil, we won't be motivated to invest in them on the massive scale necessary until it's too late. To illustrate this point: as of October 2007 a barrel of oil costs about $75. The amount of energy contained in that barrel of oil would cost between $100-$250* dollars to derive from alternative sources of energy. Thus, the market won't signal energy companies to begin aggressively pursuing alternative sources of energy until oil reaches the $100-$250 range and stays there for several years.

*This does not even account for the amount of money it would take to locate and refine the raw materials necessary for a large scale conversion or the retrofitting of the world's $50 trillion plus economy to run on these alternatives.

Once we do finally begin aggressively pursuing these alternatives, there will be a 25-to-50 year lag time between the initial heavy-duty research into these alternatives and their wide-scale industrial implementation. However, in order to finance an aggressive implementation of alternative energies, we need a tremendous amount of investment capital - in addition to affordable energy and raw materials - that we absolutely will not have once oil prices are permanently lodged in the $200-$300 per barrel neighborhood. Source

While we need 25-to-50 years to retrofit our economy to run on alternative sources of energy, we may only get 12-to-18 months once oil production peaks. Within a short time of global oil production hitting its peak, it will become impossible to dismiss the decline in supply as a merely transitory event. Once this occurs, traders on Wall Street will quickly bid the price up to, and possibly over, the $200 per barrel range as they realize the world is now in an era of permanent oil scarcity.

With oil at or above $200 per barrel, gasoline will reach $10 per gallon, assumming it is even available. This will cause a rapid breakdown of trucking industries and transportation networks which have all been built and financed under the assumption fuel prices would remain low. Importation and distribution of food, medicine, and consumer goods will grind to a halt as trucking and shipping companies go bankrupt en masse.

The effects of this will be frightening. As Jan Lundberg, founder of the *Lundberg Survey*, aka "the bible of the oil industry" recently pointed out:

The scenario I foresee is that market-based panic will, within a few days, drive prices up skyward. And as supplies can no longer slake daily world demand of over 80 million barrels a day, the market will become paralyzed at prices too high for the wheels of commerce and even daily living in "advanced" societies.

The trucks will no longer pull into Wal-Mart, Safeway or other food stores. The freighters bringing packaged techno -toys and goods from China will have no fuel. There will be fuel in many places, but hoarding and uncertainty will trigger outages, violence and chaos. For only a short time will the police and military be able to maintain order, if at all. Source

Although mentioned on the previous page, Oxford trained geologist Jeremy Leggett's analysis of the consequences of Peak Oil bares repeating:

. . . when the truth can no longer be obscured, the price will spike, the economy nosedive, and the underpinnings of our civilization will start tumbling like dominos. "The price of house will collapse. Stock markets will crash. Within a short period, human wealth -- little more than a pile of paper at the best of times, even with the confidence about the future high among traders -- will shrivel.

There will be emergency summits, diplomatic initiatives, urgent exploration efforts, but the turmoil will not subside. Thousands of companies will go bankrupt, and millions will be unemployed. "Once affluent cities with street cafés will have queues

*at soup kitchens and armies of beggars. Crime will soar. The earth has always been a dangerous place, but now it will become a tinderbox...*Source

Under these sort of conditions, financing a large scale switchover to alternative energies will be, for all intents and purposes, impossible.

"What about all the various alternatives to Oil? Certainly there are replacements we can turn to?"

People tend to think of "alternatives to oil" as somehow independent from oil. In reality, the alternatives to oil are more accurately described as "derivatives of oil." It takes massive amounts of oil and other scarce resources to locate and mine the raw materials (silver, copper, platinum, uranium, etc.) necessary to build solar panels, windmills, and nuclear power plants. It takes more oil to construct these alternatives and even more oil to distribute them, maintain them, and adapt current infrastructure to run on them.

Each of the alternatives is besieged by numerous fundamental physical shortcomings that have, thus far, received little attention. These are discussed one-by-one in the questions that follow.

For more information, see:

U.S. energy independence: the ever-receding mirage

Physical contraints on renewable energy technologies

Nine critical questions to ask about alternative energy

The hydrogen economy and other high-tech myths

It's time to face some hard truths about our energy problems

"What about green alternatives like solar, wind, wave, and geothermal?"

Few people realize how much energy is concentrated in even a small amount of oil or gas. A barrel of oil contains the energy-equivalent of almost 25,000 hours of human labor. Source A single gallon of gasoline contains the energy-equivalent of 200-to-500 hours of human labor. Source

Most people are stunned to find this out, even after confirming the accuracy of the numbers for themselves, but it makes sense when you think about it a bit: it only takes one ($3) gallon of gasoline to propel a three ton SUV 10 miles in 10 minutes when traveling 60 mph. How long would it take you to push a three ton SUV 10 miles?

While people tend to drastically underestimate the energy density of oil and gas, they drastically overestimate the energy density (and thus scalability) of renewable. Some examples should help illustrate this point:

Example #1: Wind compared to Natural Gas

It would take every single one of California's 13,000 wind turbines operating at 100% capacity (they usually operate at about 30%) all at the same time to generate as much electricity as a single 555-megawatt natural gas fired power plant. Source

Example #2: Wind compared to Coal

As of 2004, the United States has 6,361 megawatts of installed wind energy. This means that if every wind turbine in the United States was spinning at peak capacity, all at the exact same time, their combined electrical output would equal that of six coal fired power plants. Since, as mentioned previously, wind turbines typically operate at about 30% of their rated capacity, the combined output of every wind turbine in the US is actually equal to less than two coal fired power plants. Source

Example #3: **Solar compared to Coal**

The numbers for solar are ever poorer. For instance, on page 191 of his 2004 book "The End of Oil: On the Edge of a Perilous New World", author Paul Roberts writes:

. . . if you add up all the solar photovoltaic cells now running worldwide the combined output - about 2,000 megawatts - barely rivals the output of two coal-fired power plants.

Robert's calculation assumes the solar cells are operating at 100% of their rated capacity. In the real world, the average solar cell operates at about 20% of its maximum capacity as the sun is not always shining. This means the combined output of all the solar cells in the world at the end of 2004 was equal to less than 40% of the output of a single coal fired power plant. Source

By 2008, there was just over 5,000 megawatts of solar pv cells installed worldwide. Operating at average efficiency of 20%, the combined output of all the pv cells in the world is now equal to the output of a single coal fired power-planet.

Example #4: Solar and Wind compared to Petroleum

In order to offset a 10% reduction in U.S. petroleum consumption, the amount of installed solar and wind energy would have to be increased by 2,200%. Source

Example #5: Solar compared to Gasoline

The amount of energy distributed by a single gas station in a single day equivalent to the amount of energy that would be produced by four Manhattan sized city blocks of solar equipment. (There are over 170,000 gas stations in the U.S. alone.) Source
The reason for this difference is because, as explained above, oil is an incredibly dense source of energy while solar is extremely diffuse

Example # 6: Low starting point for industrial solar

It would take close to 220,000 square kilometers of solar panels to power the global economy via solar power. This may sound like a marginally manageable number until you realize that the total acreage covered by solar panels in the entire world right now is a paltry 10 square kilometers. Source

Example #7: Diminutive contribution of residential solar:

According a recent MSNBC article entitled, "Solar Power City Offers 20 Years of Lessons:

By industry estimates, up to 20,000 solar electric units and 100,000 heaters have been installed in the United States, diminutive numbers compared to the country's 70 million single-family houses. Source

This means that even if the number of American households equipped with solar electricity is increased **by a factor of 100**, less than two million American households will be equipped with solar electric systems. Assuming we are even capable of scaling the use of household solar electric systems by that amount, two questions remain:

#1. What do the other 68 million households do? What about the millions of companies, nations, and industries around the world of which the industrialized world are dependent?

#2. Since oil, not electricity, is our primary transportation fuel (providing the base for over 95% of all transportation fuel) what good wih this do us when it comes to keeping our global network of cars, trucks, airplanes, and boats going?

