Climate Change and Energy Security: The Future is Now

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Audit . Tax . Consulting . Financial Advisory.

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The New Math and Politics of Energy in the 21st Century

The essential question we now face is how best to arrive at a post-carbon world.

There is an old saying in the energy business: "The stone age did not end because the world ran out of stones, and the oil age will not end because the world runs out of oil." Never has this rung more true than today.

No, the world is not running out of hydrocarbons, as some might claim. In fact, our fossil fuel reserves are vast. But we are now collectively acknowledging the qualitative limitations of hydrocarbons and the challenges these pose—especially in light of mounting global energy demand. Put in market terms, we are beginning to understand the true costs of fossil fuels. And we are thus confronted by the reality that if we do not vigorously tackle climate change and energy security, the world will face limited growth—or worse.

History might well remember 2007 as the year we established a new energy horizon. We can now imagine what the world might look like *after oil*, in two generations. We can envision living in a world of dramatically changed consumption patterns, in which new end-use technologies are powered predominately by alternative sources: more efficient cars that run on low-carbon electricity, green buildings, a bias for local production, utilities that profit by *saving* energy rather than *selling* it. And instead of seeing our energy future with fear and trepidation, we are beginning to perceive this new world as one that is full of promise, and a potential engine for economic growth.

But we are not there yet. We are living through an environmental enlightenment that has the potential—the *potential*—to trigger the next industrial revolution. The essential question we now face is how best to arrive at a post-carbon world.

The convergence of concerns about climate change and energy security over the past two years has allowed us to cross the threshold of awareness. For the first time in history, citizens around the world believe that they as individuals can make a difference—through their own actions—in confronting a global crisis.

The Transforming Ingredient: Language of a New Reality of Hope Rather than Fear

LANGUAGE OF FEAR

Energy Independence
Find more oil...but where?
+ peak oil fears

Energy Security
Cheap Middle East oil, but "cheap" doesn't include the value of lives lost and other military costs

Energy Conservation
Some politicians try to equate it with "sacrifice" but it has more to do with common sense

LANGUAGE OF HOPE

Energy can be redefined as
Services we require which engender
Technology which requires
Skills that create
Jobs that foster
Economic growth

This redefined energy means a new diplomacy in the world.

Energy of Technology: Redefine the old world of cheap, clean, secure, discrete energy to the new era of services we buy.

Source: The JAStanislaw Group LLC

But we must build on this epiphany by making it easy for consumers to do good, and by becoming far more active in fostering the technology that will enable a new energy era. We have no time to lose. Retooling our energy infrastructure will take at least two generations. During this window, we must use oil, gas, coal, and nuclear energy in new and "cleaner" forms as a bridge to a world of new energy demand patterns, new end-use technologies, "greener" production processes, and alternative energy sources.

Those who succeed in this—nations, corporate leaders, entrepreneurs, and individuals—will be the winners of the post-carbon age.

Hurricane Katrina was the trigger—the moment, in retrospect, when climate change for so many went from theory to reality.

Convergence of Climate Change and Energy Security

It is difficult to believe that it was just two years ago when a pair of leading environmentalists published a tome entitled "The Death of Environmentalism." How, in the short time since, did climate change, energy security, and the "energy of geopolitics" capture the public imagination?

Hurricane Katrina was the trigger—the moment, in retrospect, when climate change for so many went from theory to reality. Accurately or not, Katrina settled in the American imagination as proof of climate change, while underscoring the vulnerability of our energy supply system. Remember, Katrina knocked out 16 percent of American refining capacity.

Then, the summer of 2006 began an onslaught of evidence that our use of fossil fuels was causing irreparable damage to the environment—heating up the planet, lifting the oceans, extinguishing species. The United Nation's Intergovernmental Panel on Climate Change (IPCC) started releasing its series of devastating reports. In the UK, Sir Nicholas Stern warned climate change could cause an economic calamity. Al Gore's hyperventilating "An Inconvenient Truth" became a box office hit, won him an Oscar, and earned him and the IPCC the 2007 Nobel Peace Prize for efforts in this area. In the business world, meanwhile, the bottom line started turning green.

The Convergence of Climate Change and Energy Security: Two Sides of the Same Coin?

