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Cornell Global Forum on Sustainable Enterprise

Taking the Green Leap

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The year 2008 will come to be recognized as the turning point. Beginning that year, a series of crises gripped the planet—the oil price spike, the world food shortage, the sub-prime debacle, and finally, the global financial meltdown. Add these crises to the already long list of on-going mega-problems—melting glaciers, climate change, loss of biodiversity, deep poverty, growing inequity, hopelessness, terrorism—and it finally became clear to most that something fundamental was wrong.

The world—and global capitalism— now clearly stand at a crossroads. At the World Economic Forum (WEF) in January 2009, Klaus Schwab, Founder of the WEF proclaimed that "the financial crisis is a wake-up call to reformulate the world's institutions and corporations for the 21st century. Jeff Immelt, CEO of GE declared that there would be no "recovery" since the world would never return to where it had been before. Rather we should be thinking in terms of "reset."

New York Times columnist Tom Friedman recently observed that we have perhaps reached the global "inflection point"-- that the growth model we created over the last 50 years is simply unsustainable economically and ecologically and 2008 is when it finally imploded. Australian sustainability commentator Paul Gilding even had a name for this moment: "The Great Disruption"—when both Mother Nature and Father Greed hit the wall at the same time. The significance of the transformation we are experiencing cannot be overstated; and organizations ill-prepared for this new world will simply not survive.

Globalization critic David Korten suggests that one hundred years from now, our progeny will look back on our time as either the Great Unraveling or the Great Turning. Our actions over the next ten years or so will tell the story. The good news is that after decades of denial, inaction or, at best, incremental policy prescriptions, the alarm bell has now sounded. The Obama administration in the US has now made green technology (and the creation of "green collar" jobs) a national priority, along with scores of other countries around the world.

Indeed, we are now flooded with proposals for massive government programs, corporate restructurings, stimulus packages, and moon-shot-style initiatives for green technology development. During times of crisis, the temptation is great to believe that a few smart people can design the Big Solution. The metaphor of "war" is often invoked—the war on terrorism, drugs, poverty, global warming, etc. Yet, with the exception of actual wartime military mobilizations, seldom have massive, centrally-directed initiatives succeeded.

So if incremental environmental policies are insufficient, and large-scale, crash programs are likely to fail, then what can be done? Fortunately, there is a third way— *a strategy for incubating thousands of small-scale, yet radical business experiments aimed at leapfrogging today's unsustainable practices, each with the opportunity to grow and become one of tomorrow's sustainable corporations.* In order for the vision of a sustainable future to flourish, it will take an engaged private sector and entrepreneurship on an unprecedented scale.

I call this strategy the "Green Leap." It is a strategy that taps into the entrepreneurial spririt in all of us--global corporations, start-up ventures, underserved communities, investors, public servants, and social entrepreneurs; a strategy that unites the world—East and West, North and South, Rich and Poor-- in a common cause, fostering peace and shared prosperity. But perhaps most importantly, it is a strategy that starts small and grows from the bottom up.

Beyond the Green Giant

There are two fundamentally different types of clean technology—large-scale, centralized applications, and small-scale, distributed solutions (see the figure below). The first variety (Green Giant) typically requires policy change, public investment, and a centralized deployment strategy to implement. Because of their scale and scope, Green Giant technologies are more readily developed by large, incumbent firms with much to gain through government subsidy or procurement; think big wind, centralized water treatment, and massive solar wind farms.

The "go big" approach is also politically advantageous, because it gives the appearance of taking on big problems with big and bold solutions. The problem, of course, is that there is little margin for error: Betting on a few big solutions in unexplored territory almost always produces nasty surprises. Remember nuclear power in the 1960s and 70s? Electricity too cheap to meter short-circuited with Three Mile Island. In the end, the Law of Unintended Consequences almost always wins. We are just not that smart.