Example #8: Electric Car Batteries Versus Gasoline Engines

Dr. Walter Youngquist explains:

. . . a gallon of gasoline weighing about 8 pounds has the same energy as one ton of conventional lead-acid storage batteries. Fifteen gallons of gasoline in a car's tank are the energy equal of 15 tons [3,000 pounds] of storage batteries. Source

Some will say that the problems associated with lead-acid batteries as pointed out by Dr. Youngquist can be resolved by moving to lithium-ion batteries. Unfortunately, lithium is in such short supply globally that electric car manufacturers are already anticipating problems sourcing it even though only a tiny fraction of westerners currently drive electric cars:

It wasn't the sound of his car engine that was distracting Ian Clifford. The chief executive of Canadian business Zenn Motors makes electric vehicles that give off no noise. He was worried that the obvious choice to power his next car - the same stuff that goes into laptops and cellphone batteries - was going to be in short supply. "If you look at the increase in lithium prices over the past seven to 10 years, it's been dramatic," says Clifford. Zenn's short-range urban cars traditionally used nickel metal hydride batteries, but his next vehicle - an 80mph model with a 250-mile range - needed more efficiency. "There are very limited global reserves, and they're in potentially very unstable parts of the world," adds Clifford. Source

Example #9: Energy Intermittency, Lack of Battery Technologies

Unlike an oil pump, which can pump all day and all night under most weather conditions, or coal fired/natural gas fired power plants which can also operate 24/7, wind turbines and solar cells only produce energy at certain times or under certain conditions. This may not be that big of a deal if you simply want to power your discretionary household appliances or a small scale, decentralized economy. If,

however, you want to run an industrial economy that relies on airports, airplanes, 18-wheel trucks, millions of miles of highways, huge skyscrapers, 24/7 availability of fuel, etc., an intermittent source of energy will not suffice.

While promising work is being done to counteract the intermittency of wind and solar energy, most of this work is still in the developmental stage and won't be ready or cost effective on a large scale for several decades at the earliest. Source

Example #11: Lack of Energy Density

As explained a few times in the preceding paragraphs, oil is simply unmatched in its energy density. A good way to illustrate its density is to analyze what it would take in terms of solar pv panels to generate the energy necessary to run a typical automobile. Physicist Les Jackson explains that once you account for the typical solar PV efficiency rating of 20%, you would need a solar panel set up measuring almost 100 feet on each side in order to power your car:

The sun delivers approximately 1,000 watts of total energy per square meter (roughly 100 watts per square foot) on the earth, and that's really only when there's direct light, at noon, on a clear day. If you could convert all that solar energy to electric power you'd need 7.43 square feet for each horsepower (there are 743 watts in a horsepower) in your motor. You need at least 50 horsepower (37,000 watts) to safely move a car in real-world traffic, so you'd need at least 371 square feet of surface area to generate the electricity. That's a square about 19 feet on a side, so your car would have to be very large or have a huge solar sail on it to capture the light.

It gets worse, because solar photovoltaic panels waste most of the sun's energy. The best solar panels on the market today are less than 20% efficient at conversion of energy, so you really need panels 5 times larger than the one in the example above to create enough electricity to run the car. Remember also that we're talking about "perfect" conversion of energy at midday when it's clear outside. As the daylight goes down so does the amount of electricity. If this isn't difficult enough, how do you compensate for those periods when the car is driving in the rain, cloudy weather, through tunnels and at night? What we've got here is a fundamental problem of capacity: There's simply not enough surface area on a car to generate sufficient power from photovoltaic cells.

Add to these pressures the fact that photovoltaic cells cost at least $6 per watt of output, making these things prohibitive for most people even if size weren't a consideration. Source

Are there ways around some of these limitations? Yes, if you have a tremendous amount of money at your disposal. Some people, for instance, are already experimenting with "plug-in hybrids" which they charge using solar panels on their homes. The problem is that a typical solar-pv set up designed to deliver all of a home's power in sunny California will run $50,000. The plug-in hybrid car will run another $50,000. If you want to charge the plug-in hybrid using solar panels in addition to powering your home, you will need to double or triple the pv capacity on your roof. Even in a place with a lot of sunshine, you're looking at a set-up costing $150,000-$200,000 by the time it's all said and done. Under the rapidly declining economic conditions of 2008-20099only a tiny fraction of people can currently afford such a set-up. As the housing economy continues to crumble and gas prices continue to be unpredictably volatile, the already small percentage of people who can afford

this sort of capital outlay will only dwindle. Worst still, the price(s) of such a set-up are unlikely to fall due to "economies of scale" because the panels and batteries require prodigious volumes of rare metals (such as lithium and copper), the supplies of which are already falling short of demand. Source

Example #10: Expansion of Renewable Power Means More, not less, Dependency on Coal and Natural Gas for "Back up Power"

Without a cost-effective and scalable storage (battery) technology to provide power when the wind is not blowing or the sun is not shining, large scale solar/wind farms must be backed up by things like oil pumps or natural gas/coal fired powered plants. For this reason, the expansion of renewable like wind power actually requires **an expansion** in the use of fossil fuels. Journalist Michael Kane explains:

Europe is light-years ahead of America in wind energy, and Germany leads the world. The German numbers are painting a dismal picture for wind's capacity. E.ON Netz – one of the eworld's largest private energy providers – owns over 40% of Germany's wind generating capacity. They released a report titled "WIND REPORT 2004" stating that wind energy require "shadow stations" of traditional energy on back-up reserve in case the wind forecast is wrong. They state that reserve capacity needs to be 60% to 80% of the total win capacity! So as mo wind comes on line, it is all but certain that more hydrocarbon reserve capacity will be required, further demonstrating how renewable energy is used to supplement over-consumption. Source

Here is the real kicker: due to their prodigious size, these shadow stations cannot just be turned on and off at will. In order to be ready to produce electricity when the wind is not blowing or the sun is not shining, they must be fed a constant supply of natural gas or coal.

In other words, as counter-intuitive as it may sound at first, installing renewable energy at the industrial or utility level does not mean conventional power sources can simply be shut down or turned off. If anything, **more** coal fired or natural gas fired power plants have to be brought online to prevent blackouts from occurring when the wind is not blowing or the sun not shining.

Inappropriateness as Transportation Fuels:

Approximately 2/3 of our oil supply is used for transportation. Over ninety percent of our transportation fuel comes from petroleum fuels (gasoline, diesel, jet-fuel). Thus, even if you ignore the challenges catalogued above, there is still the problem of how to use the electricity generated by the solar cells or wind turbines to run fleets of food delivery trucks, ocean liners, airplanes, etc.

Unfortunately, solar and wind cannot be used as industrial-scale transportation fuels unless they are used to crack hydrogen from water via electrolysis. Hydrogen produced via electrolysis is great for small scale, village level, and/or experimental projects. In order to power a significant portion of the global industrial economy on it, however we would need the following:

Need #1: Hundreds of trillions of dollars to construct fleets of hydrogen powered cars, trucks, boats, and airplanes.

Need #2: Hundreds, if not thousands, of oil-powered factories to accomplish number one.

Need #3: The construction of a ridiculously expensive global refueling and maintenance network for number one.

Need #4: Mind-bogglingly huge amounts of platinum, silver, and copper, and other raw materials that have already entered permanent states of scarcity.

Extremely Low Starting Point:

Finally, most people new to this issue drastically overestimate the amount of energy we will be able to realistically derive from these sources inside of the next 5-25 years. If the previous examples didn't convince you that solar and wind are incapable of replacing oil and gas on more than a small scale/supplemental level, consider the following, easily verifiable facts:

In 2003, the US consumed 98 quadrillion BTU's of energy. Source A whopping .171 quadrillion came from solar and wind combined. Source Do the math (.171/98) and you will see that a total of less then one-sixth of one percent of our energy appetite was satisfied with solar and wind combined. Thus, just to derive a paltry 2-3 percent of our current energy needs from solar and wind, we would need to double the percentage of our energy supply derived from solar and wind, then double it again, then double it again, and then double it yet again.

Unfortunately, the odds of us upscaling our use of solar and wind to the point where they provide even just 2-3 percent of our total energy supply are about the same as the odds of Michael Moore and Dick Cheney teaming up to win a 5K relay race. Despite tremendous levels of growth in these industries, coupled with practically miraculous drops in price per kilowatt hour (95% drop in two decades), along with increased interest from the public in alternative energies, the percentage of our total energy supply derived from solar and wind is projected to grow by only 10 percent per year. Source Since we are starting with only one-sixth of one percent of our energy coming from these sources, a growth rate of 10 percent per year isn't going to do much to soften a national economic meltdown. Twenty-five years from now, we will be lucky if solar and wind account for one percent of our total energy supply. Source

Other green alternative energy sources, such as wave and geothermal power are incapable of replacing more than a fraction of our petroleum usage for similar: they are nowhere near as energy dense as petroleum and they are inappropriate as transportation fuels. In addition, they are also limited by geography. Wave power is only technically viable in coastal locations while only a handful of nations, such as Iceland, have access to enough geothermal power to make up for much of their petroleum consumption.

