



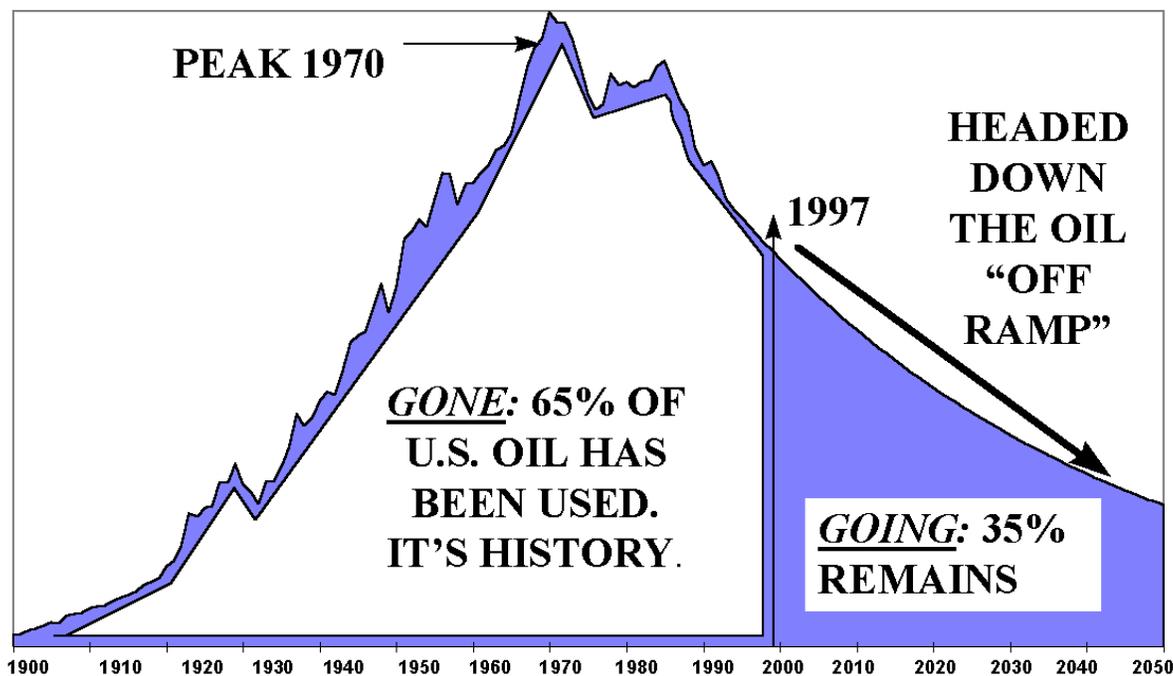
When Will the Joy Ride End?

By Randy Udall, 1999

BLACK MAGIC. During the last century oil has transformed the world. British coal launched the Industrial Revolution, but American oil put the pedal to the metal. No other material has so profoundly changed the face of the world in such a short time. Petroleum is black magic, the lifeblood of our civilization. The petroleum industry provides 40% of the globe's energy and is humanity's largest commercial enterprise. Oil is our most concentrated, flexible, and convenient fuel. Without petroleum there would be no automobile industry, no tourism. Without petroleum 2% of Americans could not feed the remaining 98%. But oil is more than energy. It's the key feedstock for plastics, medicines, clothing, pesticides, paint, and thousands of other products. Fueling Toyota or fabricated into Tupperware, petroleum is the world's premier commodity. Soon, experts say, world oil production will reach an all-time high, an apex, a **peak**. Then, after a short plateau, it will decline forever. What historians will someday call the Oil Era will last just two centuries. In 1998 we are closer to its end than its beginning.

THE OIL TRIBE. In 1859 oil was struck in Pennsylvania. The magic fluid unleashed Yankee ingenuity, put America on wheels, and helped to create the world's richest superpower. The transformation was unimaginably swift: In 1859 Americans traveled on horseback; in 1969 they drove Mustangs and flew to the Moon. Today it is difficult to overstate oil's importance to our economy. Four percent of the world's people, we use 25% of the world's oil. We are an Oil Tribe, the Petroleum Clan, imbibing about 3 gallons per person per day. The automobile is our most cherished icon, a new car our symbol of success. The local gasoline station is our secular temple where each week 150 million Americans "fill 'er up." An average American drives 1,000 miles a month, 12,000 miles a year, the distance to the Moon every 20 years. The Oil Tribe numbers 265 million. Together we weigh about 34 billion pounds. Hungry for speed, addicted to motion, we consume our weight in petroleum every 7 days.

U.S. OIL PRODUCTION 1900 TO 2050



BLESSED BY GEOLOGY. Cheap oil has always been an American birthright. Through fate and geology, the United States was extravagantly blessed. Our original cargo was about 260 billion barrels; only one country, Saudi Arabia, had more. Oklahoma

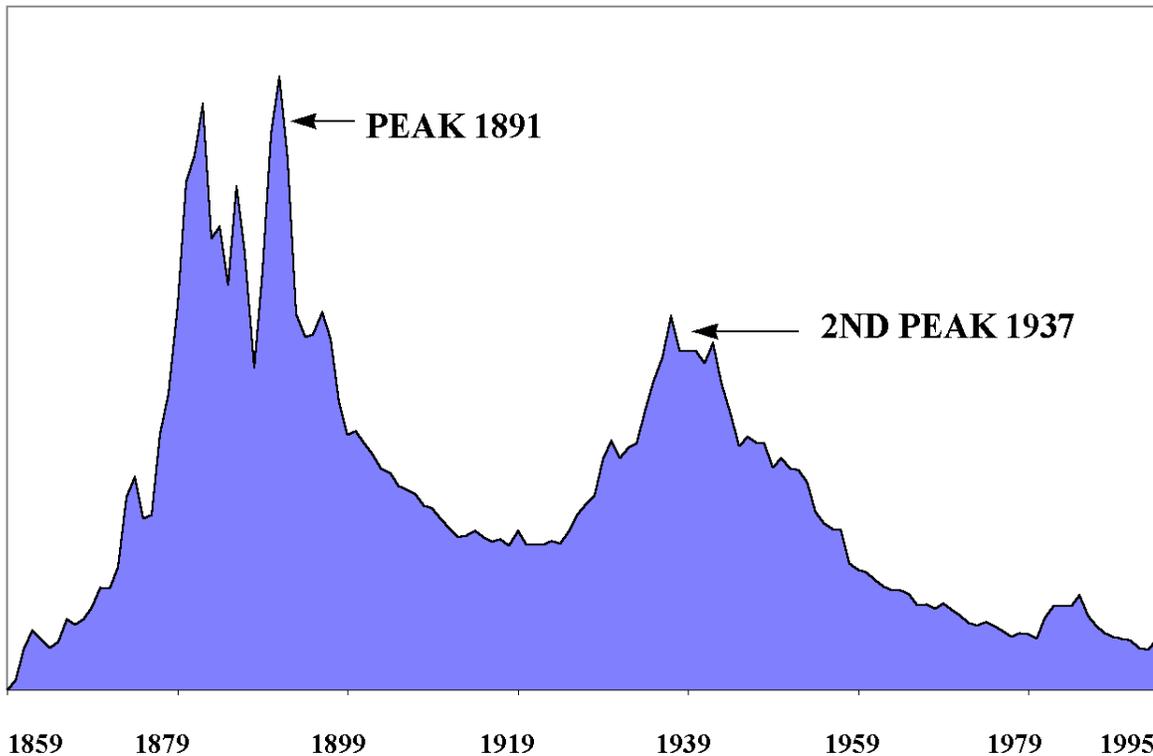
alone possessed more oil than Germany or Japan. California had more than Germany, Japan, France, Spain, Denmark, Sweden, Finland, and Italy combined. The U.S. has—or rather **had**—20 times as much oil as India, 16 times as much as Brazil, 3 times more than China. From 1859 to 1939 the U.S. produced two-thirds of the world's oil. After Japan attacked Pearl Harbor in oil-starved desperation and Hitler failed to capture Russia's Baku oil field, American petroleum, and the industrial output it nourished, triumphed in World War II.



