Why Immigrants Can Drive the Green Economy

The Need for New Policy, Vision and Storytelling

The 2000 Census found that immigrants, while accounting for 12 percent of the population, made up nearly half of the all scientists and engineers with doctorate degrees. Nearly 70 percent of the men and women who entered the fields of science and engineering from 1995 to 2006 were immigrants. So it should come as no surprise that immigrants will help drive the green revolution. America's young scientists and engineers, especially the ones drawn to emerging industries like alternative energy, tend to speak with an accent. Yet, the connection between immigration and the development and commercialization of alternative energy technology is rarely discussed.

In IPC's lastest Perspective on Immigration piece, *Why Immigrants Can Drive the Green Economy* [1], Richard T. Herman and Robert L. Smith explain how policymakers envision millions of new jobs as the nation pursues renewable energy sources, like wind and solar power, and hightlight the voices that warn that much of the clean-technology talent lies overseas, in nations that began pursuing alternative energy sources decades ago.

By Richard Herman and Robert L. Smith [18]

Introduction▲ [19]

Raymond Spencer, an Australian-born entrepreneur based in Chicago, has a window on the future—and a gusto for investing after founding a high-technology consulting company that sold for more than $1 billion in 2006. “I have investments in maybe 10 start-ups, all of which fall within a broad umbrella of a ‘green’ theme,” he said. “And it’s interesting, the vast majority are either led by immigrants or have key technical people who are immigrants.”

It should come as no surprise that immigrants will help drive the green revolution. America’s young scientists and engineers, especially the ones drawn to emerging industries like alternative energy, tend to speak with an accent. The 2000 Census found that immigrants, while accounting for 12 percent of the population, made up nearly half of the all scientists and engineers with doctorate degrees. Their importance will only grow. Nearly 70 percent of the men and women who entered the fields of science and engineering from 1995 to 2006 were immigrants.

Yet, the connection between immigration and the development and commercialization of alternative energy technology is rarely discussed. Policymakers envision millions of new jobs as the nation pursues renewable energy sources, like wind and solar power, and builds a smart grid to tap it. But Dan Arvizu, the leading expert on solar power and the director of the National Renewable Energy Laboratory of the U.S. Department of Energy in Golden, Colorado, warns that much of the clean-technology talent lies overseas, in nations that began pursuing alternative energy sources decades ago.

Expanding our own clean-tech industry will require working closely with foreign nations and foreign-born scientists, he said. Immigration restrictions are making collaboration difficult. His lab’s

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efforts to work with a Chinese energy lab, for example, were stalled due to U.S. immigration barriers. "We can't get researchers over here," Arvizu, the son of a once-undocumented immigrant from Mexico, said in an interview in March 2009, his voice tinged with dismay. "It makes no sense to me. We need a much more enlightened approach."

Dr. Zhao Gang, the Vice Director of the Renewable Energy and New Energy International Cooperation Planning Office of the Ministry of Science and Technology in China, says that America needs that enlightenment fast. "The Chinese government continues to impress upon the Obama administration that immigration restrictions are creating major impediments to U.S.-China collaboration on clean energy development," he said during a recent speech in Cleveland.

So what's the problem? Some of it can be attributed to national security restrictions that impede international collaboration on clean energy. But Arvizu places greater weight on immigration barriers, suggesting that national secrecy is less important in the fast-paced world of green-tech development. "We are innovating so fast here, what we do today is often outdated tomorrow. Finding solutions to alternative energy is a complex, global problem that requires global teamwork," he said.

We need an immigration system that prioritizes the attraction and retention of scarce, high-end talent needed to invent and commercialize alternative energy technology and other emerging technologies. One idea we floated by Arvizu was a new immigrant "Energy Scientist Visa," providing fast-track green cards for Ph.D.s with the most promising energy research, as reviewed by a panel of top U.S. scientists. Arvizu enthusiastically responded, "Wow, that's a brilliant idea." As the recent submission of the Startup Visa Act bill suggests, there's really no shortage of good ideas of leveraging immigration to jumpstart the economy. The challenge is getting the American people to understand that high-skill immigration creates jobs, that the current system is broken, and that action is required now.

Suffering an Antiquated System ▲ [19]

While unlimited H1-B visas are available to foreign workers at U.S. government and university research labs, the antiquated green-card system creates a disincentive for immigrant researchers who seek a more permanent stay and status in the U.S.

