The Perfect Storm Primer

A

Survival Plan

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The Perfect Storm

"We're on a collision course with the *perfect storm* of all times"

The phrase "the perfect storm," originating from Sebastian Junger's book by the same name, is now commonly used to describe a confluence of powerful forces coming together at the same time to produce a catastrophic event.

We are on a collision course with the ***perfect storm*** of the millennia and we are not responding. We don't even see it coming.

To be sure, we have experienced elements of the ***storm*** over the past year and have even made haphazard efforts to address some of the more egregious elements. But, absent a big picture of the ***storm's*** true ferocity, our efforts are comparable to rearranging the proverbial deck chairs on the Titanic. Make no mistake, the ***perfect storm*** will be a paradigm-busting challenge that forever changes our way of life, and there is simply no precedent for it.

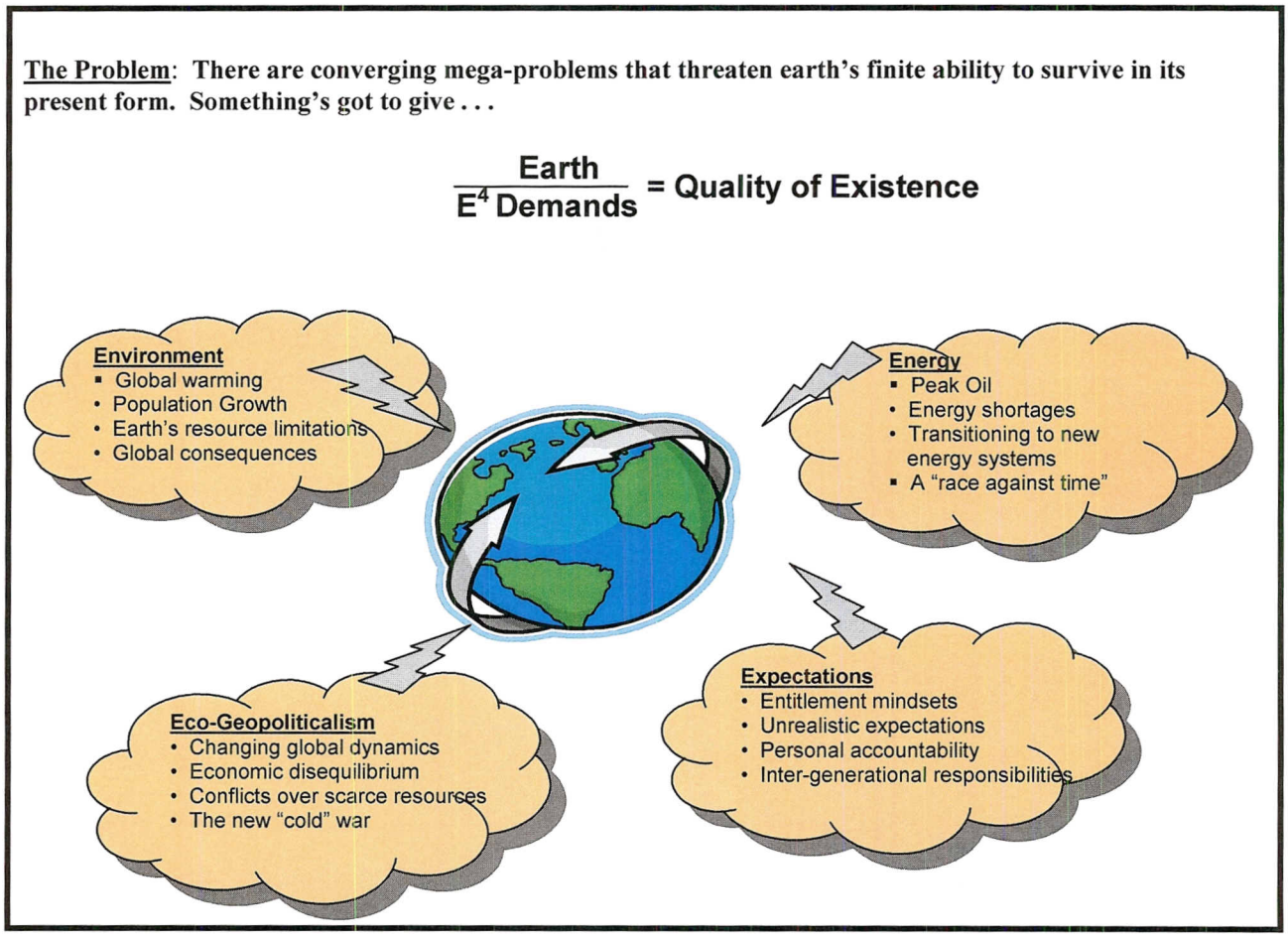
As the tectonic forces of the ***storm*** collide with a fury and suddenness we don't understand, we are caught in a "twilight zone" that often precedes a massive change. The attempt here – through the Vision 2020 blueprint that follows – will be to create a greater sense of ***awareness*** and ***engagement*** that gets us beyond the twilight zone and better prepared to meet the new realities of the ***perfect storm.***

The Vision 2020 strategy for addressing the ***storm*** may, at first blush, seem daunting with unrealistic timeframes. This will change, however, as the consequences of inaction are understood and our survival instincts triggered. The transformation of a fully engaged America focused on winning WWII exemplifies the commitment, scope and intensity of effort it will take to effectively address the ***perfect storm.*** As in WWII, half measures won't cut it.

