



## MARCH 2008 TREND EVENTS

**End of the Oil Age**, By John Lippert and Alan Ohnsman, *Bloomberg Markets*, March 2008 —  
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Bill Reinert, an innovator of Toyota's gasoline-saving Prius, says carmakers aren't moving fast enough to cope with global warming and \$100-a-barrel crude. Hybrids, plug-ins and electric-only vehicles must take center stage to help the planet avoid environmental and economic disaster.

Bill Reinert, who helped design Toyota Motor Corp.'s Prius hybrid, hovers in a helicopter 1,000 feet over Fort McMurray, Alberta. On this clear November morning, he's craning for a look at one of the world's largest petroleum reserves where there's not an oil well in sight. Instead, in a 2-mile-wide pit below, trucks head to refineries with loads of sand weighing more than Boeing 747s. Yellow flames shoot skyward as 900-degree-Fahrenheit (482-degree-Celsius) heat liquefies any embedded petroleum. Floating scarecrows and propane-powered cannons do their best to chase migrating birds from lethal wastewater ponds. Eventually, nuclear reactors may surround the crater 270 miles (435 kilometers) northeast of Edmonton, Alberta, delivering the power required to wring oil from sand... "This is what the end of the age of oil means," says Reinert, 60, who, as national manager for advanced technology at the sales unit in Torrance, California, plans the vehicles Toyota will make in a quarter century. "The car-based culture, the business-as-usual of building cars and trucks, is going to change dramatically."

Since Henry Ford introduced the moving assembly line in 1913, the world's automakers have relied on a single source of power — the gasoline-dependent internal combustion engine. Today, the twin threats of \$100-a-barrel oil and global warming are convulsing an industry addicted to cheap, abundant petroleum. Auto companies, already hurt in 2007 by the lowest U.S. demand in a decade, are struggling to perfect cars that run on ethanol, diesel, natural gas, hydrogen, and household electricity. They're under the gun from California and more than a dozen other states to cut carbon exhaust by 2020 with vehicles that must get 44 miles per gallon (19 kilometers per liter) of gasoline, about double today's average. On Dec. 19, President George W. Bush signed a law that mandates fuel efficiency of 35 mpg nationwide by that year.

Reinert says automakers are endangering themselves by basing sales and profits on the big, fast cars that many U.S. customers say they want in 2008. In five years, as oil shortages and global warming intensify, car companies may be out of step with drivers' demands for fuel-efficient vehicles. Even worse, degrading stretches of the planet like Fort McMurray will only delay — not prevent — the time when the world must function in a post-peak petroleum economy... Canada's oil sands region may eventually provide a quarter of U.S. crude oil demand, currently at 21.3 million barrels per day, Reinert says. "At that point, the environmental impacts are totally irreversible," he says. "You turn this area into an ecological sacrifice zone."

Toyota investors, whose shares tumbled 27 percent to 5,630 yen in the 12 months ended on Jan. 11, say the company's priority must be weathering a weak U.S. market, not chasing breakthroughs in green technology. Last year, U.S. sales declined 2.5 percent to 16.1 million vehicles industry wide. "There's cake, and there's frosting," says Jeffrey Scharf, president of Santa Cruz, California-based Scharf Investments, a fund firm that owns Toyota stock among its \$700 million in assets. "Hybrids are more into the area of frosting."

Shareholder ambivalence about clean cars is only one hurdle to surviving the end of easy oil. Reinert, a former Navy submariner who stands 6 feet 1 inch (1.85 meters) tall, says he lies awake at 2:30 a.m. wondering whether he's making the right recommendations for the future of Toyota — and the planet. His suggestions run from building lightweight compacts and plug-in hybrids to redesigning smog and people-choked cities and populating them with electric-only cars.

Reinert says nobody can say for sure how the separate tailpipe emission, fuel economy, and manufacturing regulations promulgated worldwide by multiple levels of government will affect the environment. There's no

blueprint for the impact of increasingly scarce oil on a U.S. economy already laboring with a mortgage crisis and a dropping dollar. Add industrialization in China and India, and the number of cars and trucks worldwide may double to 2.1 billion by 2030, according to the Paris-based International Energy Agency.

"We don't have a past, a history, or a database that allows us to explore the simultaneous impact of recessions, disruptions to the energy supply, and climate change," says Reinert, who spent six years in the 1980s maintaining solar- and wind-powered telephone towers in Colorado's Rocky Mountains. "We don't have the legislative, regulatory, financial, or product-planning tools." Toyota is making excuses for not moving faster on fuel efficiency, says Daniel Becker, a Washington lawyer and former head of global warming programs at environmental group Sierra Club. Since Toyota's 2003 hit with the second-generation Prius, which gets as much as 45 mpg in city driving, the company has slid backwards, he says. In early 2004, Toyota and other carmakers refused to negotiate with state legislators before California developed its carbon restrictions. In December 2004, they sued to strip California of its ability to enact its own limits, prompting counterclaims that may end up in the U.S. Supreme Court. "People like Bill Reinert understand the issues," Becker says. "That hasn't stopped the company from turning to large trucks and SUVs to boost sales."