The need to reverse the drivers of the Energy (E) System

For Consumers Climate Change (CC) and Energy Security (ES) Mean:

- Reduce use of imported energy
- Reduce use of energy
- Reduce use of hydrocarbons
- Increase use of alternative energy
- Increase use of local energy
- Improve efficiency of use
- Change processes and ways
- Change products to use less energy
- Change technology

Outcome:

- Smaller future markets
- More relative "independence"

⟺

For Producers CC and ES Mean:

- Shrinking markets in consuming countries
- Threats to market share
- Threats to income
- More competition for markets

Outcome:

- Need to capture/own end-use market
- Need to acquire assets in consuming countries to "guarantee" a market
- Need to lock in higher prices now
- Need to create dependency

Reality: Actions by both producers and consumers increase "relative independence"– not totally, but mutual interdependence is enhanced.

Source: The JAStanislaw Group LLC

It is possible that, on its own, the environmental impact of climate change might have led us to re-imagine our energy future. But it was, in fact, the confluence of several forces that compelled action. Among the most important are:

- The energy politicking of Russia, which is making Europe focus on diversifying its energy sources; and Venezuela's nationalizations, which have put the US on alert.
- The related politicization of supply, as state-owned oil companies claim 80-plus percent of oil and natural gas fields, forcing private energy companies to adjust to an unfamiliar and hostile landscape. The cost of doing so is pushing these companies past the "break" point and broadening their focus from exploration to embrace developing alternative technologies.
- The war in Iraq, with its half-trillion-dollar cost and 3,800+ US lives lost, underscores the price, at least in part, we pay to protect the global oil supply.
- In April 2007, a group of leading US generals released a report warning of "resource wars"—which could be triggered by disputes over ownership of or access to fossil fuels and diminishing freshwater supplies—and other conflicts fueled by climate change.

The security impact of climate change began to trouble politicians across the political spectrum. This convergence of concerns over climate change and energy security could well have led to public *immobilization* in the face of an overwhelming challenge. That was the argument that had been advanced in "The Death of Environmentalism": that climate change was too daunting a prospect to confront. But the opposite has happened. Individuals feel emboldened to play their part in what Prince Charles has likened to a "war" on climate change, not dissimilar in importance to World War II.

Until recently, to be an environmentalist meant that you resided on the cranky fringe, heralding doom and gloom. Today, to be an environmentalist implies something very different—that you are at the patriotic vanguard of a global movement. Environmentalists today are emerging as entrepreneurs, visionary policymakers, and the high priests of hope and eco-chic.

Tipping Point to Break Point

The confluence of climate change and energy security has pushed us past the tipping point of awareness and into a movement to finally price energy in a way that more accurately reflects its true costs—not just exploration, production, and distribution for conventional energy, but also for all alternative forms. True costs would account, as well, for energy's impact on the environment, health, and geopolitics. Getting the price right—meaning that all costs are captured—will support a wave of market-led innovation and job creation in energy efficiency, new end-use technologies, renewable sources, as well as in the traditional energy sector.

The Energy of Geopolitics: Climate Changes Everything

Source: The JAStanislaw Group LLC

We have moved, in 2007, from the tipping point of awareness, through a break point caused by the high financial and political barriers to accessing resources, to the transformative stage of action.

Until now, energy has largely been seen as the domain of giant multinational corporations and of mighty oil-producing nations. But because of the convergence of concerns about climate change and energy security, the picture that has emerged in the past year is a far more complicated, and yet more promising, one.

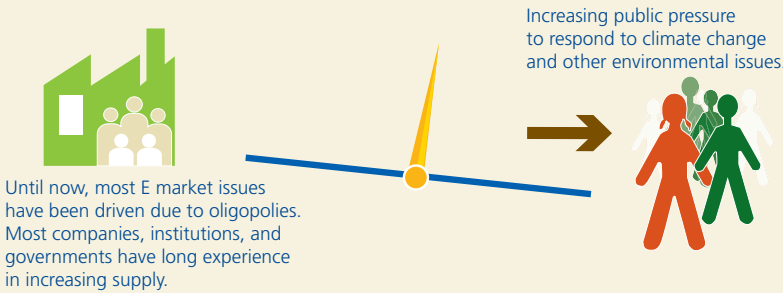
Suddenly, the corn farmer is a player on the energy chessboard, as are small producers like Ghana—whose oil supplies, while modest, can be important to price stability. Even smaller ones, like Joe Smith, one of several thousand Americans who have installed personal wind turbines on their land, are players. Each of these sources of energy increasingly will fill a niche of need. Venture capital is pouring into over 1,000 startup companies seeking to define the cutting edge in clean-tech energy sources such as bio-fuels, solar, and wind.