What you are about to read will be troubling – at least it was for me in my early days of discovery – but by no means hopeless. What follows is an overview of the *perfect storm* and strategies for mitigating its daunting ramifications.

What Exactly is the *Perfect Storm?*

The following schematic visually illustrates the converging forces of the ***perfect storm***:



The tectonic forces creating the ***perfect storm*** are classified into four broad categories dubbed the **4-E's** and include 1) Energy, 2) Environmental & Ecology, 3) Economic & Geo-political and 4) Expectations. The sub-set forces working within each category further complicate the dynamic.

As these forces intensify, gain critical mass and trigger a chain reaction of negative synergies, the ***multiplier*** effect will create a ***perfect storm*** exceeding the sum of all parts in intensity, scope and duration.

Before addressing the challenges of the ***storm,*** we need to first understand its dynamics and how all the moving parts interact.

Energy – The 800-pound gorilla in the living room:

Energy will trigger the ***storm***. Why? As shortages in oil – the "mother's milk" of all industrial economies – becomes a reality, the all-pervasive impact on world economies will be devastating. Consider this:

* **Peak oil** - World oil production appears to be peaking at the 85-87 mb/d (million barrel per day) range and future production will start to decline. (***"peak oil"*** is a geologic concept describing the bell-shaped supply curve of oil: ***once about half of the oil is gone – as now seems to be the case – production will irreversibly decline; remaining oil will be increasingly expensive to find and extract and gasoline prices will skyrocket.)***[1]

* **Discovery rates** - New discovery rates are falling far short of usage. We now use about 4 mb/d or more for every new barrel discovered. The days of "easy" oil are over and new oil will be harder, riskier and costlier to find and extract. ***The recent plunge in oil prices has slowed current oil exploration and will, as a result, magnify future oil shortages as economic recovery occurs.***

* **Oil reserves** - Roughly 80% of all proven reserves are held by OPEC countries. You want oil - you go to them on their terms.[2]

* **Oil markets** - China, India and others are competing for a greater share of the global oil supply – the U.S. is no longer the only game in town.

* **U.S. dependencies** - The U.S. imports roughly 65% of its oil – much of it coming from precarious sources - and our dependency increases daily.

* **Drill, Drill, Drill** – Sounds good on a sound bite, but even an all-out effort would produce only a fraction of our total future domestic needs – and it would take a decade before new oil could be produced on any scale.

In summary:

Current oil supply and demand trajectory lines are unsustainable. The current economic meltdown has merely "postponed" that fact. As world economies improve and oil consumption once again increases, the true magnitude of the supply deficiencies will start to sink in. When this "wake up" call, and the realization that there is no "Plan B" of sufficient scale to replace oil-based fuel occurs, ***we are likely to see the catalyst that triggers the "perfect storm."***

Environment & Ecology:

Recent "Cap & Trade" legislation has intensified the climate change debate. The misinformation and "spins" out there are appalling. Consider this:

CO_2 levels - nearing the 400 ppm (parts per million) level, far exceed the natural ranges over the last 650,000 years of 180-300 ppm. The GHG (greenhouse gas) levels, increasing from 285 to almost 400 ppm since 1850 – a 40% increase in only 160 years – is too meteorically fast in geologic timeframes to be explained away as merely a "cyclical" event.

Trend Lines – quantify what day-to-day observations often fail to pick up:

Oceanic changes – growing acidification, **CO_2**concentrations, water circulation pattern changes, coral reef destruction, etc.
Melts – glacial and ice cap melts - occurring at unprecedented levels.
Permafrost – thawing and releasing large quantities of toxic methane.
Weather – severe patterns now a norm. Global temperatures in 11 of 12 years (1995-2006) – were warmest since instrumented recording.
Land/Water losses – increased desertification leading to losses in cropland and severe water shortages across large sectors of the world.

The great concern is that trend lines will reach a point of critical mass where ***"negative feedback loops"*** trigger a ***"tipping point"*** that exceeds Earth's ability to assimilate change. The results could be catastrophic.

Credible institutions – such as the National Intelligence Center (NIC), insurance underwriters and even Wall Street – now recognize the dangers of climate change and factor this risk into their calculations. The preponderance of new incoming scientific data also confirms the intensification of climate change.

Conclusions: The recent IPCC Report concluded that: 1) climate change is happening, 2) it is happening at a greater rate than initially thought and 3) it is significantly anthropogenic (man-made) in scope. They further concluded that aggressive counter-steps are required immediately.[3]

Economic & Geo-political:

In the meantime, the current economic meltdown – from Wall Street to Main Street and throughout the world – has triggered tremendous shockwaves. America's overwhelming economic hegemony has lessened as China, India and the OPEC cartel emerge as power players. ***It is reality time, and we need to understand this new geo-political dynamic and what it means as the perfect storm intensifies.*** Consider this:

* **Energy** – America, with only 4% of the world's population consuming 25% of its oil – of which over 65% is imported – is vulnerable.

