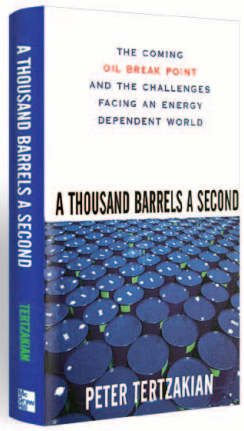
SOUNDVIEW Executive Book Summaries®



By Peter Tertzakian

CONTENTS

The Coming Oil Break Point and the Challenges Facing an Energy Dependent World

A THOUSAND BARRELS A SECOND

THE SUMMARY IN BRIEF

In A Thousand Barrels a Second, *Chief Energy Economist of ARC Financial Peter Tertzakian delivers a provocative look at the future of oil and offers fresh insight into what it will take to rebalance our energy needs, while seizing new opportunities in a post-crude-oil world. He also offers a brief history of worldwide energy policy as well as explanations of past "break points," such as when the world shifted away from whale oil toward rock oil, and how the invention of electricity became linked to the notions of scientific and social progress. This summary also looks at the kinds of energy policies that would be best for the United States in the years ahead.*

In his approach, Tertzakian concedes that the issues, conflicts and worldwide implications of oil supplies that are dwindling — at the astonishing rate of 1,000 barrels per second or 85 million barrels per day — are confusing, even to the experts.

Tertzakian offers a strong case for his belief that the world is approaching another energy break point. Despite the many challenges he outlines, however, in the end his message is positive. He establishes that there are new energy options available to us, many of which will be surprising and unexpected.

In this summary, you will learn:

- ✓ ***About the history of energy development and the meaning of "break points."***
- ✓ ***That the oil crisis isn't so much about running out of oil, but running out of the oil that's easiest to process.***
- ✓ ***Why there are no "magic bullets" that will solve the energy crisis.***
- ✓ ***That the solutions to the energy crisis involve some public sacrifice and a mix of resources involving coal, gas, natural gas and perhaps even nuclear power.***

Published by Soundview Executive Book Summaries, P.O. Box 1053, Concordville, PA 19331 USA

A THOUSAND BARRELS A SECOND

By Peter Tertzakian

— THE *COMPLETE* SUMMARY

The Coming Oil Break Point

Big changes in the world of energy are coming at you faster than you think. Beginning now, and over the course of the next five to 10 years, unstable energy prices are going to affect how you live and what you drive, not to mention the economy, the environment and the complexity of the geopolitical chess match being played out for the world's precious energy resources. We're on the verge of a tipping point on oil.

We are in the midst of volatility, right on the cusp of a break point that will change the way governments, corporations and individuals exploit and consume primary energy resources, especially crude oil. The vulnerabilities that hurricanes Katrina and Rita exposed in the United States' energy lifeline in 2005 highlight the increasingly untenable balance between the way we are supplied oil and the way we consume its marvelous products: day-to-day necessities like gasoline, heating oil and jet fuel. Future potential calamities — natural or political — will continue to exacerbate the pressure points of an intertwined global problem.

Warning Signs

Whether Katrina or Rita are the events that actually accelerate a response to those challenges, and put into motion the serious structural and lifestyle changes that are necessary, remains to be seen. But circumstances will force us to come to grips with our problems and rally to a new balance in our energy use.

Even a cursory glance at the growing number of news articles over the past 12 months reveals the warning signs of change. As the price of crude oil has reached new highs at $70 per barrel, this has already hurt profits and created uncertainty about the future for many industries.

Nor is the news about other primary energy commodities any better, as natural gas, coal and uranium prices have at least doubled since 2002. The reason for this dramatic change is simple: Worldwide, demand for energy is growing at a never-before-seen pace, just as supplies of inexpensive, light, sweet crude are finally tightening and getting more difficult to find. The impact is only beginning to be felt. As the pressure builds, we will soon wake up to the realization that the age of cheap, easy-to-obtain energy is rapidly coming to an end.

Questions Everywhere

The questions that business leaders, politicians and concerned citizens have are simple but profound:

- How high will the price of oil go?
- Why are these changes happening?
- Are we running out of resources?
- Where are the solutions going to come from?

Providing answers involves many dynamic variables, including the economy, the weather, technological advances, environmental issues, social factors, policy strategies and geopolitics. Most of these factors have long been taken for granted because energy has been available without undue pain or worry for many years.