Reinert defends Toyota's need for sport utility vehicles, minivans, and pickups, which contributed 42 percent of its 2.6 million U.S. vehicle sales in 2007. The company earns about \$6,000 before taxes in the U.S. on an SUV. That compares with a \$1,000 profit on a Corolla and a small loss on a Prius, says David Healy, an analyst at New York-based Burnham Securities Inc. The Toyota City, Japan-based company, made ¥450.9 billion (\$4.1 billion) in the three months ended on Sept. 30 compared with ¥405.7 billion a year earlier. Sales rose 11.3 percent to ¥6.49 trillion.

"Without these profits, where does the investment capital come from for our research on plug-ins or fuel cells?" Reinert asks. Yet he fears Toyota and other carmakers may be too bureaucratic and profit driven to prepare for the energy-constrained future. Toyota's U.S. sales headquarters employed 400 people when Reinert was hired in 1990; today, 8,000 work there, and the U.S. is Toyota's most profitable market.

"There's a tension between pickups and hybrids within Toyota," says David Schearer, chief scientist for California Environmental Associates and a consultant on the Prius. "They want to do the right thing, but the Prius is a relatively small piece in terms of overall sales volume." Prius sales totaled 181,221 in the U.S. last year compared with 30,000 in Toyota's original forecast when the car went on sale in 1997.

Toyota may have become the world's largest automaker in 2007, building 9.51 million cars and trucks versus an estimated 9.26 million for General Motors Corp. The U.S. automaker planned to announce final results on Jan. 23. Given Toyota's craving for growth and profits, Reinert says he feels like a 21st-century Cassandra, endowed with the gift of prophecy about the oil-related crises to come but fated not to be believed.

The environmental desecration at Fort McMurray and the dangers in petroleum-rich countries such as Iraq and Saudi Arabia show why it's foolish to brush off warnings about an energy-depleted future, says Jan Kreider, an engineering professor at the University of Colorado at Boulder who had Reinert as a graduate student. "We're going to have crisis on top of crisis before energy policies change," he says. "Americans have this shock mentality where they do what they want to do for as long as they can and then set up massive programs to fix everything in a few years."

So far, Americans are embracing small steps such as switching to fluorescent light bulbs. Meanwhile, at Fort McMurray's pit mines, it takes 2 tons of sand, 250 gallons (947 liters) of water, and 1,400 cubic feet (39.6 cubic meters) of natural gas to produce one barrel of synthetic crude, says Peter Wells, director of research firm Neflex Petroleum Consultants Ltd. in Abingdon, England. That's enough water for a day's use for a U.S. family of four and enough natural gas for 5.6 days. The gas is burned to power a process that extracts a tarry substance called bitumen from the sand and then refines it into synthetic crude... In turn, each barrel generates as much as 110 kilograms (240 pounds) of carbon dioxide equivalents, the same as refining three barrels of traditional light crude.

"When you're schlepping around two tons of sand for a barrel of crude, it shows that conventional oil is already well into depletion," says Jeffrey Rubin, chief economist at CIBC World Markets Inc. in Toronto.

"Price will ultimately ration demand. People won't be able to afford to drive." ... Canadian Association of Petroleum Producers Vice President Greg Stringham generally agrees with Wells's numbers. He says each barrel of synthetic crude requires only 900 cubic feet of natural gas and puts out about 96 kilograms of carbon dioxide equivalents. "It's definitely true that the era of cheap and easy oil is over," says Brad Bellows, spokesman for Suncor Energy Inc., which opened Fort McMurray's first commercial oil sands mine in 1967. "Industry is looking offshore and to unconventional sources like oil sands."

Oil sands facility operators are working to minimize environmental harm by recycling water faster and using the refining process to produce heat that's now generated with gas, Stringham says. They're also *trying* to sequester carbon dioxide emissions underground and quickly restore land to its original condition.

Wells predicts world oil production will peak at about 100 million barrels a day in about a decade. By 2030, output will fall to today's level of 87 million barrels. Declining production will collide with rising demand, which could hit 118 million barrels a day by 2030 if trends were to continue, the U.S. Energy Information Administration forecasts. "When production levels off, if the price is \$200 or \$300 a barrel, then that's what people will pay," Wells says.