* **Economic** – As the world's largest debtor nation, America relies heavily on foreign governments to finance its deficits. As the red ink grows and baby boomer entitlements come due, America is vulnerable.

* **Trade Balance** – With an eroding manufacturing base and massive transfer of wealth from America to overseas oil producers, future trade deficits are a "given" and the likelihood of reversal slim. America is vulnerable.

* **The Dollar** – As dollar devaluation continues, and America prints new money to monetize – de-facto – its debt, look for growing international pressure to replace or change the cherished *fiat* currency status of the dollar, and/or challenge the *petro-dollar* oil transaction system. Both systems are of enormous economic value to the U.S. and could, over time, be threatened. Again, America is vulnerable.

Tectonic shifts are occurring in the geo-political arena that will increasingly challenge the western powers: 1) the ascendancy of China and the Pacific Rim as a formidable power base, 2) competition for scarce resources – particularly oil – where roughly 80% of all proven reserves are located in OPEC countries, 3) growing food and fresh water shortages in poorer countries, 4) the growth of sectarian regimes in strategic locations and 5) the proliferation of nuclear weapons.

Our next "cold war" may well be with China with world resources – and not ideology – the major source of contention. In any event, the world is becoming a more dangerous place to live, and the forces of the ***perfect storm*** will further exacerbate the challenges.

Expectations:

The "American Dream" was made possible by cheap and abundant energy and resources. It enabled Americans to own a home in the suburbs – often far from their worksite; produce prodigious amounts of agricultural and manufactured products through automation; travel throughout the world in low cost airline seats and enjoy all the modern conveniences of life. ***The expectation of unlimited growth and prosperity has translated, almost, into a sense of entitlement that every generation ought to live better than the previous one.***

Indeed, the American dream has been exported. For example, China and India are now in a similar mode with rapid growth, industrialization, modernization and upward mobility. As their rapidly expanding middle class starts to drive cars, use gas, construct highways, eat a more energy intensive diet of meat and dairy products and build infrastructure, ***the problematic challenges of finding the global resources for this growth – equal to about seven times the population of the U.S. – will be daunting.***

The Dilemma:

Rising expectations – and the entitlement mindsets they often produce – put us on a collision course with the harsh realities of the ***perfect storm.*** In essence, the basic building blocks of the dream – cheap and abundant energy and resources – are crumbling, making the dream unsustainable over time.

The "Twilight" Zone:

We now seem to be caught in the middle of two tectonic paradigm shifts: the ***"American Dream"*** and the ***"Perfect Storm."*** There is a deep uneasiness about the future and where today's problems will take us, and we look for old paradigm solutions to address new paradigm challenges. ***This disconnect will continue until we recognize and acknowledge the true nature of the perfect storm in our path.*** In the meantime, the transitional process will include the usual patterns of denial, anger, bargaining, depression and, finally, acceptance. The quicker we become aware of the new paradigm, adjust to it and address it, the better our chances of mitigating the daunting challenges of the ***perfect storm.***

Early Warning Signals:

We have caught isolated glimpses of the ***storm*** over the past year or so and it has not been pretty. We just haven't seen all of the forces collide at the same time – as will be the case when the full fury of the ***storm*** hits us. Consider this:

We have seen the effects of pump prices in excess of $4.00 per gallon, the angst it caused and changes it created in our transportation habits. We have directly felt the impacts of the economic meltdown and its hit on our personal balance sheet, job security and behaviors as consumers. We hear more about climate change and early side effects in the form of droughts, fires and severe weather patterns – and we may even have gnawing concerns about ice cap melts, tundra thawing and rising sea levels. We have also been at war for most of this decade and know first-hand the price of geo-political instability – a condition likely to intensify as the world competes for finite oil and other natural resources. Lastly, we have seen our expectations and lifestyles change and long for the good old days when things were simpler.

Bad as it may seem, we have yet to experience the full fury of these forces acting in concert. Imagine, for instance, living through this deep recession with pump prices in the $5-7 per gallon range with growing uncertainties over foreign oil supply. Throw in rising costs for food, heating, goods and services – with their strong oil-based components – and the economic consequences of losing virtually all discretionary income because of it, and you can start to see what the early stages of the ***perfect storm*** might look like.

As the ***storm*** intensifies and the economic engines of the world sputter; international trade ebbs; global unemployment increases, and escalating food, water and energy costs and/or shortages magnify, we can expect growing geo-political instability to occur. Indeed, the world will be in peril. Underdeveloped countries will be the first to feel the pinch, but the rippling effects will be pervasive.

Even the vaunted economic position of the U.S. will be at risk as foreign lenders, concerned with their holdings of devalued American dollars and assets, question the continuation of the *petrodollar* oil transaction system and/or use of the dollar as the global *fiat* currency reserve of choice. ***Sound impossible? The Roman and British empires probably felt the same disbelief at the height of their global economic power.***

Principles of Engagement:

The ***perfect storm*** will present a number of unique and unprecedented challenges and the strategic solutions that follow – **"Vision 2020"** – are based on a few key principles:

Face reality like it is: Current trajectory lines are unsustainable, and something's got to give. The quicker we internalize this fact – deep in our hearts – the faster we can build the political will necessary to effectively engage.