But even now, a new lexicon of issues has become fodder for popular debate:

- Is China's growing thirst for oil sustainable?
- Have we entered a new multi-polar world in which energy is the primary source of global tension?
- Is oil from Iraq a panacea for growing U.S. gasoline consumption?
- Will nuclear power and coal save the day — again?
- Will you really be driving a fuel-cell vehicle in the next decade, and will it even matter?

(continued on page 3)

The author: Peter Tertzakian is the Chief Energy Economist of ARC Financial Corp., one of the world's leading energy investment firms. Tertzakian's background in geophysics, economics and finance, combined with his entrepreneurial spirit, helped him rise from the trenches of oil-exploration fieldwork to become an internationally recognized, top-ranked expert in energy matters. Tertzakian publishes *ARC Energy Charts*, a weekly synopsis of world energy trends.

Published by Soundview Executive Book Summaries (ISSN 0747-2196), P.O. Box 1053, Concordville, PA 19331 USA, a division of Concentrated Knowledge Corp. Published monthly. Subscriptions: $209 per year in the United States, Canada and Mexico, and $295 to all other countries. Periodicals postage paid at Concordville, Pa., and additional offices.

Postmaster: Send address changes to Soundview, P.O. Box 1053, Concordville, PA 19331. Copyright © 2007 by Soundview Executive Book Summaries.

Available formats: Summaries are available in print, audio and electronic formats. To subscribe, call us at 1-800-SUMMARY (610-558-9495 outside the United States and Canada), or order on the Internet at www.summary.com. Multiple-subscription discounts and corporate site licenses are also available.

The Coming Oil Break Point

(continued from page 2)

- Which government policies work and which do not?
- What sort of global landscape will emerge from the turmoil?

A Light at the End of the Tunnel

In the end, there is a positive message to be found: There are energy options available to us, many of which will be surprising and unexpected. Understanding these possibilities will inspire confidence and optimism in our ability to navigate the future.

Will the fuel cell become the steam engine of tomorrow? What will the next Edison be discovering in his or her laboratory? Where will the General Electric or Standard Oil of tomorrow emerge? Will the struggle for oil between the United States and China define the next generation of geopolitics the way the struggle between the United States and Britain defined the early 20th century?

Someday, historians will mark the first two decades of the 21st century as the dawn of a new energy era. ■

Lighting the Last Whale Lamp

The daily news about oil is arbitrary, contradictory and confusing. We're told many different things, often based on misconceptions and half truths. For instance, we've all heard that OPEC can produce more oil and bring down the price, or that drilling in the Arctic National Wildlife Refuge (ANWR) will alleviate U.S. dependency on Middle East oil.

Other pundits claim that a new Manhattan Project can wean us off oil altogether, while many consumers have come to believe that hybrid cars and fuel cells are the answer or that conserving electricity will have a direct impact on oil consumption. None of these magic bullets are practical now or will make a difference any time soon.

In fact, our problems aren't going to go away for a decade or more. North American addiction to cheap energy is too strong, and the technological standards of the last century too entrenched, for any new or different approach to be easily or painlessly (let alone quickly) adopted. Moreover, because of its rapidly growing demand for imported oil, the United States is becoming increasingly exposed to global risk. Our birthright of abundant, reliable energy is coming to an end.

Why is this happening? How will we find a way forward to a cheaper, cleaner, more secure energy future? The answers are complex, but they're also fascinating. Throughout history, because of our evolving energy needs, we've gone through cyclical periods of protracted demand increases, volatile tension and pressure in our supply chains, followed by a break point that ultimately provokes great innovation and change in the structure of the world's energy sources. We call this the "energy cycle."

During high-pressure eras such as today in which a break point is imminent, we'll go to any lengths to secure the energy we need — scavenging, hoarding and even engaging in war for resources that spike in price. The balance returns only when consumption patterns change, and new energy resources or processes are discovered and restructured into the economy. Getting back to a point of balance is never easy, but it can be made less painful if we understand the dynamics and evolution of the energy cycle.