STRENGTH THROUGH EXHAUSTION. As recently as 1950 the U.S. was producing half the world's oil. Forty-eight years later, we don't produce half our own oil. **Domestic production peaked in 1970, 27 years ago**, and today we produce just 45% of the crude we consume. To fuel our economy we've drilled more and pumped longer than any nation on Earth, pursuing an oil policy that's been called "Strength

Through Exhaustion." Although the U.S. remains the world's third largest producer, about 65% of our petroleum has been burned. It's downhill from here.

PENNSYLVANIA OIL PRODUCTION: 1859-1995

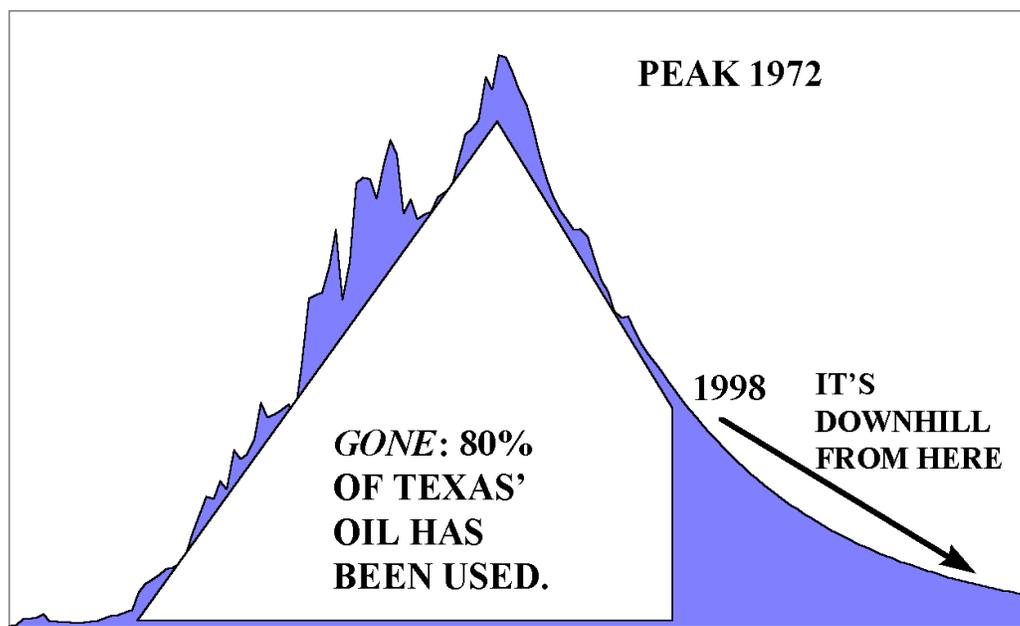


LIKE DEATH AND TAXES. Perhaps for the same reason that State Farm sells life insurance rather than death insurance, oil companies shun phrases like **extraction** and **depletion**. Instead they prefer **production**, as in "Chevron produces oil." This implies that we can manufacture oil at will, the way we do jeans or computers. In truth, petroleum reserves are finite and depletion is a reality like death and taxes. Oil fields have been

compared to track athletes whose best performance comes early in life. After a youthful sprint upwards, production peaks, plateaus, declines, and ends. Chevron speaks of the U.S. as "mature" or "aging." That's mature, in the same way that 75 year-old golfer Arnold Palmer is mature. Tiny Kuwait, smaller than New Jersey, has three times the reserves of the entire U.S. To better grasp the concept of depletion, consider Pennsylvania.

PENNZOIL. Our most famous motor oil honors the state where the Oil Age began. Prior to the invention of the automobile, most oil was burned in kerosene lamps. For the first 25 years of the era Pennsylvania was the world's leading producer. (John D. Rockefeller coined America's largest fortune by cornering the Pennsylvania market.) In 1891 the Quaker State produced enough oil to light the U.S. for **7 months**. In 1937, when its production reached a second lower peak, Pennsylvania supplied enough to run the now motorized country for **7 days**. Today the state's oil could power the U.S. for only **3 hours**. Although there are still 19,000 wells in Pennsylvania, collectively they produce a puny 6,900 barrels each day. In contrast, Saudi Arabia produces 8 million barrels—1,100 times as much—from just 1,400 wells.

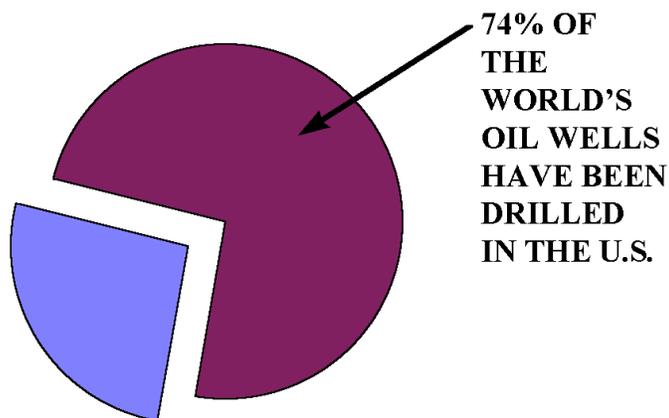
TEXAS OIL PRODUCTION: 1900-2050



GUSHERS IN TEXAS. As oil prospectors, some of them retired whalers, continued to harpoon the Earth, oil was struck in New York, Ohio, Oklahoma, and then, Texas. Texas was a gusher, America's first world class find. If Texas had been a sovereign country, its oil riches would have placed it in the world's top ten. The state's original reserves were 6 times greater than those of India, 4 times greater than Brazil, twice as large as Norway. Texas was big, as big as the braggadocio it came to symbolize. As thousands of men made fortunes in the oil patch, a new social class

arose: the "oil millionaires." The Hunt brothers, George Bush, and Lyndon Johnson all made money in Lone Star oil. For the last 70 years the state has been America's leading oil producer. But production in Texas peaked in 1972 and has been declining rapidly since. According to the American Petroleum Institute, about 80% of all the oil that will ever be produced in Texas is gone. This is not an anomaly. Thirty-one states produce oil and all are past their peaks. Oklahoma peaked in 1927, Colorado in 1956, Wyoming in 1970, Alaska in 1988.