Targeting the *storm:* The magnitude of the ***storm*** requires it be addressed strategically and in its entirety, not piecemeal

Scope of effort: The enormity of the challenge will require an effort comparable to or exceeding America's transformational effort to win WWII.

Collaborative responses: The ***storm's*** complexity requires a collaborative "give and take" effort from all parties. In embracing a broader vision of success, we should seek optimal – not perfect – solutions (progress not perfection).

2% Rule: Grand slam homers or one-panacea-fits-all solutions are not likely to happen. Success will ultimately come from a 2% solution here and 2% there that will collectively occur when aligned with a common vision of success.

Do no harm: In treating the *hypercritical* (economic meltdown), *acute* (energy shortages) and *chronic* (climate change) ailments, care must be taken to "do no harm." A solution, injudiciously applied to one set of problems, could have a toxic effect on the other areas – hence, the need for addressing the ***perfect storm*** in its entirety.

Metrics and accountability: We can't achieve what we don't quantify and measure. Everyone, in fact, has an accountable role to play.

Flexibility: A "disaster planning" approach was used in designing the Vision 2020 plan. Once operational, it can be modified, postponed or extended to reflect the political realities of the time. The only caution is that the longer we delay, the greater the challenge will ultimately be.

We now offer a vision for addressing the ***perfect storm*** called Vision 2020.

Vision 2020

"Achieve energy independence in America by 2020 while collaboratively working to achieve all globally established environmental standards."

Concept: Vision 2020 integrally links energy independence and collaborative climate change mitigation in a common effort. If achieved, it will spur economic growth, reduce geo-political tensions and create a pathway for transitioning through the ***perfect storm***.

D-Day Caveat: The successful launch of Vision 2020 requires a public sense of imminent danger and the political will to act with intensity and force – comparable to our efforts in winning WWII. ***The Vision 2020 Plan will require the implementation of a formal oil reduction type plan – as outlined on page 11 – before it can begin.*** Absent this, the 2020 timeframe must be moved back or extended until this or similar preconditions are met.[4]

Imperatives for change:

There are at least three compelling reasons for aggressively implementing Vision 2020:

1. **National Security Risks:** Our dependence on foreign oil poses an increasing risk to our national security and the need for endless military actions to "protect our stash." Since we can't drill our way into energy independence, the only way around it is to change our energy models.

2. **Economic Risks:** The massive transfer of wealth to finance our oil addiction, and the costs of not addressing climate change in a timely manner, pose serious long-term economic risks. Simply put, it makes good economic sense to use clean – domestically-produced – energy wisely.

3. **Intergenerational Responsibility:** As we mortgage the futures of our grandchildren to pay for our creature comforts today, we are merely postponing the inevitability of the ***perfect storm.*** There is no free lunch and the bill is coming due.

With the above in mind, we now move to the Vision 2020 Plan.

Vision 2020

Strategic Plan Overview

The following high-level summary of the Vision 2020 Strategic Plan outlines the key features and directions to be taken. The plan is covered in great detail in the formal Vision 2020 document. The strategies are as follows:

1. **Energy Independence:** Implement a formal foreign oil reduction plan that incrementally leads to energy independence by 2020.

2. **Transform Energy Systems:** Build an electrified power system to materially replace oil-based fuels, and institute an interim ***Energy Supply Protocol*** to facilitate the transformation to a cleaner, electrified system.

3. **Demand Reduction:** Through aggressive energy efficiency, conservation and demand reduction efforts, go for the "low hanging fruit" and redeploy energy saved to meet growing new electrical power needs.

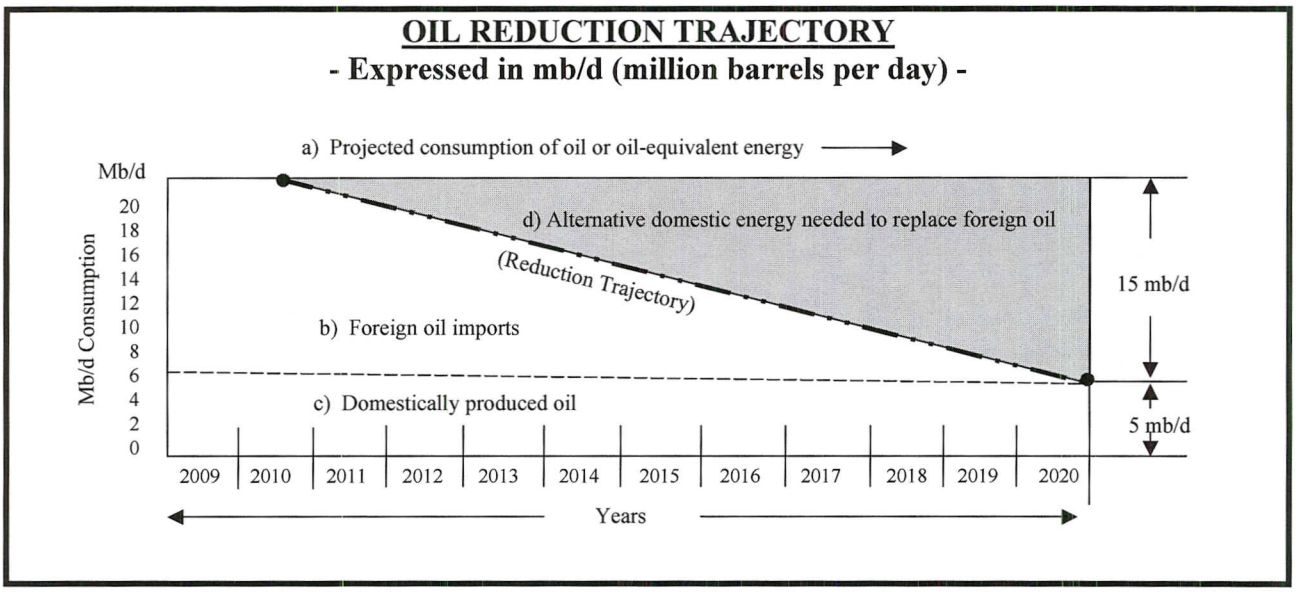
4. **Climate Leadership:** Take a leadership role in developing and implementing global climate initiatives.