Lighting the World

We've been through such transitions before. The story of energy is an often dramatic and turbulent tale of world events and social evolution driven by the economics of supply and demand, the buildup of pressure on valued resources, and the "magic bullets" of ingenious innovation. Today, the world is lit and powered by a mix of fuels, including coal, uranium, crude oil, natural gas and renewables like wind and solar power. But just 150 years ago, whale oil was the world's primary illuminating fuel.

If you think that our search for crude oil has been intense in recent decades, imagine a time when men chased whales across the oceans to meet the world's growing energy thirst. Indeed, from its rise in the mid-1700s to its peak in the mid-1800s and through its sudden and rapid decline in 1870, the whale hunt was more than a mere fishery; it was an ever more desperate search for the oil that lit up our world.

Ironically, at the peak of its worldwide demand, the days of whale as a premium fuel were nearly over. In 1849, Abraham Gesner, a Canadian geologist, distilled bituminous tar to produce coal oil. Gesner called the substance kerosene as a way of easing its adoption to those already familiar with the suffix in camphene. Kerosene was a wonderful new illuminate, as clean burning as whale oil and much cheaper, though not as nice smelling.

Eight years later, with the invention of the kerosene burner by Michael Dietz in 1857, kerosene became the most sought after illuminate on the market.

The Last Whale Lamp

The new fuel, kerosene, was cheap enough to be afforded by nearly everyone. The conversion from whale oil to this new petroleum-based fuel marked the beginning of a sense that cheap, clean energy is our

(continued on page 4)

Lighting the Last Whale Lamp

(continued from page 3)

birthright, something we can take for granted. Kerosene's use as an illuminate was actually short-lived due to the introduction of the electric light bulb. But because of other timely innovations, namely diesel engines for ships and gasoline engines for automobiles, the crude oil from which kerosene was extracted became the most sought after substance on the planet. In the 140 years since the U.S. whale fishery began its demise, our thirst for crude oil has gotten ever stronger, even as we supplemented our energy needs with coal, natural gas, hydroelectricity and nuclear power.

Since the dawn of the modern era, our hunt for fuel has been a frantic one, catalyzed by the insatiable needs of our energy-hungry world. If the psychologist Abraham Maslow could append his theory of the Hierarchy of Needs, he would do well to include energy, along with such basics as food, water and shelter as a primary need that must be fulfilled before other, higher needs get our attention.

Energy is the underlying force that has shaped our history and built our modern world, even as it makes our society work. To see to that need, we have chased whales across the ocean, drilled into the depths of the earth, fought wars and fought them again, changed the course of rivers and split the atom.

With amazing ingenuity, we have created the means of converting fuel into the energy we need to light and power our lives. Today, as the global supply of light, sweet crude tightens and the demand for it continues to grow, our world is under great pressure, not unlike it was in the last days of the sperm-whale fishery. ■

The 33 Percent Advantage

In the late 19th century, John Arbuthnot Fisher, First Sea Lord of the Royal British Navy, felt that the navy had to convert from coal to oil in order to power its fleet. He quantified the benefits of an oil-powered navy as having a 33 percent advantage over a conventional coal-powered navy. However, while large reserves of high-quality coal could be found in Wales, converting to oil meant that Britain would become dependent on importing its most strategic fuel, putting it into direct competition with other nations struggling for their own access.

The vulnerability of committing to an extended supply chain made it difficult for many people to see the advantages of oil. Nonetheless, over the years the change was gradually made, with the Rockefeller family's Standard Oil coming to the forefront in the United States and Royal Dutch/Shell and British Petroleum (BP) growing in Great Britain.

Not a Wheel Turns

The entrenchment of crude oil parallels how extensively the personal computer has penetrated society, business and government, and been embraced as a new essential by individual consumers. Such platform products don't come around often, but when they do, visionary entrepreneurs like John D. Rockefeller and Bill Gates can become titans of the new industry, and opportunities are rich for investors.

One of the more prescient early historians of the oil industry was an American investor named Reid Sayers McBeth. In his 1919 book, *Oil: The New Monarch of Motion*, McBeth observed the great changes taking place in America and wrote that, "Petroleum today holds the front of the stage in a greater degree than ever before. As a wealth creator it never has been so fruitful as at present."

The reason for McBeth's bullishness was simple: He saw that average consumers were starting to buy gasoline-needy cars. Noting that ships, airplanes and nearly everything industrial was becoming increasingly dependent on oil products, he stated that, "Not a wheel turns which is not dependent on petroleum."