Anyone coming to America from a foreign land experiences the U.S. immigration system. They seldom forget the experience. This vast bureaucracy, with tentacles reaching into myriad federal agencies, wields enormous power over the lives of people trying to follow its directives. Federal immigration authorities decide if a persecuted family can escape Congo, if a prospective college student from Germany will start the school year on time in Cleveland, or if a Honduran family separated for years will be reunited in Miami.

U.S. immigration law dictates who can enter America and how long they can stay. Congress can enact new immigration policies as it deems fit—and it did so in 1986 and in 1990. But the foundation of the system remains the Federal Immigration and Nationality Acts of 1965 and 1952. The 1965 act diversified America by opening immigration to new parts of the world, but it also levied restrictions that soon become dated and counterproductive. In a manufacturing era, the act made family reunification an overarching goal, while paying relatively little attention to the migration of highly skilled workers. In fact, it imposed rigid nationality quotas on skilled immigrants. The result, critics say, is a dinosaur of a system ill-equipped to deal with the demands of a fast-changing, global economy.

"Our immigration laws discriminate pretty heavily against highly talented scientists and engineers who want to come to this country and be part of our technological establishment," Federal Reserve Chairman Ben Bernanke told a Congressional panel in May 2009.

Of particular concern to employers and economists are two sets of quotas: one that limits the number of visas available to skilled workers, and another that limits the visas available to a nationality. The U.S. Citizenship and Immigration Service (USCIS) issues about 1 million green cards per year. Also known as immigrant visas, green cards bestow permanent residency, or the right to

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live and work permanently in America. A green card puts one on the path to citizenship. In a typical year, the vast majority of green cards go to people sponsored by a family member already here. There is no limit to the numbers of green cards that can be issued to the spouses, parents, and unmarried children of naturalized U.S. citizens.

America accepts far fewer people whose main reason for coming is to practice a profession, to pursue science, or to start a company—even if that person possesses extraordinary ability. The government is restricted by law to issuing 140,000 employment or skill-based green cards each year to applicants and their immediate family members. That's about 15 percent of the immigrant visa pool.

A chunk of green cards are set aside for religious workers and wealthy investors, so the United States actually offers 120,000 employment-based green cards each year.

Within the employment visa categories, known as EB visas, are several subcategories that acknowledge skill levels. For example, 40,000 visas are designated for persons of extraordinary ability—outstanding professors, researchers, and multinational executives. Another 40,000 visas are designated for professionals with advanced academic degrees whose work will serve U.S. national interests. And another 10,000 visas are available for wealthy people who commit to investing in a U.S. enterprise and creating jobs.

So, out of 1 million green cards issued in an average year, 90,000, or about 9 percent, are reserved for persons with advanced degrees, exceptional skills, or capital to create jobs. Put another way, about 9 percent of immigrant visas are reserved for high-skill immigrants—the people driving the New Economy. It's a scant amount in the context of a U.S. labor force of 154 million people.

Should those exceptional immigrants hail from a nation whose workers are in high demand—for example, India and China—they face delays imposed by a nationality quota system. The 1965 immigration law sets per-country limits on employment visas. People from any one nation cannot use more than 7 percent of the visas available that year. This means that workers from large sending countries are forced to wait, sometimes more than 8 years, because their visa allotment has been "oversubscribed" by their fellow citizens.

The 7 percent quota applies equally to every nation on Earth, regardless of its size or the potential number of immigrants it sends to America. For example, Malawi, which has a population of 10.5 million people, is allocated the same amount of employment visas as India, which has a population of over 1 billion. In any given year, only 5,600 green cards are reserved for Indians with advanced academic degrees or extraordinary ability, the same number available to nationals of Malawi.

Congress has sought to circumvent the quotas and respond to industry demands—especially in high technology—with guest worker visas like the H1-B, a source of some controversy. The H-1B is a temporary visa for a professional offered a job by a U.S. company that agrees to pay the prevailing market wage. Only 65,000 regular H-1B visas are available each year, a quota set in the early 1990s and temporarily increased to 195,000 from 2001 to 2003. Many employers say the cap is set too low to meet their needs, especially as they seek to staff engineering and software positions. Some lawmakers would like to help them with a higher quota. These skilled immigrants often come to America as students, then go to work in growing industries. A 2008 study by the National Foundation for American Policy found that for each worker hired on an H-1B visa, at least five new jobs were created.