5. **Align Forces:** Align public policy with the supportive tools, R&D funding, tax incentives and policies that liberate – not limit – the marketplace to do what it does best: create, build, innovate and grow.

6. **Growth Opportunities:** Nurture and leverage the many new home-grown industries that will emerge from Vision 2020, and position these new engines for growth to help replace America's lost manufacturing base.

Highlights of each of the six strategies are illustrated on the following pages.

1. **<u>Energy Independence:</u> Implement a formal foreign oil reduction plan that incrementally leads to energy independence by 2020.**



What does this mean? Assuming America continues to consume an energy "equivalent" of 20 mb/d (million barrels per day) – of which 5-6 mb/d can be produced domestically – America would have to find an *equivalent* energy replacement for 15 mb/d, or 75% of all oil used by 2020. Amortized over a period of 11 years from 2010-2020, this would require an <u>annual</u> reduction and energy replacement of 1.4 mb/d – or 7% - of current usage daily. (15 mb/d/ divided by 11 yrs. = 1.4 mb/d) ***A targeted oil reduction plan is a prerequisite for a launch of Vision 2020.***

What is the magnitude of this challenge? While achievable in the early years through aggressive efficiency and demand reduction efforts, the challenge thereafter intensifies and can only be met by a) major energy infrastructure shifts away from oil-based fuels, and b) significant increases in the production of <u>all</u> other fuels. ***The utility and power punch in just one barrel of oil is enormous, and the amounts of equivalent energy needed to replace it will require using virtually <u>all</u> forms of energy.***

Where is the greatest challenge? The transportation sector relies on petroleum for 96% of its energy, and this is where the battle will be won or lost. The only energy with scalability to materially replace oil is an electrified system with strong bio-fuel components. ***A "race against time" will occur to retrofit and replace our oil-based transportation systems with alternative fuels without significantly disrupting the economy. This will be one of the great Challenges of Vision 2020.***

2. **Transform Energy Systems: Build an electrified power system to materially replace oil-based fuels, and institute an interim *Energy Supply Protocol* to facilitate the transition to a cleaner, electrified system.**

America's electrical power system is wearing out and at the end of its design cycle after a half century of operations. Power outages, equipment failures, obsolete infrastructures and cyber-security breaches all point to significant risk exposure. ***The energy wasted from this antiquated system is mind-boggling.***

Despite current structural deficiencies, a transformed electrical energy system offers the best hope for achieving Vision 2020 goals. Consider this:

Scalability: Electrical power is the only energy with scale to replace oil
Independence: Power generation comes from domestic energy sources
Efficiency: New technologies will reduce waste and bolster efficiency
Environment: Cleaner energy is available through new technologies
Value: Future expenditures to maintain aging systems can be redeployed to help fund the new electrical transformation

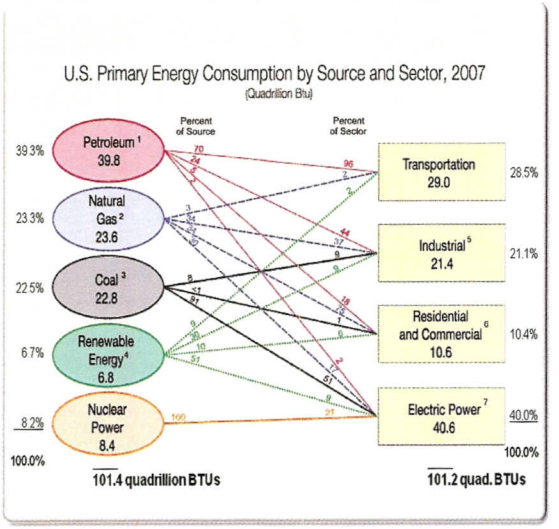
Getting started: The great "electrical transformation" will require major changes in three areas: 1) energy grid systems, 2) end-user behaviors and the way we use energy, and 3) power plant energy production. A quick look at each area:

1) **Energy Grids:** It all starts here as we create a robust interstate energy highway and grid system. It should feature: a) interactive and self-diagnostic capabilities to control energy flow and self-correct problems on a real-time basis, b) provide two way connections with renewable energy sources that foster distributed generation using local power sources, c) employ digitally-oriented versus analog-driven power delivery systems for greater energy quality, and d) use "smart" grid technologies that interact closely with end-users and provide "real time" feedback for greater efficiency.