This is by no means reason not to invest in or pursue these alternatives. We simply have to be realistic about what they can and can't do. While they are certainly worthy investments, it is simply unrealistic to expect they are going to power more than a small fraction of our forty-five trillion dollar per year (and growing) global industrial economy.

"But aren't the big investment banks investing heavily in renewable energy?".

The large investment banks have concluded that renewable energy will never comprise more than a very small fraction of the world's total energy profile. They have also realized the world is plunging into an era of massive energy wars. They are thus disproportionately moving their money into **new weapons technologies** over new energy technologies. Journalist Naomi Klein explains:

Anyone tired of lousy news from the markets should talk to Douglas Lloyd, a director of Venture Business Research, which tracks trends in venture capitalism. "I expect investment activity in this sector to remain buoyant," he said recently. Lloyd's bouncy mood was inspired by the money that is gushing into private security and defense companies. He added: "I also see this as a more attractive sector, as many do, than clean energy."

Got that? If you are looking for a sure bet in a new growth market, then sell solar and buy surveillance: forget wind, buy weapons. This observation - coming from an executive who is trusted by such clients as Goldman Sachs and Marsh & McLennan - deserves particular attention . . .

According to Lloyd, the really big money - despite all the government incentives - is turning away from clean-energy technologies, and is banking instead on gadgets that promise to seal wealthy countries and individuals into hi-tech fortresses. To put it simply, in the world of venture capitalism, there has been a race going on between greens on the one hand, and guns and garrisons on the other - and the guns and garrisons are winning. Source

To be perfectly clear: the investment banks are investing considerable amounts in new energy technologies. It's just that they are investing 100 or 1,000 times as much in new weapons technologies which will be used to fight over the world's diminishing supply of fossil fuels. **The ratio between investment in the two sectors is the key point here:** while the global market for renewable energy measures in the tens of billions, the (combined) global markets for oil and arms measures over $3 trillion. Furthermore, as fast as the market for new energy technologies is growing, the market for new weapons technologies is growing by several orders of magnitude faster.

Can't the investment banks see that these strategies will plunge the world into massive oil wars and large-scale economic collapse?

Most of the investment banks' investment strategies - including the strategy to invest more in new weapons technologies than new energy technologies - are guided/informed by extremely sophisticated computer programs which, for all intents and purposes, make the decisions for the traders. According to December 2007 article in the San Francisco Chronicle, the newest generation of super-computers used by Wall Street investment strategies will soon be "peta-scale":

Sometime next year, developers will boot up the next generation of supercomputers, machines with vast increases in processing power...The first "petascale" supercomputer will be capable of 1,000 trillion calculations per second.

"The difficulty in building the machines is mind-boggling," said Mark Seager, assistant department head for computing technology at Lawrence Livermore. "But the scientific results that we can get out of them are also mind-boggling . . ."

*Petascale computers are also expected to lead to more potent models for Wall Street to calculate risk and predict the fate of financial instruments...*Source

A June 2007 Bloomberg article entitled "The Ultmate Money Machine" confirms that the world's most powerful investment consortiums are using the latest generation(s) of super-computers to guide their investment strategies:

For decades, investment banks and hedge fund firms have used computers to uncover relationships in the markets and exploit them. Today, computer-guided trading has reached levels undreamed of a decade ago. A third of all U.S. stock trades in 2006 were driven by automatic programs, or algorithms. By 2010, that figure will reach 50 percent. Rex Macey, director of equity management at Wilmington Trust Corp. says computers can mine data and see relationships that humans can't. Source

Independent journalist Michael Ruppert gives a more in-depth explanation of how these modeling programs work:

. . . [this sort of software] combines datamining and artificial intelligence...Datamining is a technique for detecting and extracting meaningful patterns hidden within vast quantities of apparently meaningless data. Programs based on datamining are powerful analytical tools; finding meaningful patterns in an ocean of information is very useful. But when such a tool is driven by a high-caliber artificial intelligence core, its power gets spooky. The datamining capability becomes a smart search tool of the AI program, and the system begins to learn.

Great strides have been made by the mutually fertile disciplines of mathematics, computer science, and neuroscience. With neural networking, software has become much smarter than it had been. Now it can perform multiple, related operations at the same time through parallel processing; now it can learn from setbacks, and use genetic algorithms to evolve its way out of limitations.

This kind of computational power supports an inference engine that can digest the mined data into results that are predictive for imminent and, to some degree, even middle -term outcomes. It extrapolates from current trends in a more than quantitative way.

*Conventional electronic surveillance finds patterns in the data of other instruments; [this software] can exploit patterns it detects and extrapolate future probabilities...*Source

According to a 2007 UK Register article, the Pentagon and Homeland Security now possess computer programs capable of modeling the decision making processes of financial institutions, media outlets, even the entire human population (all 6.6 billion) right down to individuals:

. . . the US Department of Defense may already be creating a copy of you in an alternate reality to see how long you can go without food or water, or how you will respond to televised propaganda.

Called the Sentient World Simulation (SWS), the program replicates financial institutions, utilities, media outlets, and street corner shops. By applying theories of economics and human psychology, its developers believe they can predict how individuals and mobs will respond to various stressors.

Yank a country's water supply. Stage a military coup. SWS will tell you what happens next. Homeland Security is already using SWS to simulate crises on the US mainland. Source

If government bureaucracies such as DHS are modeling financial institutions by using computer programs as sophisticated as SWS, it stands to reason the world's largest and most powerful private investment banks have similar, if not far more sophisticated, tools at their disposal.

The point of all this is that the top investment banks' strategies to disproportionately invest in weapons technologies over new energy technologies has not been made "willy-nilly." Quite the contrary, these strategies have been informed by computer programs of almost unimaginable power.

The implications of this go far beyond just Wall Street as the companies using these super-computer programs are the same companies that, for all intents and purposes, determine who can afford to make serious runs for office at the state and national level.

On a related note, even if solar, wind, and other green alternatives could replace oil, we still wouldn't escape the evil clutches of so called "Big Oil." The biggest maker of solar panels is British Petroleum with Shell not too far behind. Similarly, the second biggest maker of wind turbines is General Electric, who obtained their wind turbine business from that stalwart of corporate social responsibility, Enron. Source As these examples illustrate, the notion that "Big Oil is scared of the immerging renewable energy market!" is silly. "Big Oil" already owns the renewable energy market. Source

Relevant background reading:

NY Times: A Smarter Computer to Pick Stocks

NY Times: Automated Software Enabled the Subprime Boom, Bust

"What About the Hydrogen Economy?"

As of 2003, the average hydrogen fuel cell costs close to $1,000,000. Unlike other alternatives, hydrogen fuel cells have shown little sign of coming down in price. Source Unfortunately, hydrogen and/or hydrogen fuel cells will never power more than a handful of cars due to the following reasons:

Astronomical Cost of Fuel Cells

With fuel cell powered cars themselves costing $1,000,000 a piece, replacing just 210 million cars -or less than 1/4 of the world's automotive fleet -with fuel cell powered cars would cost $210,000,000,000,000. (That's two-hundred and ten trillion dollars.) Source

Furthermore, as a recent article in *EV World* points out, the average fuel cell lasts only 200 hours. Source Two hundred hours translates into just 12,000 miles, or about one year's worth of driving at 60 miles per hour. That's not much of a deal for a car with a million-dollar price tag.

That doesn't even begin to address the cost of replacing a significant portion of the millions upon millions of oil-powered airplanes, boats, trucks, tractors, trailers, etc., with fuel cells nor the construction of a worldwide system to maintain all of these new technologies.

Platinum Supply and Cost

A single hydrogen fuel cell requires approximately 20-50 grams of platinum. Source Let's say we want to replace 1/4 of the world's petroleum powered cars with hydrogen fuel cell powered cars. Twenty-to-fifty grams of platinum per fuel cell x 210 million fuel cells equals between **4.2 billion and 10.5 billion grams of platinum** required for the conversion. Unfortunately, world platinum production is currently at only about 240 million grams per year, most of which is already earmarked for thousands of indispensable industrial processes.