In macroeconomic terms, McBeth sensed that every corner of the economy was being fueled by petroleum. Naturally, the reverse of this observation was also true: Petroleum demand was being fueled by the growing economy.

Pressure Buildup, Break Point, Rebalance

Global tension, anger at oil companies, drastic government action, frustrated consumers, steep and volatile prices, economy uncertainty and no relief in sight are all very familiar. From the OPEC Embargo in 1973 until the early 1980s, the pressure surrounding energy was unrelenting.

Although energy sources can often coexist seamlessly, at the end of some energy supply chains there is very little room for substitution. The vehicle you drive is a good example. It needs gasoline. You can't shovel coal into your fuel tank any more than you can put in a uranium fuel rod or strap on a windmill. Other fuels like diesel can be used in vehicles, but then you need a different engine.

When do we know that things have reached a break point for fuel? A break point occurs when a primary fuel or an associated supply chain becomes substantially

(continued on page 5)

Not a Wheel Turns

(continued from page 4)

disadvantaged relative to other energy supply sources in a nation's energy mix, or relative to the emergence of a completely new supply chain. Upon reaching a break point, governments, industries and individuals take proactive measures to mitigate the imbalance caused by the break point, and rebalancing ensues. ■

To the Ends of the Earth

So what is happening today? Listening to the pundits, you're bound to get confused. The alarms have sounded; the prices are up. Everyone acknowledges that we're confronting energy challenges that we've never faced before.

The problem is that we're not talking about the same thing. Whether you think the end of the world is near or today's concerns will go away on their own depends on what kind of expert you are listening to at the time.

There are a host of experts on both the supply side and on the demand side — and there is a raging debate between them. Some think we're running out of oil; others say we've got plenty left.

Some think that world demand — especially from China — is going to push the pressure needle into the danger zone; others say that all those engines firing at the same time will cool down soon and leave us idling comfortably. Throw in the voices of those who are advocating various positions on conservation, global warming, geopolitics, government policy and the wonders or limitations of new technological advances — and you are left with a blurry picture of what is really happening now and how that will affect your life in the next five to 15 years.

Without a comprehensive understanding of the various forces affecting us today, we can't understand why the pressure in our energy cycle is rising and what that means for the near future. So let's clear some things up. We're not running out of oil, but the oil we need is getting harder to find. Neither China, India nor the United States is going to swallow the world's resources whole, but even a global economic slowdown is not going to turn back the clock on how much oil is consumed every year.

There are no magic bullets in the form of radical technological innovations to rescue us, and yet technology in some form or another will still help save the day. It all seems contradictory, confusing and complicated, and for the most part it is. But from these basic ideas, we can begin to get a handle on what's going on and how to bring energy's big picture into focus. ■

The Technology Ticket

"Technology is this nation's ticket to greater energy independence," President George Bush declared in an April 2005 speech promoting his energy plan. Referring to gasoline costs that were unacceptably high, he went on to tell the expectant crowd, "This problem didn't develop overnight."

President Bush was right in his assessment of the situation. Neither the United States nor the world's energy problems developed overnight; they evolved in conjunction with economic growth and dependency. On the one hand, our problems are evidence of the extent to which a society has grown through crude oil.

On the other hand, they are a kind of reckoning for the choices we have made along the way that increased our dependence on a wonderful resource. When we imagine the power of technology to change the world, we often think in terms of stunning speed: a bolt of lightning from the sky, a magic bullet quickly neutralizing all that ails us. But the amount of time from experiment to application is almost always much, much longer than we realize, and in the case of energy technology that often means decades.

The Last Carbon Standing

Once compelling standards are set, they are remarkably intransigent. This fact alone makes the period from 1800 to 1920 the most influential in our modern energy era. Despite all the scientific progress we have achieved in the interim, in our search for energy alternatives we remain largely fixed in our approaches and limited in our options because of the winning technologies that were adopted in those early, formative days. Think, for example, how difficult it would be to successfully mass-market and sell a 60-watt light bulb that didn't fit Edison's simple screw-based lamp socket, or an electric product in North America that didn't run off the two-prong 110-volt wall plug.

And so, too, should innovators and pundits in the world of energy consider that introducing an alternative is about replacing an entrenched set of compelling standards up and down a complex supply chain. Gasoline, for example, is not merely a fuel, it is the Microsoft Windows operating system of the transportation world, and much harder to displace.