Two Shades of Clean Technology

Green Giant	Little Green
Centralized	Distributed
Large-Scale	Small-Scale
Remote	On-Site
Capital intensive	Labor intensive
Centrally planned	Self organizing
Standardized	Localized
Trickle Down	Bottom-Up
Big Footprint	Small Footprint
•Solar Farms	•Decentralized Solar
•Big Wind	•Small Wind
•Smart Grid	•Fuel Cells
•Nuclear	•Microturbines
•Clean Coal	•Small Head Hydro
•Water Plants	•Point-of-Use Water
"Bigger is Better"	"Smaller can be Beautiful"

In contrast, the second variety (Little Green) is typically disruptive to incumbent firms and institutions. Because existing players in the utility, energy, transport, food, and material sectors have so much to lose, it is enormously difficult for the entrepreneurs developing small wind, decentralized solar, point-of-use water and other distributed solutions to gain traction in established markets. Indeed, Clay Christensen's work on disruptive innovation strongly suggests that the early incubation market for such technologies is found outside of the mainstream, in underserved or ignored spaces.

It is for this reason that communities at the "base of the income pyramid" (BoP) become so attractive as an early incubation space for emerging clean technologies: The poor are typically poorly served, paying exhorbitant prices for bad service (e.g. 1000% interest rates on loans, expensive bottled water, kerosene, lanterns, and candles for lighting). Rural villages and shantytowns typically do not have pre-existing physical infrastrutures and there are few large incumbents with significant positions to lose. Declining industrial cities in the developed world offer the opportunity to "start again" with thousands of acres of vacant and abandoned land in places like Detroit, Michigan, and a population hungry for new opportunities.

"Little green" technologies lend themselves to small-scale experimentation and learning, thereby minimizing the Law of Unintended Consequences. By "failing small" but "learning big" such commercialization strategies can generate the collective learning necessary to rapidly evolve a range of viable strategies and models. Indeed, by tapping the "wisdom of the hive," Little Green technologies are more appropriate to the way the innovation process actually unfolds. Remember that no central authority planned the Industrial Revolution; it was the result of thousands of small players and enterpreneurs each trying their own particular variations. Winners emerged based upon market test and experience. There is no reason to believe that the Sustainability Revolution will be any different. Think of the BoP as the breeding ground for the sustainable corporations that will rise to prominence in the 21st Century.

The Green Leap, therefore, opens the possibility of developing and commercializing the most advanced clean technologies from the Rich World in the underserved spaces at the base of the pyramid throughout the world. Once established, such technologies can then "trickle up" to the established markets at the top of the pyramid—but not until they have become proven, reliable, affordable, and competitive against the incumbent infrastructure. The convergence of clean technology at the base of the pyramid thus offers unparalleled opportunity for innovation and entrepreneurial growth.

The global explosion of wireless telecommunications provides an early model of the Green Leap phenomenon. It took 20 years for wireless IT to reach the first billion people, largely through high-end commercial experiments in the US, Western Europe, and Japan. But once the need and business model for wireless IT was demonstrated in the developing world's underserved urban and rural areas, it took off like wildfire: It took only two years to reach the 2nd billion and less than one year to reach the 3rd billion people. Today nearly half of humanity has access to wireless telecommunications, with

the BoP market serving as the innovation driver—for cost reduction and technological innovation in hand-held and solar recharging devices.

Transforming "Chimerica"

The evolving relationship between China and America over the past 30 years serves to illustrate the seismic shifts described above. After "Opening Up" in the 1980s, China became a manufacturing and exporting juggernaut—the Workshop to the World—experiencing astounding, often double-digit economic growth. That growth, however, was limited largely to the eastern coastal cities where the factories and manufacturing capacity was concentrated. It has been slower to affect the rural areas and the central and western regions of China, where hundreds of millions of peasants still live in poverty.

The economic boom has also resulted in massive environmental problems--toxic contamination, choking air pollution, and a solid waste nightmare; deforestation, ecosystem destruction, and an impending water crisis. In addition to China's mounting domestic environmental problems, the country's international footprint has also been expanding. With a new coal-fired power plant being built every 8-10 days, China will rapidly become the world's largest greenhouse gas emitter.