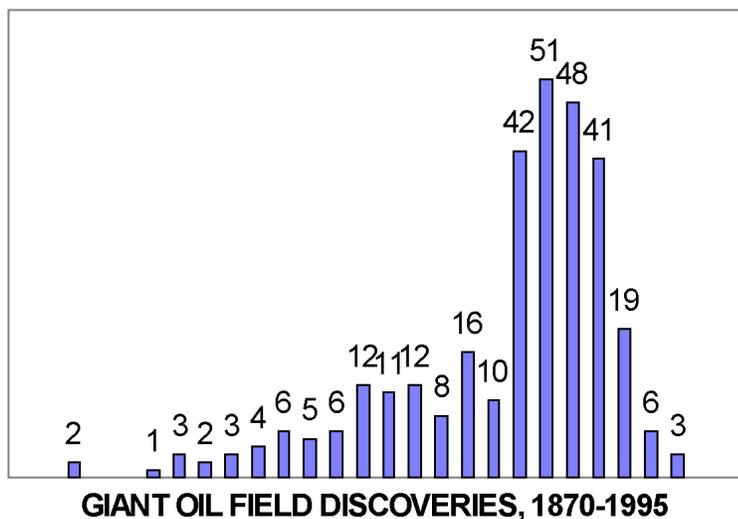
HARPOONING THE EARTH



SWISS CHEESE. Well, ok, if Pennsylvania and Texas are played out, why not drill more wells somewhere else? In fact, the U.S. is already one of the most thoroughly explored and drilled countries on Earth. Of the 4.6 million wells worldwide, 3.4 million have been drilled in this country. Very very few prospects remain. With the exception of the Arctic National Wildlife Refuge and a few deep water basins, we've been there and done that. From the oil industry's perspective, the U.S. is Swiss cheese.

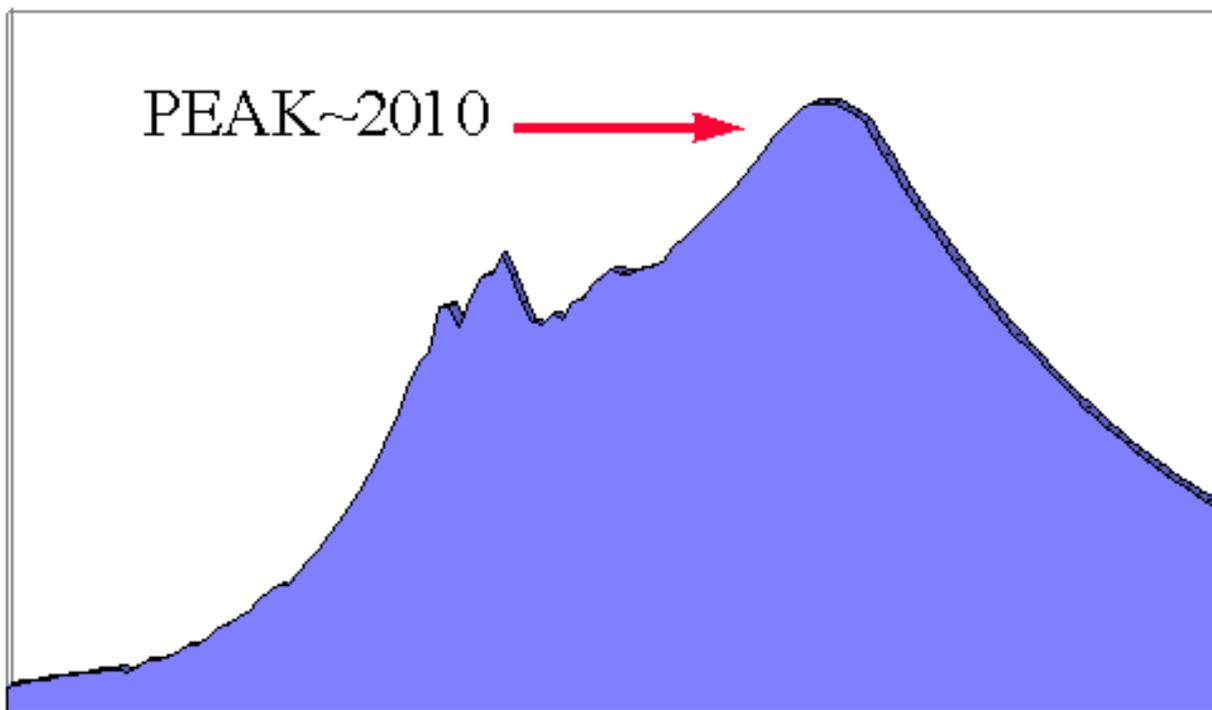
THE LAST HURRAH. The oil industry employs many smart, inventive, and creative people. In a quest to find more oil, the industry has developed a host of

new exploration techniques, computer imaging software, and drilling methods. Many are being put to good use in the Gulf of Mexico. There, the oil majors are drilling in 5,000 feet of water—an astounding fact—with the likelihood that they will soon sink wells in 10,000 feet. Analysts expect the Gulf to be America's last great bonanza. A mile under the ocean floor may lie 15 billion barrels. It's a lot of oil, but only as much as the nation uses every 2.5 years.



HUNTING ELEPHANTS. Ghawar. Burgan. Safaniya-Khafji. Zakum. These are the strange, unfamiliar names of the four largest oil fields in the world. Oil occurs rarely in nature and when it does it's often concentrated in large amounts. About 70% of the world's petroleum is found in 370 giant fields, nicknamed "elephants"

because they are so huge. Western civilization—life as we know it—is based on these elephants. In part because they are so big, the elephants were easy to find and inexpensive to produce. (To get oil out of Ghawar, for example, costs the Saudis less than \$1 per barrel.) The discovery rate for elephants peaked in the 1960s. It's getting harder and harder to find new ones. Indeed, many geologists believe that elephants are nearing extinction, that only a handful remain unfound.



THE COMING PEAK. In the same way that U.S. oil production peaked in 1970, global production is destined to peak during the first two decades of the coming century. Some analysts expect a peak around 2005;

some suggest it will be 2010; others believe it will come as late as 2020. The exact date can't be predicted, since it will depend as much on economic and political factors as on geology. The biggest wild card? Saudi Arabia, the world's most prolific oil province. If the Saudis invest hundreds of billions of dollars they could double their output to meet expected demand. But they may decide not to double production, choosing instead to produce somewhat less oil and charge more for it. Although predicting the peak is impossible, this

great turning point is imminent.