It is in this light that Edison's skills as an innovator can be best appreciated. In fact, his relentless determination to win support for the electric light bulb was absolutely necessary to overcome the deeply entrenched standards of the existing supply chains — for example, kerosene, coal gas, candles and even the last vestiges of whale oil. Imagine switching a whole world to a new

(continued on page 6)

The Technology Ticket

(continued from page 5)

source of illumination. Anyone who longs to create such change today will need all of the skills of Edison and then some.

Nevertheless, there are those today who believe that new alternatives to oil will come to the rescue any time now. Even the venerable Alan Greenspan sells a version of this story with his public retelling about how "oil displaced coal despite still vast untapped reserves of coal, and coal displaced wood without denuding our forest land." On the surface, such beliefs are not wrong, but it's dangerous to think it will all just work out and a solution will emerge before we run out of a primary fuel like oil.

With time at a premium, how long should we expect to wait for the next great energy substitution? Historically, substitutions in the energy world take a long time and there's no reason to think the next substitution is going to happen overnight. While it's likely that we may not run out of oil before a substitute is found, it will be decades or more into the future before any new solutions make a difference.

The Most Abundant Element in the Universe

Many are betting that hydrogen will be the wonder fuel of the future. The first and simplest atom on the periodic table of the elements, hydrogen is an odorless, colorless gas. A more high-tech solution is to use something called a fuel cell: a device akin to an atomic cheese grater that strips electrons off hydrogen atoms to generate electricity. Though it's not a combustion process, oxygen from the air is essential to the fuel cell's operation. Heat and water are produced as by-products.

That sounds like a dream process: hydrogen and air being fed into a device with no moving parts; water, electricity and heat come out. Why aren't we rushing to use this process? We're trying to. Governments around the world are funding hydrogen and fuel-cell research. Giant automakers like Toyota and GM are pioneers and have devoted hundreds of engineers to make a practical and economical vehicle that runs on a fuel-cell "engine." It all sounds great, but there is a core issue that needs to be resolved: Where will the hydrogen come from?

Despite clean and simple operation, fuel-cell vehicles today do not have an overall utility advantage over piston-fired cars, trucks and SUVs. That's not to say they won't get there eventually, but best-case scenarios appear to be 10 to 20 years from now. Think back to the last major substitution in transportation, the diesel locomotive over the steam locomotive, and recall the compelling utility of diesel over coal/steam. If railroads didn't switch to diesel, they went bankrupt. Will anyone go bankrupt if they don't buy a fuel-cell vehicle? As a consumer choice, it's going to have to be really compelling — or legislated.

And then we come back to the issue of hydrogen. Set aside the nontrivial problem of having to establish a nationwide network of new fueling stations while mothballing gas stations: Where is the hydrogen going to come from practically?

Is Nuclear the Answer?

In 2005, President Bush pushed for more nuclear power plants to be built, in part because the electricity can be used to electrolyze water and produce hydrogen fuel for fuel-cell vehicles in the future. If that's the intent, then more power plants are certainly required. In fact, to completely substitute the oil-to-gasoline supply chain with one that goes from uranium to hydrogen —

(continued on page 7)

Looking Back for Answers

How will the world deal with the coming break point? The past can provide us some answers. In the mid-1980s, the world came out of a difficult and painful 13-year break point and rebalancing period. In many ways, we were all better off as a result.

By 1986, U.S. oil consumption was far less sensitive to economic activity as compared to the years leading up to 1973: Only half as much oil was needed to fuel each new dollar of GDP growth. The world had expanded its portfolio of primary fuels in its energy mix to include more nuclear power and natural gas. In countries like the United Kingdom and Japan, oil consumption flattened even while economic growth continued.

Today, each nation is unique in terms of its energy mix and dependency. Some nations, like Brazil, are rich in natural energy resources; others, like Japan, have next to none. Some are in geographically secure positions like the United Kingdom; others, like China, are less secure. For these reasons, each nation will experience the break point, rallying cry and rebalancing in different ways.

Nevertheless, the rebalancing challenge we now face is more complicated than it was in the 1970s. Oil has become more difficult and expensive to find, develop and bring to market. Geopolitical issues still antagonize. Environmental and social pressures are more acute. "Magic bullet" cures are not handily available to diversify our energy mix and ease the burden of our oil dependency, nor will this period of global turmoil we're entering end quickly.