If the hydrogen economy was anything other than a total red herring, such issues would eventually arise as 80 percent of the world's proven platinum reserves are located in that bastion of geopolitical stability, South Africa. Source

Even if an economically affordable and scalable alternative to platinum is immediately located and mined in absolutely massive quantities, the ability of hydrogen to replace even a small portion of our oil consumption is still handicapped by several fundamental limitations, some of which are detailed below. NASA, which fuels the space shuttle with hydrogen, may be able to afford to get around the following challenges, but there is a big difference between launching a single space shuttle and running a $50 trillion global economy with a voracious and constantly growing appetite for energy.

Inability to Store Massive Quantities at Low Cost:

Hydrogen is the smallest element known to man. This makes it virtually impossible to store in the massive quantities and to transport across the incredibly long distances at the low costs required by our vast global transportation networks. In her February 2005 article entitled "Hydrogen Economy: Energy and Economic Blackhole," Alice Friedemann writes:

Hydrogen is the Houdini of elements. As soon as you've gotten it into a container, it wants to get out, and since it's the lightest of all gases, it takes a lot of effort to keep it from escaping. Storage devices need a complex set of seals, gaskets, and valves. Liquid hydrogen tanks for vehicles boil off at 3-4% per day. Source

While some research into hydrogen storage technologies looks promising, it is still in the experimental stages and decades (at the earliest) from being ready to scale on an industrial level. Source

Massive Cost of Hydrogen Infrastructure:

A hydrogen economy would require massive retrofitting of our entire global transportation and fuel distribution networks. At a million dollars per car, it would cost $350,000,000,000,000 to replace half of our current automotive fleet (700 million cars world wide) with hydrogen fuel cell powered cars.

That doesn't even account for replacing a significant fraction of our oil-powered airplanes or boats with fuel cells.

The numbers don't get any prettier if we scrap the fuel cells and go with straight hydrogen. According to a recent article in *Nature,* entitled "Hydrogen Economy Looks Out of Reach:"

Converting every vehicle in the United States to hydrogen-power would demand so much electricity that the country would need enough wind turbines to cover half of California or 1,000 extra nuclear power stations. Source

Unfortunately, even if we managed to get this ridiculously high number of wind turbines or nuclear power plants built, we would still need to build the hydrogen powered cars, in addition to a hydrogen distribution network that would be mind-boggingly expensive. The construction of a hydrogen pipeline network comparable to our current natural gas pipeline network, for instance, would cost 200 trillion dollars. That's about fifteen times the size of the US GDP in the year 2006.

How such capital intensive endeavors will be completed in the midst of massive energy shortages is anybody's guess.

Hydrogen's "Energy Sink" Factor:

As mentioned previously, solar, wind, or nuclear energy can be used to "crack" hydrogen from water via a process known as electrolysis. The electrolysis process is a simple one, but unfortunately it consumes more energy than it produces. Source This has nothing to do with the financial costs. Again, Alice Friedemann explains:

The laws of physics mean the hydrogen economy will always be an energy sink. Hydrogen's properties require you to spend more energy to do the following than you get out of it later: overcome waters' hydrogen-oxygen bond, to move heavy cars, to prevent leaks and brittle metals, to transport hydrogen to the destination. It doesn't matter if all of the problems are solved, or how much money is spent. You will use more energy to create, store, and transport hydrogen than you will ever get out of it.

Even if these problems are ignored or assumed away, you are still faced with jaw-dropping costs of a renewable derived hydrogen economy. In addition to the 200 trillion dollar pipeline network that would be necessary to move the hydrogen around, we would need to deploy about 40 trillion dollars of solar panels. If the hydrogen was derived from wind (which is usually more efficient than solar) the cost might be lowered considerably, but that's not saying much when you are dealing with numbers as large as $40 trillion.

As far as how much you as the consumer would pay for hydrogen fuel derived from renewable resources, Joseph Romm, author of *The Hype About Hydrogen*, estimates you will have to pay $10-$20 per gallon of gasoline equivalent, assuming you can even find a renewable-hydrogen filling station. Source

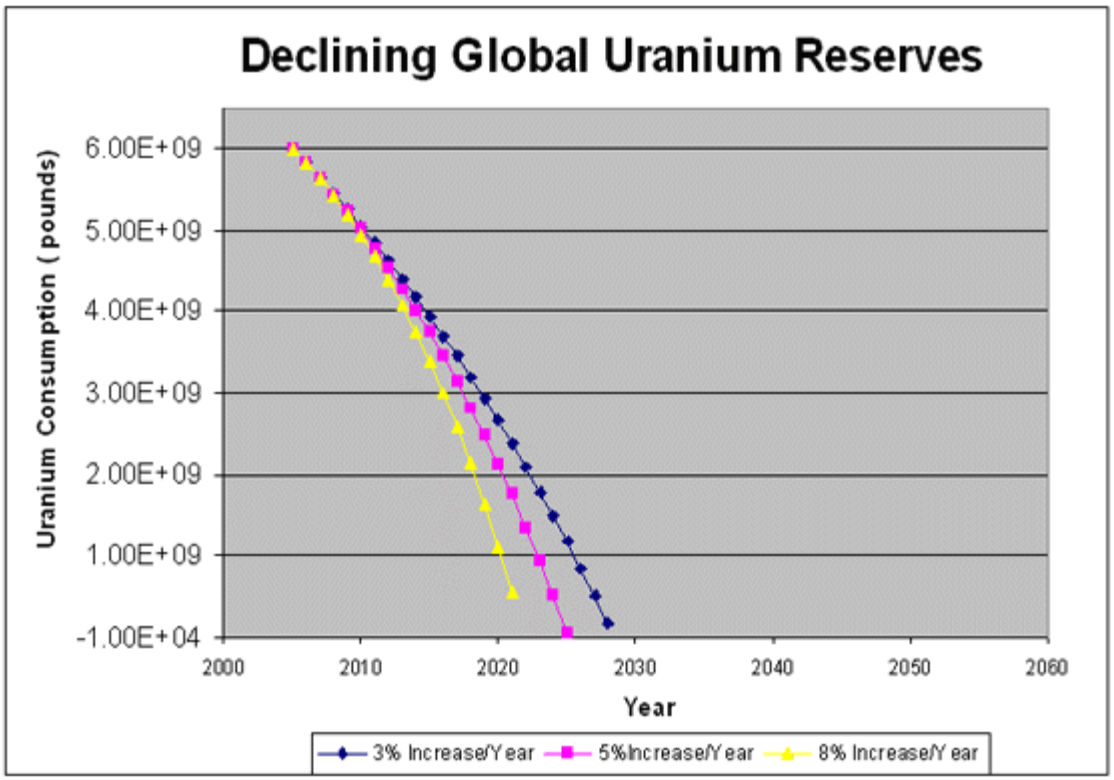
For more information, see:

The Hydrogen Economy is a Red Herring

"What About Nuclear Energy?"

Nuclear energy requires uranium, which is problematic because as David Petch explains in his article "Peak Oil and You", even in the most optimistic scenarios, uranium will soon be in short supply:

Figure 2 illustrates the different projections of uranium depletion, pending an increase in annual consumption rates of 3%, 5% or 8%. Currently, uranium production falls incredibly short of the demand. As oil resources become scarce, uranium will have more pressure put upon it as a resource. All three different scenarios have a similar course until around 2013, where they part trails. By 2020, there is a serious uranium shortage.



Let's assume a Pollyanna position and assume that uranium deposits can be doubled up in the coming decade. Figure 3 illustrates the 3 different scenarios, depending on the net increase in consumption per year. Rather than 2013 being a focal year, it is stretched out by 3 years to 2016.

Uranium supply issues aside, nuclear energy (like solar and wind) is not an economically or energetically feasible transportation fuel. Put simply, you can't power your car with a nuclear reactor in the trunk.