2) **End-Users:** Energy user behaviors and practices are critical. A focal point will be to transition the transportation sector away from petroleum-based fuels toward an electrically powered environment. ***Since this sector uses about 70% of the nation's oil supply, energy independence is unachievable without breaking this dependency.*** Four key strategies will be to:

1) Electrify the auto and light trucking fleet – phasing out oil fueled vehicles,
2) Build robust all electric rail systems for moving passengers and freight,
3) Redeploy energy saved by conservation efforts to transportation sectors, and
4) Develop bio-fuels and synthetics to free up oil for high priority usage.

3). **Power Plant Energy Production:** While conservation, efficiency and demand reduction efforts will create a reservoir of surplus energy for growth, ramped up electrical demand will require new power generation. The following chart illustrates the magnitude of change required to achieve Vision 2020 objectives:



Source: US Department of Energy, Energy Information Administration (DOE/EIA)
http://www.eia.doe.gov/basics/energybasics101.html

Vision 2020 Observations

1. Petroleum, now providing 39.8% of the nation's energy, will need to reduce to about 10% by 2020.
2. The transportation industry, relying on petroleum for 96% of its energy, will need to be electrified and restructured.
3. Industrial, residential & commercial, electric power sectors, using over 70% of the nation's primary energy, are excellent targets for energy efficiency and conservation efforts
4. Renewable energies, supplying 6.8% of the nation's energy, will need to more than triple in size by 2020.
5. Natural gas, providing 23.6% of all energy, provides a clean, transitional fuel source but is of finite quantity and will peak.
6. Electrical power, using 40.6% of all energy, will be the workhorse expected to expand and materially replace petroleum by 2020.
7. Coal and nuclear power, now generating over 70% of all electrical power, will continue to be workhorses, but tremendous R&D efforts will be required to meet emissions and waste disposal targets.

Energy Supply Protocol: The Protocol acknowledges ***it will take all forms of energy – including coal and oil – to meet future energy needs,*** and suggests the following priority mix of fuels with attendant caveats:

Renewable Energy: Triple renewable energy by 2020 - equal to about 20% of projected total energy supply at that time,

Natural Gas: Use as a key transition fuel in the Vision 2020 timeframe to bridge the gap and fill electrical energy shortages as new systems are being developed.

Nuclear Power: Ramp up current production and build plants using new "fourth generation" technologies: (using/reusing spent fuel, new IFR reactors, etc.).[5]

Coal: Coal currently supplies over 50% of our electrical power and cannot be taken out of the equation. Cleaner burning IGCC (gasification) or CCS (carbon sequestration) technologies should be developed and plants retrofitted.[6]

Oil: Vision 2020 requires a domestic supply of 5 mb/d of oil by 2020. (roughly equal to current production) ***Drilling is a must, but make no mistake, "drill, drill, drill" will not solve our oil or energy problem – it will only cushion it.*** Bio-fuels should also be used to supplement likely shortages in the transportation sector.

3. **<u>Demand Reduction:</u> Through aggressive energy efficiency, conservation and demand reduction efforts, go for the "low hanging fruit" and redeploy energy saved to meet growing new electrical power needs.**

It all starts with demand reduction. The <u>bad news</u> is the colossal amount of energy wasted by current energy practices. The <u>good news</u> is that enormous amounts of "new-found" energy can be secured from the elimination of waste and redeployed to bridge the transition to an electrically powered economy.

In its broadest sense, ***demand reduction*** includes a) **energy efficiency** – using less energy to provide the same level of energy service, b) **conservation** – reducing waste through recycling, re-using, repairing, turning off lights, etc, and c) **demand reduction** – changing consumption patterns by walking, biking driving less, etc, – while, at the same time, reducing one's *carbon footprint.*

The target-rich areas for demand reduction are enormous and include a) transportation systems, b) retrofits of commercial buildings, industrial plants and processes, c) residential dwellings and appliances, d) energy production and transmission processes, and e) personal and institutional behavioral changes.

Aligning incentives to demand reduction activities can be a particularly useful tool. A good example of this is to ***"decouple" power company earnings from the units of energy sold and align profit margins instead to energy efficiency and demand reduction results*** – a process that has worked well in California.

As one measure of scope, the RMI published a study that said *"...the electric productivity (measured in dollars of gross domestic product divided by kilowatt-hours consumed) of U.S. states varies dramatically. If lower performing states could achieve the electric productivity of the top performing states through energy efficiency, the nation could save 1.2 million gigawatt-hours and displace more than the equivalent of over 60 per cent of America's coal fired generation. This could save consumers more than $100 billion dollars."*[7]

There have been a number of similar studies to suggest large savings across a broad spectrum of initiatives. ***In short, major energy savings can be generated by discontinuing the wasteful practices and systems now in use, and then redeployed to help fuel future growth. Better yet, we don't have to go back to the stone-age to achieve these savings.***

4. **<u>Climate Leadership:</u> Take a leadership role in developing and implementing global climate change initiatives.**

This is the second visional component of Vision 2020 and calls for U.S. leadership. As an historical footnote, the U.S. was the <u>only</u> country, by 1990 Kyoto definitional standards, not to ratify the Kyoto Protocol – a fact not lost by China, India and other emerging countries as they consider their positions on the next round of Kyoto – which expires in 2012.