Average consumers have become empowered. For the most part, they cannot produce energy—though California's Million Solar Roofs campaign is trying to change this as well. But consumer behavior can substantially reduce consumption, thus lessening the need for energy. Seen from this perspective, demand reduction is potentially the largest source of supply. It is this drive towards efficiency—enabled by end-use technologies that sip rather than chug energy—that must be put at the heart of the new energy era.

The consumption of energy is becoming an increasingly conscious act—and it is becoming an act of conscience. This change—the politicization of demand—is a function of our heightened awareness of the impact of energy consumption on our wallets, on foreign policy, the environment and climate change. And this change is driven by a simple fact—the knowledge that the actions of each and every individual across the globe can make a real difference.

The Transformation Logic:
The Challenge of Politicization of Demand

The need to reverse the drivers of the Energy (E) System



Few institutions are equipped to deal with consequences of demand decisions made by millions/billions of individuals and politicization of demand is unpredictable, traditionally driven by politicians or regulators. It should be driven by price, markets, and technology.

Source: The JAStanislaw Group LLC

The potential ability to consume oil, gas, and electricity more efficiently—thus reducing the need for new energy sources—has captured the public imagination. Whether driving hybrid cars, diesel cars, weatherizing homes, or buying offsets to lighten their carbon footprints, consumers are becoming an activist force. And this comes with the realization that their actions are not a sacrifice. Instead, consumers are getting more for their money, as well as the satisfaction of reducing their environmental impact. They are, in effect, on the frontier of discovering new energy reserves—since energy not used is arguably the best, cheapest, and least environmentally damaging source of supply.

Demand reduction is potentially the largest source of supply. It is this drive towards efficiency that must be put at the heart of the new energy era.

Whether this awareness and activism will spread broadly in the population—and remain sustained and sustainable over the long term—is a critical question. The essential challenge for policymakers and the market is to harness the current awareness to create and encourage mitigation and adaptation.

It is perhaps fitting that the most sudden and best-publicized change in end-use technologies is one that pervades our lives: lighting. Practically overnight, we have seen the determined burial of the incandescent light bulb—a terribly obsolete, 128-year-old technology. First, in January 2007, Australia announced it would phase out Edison's invention by 2010. Then Wal-Mart committed to selling 100 million fluorescent bulbs each year and Home Depot gave away one million of them on Earth Day. Ontario decided to ban the old bulbs as of 2012. In spring 2007, California became the first US state to act, banning the sale of incandescent bulbs as of 2012. Meanwhile, the European Union in March 2007 set an even more ambitious goal of phasing out common incandescent light bulbs in homes by 2009. The US Department of Energy estimates that if every American household replaced its five most frequently used bulbs, the reduction in greenhouse gases would be equivalent to taking 10 million cars off the road.

Another innovation—long-established in parts of Europe, but new to America—seeks to train us in how efficiently we consume power. Smart meters flash red and green to signal the current price of electricity. Pursuing such creative and concerted action, we could conceivably cut per-capita US electricity demand by 20 percent within a decade.

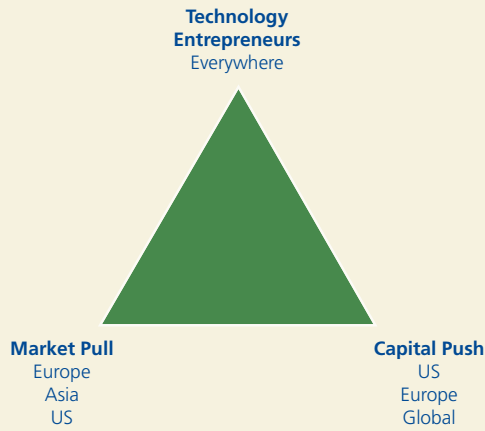
This fixation with light bulbs and meters is critical to generating awareness that every individual can fight climate change. They are small steps, but they are inspiring a new consumer attitude towards the products people buy. Every time we flip a light switch we are making a conscious energy consumption decision. It is a good time to ask, have we done our small part in reducing emissions and saving energy? The fluorescent craze can help build the momentum but we need to take the harder steps that lead to adaptation. Nonetheless, there is a risk that small steps might generate a sense of complacency, creating a false belief that we have done enough.