Even if these problems are assumed away, a large scale switch over to nuclear power is still not going to do all that much to solve our problems due to the cost and

time frames involved in the construction of nuclear power plants. It would take 10,000 of the largest nuclear power plants to produce the energy we get from fossil fuels. Source At $3-5 billion per plant, it's not long before we're talking about "real money" - especially since the $3-5 billion doesn't even include the cost of decommissioning old reactors, converting the nuclear generated energy into a fuel source appropriate for cars, boats, trucks, airplanes, and the not-so-minor problem of handling nuclear waste.

Speaking of nuclear waste, it is a question nobody has quite answered yet. This is especially the case in countries such as China and Russia, where safety protocols are unlikely to be strictly adhered to if the surrounding economy is in the midst of a desperate energy shortage. It may also be true in the case of the US because, as James Kunstler points out in his recent book, The Long Emergency:

. . . reactors may be beyond the organizational means of the society we are apt to become in the future, mainly one with much weaker central authority, less police power, and reduced financial resources... in the absence of that (cheap) oil we can't assume the complex social organization needed to run nuclear energy safely will even exist. Source

Assuming we find answers to all questions regarding the cost and safety of nuclear power, we are still left with the most vexing question of all:

Where are we going to get the massive amounts of oil and money necessary to build hundreds, if not thousands, of these reactors, especially since they take 10 or so years to build and we won't get motivated to build them until after oil supplies have reached a point of permanent scarcity?

Remember, once we get the reactors built, we still have the not-so-inexpensive task of retrofitting a significant portion of the following to run on nuclear-derived electricity:

The 800 million oil-powered cars traversing the world's roads;

The millions of oil-powered airplanes crisscrossing the world's skies;

Millions of oil-powered boats circumnavigating the world's oceans.

Scientists have made some progress in regards to nuclear fusion, but the road from success in tabletop laboratory experiments to use as an industrial scale replacement for oil is an extremely long one that, even in the most favorable of circumstances, will take decades to traverse.

For more information, see:

10,000 Nuclear Breeder Reactors Needed

Uranium in Sea Water Will Never Produce Net-Energy (PDF)

"What about Ethanol?"

Ethanol, methanol etc. are great, but only in small doses. Like all other biofuels it is grown with massive fossil fuel inputs (pesticides and fertilizers) and suffer from

horribly low, sometimes negative, EROEIs. The production of ethanol, for instance, requires six units of energy to produce just one. Source That means it consumes more energy than it produces and thus will only serve to compound our energy deficit.

In addition, there is the problem of where to grow the stuff, as we are rapidly running out of arable land on which to grow food, let alone fuel. Source This is no small problem as the amount of land it takes to grow even a small amount of biofuel is quite staggering. As journalist Lee Dye points out in a July 2004 article entitled "Old Policies Make Shift From Foreign Oil Tough:"

. . . relying on corn for our future energy needs would devastate the nation's food production. It takes 11 acres to grow enough corn to fuel one automobile with ethanol for 10,000 miles, or about a year's driving, Pimentel says. That's the amount of land needed to feed seven persons for the same period of time. And if we decided to power all of our automobiles with ethanol, we would need to cover 97 percent of our land with corn, he adds. Source

According to a Fortune Magazine article entitled "Ethanol Could Leave the World Hungry", emphasis added:

The growing myth that corn is a cure-all for our energy woes is leading us toward a potentially dangerous global fight for food. While crop-based ethanol -the latest craze in alternative energy - promises a guilt-free way to keep our gas tanks full, the reality is that overuse of our agricultural resources could have consequences even more drastic than, say, being deprived of our SUVs. It could leave much of the world hungry. ***One tankful of [ethanol] could feed one person for a year.*** Source

Finally, geologist Byron King explains how small the nation's ethanol production is when compared to its colossal petroleum consumption:
. . . the forecast annual U.S. production of 11 billion gallons of ethanol translates into about 262 million barrels of that type of fuel produced over the course of a year. And I am not even adjusting for the energy density of ethanol, which is far lower, only 59.5%, than an equivalent barrel of petroleum. . . What appears at first to be an impressive number in terms of energy supply (11 billion gallons per year) is actually relatively small. In fact, it is almost in the "rounding error" of the nation's daily liquid fuel consumption of about 21 million barrels of oil per day. Source

For more information, see

The Cellulosic Ethanol Delusion

Vinod Khosla Debunked: Ethanol is Not the Answer

The Ethanol Scam: America's Biggest Political Boondoggle

Love Affair with Ethanol Will Produce Massive Food Crisis

Large Scale Ethanol Production Could Create Food Crisis

What about Biodiesel?

If we wanted to replace even a small part of our oil supply with farm grown biofuels, we would need to turn most of Africa into a giant biofuel farm, an idea that is currently gaining traction in some circles. Obviously many Africans - who are already starving - would not take kindly to us appropriating the land they use to grow their food to grow our fuel. As journalist George Monbiot points out, such an endeavor would be a humanitarian disaster.

Some folks are doing research into alternatives to soybeans such as biodiesel producing pools of algae. As with every other project that promises to "replace all petroleum fuels," this project has yet to produce a single drop of commercially available fuel. This hasn't prevented many of its most vocal proponents from insisting that algae grown biodiesel will solve our energy problems. The same is true for other, equally ambitious plans such as using recycled farm waste, switchgrass, etc. These projects all look great on paper or in the laboratory. Some of them may even end up providing a small amount of commercially available energy at some undetermined point in the future. However, in the context of our colossal demand for petroleum and the small amount of time we have remaining before the peak, these projects can't be expected to be more than a "drop in the bucket."

See also: Biodiesel from Algae Not Viable Until Oil is $800/Barrel

Tragically, many well-meaning people attempting to develop solutions don't even understand this. As Dr. Ted Trainer explains in a recent article on the thermodynamic limitations of biomass fuels:

This is why I do not believe consumer-capitalist society can save itself. Not even its "intellectual" classes or green leadership give any sign that this society has the wit or the will to even think about the basic situation we are in. As the above figures make clear, the situation cannot be solved without huge reduction in the volume of production and consumption going on

The current craze surrounding biodiesel is a good example of what Dr. Trainer is talking about. While folks who have converted their personal vehicles to run on vegetable oil should certainly be given credit for their noble attempts at reducing our reliance on petroleum, the long-term viability of their efforts is questionable at best. Once our system of food production collapses due to the effects of Peak Oil, vegetable oil will likely become far too precious/expensive a commodity to be burned as transportation fuel for anybody but the super-rich. As James Kunstler points out in an April 2005 update to his blog "Cluster Fuck Nation", many biodiesel enthusiasts are dangerously clueless as to this reality:

Over in Vermont last week, I ran into a gang of biodiesel enthusiasts. They were earnest, forward-looking guys who would like to do some good for their country. But their expectations struck me as fairly crazy, and in a way typical of the bad thinking at all levels of our society these days.

For instance, I asked if it had ever occurred to them that biodiesel crops would have to compete for farmland that would be needed otherwise to grow feed crops for working animals. No, it hadn't. And it seemed like a far-out suggestion to them.) Their expectation seemed to be that the future would run a lot like the present, that bio-diesel was just another ingenious, innovative, high-tech module that we can

"drop into" our existing system in place of the previous, obsolete module of regular oil.

Kunstler goes on to explain that when policies or living/working arrangements are set up around such unexamined expectations, the result is usually a dangerous deepening of our reliance on cheap energy and "easy motoring."

Biodiesel advocates can get downright nasty when somebody points out any of the above described limitations of their favorite fuel. For instance, in a December 2005 article entitled, "The Most Destructive Crop on Earth No Solution to the Energy Crisis," well known progressive journalist George Monbiot, recounted his experiences attempting to point out the limits of biodiesel:

The last time I drew attention to the hazards of making diesel fuel from vegetable oils, I received as much abuse as I have ever been sent for my stance on the Iraq war. The biodiesel missionaries are as vociferous in their denial as the executives of Exxon Mobil.

If biofuels such as biodiesel and ethanol are such poor substitutes for oil, why then do you hear about them so much? The answer becomes obvious once you follow the money: the vast majority of the biofuels produced in this country are (as mentioned earlier) produced by giant agribusiness conglomerates such as Archer Daneiles Midland. Investigative reporter Mike Ruppert points out:

Archer Daniels Midland laughs all the way to the bank. With a price to earnings (P/E) ratio of 17:1, every dollar of net profit thrown into their coffers by politicians or investment advisors selling the snake oil of alternative fuels generates $17 in stock value which ADM will happily sell off before all the markets succumb to Peak Oil. That came out of your pocket whether you invested or not.