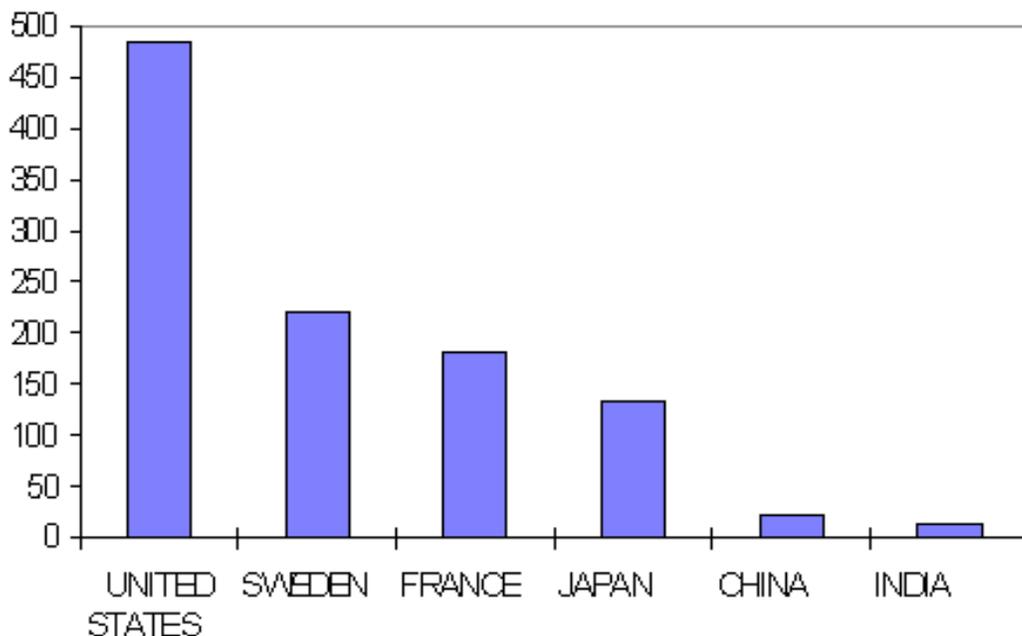
COLLISION IN SLOW MOTION. A decline in world oil production? The thought takes some getting used to. What seems impossible is inevitable. The crunch may arrive suddenly. Or in slow motion. As Reagan's former Energy Secretary Donald Hodel says, "We're sleepwalking to disaster." When it happens, journalists will shout, "We're running out of oil." That's not true. Rather, we are running out of **cheap** oil. After production peaks oil still will be readily available at a higher price, though in slowly declining amounts, for at least 50 years. What we face is not a short-term crisis but a chronic shortfall. No one will freeze in the dark (America still has a century of coal and 50 years worth of natural gas), but the transition to more expensive oil could be bumpy.

CRUDE CRUNCH. As global oil production nears the peak, oil prices will rise, perhaps overnight with staggering impacts on the global economy. This absolutely predictable, absolutely inevitable oil crunch will likely have tremendous economic impacts. Hitting as the Baby Boomers retire, it could rock our economy, psychology, and sense of self.

GIMME THAT OIL TIME RELIGION. Of course, not everyone agrees that we face an imminent crisis. (In part, it depends on how you define "imminent." Some people define it as "before I'm dead.") **Business Week** recently ran a cover article on global oil. The take home: don't worry, be happy, Exxon has you covered. (Call CORE for a reprint.) Energy Secretary Pena talks hopefully about "reversing the decline in U.S. oil production." This is whistling past the graveyard. There's not that much oil left to find in the U.S. That's why the oil majors are trying to muscle in on Russia's Caspian Sea, 9,000 long miles from home. How the Caspian qualifies as "our oil" I'm not sure. The Chinese need it as badly as we do. Nonetheless, Henry Kissinger and Dick "Desert Storm" Cheney are lobbying to gain U.S. companies preferential treatment.

ASLEEP AT THE WHEEL. There are many ways to soften the inevitable transition to a world in which oil is more expensive. They include more efficient cars, smarter land use planning, mass transit, and alternative fuels—but we won't begin implementing them, at the local or national level, until we recognize that a grave problem looms. At the moment, this nation is asleep at the wheel. Time is short. If we want to retool our transportation systems, a world oil peak in 2010 or even 2020 is next month. A peak in 2005 is a train wreck **tomorrow**. But few are talking about this predictable development. Even fewer are planning for it.

ANNUAL GASOLINE CONSUMPTION: GALLONS PER PERSON

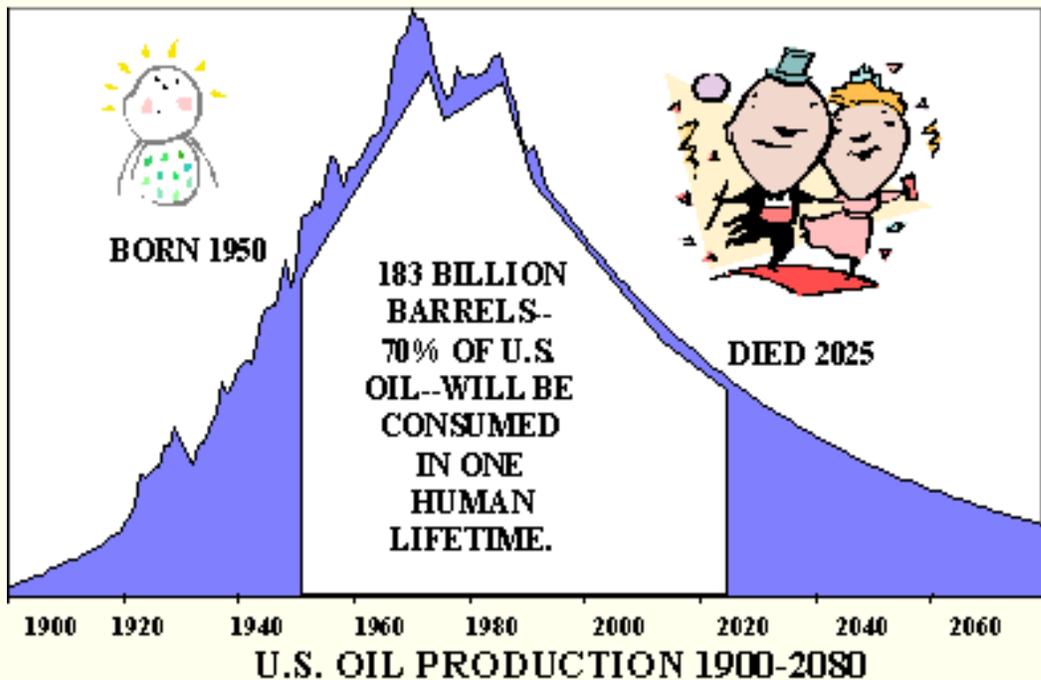


ROAD WARRIORS. In 1900 oil married the automobile. Together they gave birth to a century of travel. Today oil is so thoroughly woven into the fabric of America that we can't imagine life without it. Fish don't worry about water and Americans don't worry about oil. Instead we swim in it. Think of your life: the kid schlepping, commuting, and errand running. Skiing on the weekend, Thanksgiving at mom's, a conference in Chicago, a jaunt to Vegas or Lake Powell, a Sunday drive to Grand Junction. I know middle-class Coloradans who do their Christmas shopping in Minnesota at the Mall of America. Texans drive 1,000 miles to shoot a Colorado elk, hunting-and-gathering

taken to new extremes. Oil is fundamental to agribusiness: the average potato travels 750 miles. How long have people in Colorado been eating bananas grown in Guatemala and beer brewed in Germany? How much longer do you think? Will driving a Saab to Moab to go mountain biking be a weekend option in 2050? By then Saabs will get 80 miles to the gallon and so it might be. Then again, maybe not.