Toyota's rivals are struggling with the same predictions. "The biggest risk is the risk of a recession, of a shock to the global economy," says Larry Burns, vice president of research and development at General Motors Corp. "The second risk is China... China's growth is unbelievable, and it depends on energy. In every country that's providing China with commodities, you're seeing record years in car sales.

GM plans to sell 16 models of gas-electric hybrids in North America by 2011. One of these, a Silverado pickup, gets 40 percent better fuel economy in city driving than the gasoline version, which gets 15 mpg.

At Nissan Motor Co., 25 percent of sales in five years may come from electric cars, hybrids, and clean-burning diesels, up from 5 percent today, Chief Executive Officer Carlos Ghosn says. "I don't consider climate change or oil prices as a threat," he says. "I consider it an opportunity." (**Catastrophe = PROFIT**)

In an industry first, Honda Motor Co. will start leasing its Clarity fuel cell car in California this year. Fuel cells create electricity in a chemical process that combines hydrogen and oxygen, with water vapor as the only by-product. The Clarity has a top speed of 100 miles an hour, a range of 270 miles, and lease payments of \$600 a month.

Such advances may not come soon enough, says Reinert, who counts Toyota Executive Technical Adviser Norihiko Nakamura as an ally who shares his urgency. Nakamura, one of a handful of occupants on the top floor of Toyota's Higashi Fuji Technical Center near Mt. Fuji, says he worries the world's oceans could get so hot that they'll release carbon instead of storing it — with catastrophic consequences for human life. Nakamura takes his own measurements of atmospheric pollution and is scouring the world for alternative fuels. He's targeting hydrogen, electricity, or ammonia as replacements for petroleum to ensure that auto, aircraft, and shipbuilders remain viable for another century.

"Oil and natural gas are getting scarce, and there's global warming, so we need something that's carbon free," says Nakamura, 65, whose white hair almost reaches his shoulders. "Toyota has a sense of crisis that there are only several years left to do something about this."

The United Nations' Intergovernmental Panel on Climate Change, which shared the 2007 Nobel Peace Prize with former U.S. Vice President Al Gore, says **carbon emissions must peak in 2015 to avoid irreversible climate shifts**. In its November 2007 report, the panel concluded that emissions of greenhouse gases at or above current rates will cause changes in the 21st century that are likely to be larger than those in the 20th century. Among them are probable increases in heat waves, heavy precipitation, and cyclones; reduction in the size of areas covered by snow; and a decrease in Arctic sea ice.

Reinert says that without action, oil may become so expensive that the world would resemble the one in Blade Runner. In the 1982 film, the rich live hundreds of stories high and the poor walk dark, rain-soaked streets. Or the lack of oil may cause the breakdown of social order depicted in the 1979 movie Mad Max.

Reinert says Fort McMurray provides a window into such fictional portrayals. He predicts that the clamor for alternative conventional petroleum, such as oil sands and ethanol, will make climate change and water shortages worse... Signs of indelible change already are emerging at Fort McMurray, whose soil was saturated with petroleum when landmasses collided to form the Rocky Mountains millions of years ago. Oil-related development has displaced 330 square kilometers (127 square miles) of previously untouched forest rich with spruce trees and peat bogs. The population has doubled to 64,441 in 10 years, with another 20,000 people living in mining and construction camps. Refineries, mines, and so-called *in situ* extraction, in which underground oil sands are melted with high-pressure steam or set afire, have drawn investments totaling 155.6 billion Canadian dollars (US\$152.6 billion) since 1997.

"It's an enterprise of epic proportions, akin to building the pyramids or China's Great Wall," Canadian Prime Minister Stephen Harper said at a Canada-United Kingdom Chamber of Commerce meeting in London last year... In total, 175 billion barrels of recoverable oil exist in an area the size of Florida, Stringham says. That compares with 259 billion barrels in Saudi Arabia. "It won't be a lack of resources that causes a shift away from oil," Stringham says. "There's lots of oil."... Daily output of oil from Fort McMurray may reach 6 million barrels by 2050, up from 1.2 million last year, Wells says. Some of the natural gas to fuel production could come from the proposed \$16 billion Mackenzie Valley Pipeline running 800 miles from Alberta north to the Beaufort Sea. Today, most of Fort McMurray's oil is transformed into gasoline, diesel, and jet fuel in a network of refineries stretching to Edmonton, Denver, Chicago, and Houston.