See also:

As World Turns to Biofuels, the Fight for Food Begins

"What About Synthetic Oil From Coal?"

Coal can be used to make synthetic oil via a process known as gasification. Unfortunately, synthetic oil will be unable to do all that much to soften the coming energy crash for the following reasons:

Insufficiency of Supply/"Peak Coal":

The coal supply is not as great as many assume. According to a July 2004 article published by the American Institute of Physics:

If demand remains frozen at the current rate of consumption, the coal reserve will indeed last roughly 250 years. That prediction assumes equal use of all grades of coal, from anthracite to lignite. Population growth alone reduces the calculated lifetime to some 100–120 years. Any new uses of coal would further reduce the supply. . . The use of coal for conversion to other fuels would quickly reduce the lifetime of the US coal base to less than a human lifespan. Source

Even a 50-75 year supply of coal is not as much as it sounds because coal production, like oil production, will peak long before the total supply is exhausted. Were we to liquefy a large portion of our coal endowment in order to produce synthetic oil, coal production would likely peak within 2 decades, if not much sooner. Source#1 Source #2 Source #3 Source #4 Source #5

Coal's Falling "Energy Profit Ratio":

As John Gever explains in his book, *Beyond Oil: The Threat to Food and Fuel in Coming Decades*, the production of coal will be in energy-loser within a few decades:

. . . the energy profit ratio for coal slips to 20 in 1977, comparable to that of domestic petroleum. While an energy profit ratio of 20 means that only 5 percent of coal's gross energy is needed to obtain it, the sharp decline since 1967 is alarming. If it continues to drop at this rate, the energy profit ratio of coal will slide to 0.5 by 2040.

In other words, with an EPR of .5, it will take twice as much energy to produce the coal than the coal actually contains. It will thus be of no use to us as an energy source.

Issue of Scale and Environmental Catastrophe:

The environmental consequences of a huge increase in coal production would be truly catastrophic. Caltech physics professor Dr. David Goodstein explains:

We use now about twice as much energy from oil as we do from coal, so if you wanted to mine enough coal to replace the missing oil, you'd have to mine it at a much higher rate, not only to replace the oil, but also because the conversion process to oil is extremely inefficient. You'd have to mine it at levels at least five times beyond those we mine now — a coal-mining industry on an absolutely unimaginable scale. Source

In his book, *Out of Gas*: *The End of the Oil Age*, Dr. Goodstein tells us that a large scale switch to coal could produce such severe global warming that life on planet Earth would cease to exist.

For more information, see:

Global Coal Production to Peak within 10-to-15 Years

Peak Coal is Sooner Than You Think

Scientists Begin Sounding Alarms on Dwindling Coal Supply

"Can't We Use a Combination of the Alternatives to Replace Oil?"

Absolutely. Despite their individual shortcomings, it is still possible for the world economy to run on a basket of alternative sources of energy - so long as we immediately get all of the following:

Need #1. A few dozen technological breakthroughs;

Need #2. An unprecedented degree political will, honesty, and bipartisan cooperation;

Need #3. Tremendous international collaboration;

Need #4. Massive amounts of investment capital;

Need #5. Fundamental reforms to the banking system;

Need #6. No interference or obfuscation from the oil industry

Need #7. About 25-50 years of general peace and prosperity to retrofit the world's $45 trillion dollar per year economy including transportation and telecommunication networks, manufacturing industries, agricultural systems, universities, hospitals, etc. , to run on these new source of energy.

Need #8. Rational and non-corrupt elected officials and capable government appointees to manage the generation long transition.

If we get all of the above, we might be able to get the energy equivalent of 3-5 billion barrels of oil per year from alternative sources.

That's a tremendous amount of oil - about as much as the entire world used per year during the 1950s, but it's nowhere near enough to keep our currently mammoth-sized yet highly volatile global economic system going. The world currently requires over **30 billion barrels/1.2 trillion gallons** of oil per year to support economic growth. That requirement will only increase as time goes on due to population growth, debt servicing, and the industrialization of nations such as China and India.

So even if the delusional optimistic 9-step scenario described above is somehow miraculously manifested, we're still facing a 70-90% reduction in the amount of energy available to us. A 70-90% reduction would be extremely painful, but not the "end of the world" if it wasn't for the fact that, as explained above, the monetary system will collapse in the absence of a **constantly increasing** energy supply. If a shortfall between demand and supply of 5% is enough to send prices up by 400%, what to you think a shortfall of 70-90% is going to do?

To make matters worse, even if the all of the above obstacles are assumed away, we are still faced with the problem of "economic doubling time." If the economy grows at a healthy clip of 3.5% per year, it doubles in size every 20 years. That growth must be fueled by an energy supply that doubles just as quickly. Thus, our total "energy debt" will have compounded itself by the time we have made any major strides in switching to alternative sources of energy.

"What about amazing new technologies such as thermal depolymerization, solar nanotech, space based solar arrays, and other 'energy-miracles'?"

Thermal Depolymerization:

Thermal depolymerization is an intriguing solution to our landfill problems, but since most of the feedstock (such as tires and turkey guts) requires high-grade oil to make

in the first place, it is more "high-tech recycling" than it is a solution to a permanent oil shortage.

While the following analogy is certainly a bit disgusting, it should clearly illustrate why thermal depolymerization won't do much to soften the coming collapse:

Expecting thermal depolymerization to help solve our long term energy problems makes as much sense as expecting the consumption of our own feces to help solve a long-term famine. In both cases, the energy starved party is simply recycling a small portion of the energy they had previously consumed.

On a less grotesque note, the technology is besieged by several fundamental shortcomings that those desperately hoping for a techno-messiah tend to overlook:

First, there is the problem of production costs. According to a recent article in *Fortune Magazine*, a barrel of oil produced via the thermal depolymerization process costs $80 to produce as of January 2005. To put that figure in perspective, consider the fact that oil pulled out of the ground in Saudi Arabia costs less than $2.50 per barrel, while oil pulled out of the ground in Iraq costs only $1.00 per barrel.

This means that with spot oil prices in the $50/barrel range, a barrel of oil produced via thermal depolymerization in January 2005 would have to sell for between $1,600-$4,000 per barrel to have a return on investment comparable to oil produced from Saudi Arabia or Iraq.

Oil prices of $1,600-$4,000 per barrel would put gas prices at roughly $80-$200 per gallon.

If the technology was the miracle many people are desperately hoping for, the company would likely not have needed a grant from the Department of Energy to keep its head above water. Nor would it have been the subject of an April 2005 *Kansas City Star* article appropriately entitled, "Innovative Turkey-to-Oil Plant Eats Money, Spits Out Fowl Odor."

Sky-high production costs and horrific odor problems aside, a look at the history of thermal depolymerization tends to show it will never amount to more than a tiny drop in the giant barrel that is our oil appetite. The technology was first developed for commercial use in 1996. Here we are, ten years later and there is only one thermal depolymerization plant online and it is producing less than 500 barrels of oil per day, despite record high oil prices. Even if oil production from thermal depolymerization is upscaled by a factor of 1,000, and the cost of production brought down by a factor of 10, it will still only be producing 500,000 barrels of oil per day. While that may make a tremendous amount of money for the company, it won't make much difference in our overall situation as the global need for oil is projected to reach 120,000,000 barrels per day by 2020.

If thermal depolymerization sounded "too good to be true" when you first heard about it, now you know why.

Space Based Solar Arrays

As disappointing as thermal depolymerization has been to those hoping for a techno-savior, at least it has produced a small amount of commercially available energy. The same cannot be said for space-based solar arrays, which according to NASA, are

plagued by "major technical, regulatory and conceptual hurdles" and won't see the light of day for several decades.

Even if these major hurdles are somehow cleared inside of 5 years instead of 50 years, there is still the not-so-minor problem of rewiring all of industrial civilization - including agriculture, communications, transportation, defense, health care, education, industry, government, finance/banking, etc. . . to run on space-derived solar energy.

Of course, before the global rewiring can begin, we have to find the energy, raw materials, political willingness, financial capital, etc. to get such a project off the ground. We also have to find a way to prevent China's million man standing army from snapping up all the raw materials necessary to make the transition.