FROM THE CRADLE TO THE GRAVE.

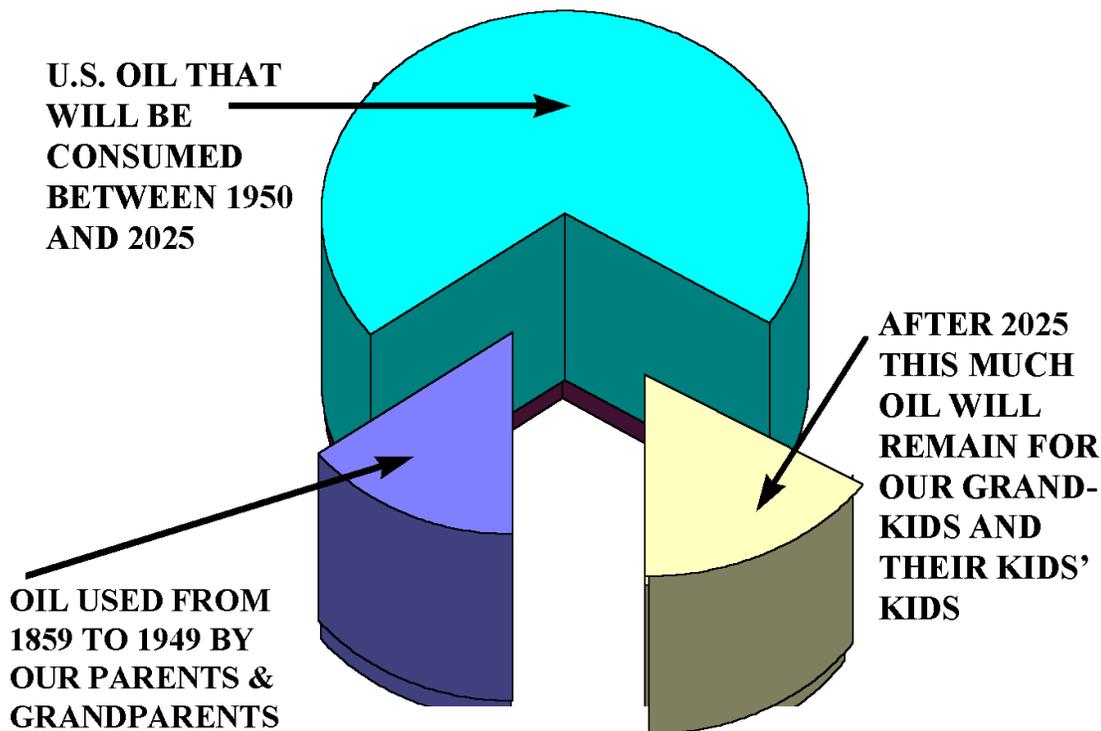
THE BABY BOOMERS' LEGACY



More than half the world's oil—and 70% of U.S. oil—will be consumed during a single human lifetime. That span happens to coincide with the Baby Boomer generation born after World War II. The graph at left shows the phenomenon. The Boomers were conceived as auto culture kicked into overdrive. As newborns, they were driven home from the hospital in a car. They grew up listening to songs like *Mustang Sally* and *Little GTO*. Getting a driver's license was their rite of passage. During their lives many Baby Boomers will drive and fly a million miles, equal to 40 trips around the globe. Magellan and Amelia Earhart were the famous circumnavigators of their day. Now every man is Magellan,

every woman Amelia.

AMERICA'S OIL: DIVIDING THE PIE

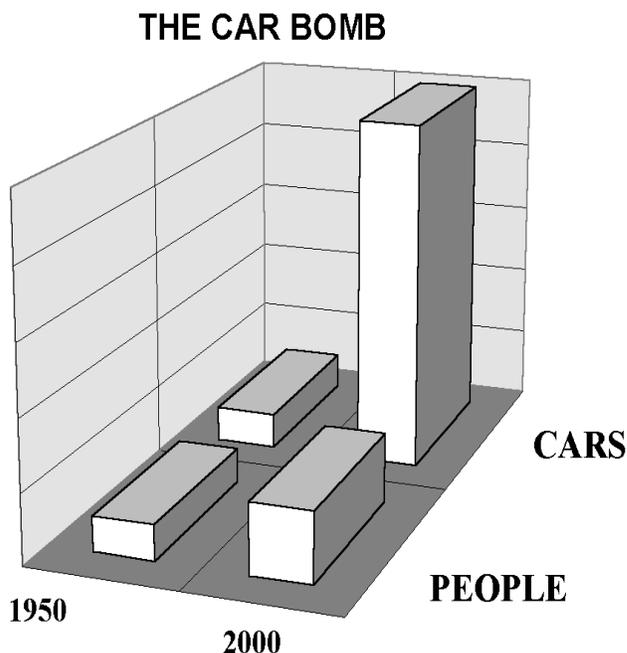


SLICING THE PIE. Geologists estimate that U.S. oil production will ultimately total 260 billion barrels. A sliver of that pie was consumed between 1859 and 1949, the first 90 years of the Oil Era. A much larger slice—if we can call 70% of the pie a slice—will be used between 1950 and 2025. Our grandchildren and their kids' kids will inherit what's left.

By 2025, when U.S. population will exceed 300 million, just 15% of U.S. oil will remain.

SNOOZE YOU LOSE. When our grandchildren ask where all the oil went, how will we answer them? We're engaged in a one-time hydrocarbon feeding frenzy the likes of which the world has never seen before and will never see again. As someone who once drove a pickup truck to Patagonia I may not be the best person to ask, but is there a neglected ethical issue here? About a year ago I was standing on Main Street in Aspen when a semi drove by. Emblazoned in large letters on the side was a question: **WE'VE SHOT ALL THE BUFFALO NOW WHAT DO WE DO?** In 1872 there were 15 million bison roaming the Great Plains. A decade later only a thousand were left. Pelt hunters had ruthlessly slaughtered the rest. The heedless waste, the bloodthirsty savagery seems criminal today. I wonder if future generations will view our pell-mell liquidation of oil, arguably Earth's most valuable resource, as equally senseless, shortsighted, and greedy. If there were a ready substitute that would be one thing. But there isn't. In fact, there is no substitute for oil in the ways and volumes in which we use it today. Petroleum is a gift of geology, a one-time windfall—and we're spending it like there's no tomorrow.

LYRICS. Everyone has their favorite car song. **Daddy took my T-Bird away... Every woman I know is crazy about an automobile... I've got the fastest wheels in town... Mustang Sally, you better slow your Mustang down... I drove my Chevy to the levee, but the levee was dry... Oh Lord won't you buy me a Mercedes Benz. My friends all drive Porsches, I must make amends...**



CAR BOMB. You hear about the population explosion. And yes, the population has doubled from 3 billion to 6 billion since 1950. In the same period, car numbers shot up from 50 million to 500 million. Cars, in other words, are reproducing five times faster than people. They're breeding like (VW) Rabbits.