The Technology Ticket

(continued from page 6)

in other words, to completely switch over 230 million cars from gasoline to hydrogen — would require about 350 nuclear power plants.

Obviously, to ease our current oil-demand problems we don't need to go to the extreme of replacing the entire fleet of gasoline vehicles with hydrogen. Partial solutions are possible, though even so, the magnitude of displacing the oil-based supply chains with hydrogen is staggering and would take decades to implement.

No Magic Bullets

Technology can still do a lot to improve the efficiency of society's energy map, whether by constructing new pathways or improving old ones. We as a society can decrease hydrocarbon consumption significantly without compromising economic productivity. This "alternative" notion is the true and potentially radical idea that new energy technology companies need to pursue. We need to be honest with ourselves.

A magic technology bullet, similar to ones that have "saved the day" so many times in the Energy Evolution cycle, will not be in our hands any time soon and certainly not in time to prevent the upcoming oil break point. Ultimately, we must be determined to make all these existing supply chains more efficient, while also making them cleaner and learning how to lower our demand for them. It's a big repaving effort on all our energy highways and side streets, and just like road construction, it won't come cheaply.

If that recipe of solutions doesn't sound very new, radical or sexy, you should recognize that it's rare in the history of technology that the early adopter gets the worm. More often than not, companies, nations and individuals who benefit from technological transitions are the ones who learn to take full advantage of the opportunities that are currently available. Technology is the ticket, but you may be surprised where the ride is going. ■

The Next Great Rebalancing Act

We are approaching another moment in the evolutionary cycle of energy supply and demand where the status quo will be shaken. A break point is coming before the end of the decade. This will force nations to alter the structure of their energy supplies and fuel consumption, especially oil. In the interim, governments, corporations and individuals need to make choices that minimize the economic damage that can result from the pressure buildup in society's vital energy supply chains.

Light, sweet crude oil is quickly becoming "disadvantaged" as a fuel. Rising energy prices are reducing people's disposable income, eroding corporate profitability and making a broad range of previously marginal substitutes like bitumen attractive. But break points are not just about numbers.

Security of supply and concentration risk for this most strategic of energy commodities is at the fore of political and economic issues. Independent oil companies and their state-owned foreign rivals are embarking upon another great scramble for the world's remaining oil concessions. And like the final years of the whaling industry, the scramble is happening at the ends of the Earth, in some of the harshest geographies and climates, the deepest oceans and the murkiest political regions.

Evolutionary Phases of Break Point and Rebalancing

Some experts believe that energy break points are resolved when economies slow down. True, economic downturns do allow energy demand to take a breather and provide suppliers with the time needed to catch up. But economic cyclicality is different from fundamental rebalancing. Normal cyclical forces are generally not strong enough to resolve the severe imbalance associated with a disadvantaged fuel in the energy mix. External measures are required to initiate real evolutionary change.

There are four evolutionary phases that a society experiences during pressure buildup and rebalancing:

- **Complaining and paying up**
- **Conserving and being more efficient**
- **Adopting alternative energy sources**
- **Making societal, business and lifestyle changes.**

Bear in mind that these dynamics occur only in broad chronological sequence and that there is plenty of overlap. For example, meaningful conservation and efficiency most often requires business and lifestyle change. And, of course, complaining and paying up is pervasive.

Making Societal, Business and Lifestyle Changes

Alternatives will slowly emerge; new supply chains will gather strength as old ones die out; people and corporations will adopt more efficient hardware, appliances and vehicles. However, these rebalancing trends are measured in decades. To speed things up, we need to make lifestyle changes that involve consuming less energy. If we don't make those choices consciously, other choices will be imposed on us by economics, government or both.

Governments that have had a vision to curb demand have imposed lifestyle changes as tough medicine in the past. In 1978, Japan was the second-largest importer of oil in the world because it had no oil or natural gas resources. This made it extremely sensitive to the spike in oil prices in the 1970s. With resolve, the Japanese government put into action the report of its Advisory

(continued on page 8)

The Next Great Rebalancing Act

(continued from page 7)

Committee on Energy, which aimed to reduce its 75 percent dependence on oil to 63 percent in the mid-1980s and to 50 percent by 1990.