Solar Nanotechonology:

While there are some promising technological advancements in solar-nanotechnology, even Dr. Richard Smalley, the scientist at the forefront of these technologies, admits we need a series of **"miracles"** to prevent a total collapse of industrial civilization. Source In the February 2005 issue of Discover Magazine, Dr. Smalley gave the following prognosis:

There will be inflation as billions of people compete for insufficient resources. There will be famine. There will be terrorism and war.

He went on to say that it will take "presidential leadership" to inspire us to pursue technologies that might alleviate this crisis.

In other words, the chances of technology saving you from the coming economic collapse are about the same as the chances of another virgin-birth taking place.

For you or any other "average" person to expect high-tech solutions to save you from the economic effects of Peak Oil is akin to a person living in sub-Saharan Africa to expect high-tech medical treatments to save their community from the effects of AIDS. These treatments are only available and affordable for super-wealthy people like Magic Johnson, not the average people in Africa.

Likewise, many of the recent technological advancements in energy production and efficiency may be available and affordable to extraordinarily wealthy people or agencies like the Department of Defense, but they aren't going to be available or affordable to the rest of us.

"What About Super Fuel Efficient and/or Electric Cars?"

Hybrids:

Hybrids or so called "hyper-cars" aren't the answer either because the construction of an average car consumes the energy equivalent of approximately 27-54 barrels (1,110-2,200 gallons) of oil. Thus, a crash program to replace the 700 million internal combustion vehicles currently on the road with super fuel-efficient or alternative fuel-powered vehicles would consume the energy equivalent of approximately 18-36 billion barrels of oil, which is the amount of oil the world

currently consumes in six-to-twelve months. Consequently, such a program (while well-intentioned) would actually bring the collapse upon us even sooner.

See also:

The Inconvenient Truth About Hybrid Cars

Electric Vehicles:

Electric vehicles are incapable of replacing more than a small fraction (5 or maybe 10%) of the 700 million internal combustion engine powered cars on the road due to the limits of battery technology. Dr. Walter Youngquist explains:

. . . a gallon of gasoline weighing about 8 pounds has the same energy as one ton of conventional lead-acid storage batteries. Fifteen gallons of gasoline in a car's tank

are the energy equal of 15 tons of storage batteries. Even if much improved storage batteries were devised, they cannot compete with gasoline or diesel fuel in energy density. Also, storage batteries become almost useless in very cold weather, storage capacity is limited, and batteries need to be replaced after a few years use at large cost.

*There is no battery pack which can effectively move heavy farm machinery over miles of farm fields, and no electric battery system seems even remotely able to propel a Boeing 747 14 hours nonstop at 600 miles an hour...*Source

Some promising research into new battery technlogies using lithium is being performed, but even the scientists at the forefront of this research admit that we are at least a generation away from these technologies being ready for the mass market.

See also:

Prius Batteries Creating Massive Environmental "Dead Zone"

Assuming these problems away, the construction of an average car also consumes 120,000 gallons of fresh water. Source Unfortunately, the world is in the midst of a severe water crisis that is only going to get worse in the years to come. Source Scientists are already warning us to get ready for massive "water wars."

Thus, the only way for us to replace our current fleet of gas-guzzling SUVs with fuel-efficient hybrids or electric vehicles is to seize control of the world's reserves of both oil and fresh water and then divert those resources away from the billions of people who already rely on them.

Even if we are willing to undertake such an endeavor, the problem will still not be solved due to a phenomenon known as "Jevon's Paradox," whereby increases in energy efficiency are obliterated by corresponding increases in energy consumption.

The US economy is a good example of Jevon's Paradox in action. Since 1970, we have managed to cut in half the amount of oil necessary to generate a dollar of GDP. At the same time, however, our total level of oil consumption has risen by about fifty percent while our level of natural gas and coal consumption have risen by even more. Thus, despite massive increases in the energy efficiency over the last 35

years, we are more dependent on oil than ever. This trend is unlikely to be abated in a market economy, where the whole point is to make as much money (consume as much energy) as possible.

"What About Large-Scale Efforts at Conserving Energy or Becoming More Energy Efficient?"

Amazingly, such efforts will actually make our situation worse. This probably makes absolutely no sense unless you understand how the modern day banking and monetary system works. To illustrate, let's revisit Jevon's Paradox, explained above, with an example:

Pretend you own a computer store and that your monthly energy bill, as of December 2004, is $1,000. You then learn about the coming energy famine and decide to do your part by conserving as much as possible. You install energy efficient lighting, high quality insulation, and ask your employees to wear sweaters so as to minimize the use of your store's heating system.

After implementing these conservation measures, you manage to lower your energy bill by 50% - down to $500 per month.

While you certainly deserve a pat-on-the-back and your business will certainly become more profitable as a result of your conservation efforts, you have in no way helped reduce our overall energy appetite. In fact, you have actually increased it.

At this point, you may be asking yourself, "How could I have possibly increased our total energy consumption when I just cut my own consumption by $500/month? That doesn't seem to make common sense . . .?"

Well think about what you're going to do with that extra $500 per month you saved. If you're like most people, you're going to do one of two things:

Option #1. You will reinvest the $500 in your business. For instance, you might spend the $500 on more advertising. This will bring in more customers, which will result in more computers being sold. Since, as mentioned previously, the average desktop computer consumes 10X it's weight fossil-fuels just during its construction (Source) your individual effort at conserving energy has resulted in the consumption of more energy.

Option #2. You will simply deposit the $500 in your bank account where it will accumulate interest. Since you're not using the money to buy or sell anything, it can't possibly be used to facilitate an increase in energy consumption, right?

Wrong. For every dollar a bank holds in deposits, it will loan out between six and twelve dollars. Source These loans are then used by the bank's customers to do everything from starting businesses to making down payments on vehicles to purchasing computers.

Thus, your $500 deposit will allow the bank to make between $3,000 and $6,000 in loans - most of which will be used to buy, build,or transport things using fossil fuel energy.

Typically, Jevon's Paradox is one of the aspects of our situation that people find difficult to get their minds around. Perhaps one additional example will help clarify it:

Think of our economy as a giant petroleum powered machine that turns raw materials into consumer goods which are later turned into garbage.

If you remove the machine's internal inefficiencies, the extra energy is simply reinvested into the petroleum supply side of the machine. The machine continues to consume petroleum and spit out garbage but now at an even faster, "more efficient" rate.

The only way to get the machine to consume less petroleum is for whoever owns/operates the machine to press the button that says "slow-down." However, since we are all dependent on the machine for jobs, food, health care, subsidies for alternative forms of energy, etc., nobody is going to lobby the owners/operators of the machine to press the "slow-down" button until it's too late.

Eventually (sooner than later) the petroleum plug will get pulled and the machine's production will sputter before grinding to a halt. At that point, those of us dependent on the machine (which means all of us) will have to fight for whatever scraps it manages to spit out.

To be clear: conservation will benefit you as an individual. If, for instance, you save $100/month on your energy bills, you can roll that money into acquiring skills or resources that will benefit you as we slide down the petroleum-production downslope. But since your $100 savings will result in a net increase in the energy consumed by society as a whole, it will actually cause us to slide down the downslope faster. (Note: for examples of Jevon's Paradox in action in other areas, click here.)

For more information:

Energy Tribune article on Amory Lovins and Jevon's Paradox

"What's likely to happen to the economy?"

The US economy is particularly vulnerable to the coming oil shocks as we consume a greater proportion of the world's oil than any other nation. The unparalleled prosperity experienced in this country during the last 100 years was built entirely on cheap oil. Oil was discovered in 1859 but did not become a truly important industrial fuel until Henry Ford began mass producing automobiles in the early 1900s. The mass production of automobiles became a cornerstone of the US economy while allowing people to move out of the cities and into the suburbs.