What distinguishes the current drive towards efficiency is this: Conservation is no longer about parsimony, cutting back, and sacrifice. It is about opportunity, being better off and becoming richer (and not just spiritually). The Tesla Roadster—started by an entrepreneur in California—goes from 0 to 60 in four seconds, even though it is 100 percent electric. The fluorescent bulb emits as much light as its incandescent counterpart, but uses a fraction of the electricity at a fraction of the cost. (However, we should not be satisfied until the electricity used by the Roadster and the flourescent light bulb is produced by low-carbon methods.) Green buildings actually have been shown to *increase* productivity. And even climate change skeptics can be brought on board, since bringing sanitation, health, and energy to the world's 2.5 billion impoverished people requires actions very similar to those demanded by the convergence of concerns over climate change and energy security—actions that, to boot, will earn skeptics and non-skeptics alike a handsome profit.

Conservation is no longer about parsimony, cutting back, and sacrifice. It is about opportunity.

Put another way, we are not being asked to adjust human nature to this new energy era. The new era is adjusting to human nature, thanks to technology enablers. And the market, guided by enlightened policy, is the intermediary.

Alternative Energy:
The Triangle of Technology Determination



Source: The JAStanislaw Group LLC

Action—Regions, States and Localities to Lead

In the US, federal policymakers have yielded the initiative to hundreds of state and local governments that are experimenting with initiatives that Washington lawmakers are too timid to pursue. Despite ambitious rhetoric from Democrats before they took control of Congress in January 2007, very little has been achieved at the federal level. In part, this is because the majority now lacks a consensus about whether to advance modestly progressive legislation now, or to make a far more ambitious push after a hoped-for victory in the 2008 presidential election.

If there is an energy revolution happening in the United States, it is being led by the states, with particular international visibility for California and the Schwarzenegger administration. The rhetoric deployed by the governor echoes the transformative language of our view that "the force is with us." He has clearly positioned California, always the greenest of American states, at the vanguard of global action against climate change. Like us, he emphasizes hope and opportunity instead of fear. Rather than seeing environmentally driven action as constraining people's choices, it as a way to improve our lives. He evangelizes that California will be the first "green economy" and that in the next quarter-century the alternative energy industry will be to California what Silicon Valley was for the past few decades— a new industrial revolution and driver of innovation, job creation, and economic growth. Because of its size as the world's sixth-largest economy, California can light the way forward, serving as a catalyst for the other 39 states that are taking, or proposing to take, action and providing enough momentum to get the United States past the tipping point in how we view energy and the environment. The governor is keenly aware of this and often notes that, "California has influence in the world, so we're not waiting for Washington—we're taking action ourselves."

If the current public outcry triggered by the convergence of concerns about climate change and energy security is not enough to move some politicians, then they will certainly be captivated by one of their traditional preoccupations: creating jobs. The green economy is already creating hundreds of thousands of them. The National Resources Defense Council estimates that since 2002, California has received $2 billion in clean-tech venture capital, 124 startups have been incorporated and an estimated 52,000-114,000 jobs will be created by 2010. Meanwhile, over 100,000 Americans are directly employed by companies producing biomass, solar, wind, and geothermal energy.

Derive Wisdom from Euphoria and Rhetoric

Amidst the rush of publicity and awareness about the power of consumers to impact climate change, it is worth pausing to catch our breath. This is, after all, a marathon and not a sprint—and we risk exhausting the public's appetite for change if we do not temper expectations and pace the rate of change. Take the fluorescent light bulb craze. Every time a traditional bulb is replaced by a compact fluorescent one, about 260 pounds less carbon dioxide is released into the atmosphere annually. This number sounds impressive—until it is compared to the total carbon dioxide emissions produced by the average American household: 12.4 *tons* each year. And this amount does not include a family's automotive emissions.