Reinert says it's not too late to mitigate the environmental toll of such development. Part of the answer lies in more Corolla-style compacts with light materials and four-cylinder engines. Part lies in hybrids such as the Prius and the Camry. Governments and corporations will have to get better at setting priorities. Carbon emissions from buildings can be reduced for \$50 a ton with measures like insulation. In comparison, it costs \$2,000 a ton to cut carbon tailpipe emissions by redesigning cars, he says. Cities must be redesigned, too. People need to rely on mass transit and live closer to where they work. "In a place like New York, there may not be a role for our traditional product — I don't mean today but 20 or 30 years from now," he says.

Right now, Reinert's main job is designing the features that will attract customers to plug-in hybrids. In the prototype stage, plug-ins resemble the Prius with a small door on their side for hooking to an electrical outlet. "The transportation sector worldwide is 95 percent dependent on liquid hydrocarbons," says Gary Kendall, a World Wildlife Fund energy analyst in Brussels. "The way to reduce this dependence is with a grid-connected vehicle." Electricity from nuclear power could be sent directly to the vehicles instead of digging up oil sands to produce liquid fuel, he says.

"I'm confident there will be an industry-leading plug-in from Toyota," Reinert says. The company plans to start leasing plug-ins to global fleet customers by 2010, he says. Plug-ins can't arrive sooner because Toyota hasn't figured out how to mass-produce lithium-ion batteries that are affordable, durable, and powerful enough for cars, Toyota President Katsuaki Watanabe said in Detroit on Jan. 14... Kendall says the company can work faster. "Toyota could bring plug-ins to market very quickly, but perhaps it's not in their business interest," he says. "They're milking the technological edge they have now with the Prius."... The delay in consumer sales until after 2010 means Toyota must endure taunts from GM Vice Chairman Robert Lutz. He told reporters at the Los Angeles auto show in November that his company will test-drive plug-ins in March 2008 and mass-produce them in November 2010. "We'll find out who is right and whose credibility takes a serious dent," Lutz said.

Menahem Anderman, president of Advanced Automotive Batteries, a consulting firm in Oregon House, California, predicts Toyota will introduce plug-ins first. Toyota spent \$7.7 billion on research and development in 2006, the most of any public company surveyed worldwide by Booz Allen Hamilton Inc., a New York-based management consulting firm. To move beyond automakers' lead-acid and nickel-metal batteries, Toyota has as many as 300 in-house engineers studying the chemistry of lithium batteries, Anderman says. GM has no in-house researchers for lithium chemistry, relying instead on suppliers, according to Joseph LoGrasso, GM's engineering group manager for plug-ins. GM spent \$6.6 billion on research in 2006.

For all of the recent research, the Prius may still be the world's cleanest car. During its lifetime, it emits 110,000 pounds of carbon dioxide equivalents, including the amount put out during manufacturing, says Kreider, the Colorado professor. That compares with 180,000 pounds for a Camry and 310,000 pounds for

a Tundra pickup... "Toyota's leading position in the hybrid arena remains one of their key competitive advantages, especially given the recent high-oil-price environment," says Wendy Trevisani, who manages Santa Fe, New Mexico-based Thornburg Investment Management Inc.'s \$17.4 billion International Value Fund. As of July, the fund held 8 million Toyota shares.

Some new Toyota vehicles are less friendly to the environment. The 2009 Corolla with a 1.8-liter engine is 193 pounds heavier than its predecessor, with just a 1-mpg improvement in highway fuel economy. The Lexus RX400h hybrid SUV gets 24 mpg on the highway, 2 miles more than the gas-only version, and, at \$42,689, costs 10 percent more. "We're focused on increasing our profits, and the U.S. is key," Reinert says. "This necessarily limits some of the options we might have pursued, especially as we move toward being a volume manufacturer, and especially in a down market."

If Reinert is sure of anything, it's that Toyota can't go into reverse. Since 1950, the world has been blessed with an eightfold increase in oil production. Yet the peak discoveries for new oil came in 1962, petroleum consultant Wells says. Total production outside the former Soviet Union and the Organization of Petroleum Exporting Countries topped out two years ago, he says. Oil in the former Soviet Union will reach its highest level in about five years; OPEC will peak in about 10, he says... In the interim, nations will be more dependent on the Middle East, where getting oil is complicated by war, political turmoil, and declining output from mature wells. "After a series of incidents in the Persian Gulf, or a low-level nuclear exchange that shuts off oil supplies, you wouldn't have a short-term disruption like Katrina," Reinert says. "You would have a profound one- or two- or three-year period in which economies and governments fail."