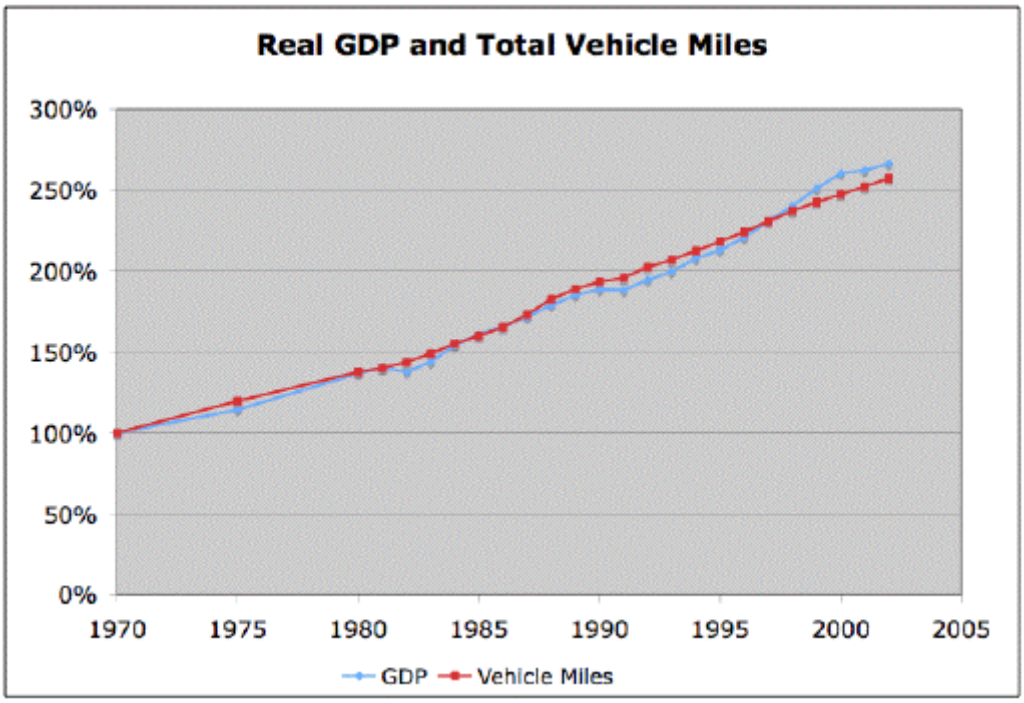
The expansion of the suburbs fueled the real estate and housing booms of the 20th century, which in turn fueled the US steel, copper, construction, etc industries. A system of finance sprung up that facilitated these booms while simultaneously becoming dependent on them.

These trends are still driving the US economy here in the 21st century:

Fact #1. According to the American Automobile Manufacturers Association, one out of every seven jobs in the US is dependent on automobile manufacturing. Source

Fact #2. According to an August 2005 report by Merrill Lynch, half of the new jobs created in the US since 2001 are dependent on (suburban) housing construction.

Most of the automobile and home purchases in this country are made with interest-bearing loans which, absent a hyperinflationary monetary policy, can only be paid back in the aggregate if the economy grows. The US economy, at least in its current incarnation, can only grow if people can afford to drive more. As researcher Stuart Staniford has shown in a series of graphs originally published on The Oil Drum, a strong causal (if not virtually direct) relationship exists between miles driven and economic growth:



In short, the US has built its entire infrastructure and way of life under the assumption oil would always be cheap and plentiful. The U.S. is no more prepared for Peak Oil in 2007 than New Orleans was prepared for Hurricane Katrina in 2005.

As far as what the specific economic effects will be, consider the conclusions a group of top officials came to when they gathered in Washington D.C. to conduct "Oil Shockwave", a simulation exercise aimed at examining how the US economy would be effected by a small (3.5 mbd) disruption in the global oil supply. Professor Michael Klare, author of *Resource Wars: The New Landscape for Global Conflict* summarizes their conclusions as follows:

A 3.5 mbd reduction in supply would cause:

#1. Global oil prices exceeding $150 per barrel.

#2. Gasoline prices of $5.00 or more per gallon.

#3. A spike in the consumer price index of more than 12%.

#4. A decline of over 25% in the Standard & Poor's stock index.

#5. A crisis with China over Taiwan.

#6. Increased friction with Saudi Arabia over US policy toward Israel.

Remember, the simulation involved the removal of only 3.5 million barrels per day of oil from the global market. For a global economy that consumes 83 million barrels per day, this is a reduction in supply of only 4.2%. What's going to happen when the supply is reduced by that much or more every year?

Given that any large scale plan to mitigate these problems would need to have been initiated on a global scale at least 20 years ago, it is hard to envision the economy not collapsing as a result of these trends.

How are people likely to react to this?

As the US economy disintegrates, one is hard pressed to imagine a scenario when violence bordering on chaos does not become widespread. The anticipation of massive unrest resulting from declining oil production may be the real reason why the Department of Homeland Security recently contracted with a subsidiary of Halliburton to build massive new domestic detention camps.

In 1985, the authors of *Beyond Oil: The Threat to Fuel and Food in the Coming Decades,* warned us of such possibilities:

A stagnant or shrinking economy will have a major effect on society's expectations. With few exceptions, each generation in the United States has become materially better off than the preceding one. This pattern of increasing wealth has become an indelible part of the American Dream; a higher standard of living than our parents is practically a birthright. These expectations are the standard against which actual performance is judged. During times of failed expectations, a society is especially vulnerable to a person or philosophy promising to restore it to its former glory. The fall of the Weimar Germany is probably the best example. Source

In 2004, commentator Robert Freeman explained how a decline in oil production will affect the global economy:

. . . civilization will be stupendously different. The onset of rapid depletion will trigger convulsions on a global scale, including, likely, global pandemics and die-offs of significant portions of the world's human population. The "have" countries will face the necessity kicking the "have-nots" out of the global lifeboat in order to assure their own survival. Source

In 2006, geologist Jeremy Leggett explained how newly-empowered fascists are likely to use various tools of repression to wage this battle for survival:

By 2010 democracy will be on the run ...economic hardship will bring out the worst in people. Fascists will rise, feeding on the anger of the newly poor and whipping up support. These new rulers will find the tools of repression -- emergency laws, prison camps, a relaxed attitude toward torture -- already in place, courtesy of the war on terror. Source

In 2007 John Robb, a former U.S. Special Forces mission commander, explained how this battle for survival is likely to play out in North America, neighborhood by neighborhood:

Wealthy individuals and multinational corporations will be the first to bail out of our collective system, opting instead to hire private military companies, such as Blackwater and Triple Canopy, to protect their homes and facilities and establish a protective perimeter around daily life.

Members of the middle class will follow, taking matters into their own hands by forming suburban collectives to share the costs of security--as they do now with education--and shore up delivery of critical services. These "armored suburbs" will deploy and maintain backup generators and communications links; they will be patrolled by civilian police auxiliaries...

As for those without the means to build their own defense, they will have to make do with the remains of the national system. They will gravitate to America's cities, where they will be subject to ubiquitous surveillance and marginal or nonexistent services. For the poor, there will be no other refuge. Source

For more information, see:

Members of U.S. Congress warned of impending econmic collapse in April 2008

British military preparing to control citizen "flash mobs" as economy collapses

Britain's year 2000 fuel riots offer a chilling preview of America's future

Energy-fascism will effect nearly every person on the planet

Pentagon says climate change could produce global anarchy

"Is there any reason to remain hopeful?"

As far as the fate of the globalized economy in anything resembling its current figuration, the most honest answer is "no." Our political processes are entirely controlled by massive corporations in the petroleum, defense, automotive, agribusiness, construction, and media industries. Most of the responses to this situation that would be favorable to you and me (such as mass transit or large scale urban gardens) would be at odds with the interests of these corporations. Thus, there is little realistic hope they will ever be aggressively pursued until it is too late. The end result is likely to be a large scale societal collapse not completely unlike what happened to the Roman, Viking, Mayan, and Easter Island societies.

For more information, see:

Collapse: How Societies Choose to Succeed or Fail

The Collapse of Complex Societies

As far as the fate of you and your family, that is a different story. Assuming you are willing to stay flexible, work hard, and encounter some good luck along the way, yes there is still hope you can carve a satisfactory existence out of some very unfavorable circumstances.

"What can I do to prepare? What do I do now?"

Attempting to prepare for a catastrophe of this magnitude is daunting to say the least. What you can or will do to prepare for this situation will depend on your age, health, marital status, geographic location, financial situation and other factors too numerous to mention. About the best I can do is point you to some articles and resources you might to be profitable reading in terms of generating your own options and plans. I maintain a continually updated repository of such articles at the LATOC Prepare page.

Best of luck,

Matthew David Savinar
www.lifeaftertheoilcrash.net