To make matters worse, China's rapid economic growth has depended primarily upon growing consumer spending in the United States. Put simply, Americans borrow money (often from China) so they can buy more cheaply produced goods so the Chinese can build more coal-fired plants to make those goods. This co-dependency was a vicious circle destined to collapse. Sure enough, when the American real estate bubble burst with the sub-prime debacle in 2008, "Chimerica" came tumbling down, with both the US and Chinese economies taking a beating.

Since the bubble burst last year, thousands of Chinese export factories have closed and tens of millions of unemployed migrant workers have returned home to the rural areas in search of work, where 700 million plus peasants still struggle to earn a livelihood. This runs directly counter to the Central government's policy which seeks to accelerate the urbanization process, moving 15-20 million peasants to towns and small cities each year. To avert social chaos, the Chinese government has proposed a 4 trillion RMB "stimulus package" to create jobs in infrastructure development and public works.

In the long run, however, the only way to keep the Chinese economy growing at a rate fast enough to absorb the urbanizing population is to increase domestic consumption. Fortunately, China enjoys a high savings rate and a low current level of consumer spending (less than 30% of GDP, compared to nearly 70% of US GDP). *With 200 million rural people moving to China's nearly 20,000 towns and small cities over the next ten years, the challenge of our time is to create an environmentally sustainable form of production and consumption for this growing internal market.*

It is here that the "little green" technologies might most successfully take root first. The opportunity is to create the sustainable communities (and industries) of tomorrow in

China's rural, central and western provinces. The same logic applies throughout the underserved communities of the world: Consider India's 700 million rural farmers and their potential to take the Green Leap.

India's Rural Renaissance

Since liberalization in the 1990s, the Indian economy embarked on a period of rapid growth. As a consequence, tens of millions of people were lifted out of poverty and India's information technology and business service industries became the envy of the world. Cities like Bangalore and Hyderabad experienced building booms and the country's business hub, Mumbai joined the ranks of the world's elite financial capitals.

But despite the rapid growth in many of India's more technically sophisticated urban centers, the countryside continued to lag behind. Fully two-thirds of India's population —in excess of 700 million rural villagers—had yet to see the benefits of economic globalization. Growing dissatisfaction and unrest in the rural areas had political consequences—witness the recent change in government. The pace of urban migration increased in recent years leading to an explosion of squatter communities, tent cities, shantytowns, and urban slums. The new government has made rural development a focus, but without opportunity creation on a massive scale in India's 600,000 villages, it will be difficult to achieve a truly sustainable form of development which avoids dividing the country into 200-300 million "haves" and 700-800 million "have nots."

India's recent rapid growth has also resulted in massive environmental problems. Rapid urbanization and industrialization has resulted in rising toxic contamination, choking levels of air pollution, and mountains of solid waste. With more and more automobiles on the roads, India's cities have become mired in gridlock. And with dramatic increases in energy use, India's contribution to climate change is on the rise. In rural areas, ecosystems and natural capital are increasingly endangered by population pressure, resource extraction, and industrial development. It is simply not possible to project the current form of development into the future: Attempting to provide livelihoods for all of India's 1.1 billion using the current approach will ultimately lead to environmental collapse.

As with China, the recent global economic slowdown has had a profound—and paradoxical-- effect on India: The information technology and business services sectors have taken a beating. The Indian stock market is down by more than 50% and real estate prices in the cities have collapsed. And even though Indian banks were not impacted by the sub-prime meltdown, investment capital in India has decreased by half. In short, the logic for India's rural population to migrate to India's burgeoning urban slums no longer exists.