The new conference – called **"COP-15"** – convening in Copenhagen in December 2009, will meet to advance and put teeth into the next iteration of Kyoto. Intense behind-the-scenes negotiations are now taking place as countries jockey for positions that best reflect their circumstance. China and India claim, for instance, that western nations dirtied the environment on their way to industrialization and now that it's their turn, they shouldn't be encumbered by over-restrictive requirements. They would like GHG (greenhouse gas) emissions pegged to a per capita formula whereas industrialized countries would prefer GHG be pegged to GDP. The solution will probably be found somewhere in the middle.[8]

Current American policy – supported by Vision 2020 – appears to be:

1. Enact "cap & trade" and other energy-related measures to create a carbon market, and, via the marketplace, redirect away from dirtier carbon fuels.

2. By executive order, redirect the EPA, Department of Energy, CAFÉ mileage enforcement and even the Stimulus Bill – with heavy seed money to jump-start the move toward alternative energies – to move America toward a new clean energy environment.

3. If and when a "cap & trade" and related energy bill is passed by Congress, America would have far greater leverage at the COP – 15 Conference. Absent a bill, we will look more like a "paper tiger."

4. In the meantime, local, state and regional efforts – conforming to Kyoto-type targets – have proliferated and, in many respects, are light years ahead of the federal government with respect to a cleaner environment.

The sticky point in the climate change debate over COP-15 participation is whether or not we should sign on before firm commitments are secured from China and India – a classic "chicken and egg" debate. ***Vision 2020 calls for leadership and that means leading and not following. The stakes are too high not to do so.***

5. **Align Forces: Align public policy with supportive tools, R&D funding, tax incentives and policies that liberate – not limit – the marketplace to do what it does best: create, build, innovate and grow.**

The enormity of the task requires a powerful combination of public and private sector initiatives working in alignment toward broad strategic goals – such as those outlined in Vision 2020. Plan development, implementation and enforcement require a political will that does not yet exist. It will come as conditions worsen, but time is running out. Some of the policy initiatives should include:

Cohesive Policy: to include long term energy and climate objectives and standards; enabling legislation to cut through red tape, expedite permits and provide eminent domain status to build a national grid; tax incentives to spur private growth and R&D, and revenue generation providing capital to support national goals.

R&D: Vision 2020 requires major technological breakthroughs and fast-tracking innovative research. It should be organized around key strategic objectives and include Fed financing of basic research and pilot projects such as "clean" coal and carbon sequestration, fourth generation nuclear technologies, bio-fuel development and more.

Marketplace: Fed policy incentives should foster private market initiatives and reduce red tape for high value projects. It should also define the "rules of the road" to provide the predictability needed for private sector capital investment.

Common Language: We need transparency and clarity in the arcane language of energy and climate change. For instance, the ability to compare the energy equivalents of a barrel of oil, cubic foot of natural gas or kilowatt of electricity are difficult without using a common denominator such as Btu's. Measuring the net energy value of a fuel (a term called EROEI is used) is critically important as we consider the relative merits of extracting hard-to-process fuels, such as shale oil, but the language barrier obfuscates our ability make choices.[9]

Individual Efforts: We all have a role to play, but it must start with awareness. For instance, the mere knowledge that **one gallon of gasoline produces 20 pounds of CO_2** might well change the driving habits of many. The Minnesota Energy Challenge program offers an excellent carbon footprint analysis and tips for saving energy through its website: www.mnenergychallenge.org/challenge/ Try it, you'll like it.

6. **<u>Growth Opportunities:</u> Nurture and leverage the many new home-grown industries that will emerge from Vision 2020, and position these new engines for growth to help replace America's lost manufacturing base.**

When looking to our future economy, two disturbing facts come to mind: 1) 70% of our economy is tied to consumer spending, and 2) we don't make very many things here anymore. Where, one might ask, will we find the new engines for growth and prosperity? Answer: Right in front of us.

New growth opportunities under Vision 2020 are mind-boggling. What's more, they will position America to export products and services again. This, along with diminishing amounts of our national treasury going overseas for oil, will greatly improve our balance of payment deficits and strengthen the dollar. A few examples of new growth areas include:

Transportation: The development of a national rail infrastructure – to include a coast-to-coast high speed rail system along with local and regional track lines – will spur tremendous growth in jobs, materials and manufacture of rolling stock.

Electrical Transformation: The building of a high tech electrical system, a new national electrical highway, "smart grid" systems, energy-efficient power stations, and infrastructure will create immense new opportunities,

Energy Development: Tripling our renewable energy by 2020 along with plant retrofits, new nuclear construction, cleaner coal infrastructures, etc, will be a major boost to the economy. Technical skills and services could become a whole new export line along with other products mentioned,

Synthetics: With about 25% of our petroleum used for non-direct energy related items such as paints, plastics, fertilizers, herbicides, lubricants, etc, the opportunities for a massive new synthetic industry focused on taking the petroleum out of these products are enormous, (see chart on page 13)

Financial Services: The capital generation required to finance these projects will ensure a steady market for the financial services industry for decades to come.