Reinert joined Toyota to run energy operations at the California sales headquarters in 1990. He spent eight years badgering top brass to let him use power electronics to design cars. He helped imbue the Prius with a hatchback and fold-down back seats for maximum cargo space and acceleration of 0-60 miles per hour in 10.4 seconds — 4 seconds faster than its predecessor... Reinert won the assignment of chauffeuring actress Charlize Theron in 2004 on the night she won an Oscar for *Monster*. He remembers how she hugged her mother when paparazzi pounded on their fuel cell-powered SUV. The Prius earned Reinert the right to speak on environmental trends inside Toyota and to outside groups. "Having a voice that may not be the company line is ultimately good for Toyota," says Jim Lentz, president of Toyota's U.S. sales unit. Reinert believes in changing individual behavior. After the oil tanker *Rebecca* sank off the Galápagos Islands in 2001, he, Toyota, and the World Wildlife Fund joined Ecuador in a multiyear cleanup. They designed an oil delivery dock to replace the leaking structure built during World War II. They set up recycling centers for motor oil that would otherwise be dumped into the ocean and household trash that would be burned. "We could actually make a measurable difference in a geographically defined area," Reinert says.

There's evidence in his personal life that such efforts may not be enough. Reinert and his wife, Pam, can't walk their dogs around their home in Rancho Santa Margarita, California, because forest fires exacerbated by drought and global warming are driving coyotes down from the nearby Saddleback Mountains... When Reinert lies awake, he worries about the Piceance Basin, where he put his life back together after doing jail time and learned to be a hands-on scientist. Petroleum hovering around \$100 a barrel is rekindling the 1970s oil shale boom. Roads and tunnels are snaking into the mesas around Grand Junction; natural gas derricks dot the horizon. Shell Oil Co. is testing ways to heat underground shale to 400 degrees Celsius and capture the melted oil inside rock frozen solid by pumped-in refrigerants. Daily output of synthetic crude from Colorado, Utah, and Wyoming may reach 1 million barrels a day by 2040, Wells says... Flying over the Piceance in a Cessna 182 in November, Reinert searches for the bald eagles, wild horses, and elk he knew in his youth. He can't find any. He studies the creeks that used to feed the Colorado River from melting snowpacks and finds them dry. The river, which would nourish oil shale extraction and the growing populations in Las Vegas, Los Angeles, and Phoenix, is narrower than the I-70 freeway alongside it. Strip mines cut straight down into solid rock even after 30 years of reclamation. Another oil shale boom would further deface the Piceance. "I feel an abject sense of hopelessness that I can't do anything to stop this," he says. "I feel like I've lost part of myself, like something's been amputated."

Toyota's technical triumph with the petroleum-saving Prius shows carmakers can be a force in mitigating the environmental damage Reinert worries about. He says that's only a start. As threats from the end of easy oil multiply and global warming accelerates, the desecrated forests and scarred earth at Fort McMurray may be harbingers of what's to come if automakers and politicians fail to act.

**"The Grip of Death: a study of modern money, debt slavery and destructive economics",**  
by Michael Rowbotham (Jon Carpenter Publishing, 1998) — **THE CLAIRE FOSS JOURNAL**  
<http://www.cfoss.com/grip.html>

Chapter 1: The debt-based financial system: When a profession fails to deliver, people inevitably suffer. When that profession happens to be the study and practice of economics, the entire world suffers. The deluge of social and environmental problems brought on by humanity's endeavors to be 'economic' suggest that the economics profession is not just failing — its advice is proving mind-bogglingly destructive... Our government officials, political economists, and newspaper columnists appear intellectually content with the current arrangements, oblivious to the depth of the crisis that economics presents to the world. They still happily argue about the dangers of 'overheating' or needing to 'cool off', as if an economy that functions along the lines of a domestic boiler or kitchen toaster provides an acceptable basis for coordinating human activity. They also appear perfectly satisfied to continue with 'business as usual', without questioning the most startling and contradictory statements issuing from the world of money and economics.

For example, every country in the world suffers from a massive and constantly increasing national debt. Britain has a national debt that is fast approaching £400 billion, Canada's debt has reached \$560 billion, and Germany's now exceeds 500 billion deutschmarks. So are these poor countries? No more so than Japan with a debt equivalent to two trillion dollars or America with a national debt now in excess of five trillion dollars. Since the poorer nations are crippled by their indebtedness to international lending institutions and foreign banks, the overall picture is of a world suffering acute and ever worsening insolvency... But this is really quite illogical and absurd... The question almost asks itself: If all the nations of the world are in debt, who are they in debt to? Rationally, where there is a debtor, there should be someone else who is a creditor. If every nation is in debt, who, precisely, owes whom? In addition to the logical absurdity of all nations being simultaneously insolvent, such escalating national debts are a complete contradiction of the real and obvious wealth of these nations. This is underlined by the fact that the nations which run the largest national debts are those with the most advanced economies. What can we say to the developing nations struggling under the burden of their debt — nations who have copied our economic institutions and aspire to a life free from poverty? 'Work hard, and one day your debt will be as small as America's — a mere five trillion dollars!'