WHO WILL FUEL CHINA? America was first to enter the Oil Age. We got a 60-year headstart on most nations. The developing world is racing to catch up. From Asia to Africa, three billion people crave the automobile

lifestyle. Who can blame them? Mobility is wonderful. GM, Ford, and Toyota are building new plants in China, India, and Thailand. But Asia is oil poor. India has almost no oil. High hopes for new discoveries in the Tarim, a frontier basin in western China, have not been realized. The Chinese national oil company is investing in Venezuela, Gulf of Mexico, and Caspian Sea—a telling vote of no confidence in prospects at home. Without large domestic reserves it will be impossible for China and other densely populated countries to develop an oil-intensive lifestyle like Americans enjoy. If India and China used as much oil per

person as we do, world production would have to **triple**. It can't; there's not enough oil. But if it could, all the globe's remaining oil would be consumed within 20 years. After that... well, you wouldn't have to worry about your next car payment. Looking ahead, the tremendous inequities in oil distribution—and consumption—are morally troubling and militarily worrisome. As oil depletion spreads worldwide, by 2015 five nations in the volatile Middle East will produce half the world's oil. As more Asians take to the road and demand outstrips supply, oil prices will rise. Economic jousting for oil—who can pay most—is certain. Military confrontation can't be ruled out. With America using three times more oil than any other nation, future generations of young Americans may again take to the battlefield for oil.

GOT OIL		USE OIL	
• SAUDI ARABIA	26%	• U.S.	25%
• IRAQ	10%	• JAPAN	8%
• KUWAIT	10%	• CHINA	5%
• ABU DHABI	9%	• RUSSIA	4%
• IRAN	9%	• GERMANY	4%
• VENEZUELA	6%	• S. KOREA	3%
• SOVIET UNION	5%	• ITALY	3%
• MEXICO	5%	• FRANCE	3%
• U.S.	3%	• ENGLAND	3%

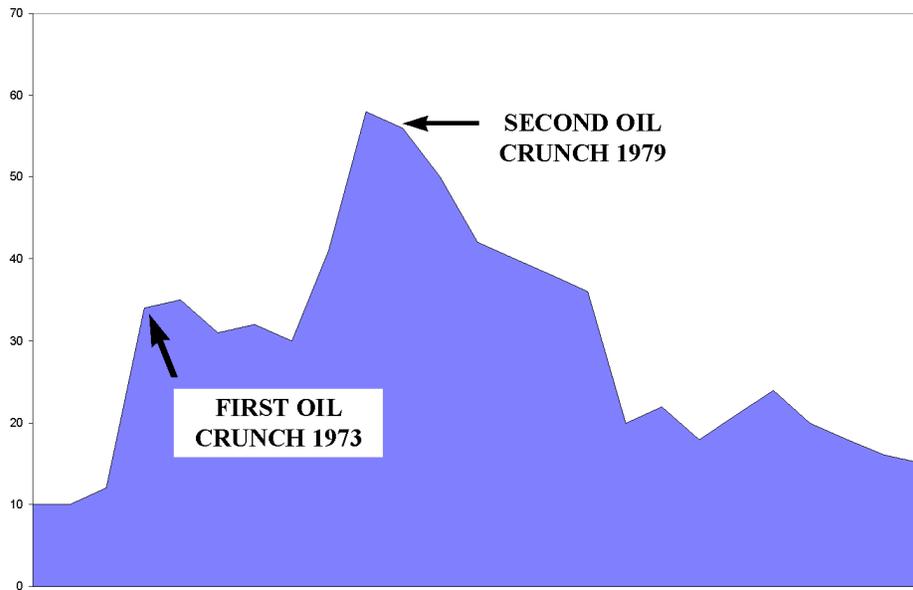
REALITY CHECK. Which nations have oil and which nations use it? Fully two-thirds of the world's oil is in five Muslim countries. The chart at right explains why Iraq's Saddam Hussein gets press, why the State Department frets about Iran, why the U.S. military did not

leave Saudi Arabia after the 1990 Gulf War, and why we fought that war in the first place. (George Bush: "Our way of life is at stake.") America's future, Japan's future, Europe's future, China's future, Europe's future...all are inextricably linked to the Middle East. In the deserts of Saudi Arabia, the U.S. military is building fortified air bases. Ostensibly we are there to protect our Saudi friends. In reality, we are an occupying force protecting our access to their oil. Some Saudis are resentful of our presence, as we would be if they were building air bases in Nevada. Would we leave their county if asked? I wonder. My son is 7. He'll be 18, fighting age, in 2009, about the time an Oil Crunch may arrive.

OPEC REDUX. As the U.S. produces less oil, we must import more. Indeed, America **imports** more oil than any other nation **uses**. Uncle Sam's appetite is humonguous, verging on gluttony. We import more than Denmark, Finland, France, Germany, Greece, Italy, Norway, Spain and Sweden collectively use. And why not, because at \$15-\$25 a barrel, imported oil is a steal. The tab for 1997 came to \$67 billion, less than 1% of the nation's gross domestic product. The bargain may not, indeed can not, last. As global population and oil demand rise, more and more people will be competing for less and less

oil. By 2015, only a handful of nations will be exporting significant quantities, and a revitalized Organization of Petroleum Exporting Countries, our old OPEC nemesis, will be in driver's seat again, able to control prices at will. Since Saudi Arabia, Iran, Iraq, and Kuwait can sustain their projected production past 2020, the world will not suddenly "run out" of oil. But \$16 a barrel will be a thing of the past.

WORLD OIL PRICES 1970-1994

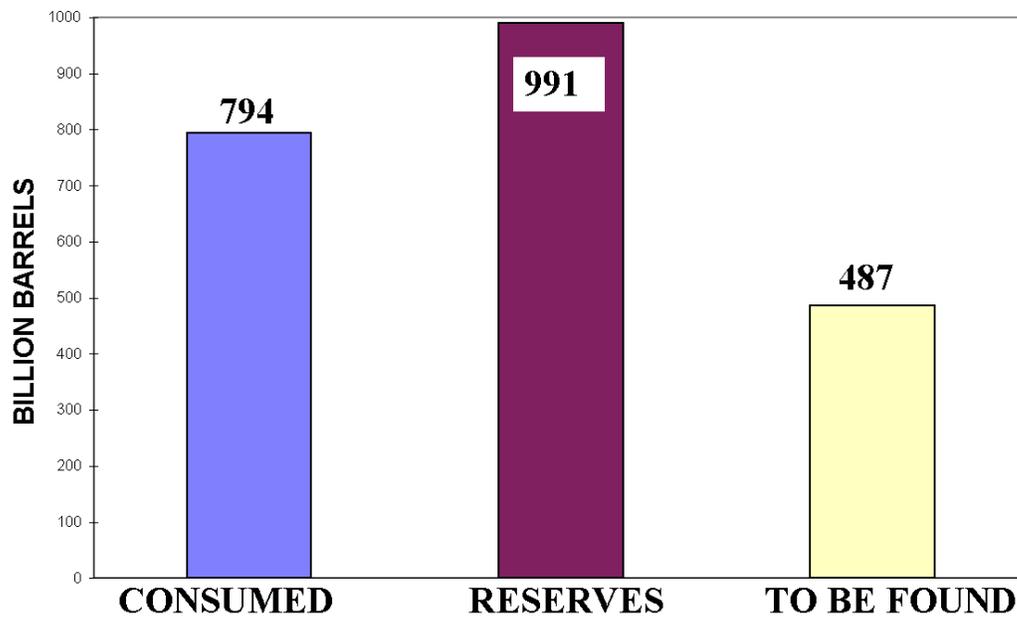


SPORT UTES. In recent years, as oil prices have plummeted, Americans have fallen in love with gas guzzling minivans, light trucks, and sport utility vehicles. In Seattle Microsoft millionaires drive Humvees. Light trucks and sport utes command 45% of the new car market in the U.S., a powerful trend aimed in exactly the wrong direction. That these vehicles sell well is not surprising. They tower above traffic, can summit Everest, and are safe in a crash (good because sport utes have