New technologies—be they biofuels, fluorescent bulbs or hybrid cars—risk becoming trendy before they have been fully assessed. We must derive "wisdom from the euphoria and rhetoric". It is essential that we do a cradle-to-grave assessment of the total impact of such innovations. For instance, while America has "gone gaga" over the Prius and other hybrids, it is safe to say that the diesel car is a smarter alternative—yet, it has been largely forgotten in the hybrid euphoria. Meanwhile, the fluorescent lighting craze has obscured the fact that each of the new bulbs contains about five milligrams of highly toxic mercury. Policymakers must become adept at assessing such trade-offs—efficiency versus health risks, ethanol versus higher food prices, and so on. Similarly, consider the biofuel rage where European activism advocates requirements for bio-fuels to avoid the "devil's triangle" of food, fuel, and water competition. Analyses should be done across the board, so that we avoid the law of unintended consequences. Only then can we be clear which technologies really make a difference, which are neutral, and which ones have a negative impact on society.

Corporate Leadership and Enlightenment: The Bottom Line Is Green

The metamorphosis of environmentalists into entrepreneurs—and vice versa—captures the transformation in how we see energy, the environment, and climate change. Richard Branson—a colorful symbol of late-20th century business acumen who built his empire on old-tech planes and trains—embodies the change. He has declared that he will invest all his Virgin air and rail profits for the next decade, some $3 billion in all, into alternative energy ventures. While there are some questions about how much of an impact Branson's moves will actually have, the symbolism alone of his announcement marks an important step forward. Meanwhile, in Silicon Valley, the titans of the internet have turned their gaze on renewable energy.

The world after oil represents the greatest economic opportunity of the 21st century. We are at the very beginning of a global race to create dominant green economies. To succeed, we will have to harness and guide the driving forces of the future—which can be neatly summarized as the "Five C's": consumption, cars, carbon-free electrons, coal, and China. The first four C's also are the driving forces in the US. The common thread running through these five C's is the need to address demand first through efficiency and new end-use technologies.

The world after oil represents the greatest economic opportunity of the 21st century. We are at the very beginning of a global race to create dominant green economies.

The Challenge of Unintended Consequences: The Devil's Triangle

Source: The JAStanislaw Group LLC

Our ability to prevail in this new era will hinge on the following question: Do we see corporations as friends or foes of the environment? If we frame them as enemies, and entangle them in a thicket of environmental regulations, we will choke off the green economy. Instead, we need to see the private sector for what it is—a hungry machine that can be harnessed for the common good. If we capture all the "costs to the commons" of producing and using energy, we can afford to allow the profit motive to work out the best answers. Government has a responsibility to define the playing field and the rules by which the profit motive will play out, but must resist the temptation to become instant replay referee.

Business leaders will respond out of a combination of necessity and analytic conviction. A business must be sustainable—that is, providing services or products that meet the demands of customers in ways that reduce costs. And, increasingly, in the future this will include the costs to the commons. Government, meanwhile, has a responsibility to make sure that these costs are assessed and paid. If businesses become sustainable, society will as well—and so, too, will the planet. The sooner we head down this road, the faster the market will create new products that are shaped by the true costs of energy, that the public wants to buy, and that protect the environment. The supply of carbon-neutral and environmentally friendly products, as Say's Law might dictate, will create its own demand.

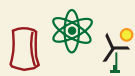
Do we see corporations as friends or foes of the environment? If we frame them as enemies, and entangle them in a thicket of environmental regulations, we will choke off the green economy.

The dazzling wealth of the 20th century was spun from oil and gas and was concentrated in the industrialized world. Our collective challenge now is to bring this same level of wealth to the developing world, which has an equal claim on it, but without incurring the costs to the environment, health, and security that our own industrialization entailed. In many parts of the world, this century will continue to be dominated by fossil fuels. China today produces four-fifths of its energy from coal and is, on average, building a new coal-based power plant every week. Next year, it will surpass the US as the world's largest emitter of carbons. So, our goal must be a universal one: to create green economies on every continent. Seen this way, climate change becomes the "China challenge."

Hydrocarbons will continue, of course, to absorb most of the $500 billion that the world invests each year in energy. They will continue to define the energy of geopolitics, as energy superpowers such as Russia flex their muscles, and as the might and market of China and India grow. And vast fortunes, both national and individual, will continue to be reaped from fossil fuels.