These are not the only contradictory financial statements to go virtually unchallenged by the majority of economists. In addition to mounting national debts, the level of private debt shouldered by people and businesses is also escalating. The total of loans, mortgages, overdrafts, and credit card purchases is massive, and in Britain stands at some £780 billion, £500 billion of which is borne by ordinary people. The Americans, supposedly the richest citizens ever to walk the face of the planet, are the most heavily indebted people of the world, carrying mortgage debts that currently total \$4.2 trillion. They are said to go shopping with their credit cards bolstered. As with national debts, such escalating domestic debt is a complete contradiction of the wealth present in those nations... Any realistic assessment of the situation must conclude that America, Britain, and the many other developed nations possess fantastically wealthy economies. Such extensive personal debt is a complete misrepresentation of the true situation. What is more, nations are becoming more, not less, wealthy all the time as further technological advances compound their already enormous ability to produce; but where is the financial reflection of this development? And why is there no natural feedback of this real wealth in a decreased pressure to work and to produce? The financial reflection of wealth does not exist; in fact, the financial system registers the complete opposite of wealth. There is only increasing debt subjecting our economies and those who work in them to increasingly intense financial pressure and monetary poverty.

### **Trust in money**

It is assumed by everyone — and clearly by economists — that money is a neutral and accurate medium, that money does no more than reflect the economic facts. This trust is shown by the unquestioning acceptance, not just of unrealistic debts, but of a whole range of other monetary data. For example, America is currently expanding its already colossal output — but not to supply itself — simply driven by the need to obtain export revenues to improve its balance of payments. At the same time, many Third World nations are striving to develop a stronger export sector, again not producing goods for themselves but to improve their balance of payments in order to fund debt repayments. Thus, we have the bizarre situation in

which the richest nation in the world is seeking to increase output simply to remain financially viable, whilst the poorest nations, who desperately need to improve their domestic agriculture and industrial infrastructure, are orienting their economies towards a glutted world market — all this being driven by monetary considerations. This again places economics, and financial economics in particular, quite simply in the realm of unreality... But this perennial shortage of government funds, enshrined in the repetitive cry “We haven't got the money,” has got to be challenged. **Money is a man-made device**, and for an entire economy to be perpetually in the position of not being able to do what it wants, simply for lack of bits of paper with numbers on them, is strong evidence that the shortage of those bits of paper and numbers lacks all validity. Consider some of the decisions taken in pursuit of cuts in expenditure... The building is already there, the equipment is in place, the people who are employed there can be good at their jobs, providing a much valued service to local residents — and then along comes a “Grey Suit” who tells us that the hospital, college, library, post office, coastguard station, research laboratory, swimming pool, or whatever has to be closed for lack of money; but in what possible sense can we not afford what we already have, and which is already there? A town can be in desperate need of a school, community centre, or repairs to its roads and drains. The raw materials may be lying idle in a builder's yard, people may be desperate for work, but there isn't enough money... so we can't do it. In what possible sense can we not afford to achieve what we plainly can in physical terms?... This situation is accepted because it is assumed that monetary statements are valid, and that a lack of money means a lack of something vital — but what is missing? If the lack of money were paralleled by a lack of manpower, raw materials, desire, or demand, that would at least be rational.

This book challenges the widespread assumption that the monetary statements and statistics commonly used as the basis of economic decisions are valid. The general confidence in modern money and monetary judgments is utterly misplaced; the apparent neutrality of the present financial system is quite false. Modern money is not a neutral medium; indeed, the way in which money is currently created gives it a specific nature and serious bias. Modern money actually operates within its own detached and limited mathematical world. It projects its own version of “the facts;” its own version of an economy; its own reality. It tells us what we can and cannot do; it tells us what we can and cannot afford, but these amount to demonstrably false, irrelevant, and misleading statements.

**The origin of debt:** It is actually not in the least surprising that nations are chronically in debt... To be direct and precise, modern money is created in parallel with debt. The reason for the failure of economists to question patently invalid monetary data becomes clear — there is a total acceptance by them of the most extraordinary method for supplying money to the modern economy... Money loaned by a bank is not a loan of pre-existent money; money loaned by a bank is additional money created. The stream of money generated by people, businesses, and governments constantly borrowing from banks and other lending institutions is relied upon to supply the economy as a whole. Thus, the supply of money depends upon people going into debt, and the level of debt within an economy is no more than a measure of the amount of money that has been created.