After having set these goals and benchmarks, Japan proceeded to meet them. Today, Japanese citizens drive cars, but they pay a high tax for gasoline and at toll booths and must undergo strict annual inspections. These choices seem restrictive and even technologically backward to North Americans, but they are culturally tolerated in Japan and have done much to moderate energy use.

Imposing lifestyle change by legislation on high consumer fuel taxes or outright limits on consumption is tough medicine. But to really offset demand we need to see lifestyle changes today at the level that was accomplished in Japan and many European countries over the past three decades. ■

A Golden Age of Opportunity

After the break point occurs, the emphasis changes. Consumption growth for the disadvantaged fuel levels off as nations, companies and individuals try to rid themselves of the dependency. The value of the energy resource asset peaks and starts declining.

The emphasis shifts to rebalancing solutions and other substitute resources. Things are still changing and there is still money to be made. But investors must look ahead, and put their money in rock oil, not whale oil. They should search for opportunity in the way people conserve. Consider the following investment areas:

- **Substitute Resources and Supply Chains** — Liquefied natural gas, coal, uranium and renewable energy sources will all gather value as light, sweet crude oil becomes progressively harder to find. Nonconventional sources of petroleum products like oil sands and shales will also remain at the fore. This often happens well before the disadvantaged fuel, in this case oil, hits a break point.
- **Balancing Infrastructure and Services** — Building infrastructure to facilitate bringing new primary fuels to market requires massive investment in infrastructure. Investing activity in liquefied natural gas infrastructure and Canadian oil sands highlights this point. Look for companies that are building equipment, hardware and specialty devices that facilitate rebalancing toward alternative energy supply chains.
- **Demand Management** — When fuel prices go up, consumers complain. Then they start minding how much they consume. Keeping tabs on conservation and counting dollars becomes important. The digital revolution is spawning the means to do so.

  Information-gathering devices to monitor energy consumption, energy efficiency and dollar consumption are going to become increasingly important in all sorts of day-to-day appliances. From corporations to individuals, we'll all be much more aware of how much the work we extract from our various fuel sources is costing us.
- **Process Innovation** — We know that rebalancing is not just about switching to alternative fuels and conserving resources. It's also about finding process innovations that improve the efficiency of the countless number of products in use that are currently dependent upon our primary fuel supply chains. Technology is a major enabler of energy efficiency, and companies that are pioneering ways to become more energy efficient have an increasing value proposition as pressure builds and a break point is reached.

  Further, the energy policies of many countries are offering grants and subsidies amounting to billions of dollars for companies to find process solutions. Product innovation is giving way to process innovation, and investing opportunities will be increasing in this area.

The Way Forward

By the end of the summer of 2005, oil had topped $65 a barrel. And when the aftereffects of hurricanes Rita and Katrina disrupted refinery operations and distribution in the Gulf of Mexico, our nation witnessed a sobering example of how vulnerable we are to operate with so little spare capacity.

These conditions also served to remind us how fortunate we have been to be able to take energy for granted. It means that we live in stable and prosperous times. But those days are over for the moment. High and volatile prices are now the norm in this chapter of our energy evolution. We should not forget, however, that the turmoil and uncertainty surrounding energy throughout history have always led to a brighter future. ■

SOUNDVIEW RECOMMENDED READING LIST

If you liked *A Thousand Barrels a Second*, you'll also like:

1. ***Black Gold*** **by George Orwel.** Learn how falling production and rising demand for oil have enabled companies and investment banks to cash in.
2. ***Twilight in the Desert*** **by Matthew R. Simmons.** Simmons offers a detailed description of the relationship between Saudi Arabia and the United States, and this country's long-standing dependence on Saudi oil.
3. ***The Coming Economic Collapse*** **by Stephen Leeb, Ph.D.** Leeb shows how hard times can be a boon for smart investors, especially in regards to oil prices and potential investments.
4. ***Commodities Rising*** **by Jeffrey M. Christian.** Filled with in-depth insights and anecdotes from Christian's 30 years in the commodity markets, this is a resource for investors or traders.
5. ***Beyond Oil*** **by Kenneth S. Deffeyes.** The author bases his book on the work of M. King Hubbert, who mathematically determined that the world's oil supply would peak in 2000 and then drop steadily thereafter.