The Transformation Drivers: The Four Cs (and One Non-C)

Consumption Efficiency
What is not used is supply found



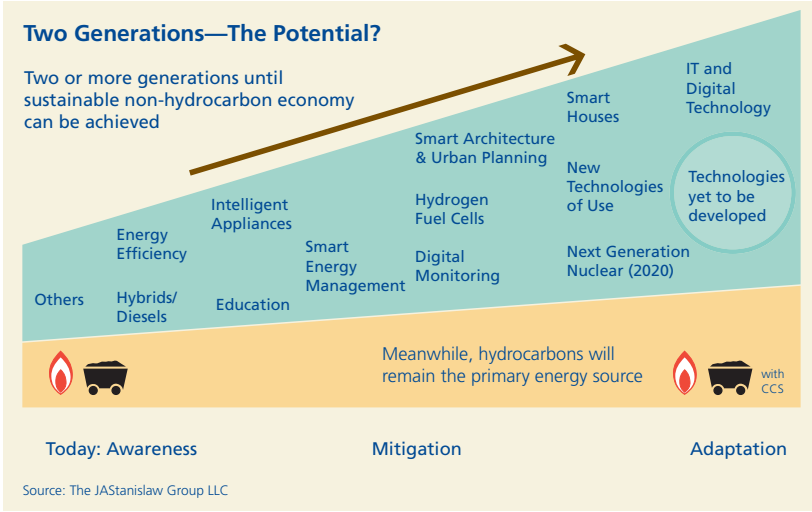
Carbon
Low-carbon electrons

Cars
The irresistible force

China
The insatiable appetite

USA
The energy sink

Source: The JAStanislaw Group LLC



Increasingly, economic winners will emerge from the new green economy. The key is instilling energy literacy. We can identify five basic ways in which corporations will adapt and assist—how they will capitalize on making their bottom lines both green and black:

- **Defining New Efficiency Technologies:** An entire industry is emerging that will help us consume energy more efficiently, from consultants who conduct energy audits, to smart meters that tell us the price of the electricity we are consuming, and smart appliances that adjust their use automatically to pricing signals.

- **Establishing Low-Impact Production Processes:** Corporations are reengineering how they create and distribute products in order to lower their environmental impact. One of the critical trends in this respect involves going local—building or growing products as close as possible to their end market, in order to reduce the impact of transportation.

- **Creating New Eco-Chic Products and Services:** In the current mitigation stage, companies are scrambling to create low-energy products—computers, cars, light bulbs. They also are creating services to feed green economies: HSBC, for instance, aims to be a leader in carbon financing, while other financial institutions are issuing energy-efficiency loans and developing green mortgages. Utilities are beginning to offer consumers the option of drawing "green" electricity from the grid. Meanwhile, energy companies—oil, gas, coal, and others—are at the cutting edge of trying to lead their industries on supply-side research and on demand-side management.

- **Greening Their Brands:** Hardly a day goes by without one or more corporations unveiling new, greener versions of themselves. Companies from every industry are getting in on the act, cutting their own energy use and emissions to appeal to eco-sensitive consumers and their own employees.

- **Discovering Supply Alternatives:** Today, there are over 1,000 startups around the world scrambling to come up with the next big thing in new supply and new efficiency technologies, and in alternative energies—from hydrogen fuel cells, to high-yield bio-fuels, to efficient wind turbines, thin-film solar, and much more. No doubt, this number will grow and from this field will emerge the next generation's "super majors".

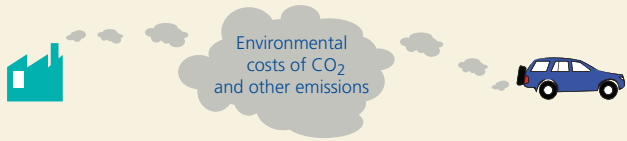
The new energy company will no longer profit from selling a commodity such as oil, gas, or electricity. Instead, it will be a high-value service company that provides light, heat, and mobility, being rewarded for doing so in the most environmentally acceptable way. Consumers will come to expect this.