One last thing: It will be a tougher time for industries with business models not supported by $5 or more per gallon gas prices; by oil companies that fail to redefine themselves as "energy" companies, or any other business failing to meet the dynamics of a transformed marketplace. Change has been a prevalent theme in American business for the last 150 years, but the smart ones have always adapted.

In Summary

* We are on a collision course with a ***perfect storm*** that can not be avoided – only mitigated. The ***storm*** will be an unprecedented life-changing event of long duration, ***and for the most part we don't even know it is coming.***

* It might take an event of "Pearl Harbor" proportions to awaken and energize America, and create the political will needed to effectively address the ***storm*** – an effort comparable to our all-out effort to win WWII.

* A prolonged oil crisis could well be the "Pearl Harbor" that activates the ***perfect storm*** and awakens America. It will come with the recognition that global oil supply can no longer keep up with demand; will worsen as "peak oil" gains traction and global production declines, and become openly apparent when the economic engines of the world – fueled by oil – start to grind down.

* Vision 2020 provides a blueprint for addressing the ***storm*** in its totality, but requires that the pre-requisite political will be in place prior to launch. ***This will be demonstrated by the implementation of a formal oil reduction plan.***

* Vision 2020 recognizes, in essence, that current oil-based energy models are unsustainable in their current form and calls for:

  1) An electrical transformation replacing oil with electricity, where possible.
  2) A ramping up of all non-oil based fuels using the **Energy Supply Protocol**.
  3) Demand reduction through efficiency, conservation and new habits.
  4) Climate standards and leadership in meeting all international covenants.

* Vision 2020 foresees tremendous opportunities for new, long term economic growth through home-grown industries – a fact worth considering as we ponder the investments required to transition through the ***perfect storm***.

* **What can I do?** While it all seems so overwhelming, the journey starts with our own personal ***awareness*** and ***engagement***: A few easy steps:

  a) Take your own personal ***carbon footprint*** (see page 16).
  b) Activate your own self-education program to learn about the issues.
  c) Contact your congressional representative and make your position known.
  d) Contact pstorm2020@gmail.com for more information.

Comments and Footnotes

Comments:

The "Perfect Storm Primer: A Survival Plan" represents a highly condensed summary version of my most recent, self-published report entitled: "Vision 2020: A Blueprint for Achieving Energy Independence in an Environmentally Clean and Economically Viable World."

The Primer was designed to promote awareness and engagement, and for this reason, every attempt has been made to keep it brief and to the point. The complete "Vision 2020" report - a 95 page document – will available for download upon activation of a new website under development. For immediate assistance or more information, contact R. Michael Conley at pstorm2020@gmail.com

Footnotes:

1. Peak oil is a widely accepted geologic concept developed by geologist, M. King Hubbard, in 1949. It has been used to project the declines of oil fields with amazing accuracy. Many of the world's major oil fields reached their peaks long ago – the U.S., for instance, peaked in 1971. The consensus amongst geologists is that global peak oil has or will occur in the 2008-2012 range.
2. BP Statistical Review – USA Today, 10/17/05
3. The International Panel on Climate Change (IPCC), a blue chip panel of over 2000 leading world scientists, published four major assessments in 2007.
4 The 2020 date is based on a full scale implementation starting in 2010. If the necessary political will is not in place until, for instance, 2014, the target date would become 2024.
5. America's nuclear power plants use a "once through" light water technology that uses only about 1% of the energy in uranium ore leaving the rest for waste. Newer reactor technology, such as Integral Fast Reactors (IFR) and/or using and re-using fuels – thereby reducing stored waste problems – should be sought as America ramps up its nuclear power generating capacity
6. The two key technologies for producing cleaner coal are IGCC (Integrated Gasification Combined Cycle) and CCS (Carbon Capture and Storage). IGCC converts coal to a syngas, which offers a cleaner burn and makes it easier to remove CO2, and CCS sequesters CO2. While the technologies are in place, they have not yet been used on a scale needed to thoroughly quantify results, etc.
7. The Rocky Mountain Institute (RMI) quotation appeared on p.16 of their Spring 2009 Solutions Publication from a study they conducted entitled " Assessing the Electric Productivity Gap and U.S. Efficiency Opportunity." The RMI and its founder, Amory Lovins, have been long time leaders in developing innovative demand reduction strategies. Lovins also created the "negawatt" metric as a way to quantify and measure energy saved from demand reduction activities.
8. In the initial Kyoto Protocol, neither China or India were subject to Kyoto because they were not classified as industrialized countries using the 1990 baseline year criteria established by Kyoto. This, in itself, is a startling indication of how rapidly the geo-political structures have changed. China became the leading global polluter in 2008 replacing the U.S.
9. EROEI – stands for "energy received over energy invested" and measures the net energy of producing fuel. The amount of energy needed to produce energy is critical. Wind, solar, geo-thermal, hydro-electric and nuclear energy have very high EROEI's – particularly after the energy used to construct the facility is taken out. Hydrogen fuel cells produce a negative EROEI, and tar sands and corn-based ethanols have lower EROEI's. The next time a pundit brags that we have more than 3 times the oil reserves of Saudi Arabia in shale, just ask what the EROEI is due to astronomical processing costs. Message: Not all oils are created equally."