more than their share.) If they're thirsty, so what? Gasoline costs are only 1/8th the total cost of driving. Driving a car that gets 30 miles per gallon rather than a 15-mpg sport ute saves about \$520 a year—not much in many budgets. Americans care little about fuel efficiency because gasoline is inexpensive. In Europe motorists pay \$3 to \$5 a gallon. Most is tax, added by governments to encourage conservation. A Suburban has a 40-gallon tank. Filling up in Finland would cost 200 bucks. Needless to say, Finns shun Suburbans. Bargain-rate gasoline has a hidden cost, but we don't pay it at the pump. Rather, we pay \$50 billion in taxes to protect access to Persian Gulf oil, we pay in smog and premature deaths from air pollution, we pay in climate change. But when gasoline is less expensive than milk, Americans have little incentive to conserve. People aren't dumb.

If gas is cheap, oil must be abundant. Big is best. If you have an Explorer I'll get an Expedition. It's a 'fuels paradise." Party hearty.

WORLD OIL: HOW MUCH LEFT?



A LIGHT GOES ON. "In America we consume the most energy per capita in the world. That's got to change." Who said it? Not Ralph Nader or Amory Lovins. Rather, it was Louis Hughes, a General Motors vice president for international operations. The oil companies and automakers are beginning to understand that we must move quickly to develop a more oil-efficient economy. Toyota is selling 66-mpg cars in

Japan. Honda is poised to follow. From a global perspective, oil is not a "sunset industry"—after all, 65% of the world's petroleum remains to be produced. Nonetheless, oil companies are beginning to diversify. Royal Dutch Shell recently launched a renewable energy division and British Petroleum is making solar panels. The ultimate heresy: General Motors supports a 50 cent per gallon gasoline tax. In this case, what's good for GM would be good for America.

SILVER BULLETS. Oil depletion is a slow, wasting disease. Is there a quick fix, a miracle cure? Actually, there are exciting new developments. They include technology for converting natural gas to a diesel-like fuel; horizontal drilling and 3D imagery to recover more oil from aging fields; cars powered by fuel cells that run on hydrogen rather than gasoline; telecommuting and other social changes that reduce oil consumption. All can buy time, delay the peak, and soften the transition that must follow. None, though, can cure depletion, or greatly reduce America's dependence on imported oil. Technology shows promise, but the negative trends remain more powerful. Every day the world uses 73 million barrels and finds 15 million. Consumption up, discoveries down. Burning more than we earn—a surefire recipe for bankruptcy.

STOCK TIPS. *Forbes* and *Fortune* recommended oil stocks in 1995. In 1997 energy service companies were the stars of Wall Street. But maybe there will be another stock-buying opportunity. The economic turmoil in the Pacific, the Asian flu, will dampen energy demand for a year or two. With the collision between rising demand and limited supplies still five to ten years away, it's a good time to travel. Fly to Baja, take a cruise, see Costa Rica. Life's a journey, enjoy the ride. Around 2005 you might want to unload your shares in Winnebago.

SILVER BULLETS II. The physics of a Pontiac (or pickup) are abysmal. According to Rocky Mountain Institute, just 1% of the energy in the gasoline moves the driver. About 15% moves his steel shell, the 2-ton carapace. The remainder is lost in the engine, drivetrain

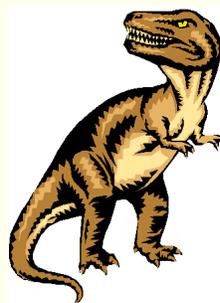
and to wind resistance. This is actually great news, because it suggests there's tremendous scope for improvement. Soon you'll be able to buy a car that gets 65 miles per gallon. These clean, efficient "21st Century" cars may capture a third of the market by 2010. But adding 20 million fuel-frugal cars a year to a global fleet that may then number 800 million will have only a modest impact on oil consumption. Every little bit helps, but it will be decades before the world fleet is dramatically more efficient.



OIL IS ASPEN. Our ski economy is much more dependent on oil than snow. After all, we can **make** snow. At Buttermilk or Highlands or Ajax, oil's importance is affirmed every few minutes as a loud jet accelerates down the runway. One in five Aspen skiers fly in from overseas. Economically, Aspen functions as a snowy suburb of New York, Chicago, and Los Angeles. How long can this continue? Decades perhaps, not forever.



DRIVING BLIND. Petroconsultants, a respected Geneva energy consulting group, recently concluded that by 2050 world oil consumption will be just one-fourth what it is today. Another oil expert, University of Colorado professor John D. Edwards, predicts that world oil production will peak in 2020 at 90 million barrels per day. "If the hundreds of billions of dollars needed to increase productive capacity to these levels are not available, peak production will occur earlier. Planning without anticipating this trend is analogous to driving without a gas gauge."



TREX. Most people abhor change. Change is scary. Mentally, we tend to be prisoners of the past, hoping that the future will be just like the present, only more so. Abundant oil is all we've

known. Cheap gas is a given. But this quaint assumption may soon take a beating. The silver miners who settled Aspen in 1880 didn't drive Range Rovers. It's a safe bet that Aspenites in 2090 won't drive them either. If the average person has a car 50 or 100 years from now it will be dramatically more efficient and powered by hydrogen or electricity. The heyday of the guzzler is passing. The gargantuan 6,000-pound 14-mpg Expeditions that now rule the road are to the car as the T Rex was to the dinosaur: the end of the line.

PURE SPECULATION. Inexpensive oil is so deeply embedded in our economy, psychology,

and even diet that it's difficult to imagine a world in which oil will be more expensive. What would a sudden spike in oil prices mean for Aspen? Let me speculate, knowing I'll probably get it wrong. An oil crunch might, where nothing else has, rein in the valley's real estate boom. Some believe that the stratospheric prices in the upper valley are a speculative bubble waiting to burst. Our valley's economy has proved remarkably resilient to other shocks, but this one could shatter Wall Street. An Oil Crunch would also slow tourism. Because only 10% of an airplane ticket pays for fuel, the direct effects would be dwarfed by the larger inflationary impacts. Psychology will come into play, too, since inexpensive oil buttresses the belief that growth is inevitable, stocks go up, and things get better. But, come what may, higher gasoline prices are not the end of life as we know it. After a rocky year or two or three of global recession, people will adjust, life will go on. Most Europeans already pay \$3 or more per gallon; Americans presumably could, too.