The Time Is Now —
The Energy Company of the 21st Century

Service = heat and light, not kWh or cubic feet	Service = mobility and miles driven, not gallons of gasoline

The 21st century energy company doesn't sell carbon or carbon electrons. It does sell carbon-free or carbon-reduced based services:

- Light, heat, transportation, sanitation, health
- Profits should be based on service, not on volume of energy sold
- Value to the customer is the service itself, not the fuel that provided it



The 21st century market captures all the costs, so provider is incentivized to provide low-carbon service

Source: The JAStanislaw Group LLC

The Way Forward: Five Imperatives

Now that we have crossed the threshold of awareness and have begun to act in earnest to mitigate the damage of fossil fuel use and address energy security, we face a generational challenge in translating all this into a viable energy system for the future. In doing so, we must guard against today's eco-chic fashion turning into tomorrow's complacency.

Where should our priorities be in creating a market framework for this new system? If we are to cross the energy Rubicon, we will need to be led by the following five imperatives:

- **Responsible Leadership:** At the federal level, the United States must join the European Union—which is way out in the lead—in setting bold, long-term carbon-reduction targets. Absent unified moral leadership from the West, China and India—which account for the lion's share of future energy growth—will find it hard to gain popular domestic support for policies to restrain their own emissions. At the same time, global leadership needs to decide in what international forums it will vest the legitimacy to act on issues related to climate change and the environment. The new energy era demands that policymakers at all levels and in all countries come together to determine national and international strategies. At the heart of this effort is the need to send clear, long-term signals to the marketplace for what we want to achieve—our targets for efficiency, emissions, environmental impact. Only in this way, and by supporting our targets with heavy investments in research and education, can we lead the world into the green economy.

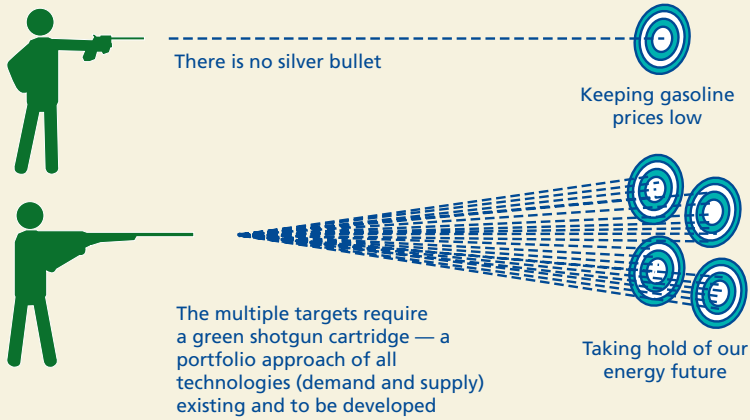
- **The Public Sector Example:** It is hard work for a government to change the behavior of the public. But it is far easier for it to set an example. Governments around the world should adopt generation-leaping standards. Public fleets should be the most energy efficient available, buildings the greenest, and civil servants thoroughly educated in environmental and energy issues.

- **The Three New R's:** A massive campaign to educate the public about climate change and energy security must be built into the core of our school systems. To the three "R's" of basic education (reading-writing-arithmetic), we must add the three basic "R's" of the environment—reduce, reuse, recycle. Then we must go beyond the basics to reimagine, reengineer, and redesign. Our goal can be nothing short of permanently transforming the consumer habits of the next generation. The virtuous circle created by the three new R's will lead to another virtuous circle: an education steeped in awareness of climate change and energy security will lead to creative ideas to address our challenges and ultimately to solutions.

- **Back to Basics:** We must rethink all the basic processes of our built environment in order to make them more climate- and energy-friendly. How do we design and construct houses? For instance, by using high quality insulation, meticulously sealing all joints, and designing windows that maximize sunlight, a house can be heated using around one-tenth as much energy as today's average home. How do we plan our cities and our transportation systems? How do our products function? Already, many cities are tearing up their building codes and establishing new green standards. Regrettably, the opposite is happening in China, where rapid urbanization is leading developers to ignore building codes.

- **Return to the Local:** The essence of globalization involves taking the best local products and ideas and seeding them around the world. Too often, though, globalization is perceived as being top-down. Part of our vision for the new energy era will revolve around thinking locally. Why? Climate change and energy security both highlight the risks of dependency. Local solutions lead to lower environmental impact, a greater supply of local jobs (a boon for political stability, among other things), and an accumulation of skills, while reducing the risks of dependency. By focusing on the local, we become better partners for those with whom we deal externally. Being strong locally means being less dependent externally, which creates the potential for true mutual interdependence rather than mutual dependence. Local does not mean independence and isolation. Local also leads to lower carbon emissions. Consuming locally produced food, where possible, would minimize the costs and emissions of transportation. And, in the spirit of E.F. Schumacher's credo that small is beautiful, "local local" will become global and lead to a more robust globalization.