The March 1997 statistical release from the Bank of England shows that the total money stock in the United Kingdom currently stands at approximately £680 billion. This is the total of all the money in existence in the economy: the coins, notes, bank, and building society deposits of everyone — the rich, the poor, businesses, public and private corporations — the lot. The figure is the measurement of money known to economists and bankers as “M4.” To place this figure in context, M4 in 1963 stood at £14 billion, in 1975 it was £53 billion, and by 1980 it had risen to £205 billion.

If people are told that there is £680 billion of money in the economy, and are then asked if they can guess how much of this money has been created by the government, they are likely to be puzzled. Why, all of it, surely? Surely a government is responsible for the currency of the nation? When people are told that the same statistical release from the Bank of England shows that the total of money created by the Treasury on behalf of the UK Government is a mere £25 billion of notes and coins, they naturally ask where does the rest of the £680 billion come from? What is the origin of the £655 billion which has not been created by the government?... If they are then informed that this other £655 billion — 97% of all money in the United Kingdom — has been created entirely by banks and building societies, and that they have created this staggering quantity of money out of nothing, most people are totally flummoxed. If you or I make money, this is called counterfeiting, and we are looking at the prospect of four walls, iron bars, and a slim glimmer of daylight in twenty years time... If they then ask how private, commercial companies can create money and are told that it is their mortgage, their personal loan, and their overdraft which has led to the creation of this £655 billion; that governments rely upon the majority of people going into debt simply to create money

to supply the economy; that virtually every pound in existence, whether circulating or deposited in bank accounts, is matched by an equivalent pound of debt — if they are told this, people generally stop asking questions. They get that uncomfortable look in their eye. “This guy is definitely right out of his tree...”

Through a barrier of doubt and suspicion, you might add that banks and building societies account for 97% of the money in the economy as their own, temporarily “on loan” to the economy; that the majority of mortgages are illegitimate and unnecessary, and that each generation's debts exceed those of the previous generation; that bankruptcies and repossessions have to be seen in the light of an impossible scramble for inadequate money; that the creation of money as a debt is directly responsible for recurrent booms and slumps and generating the intense pressure for economic growth in the developed world, as well as causing the appalling debt of the Third World; and that these facts have been established by Royal Commissions, and the system denounced repeatedly by leading economists, bankers, and statesmen.

Most people, when they are told this, dismiss the claims utterly and in their minds clearly regard you as a politically disturbed person, a sad case of mental fixation, perhaps unable to cope with the demands and opportunities of the modern world. This is really quite understandable. The natural assumption is that there must be more to this matter. If banks and building societies do indeed create money, there must be a rationale behind the decision to leave the creation and supply of money to them. It defies belief that such an extraordinary arrangement should exist without there being good reasons behind it... But, as this book shows, there are no good reasons. Indeed, there is abundant evidence of the destructive effect of this method of supplying money to an economy. Relying upon banks and building societies to create money using their “loan system,” and allowing this to form the modern money supply, gives rise to a catalogue of economic trends which are wholly undesirable and without mitigating circumstance.

### Debt-driven growth

All around us, the gross failure of modern economics screams out to be addressed. The towering indifference of those shining offices scraping the sky above the menacing ghettos of Brooklyn; the speculative channeling of billions of pounds of volatile international finance, which can leave a country prosperous one week and plunged into decline the next; the ludicrous production of cheap goods of poor durability, so that jobs are “protected”, and we can recycle the materials and make the goods all over again; the ridiculous export drives by which every country simultaneously attacks the economies of every other nation under the pretence that such global free trade improves the general wellbeing; the staggering waste of a throwaway, quick-growth, all-new spiral of constant economic change; the outrageous financial debt which Third World countries have actually paid many times over, but which, due to interest, is now larger than ever before — a debt which forces those impoverished nations to compete to supply goods already in surplus; the cynical manipulation of human emotions into buying fashion-obsessed trivia; the burgeoning transport demands of escalating economic growth and centralisation, with identical goods crisscrossing the globe regardless of environmental cost; the fact that despite the incredible productive capacity of the modern economy, people are obliged to work harder, with ever greater efficiency, forever forced to adapt and retrain or face a life of indignity and misery as one of the unemployed.

Both those in work and out must watch, as the world they know and understand changes almost in front of their eyes like some nightmarish Kafkaesque novel. This is the era of accelerating economic change. The benefits are highly dubious, and no one even pretends that the economy is responding to what people actually want. The only justification offered for the changes is that this is “the age of progress,” and “you can't stop progress” even if you are human and the progress you are discussing is supposed to be about people and the lives they might lead in the future. The world of economics has got mankind by the throat and everyone knows it, and no one has a clue where we are going or why we are going there.