Ironically, then, the 700 million rural Indians represent the country's "silver lining." With a good monsoon last year, farmers reaped a bumper crop. Largely "decoupled" from the global economy, Indian farmers have money to spend and are eager to improve their quality of life. Most would prefer to stay in their villages rather than migrating to

the urban slums in search of non-existent jobs. As in China, the challenge is to create an environmentally sustainable way of living that is affordable and builds livelihoods in India's rural villages. *In short, the rural and underserved areas at the "base of the pyramid" appear to represent the single greatest business opportunity for the clean technology sector.*

The Great Convergence

Emerging clean technologies, including distributed generation of renewable energy, biofuels, point-of-use water purification, biomaterials, wireless information technology, and sustainable agriculture hold the keys to solving many of the world's global environmental and social challenges. And they represent enormous business opportunities for those companies able to develop the competencies needed to effectively commercialize these "leapfrog" green technologies.

Because clean technologies are almost always "disruptive" in character, the BoP is often the best place to focus initial commercialization attention. China's 20,000 towns and small cities and India's 600,000 rural villages represent such an opportunity. Unlike the traditional model of rapid industrialization, which relies heavily on conventional (unsustainable) technology, this new approach to development seeks instead to fuel growth through the incubation and rapid commercialization of the green (sustainable) technologies of tomorrow (see the figure below).

The Green Leap

Old Model	Emerging Model
(Industrialization)	(Sustainable Development)
Centralized	Distributed
Large-Scale	Small-Scale
Remote	On-Site
Capital intensive	Labor intensive
Centrally managed	Self organizing
Standardized	Localized
Trickle Down	Bottom-Up
Big Footprint	Small Footprint
Conventional Technology	***Disruptive Technology***
•Power Plants	•Renewable Energy
•Public Works	•Microcredit
•Dams	•Wireless
•Highways	•Bio-based
•Factories	•Point-of-use
"Bigger is Better"	"Smaller can be beautiful"

Most effort to date has been focused on driving clean technologies into the "developed" markets at the top of the income pyramid, often with little result. Given the size, growth, and clean technology potential at the base of the pyramid, it offers the perfect "laboratory" for incubating the Green Leap strategy. The challenge is to combine the advanced technology of the Rich World with the entrepreneurial bent and community

focus of the BoP. Learning how to build upon, and not over, ancient foundations and local knowledge is key.

By creating a "Great Convergence" of clean technology at the base of the pyramid, China, India, Africa, Latin America, and the other underserved communities around the globe can become the breeding ground for the Green Leap Revolution, to everyone's benefit. Indeed, the BoP provides the best early opportunity for innovators seeking to stake out the future in the full range of emerging clean technologies. Those who ignore this enormous opportunity do so at their peril.

The Cornell Global Forum on Sustainable Enterprise

Given the urgency of both the need and the opportunity described above, Cornell's Center for Sustainable Global Enterprise has launched the Global Forum on Sustainable Enterprise. *The goal of the Global Forum is to accelerate the rate of change toward the Green Leap in the world.* The focus is on entrepreneurial strategies for the growth and scaling of ventures in the "convergence zone" between clean technology and the base of the pyramid. The inaugural Global Forum will be held in New York City, June 1-3, 2009. We have invited approximately 100 of the world's leading practitioners on the forefront of this "Great Convergence" to participate as delegates.

The distinguishing feature of the Global Forum will be its focus on bringing together the leading intrapreneurs, entrepreneurs, change agents, and financiers from around the world actually engaged in the process of disruptive innovation for sustainability at the BoP. We will endeavor to create an intimate atmosphere that enables brainstorming, dialogue, alliance-building, and action planning. Through a set of carefully designed Working Sessions, the Global Forum will focus on two primary objectives: 1. to build a global community of Green Leap change agents; and 2. to launch new action initiatives to accelerate the rate of the Great Convergence in areas of key importance (e.g. agriculture, materials, water, energy, health).

To enable the maximum degree of openness and sharing among Delegates, participation in the Working Sessions will be by invitation only. However, there will also be major Opening and Closing events intended to attract a broader public audience and media attention. David Skorton (President of Cornell University), Joe Thomas (Dean of the Johnson School of Management), Fisk Johnson (Chairman and CEO of SC Johnson), Ratan Tata (Chairman of the Tata Group), and Al Gore (Co-Founder, Generation Investment Management) have already committed to participating in either the Opening or Closing events.