Mitigation and Adaptation



Source: The JAStanislaw Group LLC

This politicization and convergence of climate change and energy security is forcing action on multiple levels:

- **Behavior Adaptation and Increased Efficiency:** Through heightened energy literacy, consumers, whether they be governments, corporations, or individuals are modifying and will modify their behavior in response to clearer market signals and the climate of ethical sensitivity.

- **Legislative Activism to Get the Price Right:** Policymakers around the world are debating and enacting hundreds of measures that will help get the price of energy right. These measures will foster the energy company of the 21st century, which will be paid for the services it provides that abet energy efficiency, rather than for the volume of energy used.

- **Investment and Innovation:** The energy industry and venture capitalists are responding to the opportunities created by the "new atmosphere" by accelerating innovation, helping to change our demand patterns, improve our efficient use of energy, and diversify and create new sources of supply.

Perhaps the biggest hurdle to overcome will be the disparity between the timescale of politics, measured in a handful of years, and that of market-driven energy development—which occurs over a span of decades. The challenge and the opportunity on which we must all now focus is this: to align the actions of local, national, and global policymakers to deliver policy frameworks that allow industry and markets to deliver the two-generation transformation of our energy system, on both the supply and demand sides, for the next half-century.

What is most extraordinary about this green revival is that, despite the devastating prospect of climate change and fears of volatile and dramatically rising prices that inspired it, it is a movement characterized by hope and opportunity. Energy conservation has metamorphosed from a sacrifice to an opportunity. By reducing emissions, we can reduce costs and have more value for money. Energy conservation has struggled for decades to enter the mainstream. Environmentalists in times past were Cassandras preaching sacrifice. Today, they are the innovators driving the economy.

On their own, politicians will not deliver such action and change. Only the public can keep the fire under them. The confluence of concerns over climate change and energy security has carried us past the tipping point of awareness. Now we must sustain this public interest and thus keep the pressure on the politicians. To succeed, people everywhere must become the agents of change, by seeing themselves as the solution to our energy challenge—every time they switch on the light and turn the key to their car. And this will only happen if the markets deliver climate-friendly products that improve the lives of consumers.

But the force is with us! And the world is changing!

About the Author

Dr. Joseph A. Stanislaw is founder of the advisory firm The JAStanislaw Group, LLC, specializing in strategic thinking, sustainability, and environmentally sound investment in energy and technology. He is an independent senior advisor to Deloitte's Energy & Resources Group. As an energy industry leader, advisor, strategist and commentator, Dr. Stanislaw advises on future trends in the global energy market.

Dr. Stanislaw was one of three founders of Cambridge Energy Research Associates in 1983 and served as managing director for all non-US activity until 1997, when he was named president and chief executive officer. He is an adjunct professor in the Nicholas School of the Environment and Earth Sciences at Duke University, where he is a Member of the Board of Advisors for the Nicholas Institute for Environmental Policy Solutions. Dr. Stanislaw was a Research Fellow of Clare Hall and lecturer in Economics at Cambridge University, where he was also a member of the Energy Research Group in the University's Cavendish Laboratory. He was a senior economist at the Organization of Economic Cooperation and Development's International Energy Agency in Paris.

Dr. Stanislaw is co-author, with Daniel Yergin, of *The Commanding Heights: The Battle for the World Economy*. Now in the second edition, the book has been translated into 13 languages and made into a six-hour documentary on PBS. He is also the author or co-author of numerous reports and published papers on the geopolitics and economics of future energy supply and demand, including *Energy in Flux: The 21st Century's Greatest Challenge*, and he will be featured in the upcoming public television documentary, *Oil ShockWave*.

Dr. Stanislaw received a B.A., *cum laude*, from Harvard College, a Ph.D. in Economics from the University of Edinburgh, and was awarded an M.A. from the University of Cambridge. He is one of only several people to have been awarded an Honorary Doctorate and Professorship from Gubkin Russian State University of Oil and Gas in Moscow.

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