DEBATING THE TRAIN. Over the last 70 years the automobile grew dominant because oil was cheap. All across America trains gave way to cars. Neighborhoods surrendered to suburbs. In the words of the song, we "paved paradise and put up a parking lot." In Colorado, too, the transportation network we see today is an artifact of abundant oil, an era that's destined to end. With oil depletion in mind, the suggestion that we should remain auto dependent, construct underground garages, and six-lane Highway 82 seems like old think. Is our long-term vision **driving cars fueled with gasoline on tires made of petroleum on roads paved with asphalt?** Hell-o! To quote Marshall McLuhan, that's like "speeding into the future while trying to

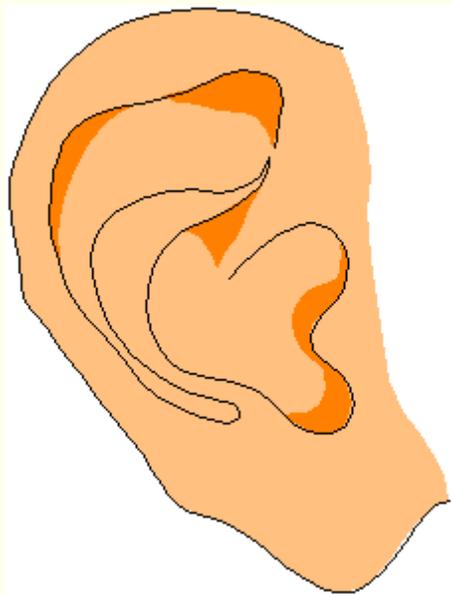
steer with a rear-view mirror." The train may or may not make economic sense. But as we debate whether valleywide rail is a wise investment, our focus should not be 2008, a short decade from now. Rather it should be 2018 or 2028, when world oil production will be **falling**, as global population continues to climb. As we study rail, let's not assume the status quo is sustainable, because it's not. By 2025, driving alone 70 or 80 miles to work may be as obsolete as riding a horse to work is today.

HARD ROCK CAFÉ. Is there really no substitute on the petroleum menu? Our natural gas reserves wouldn't last long if we burned them in both homes and cars, but what about all that oil shale near Parachute? Oil lobbyists will tell you there's tons of "unconventional" oil tied up in Canadian tar sands, Venezuelan heavy oil, and Colorado's oil shale. True enough, but that's like saying hang gliders can substitute for airplanes. Producing unconventional oil has more in common with hard-rock mining than with typical oil production, where you crank a valve and let it flow. The former is a slow, arduous, energy-intensive process that will never replace a tenth of today's conventional oil. Indeed, there's some question whether oil shale yields more energy than it takes to produce it. If conventional oil is black magic, oil shale is fool's gold.



FLOW, RIVER, FLOW. Every 24 hours the global economy burns 73 million barrels of oil. If you poured all that oil into a river it would be the size of the Colorado as it flows through Glenwood Springs. That modest river propels all motorized motion on the planet. Every car in Carbondale, China, and Chile. Every Boeing, every Airbus. Semis, autos, trucks, bulldozers, B-1 bombers, motorcycles, supertankers, tugboats, tractors, lawn mowers, snowmobiles, jet skis, snowblowers... if it moves it's powered by oil. Looking ahead, oil demand is projected to increase rapidly. By 2010 most experts predict the world will be consuming 90 million barrels a day, 25% more than it does now. Sometimes between 2005 and 2020, world oil production will reach an apex, an all-time high, a **peak**. A plateau in production will be followed by a relentless inexorable decline.

DOOMERS & BOOMERS. World oil experts fall into two camps, pessimists and optimists. It's striking how little difference there is between them. Both camps agree we've already used 800 billion barrels. The pessimists, or doomers, think there's one trillion left and that oil production may peak by 2005. Boomers believe there's 1.8 trillion left and that production will peak in 2020. If fifteen years is the only difference between pessimists and optimists, perhaps we ought to begin planning for a world in which oil is not as abundant as it is today.



LIFE IN 2050. By 2050 a world of perhaps 9 billion people will be consuming only as much oil as 3 billion did in 1950. There will be three times less oil per person. Oil will be more expensive. Is this a Doomsday message? Not necessarily. A more sustainable world may actually be a better place in which to live. The difficulty is getting from here to there.

WHY HAVEN'T I HEARD THIS BEFORE? Who would tell you? Exxon? Ford? Bill Clinton? **"Remember my Bridge to the 21st Century? Well, there's a big pothole on the far side. I'm sending Al over there right now to patch it up. When you hit that rough spot, remember Hillary feels your pain."** Should Ronald Reagan have told us? **"My fellow Americans, it is not morning in America. Actually, it's getting on towards sundown."**

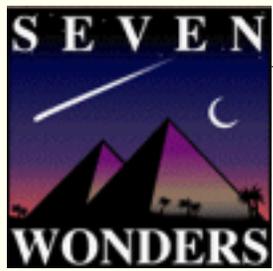
The **Oil & Gas Journal** publishes articles on oil depletion, but the coming crisis is not yet on the mainstream media's radar. It's astounding that, in a country like ours, which uses 25% of the world's oil, no one is responsible for setting oil policy. The oil majors produce oil. Carmakers

make cars. The Pentagon spends \$50 billion a year safeguarding our "cheap" Persian Gulf imports. The U.S. Department of Energy cleans up nuclear bomb plants. If ignorance is bliss, this must be Nirvana.

SOURCES & INFO. This petroleum primer was written by Randy Udall, Director of the Community Office for Resource Efficiency, with Steve Andrews, a Denver-based energy analyst. Our numbers and graphs were derived from U.S. Geological Survey, British Petroleum, and American Petroleum Institute reports. Oil consumption to 1996 is historical record. Depletion curves and future consumption were extrapolated from conservative assumptions and personal interviews with world oil experts, including Chuck Masters, Neil Foreman, L.F. 'Buzz' Ivanhoe, Colin Campbell, Joseph Riva, and James MacKenzie. Different scenarios can be imagined, some uglier, some prettier. No one can predict the future. But, on the strength of our research, America can expect a wake-up call before 2020. It could come tomorrow. Even 2020 is only 8,000 days away, which, given the stakes, isn't far. If you want more info call CORE. Good books: **The Coming Oil Crisis** by Colin Campbell and **GeoDestinies** by Walter Youngquist. CORE has the former (\$25); to order the latter call (800) 827 2499. **The Prize**, Daniel Yergin's classic oil history, is available in text or video at local libraries.

Good Internet sites: <http://ecotopia.com> and

http://energy.er.usgs.gov/products/papers/world_oil/index.htm. CORE will host a half-day seminar on world oil this spring [1999]. If you wish to attend, call for details.



The Big Question Site of the Week at [Seven Wonders](#): Is there an oil crisis? When will the Joy Ride End? [February 14, 2001]