The major role played by bank credit, which forms over 95% of the money stock in most developed nations, suggests that it cannot but be implicated in these trends. This is further suggested by the way that banking has literally become the focal point of modern economic management through manipulating interest rates. The stargazers of Whitehall and the Federal Reserve hold their councils, trying to tread the non-existent tightrope between growth and recession by debating quarter percentage-points of interest rates... **Alan Greenspan, the Chairman of the Federal Reserve, engagingly describes his task in controlling the American economy through adjusting interest rates as a matter of “taking the champagne away once the party has started.” Businessmen around the world hold their breath, measuring his every**



*and his scholarship make it uncomfortably plausible...* The book begins with an excellent history of our discovery, use of, and eventual over-reliance on fossil fuels, primarily oil. The sheer quantity of energy that humankind was suddenly able to access, and the changes it wrought, cannot be adequately conceived by those of us who have lived our lifetimes amidst its benefits... The first well was drilled into a surface seep in Pennsylvania in 1859. With the coal, water and horse-powered industrial revolution already ramping up, the new energy source was quickly exploited to power new machines of all kinds. The U.S.-led world production for over a century, an era Kunstler describes as the "cheap oil fiesta." The party's about to end in "a tremendous trauma for the human race."

Oil's pervasive influence on every aspect of our way of life proceeded in chains of causality that Kunstler deftly portrays. With automobile mass production starting in 1918, Americans gained a great way to travel and transport goods. Cars required better roads, so extensive highway building commenced. Shorter travel times resulted in a mass migration of city dwellers into nearby rural areas where they could enjoy a simulacrum of "country living." Enormous housing tracts arose around urban centers, and a sprawling retailing infrastructure grew up to supply them. Above all else, the suburban way of life was born of, and demanded, oil.

Peak oil was first proposed in 1956 by (Technocracy's co-founder) M. King Hubbert, a geologist and chief researcher for Shell Oil. He inventoried all known U.S. oil deposits, plotted consumption rates, and came up with "Hubbert's Curve" — a graph that predicted the highest possible rate of extraction, arriving about when our total in-ground oil supply was half used up... His projections proved correct. U.S. production peaked in 1970 and has been falling ever since... But just then Middle Eastern production capacity came into its most robust phase. The U.S. bought whatever was needed to fuel our ever more oil-thirsty lifestyles... Then another generation of oil scientists used Hubbert's methods to look at global production, predicting a peak between 2000 and 2010. Most now say global oil peaked in 2007: We've used half the world's oil; we're already on the "bumpy plateau" at the top, the down slope just ahead... Kunstler posits the fate of nations in an era of competition for oil and the collapse of oil-dependent social and economic systems. It will be especially hard in the U.S. Those suburbs are too spread out, while our skyscrapered urban centers are too dense, viable only thanks to oil-guzzling infrastructure. Our economy is based on cheaply transporting huge quantities of goods from around the globe... Oil shortages will profoundly affect the availability of food and water. The "food bubble" of the last 50 years resulted only from having lots of oil to run agricultural equipment, make fertilizers, pump water from underground for huge irrigation systems, and power the trucks and refrigeration systems that deliver edibles to our tables. The past century of food abundance resulted in huge population increases, leaving us with too many people to survive on the carrying capacity of a world short on oil.

Kunstler's cascade of effects continues on through famines, epidemics, social unrest and wars — all exacerbated by global warming... One casualty will be what Kunstler calls our "hallucinatory" economy, epitomized by the stock market. The hugely complex financial instruments and trading schemes that now govern our economy have divorced real value from perceived or potential value. The financial sector, now an "industry" in its own right, runs money shell games and pyramid schemes that work only if we maintain faith in perpetual economic growth. A psychological product of the oil fiesta, that faith won't survive, and the markets it supports won't either.

Kunstler doesn't offer much in the way of solutions. Renewable energy won't save us; he methodically explains the limitations of each energy technology and source, rejecting the idea that they can replace any significant part of the lost oil bonanza... Instead, we'll need to ratchet down our material expectations and live in austerity. We will need to produce essential goods locally, close to where we'll use them. We'll live in smaller, walkable cities surrounded not by malls but by farms. We'll all do more manual labor... It would be easier to dismiss Kunstler's darker speculations if he hadn't proven surprisingly prescient. For example, in expounding on the "hallucinatory economy" and the downfall of suburbia, he wrote about the housing boom and described sub-prime lending practices in detail, warning of economic disaster... Kunstler wrote the book in 2004-05, three years before the sub-prime and housing bubble burst, with ramifications still unfolding. One has to wonder just how much more he's gotten right.

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