But many labor groups argue that the cap is already set too high. Only a bachelor's degree is required to qualify for this visa, and critics charge the H-1B visas crowd skilled Americans out of the workplace, suppress wages, and make it easier for employers to outsource jobs to low-cost countries like India. Even immigrant advocates criticize the H-1B as a second-class visa that produces an anxious life. Tied to their employers, the guest workers cannot switch jobs unless their new employer is willing to sponsor their visa, and their spouses are not allowed to work. The three-year visa can be renewed once. But after six years, the visa holder must go home unless he or she is able to get a green-card sponsor.

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The national-origin quotas, coupled with a limit of 90,000 immigrant visas reserved for highly skilled professionals or investors, helps to explain why so many talented immigrants—many of them H-1B visa holders—wait in vain for permission to live and work in America. Many are now leaving the U.S., or simply not coming to study or work on an H1B.

After revealing the high-skill visa backlog in 2007, Vivek Wadhwa and his researchers at Duke University began to examine the impact. With the support of the Kauffman Foundation, they surveyed about 1,200 Chinese and Indian professionals who had studied or worked in America and returned home. The returnees were an impressive bunch, overwhelmingly young, smart, and ambitious, as described in the March 2009 report, "America's Loss is the World's Gain." Nearly 90 percent held master's or doctorate degrees. Many said they expected to start their own companies. Homesickness was common among the immigrants who went back, and many expressed frustration with the U.S. immigration system. But even more said the home country suddenly offered good jobs and bright career prospects.

That is the new reality that demands a response, Wadhwa argues. Foreign-born mathematicians, engineers, and chemists can now find world-class companies in Bangalore, Beijing, Tel Aviv, Seoul, and Singapore. With high-tech opportunities blossoming elsewhere, and anti-immigrant attitudes hardening in America, Wadhwa said his adopted homeland faces a crisis.

"The United States is no longer the only place where talented people can put their skills to work," he writes. "It can no longer expect them to endure the indignities and inefficiencies of an indifferent immigration system, and it must now actively compete to attract these people with good jobs, security and other amenities."

The competition is heating up. In an earlier study, Wadhwa pointed out that most high-skilled immigrants obtained their primary education before coming to America, meaning that the United States inherited the benefits of schooling that was paid for elsewhere. Some countries are looking to recoup that investment and attract their diasporas back home.

Alberta, Canada, sensing an opportunity to snatch talent from America, is sending recruiting teams to U.S. cities to lure disgruntled foreign professional workers on temporary H-1B visas. The province is offering expedited permanent-residency cards and quicker pathways to entrepreneurship. Many researchers believe these immigrant-attraction strategies will show results.

"The reality of the global economy is that employers and their capital will follow the talent—wherever that talent is permitted to work and flourish," Stuart Anderson, executive director of the National Foundation for American Policy, wrote in 2007. "While members of Congress often talk about 'protecting' American jobs, those who persist in pursuing restriction on hiring skilled foreign nationals unfortunately are inhibiting creation and innovation in the United States."

In 2007, Microsoft opened up a research and development facility in Vancouver, Canada, just over the border from its Seattle headquarters. Microsoft defended its decision by citing U.S. immigration restrictions on high-skilled talent.

Perhaps no country understands better the role of foreign talent in creating jobs for its people than Singapore. In July 2008, Singapore's Prime Minister, Lee Hsien Loong, declared that Singapore must be open to foreign talent to achieve a "critical mass" for innovation and entrepreneurship. Even with the global recession in full swing, Singapore Deputy Prime Minister Wong Kan Seng announced that restricting the entry of high-skill immigrants would be "short sighted" and "could ultimately lead to more job losses for Singaporeans."

America loses more than innovation if newly minted graduates go elsewhere; it loses tax dollars. A 2009 report by the respected Technology Policy Institute found that immigration restrictions cost billions in lost opportunity, taxes, and wages. The institute concluded that legislation considered by Congress to loosen green-card and H-1B visa restrictions could reduce the federal deficit on the order of $100 billion across 10 years.

In short, fantastic opportunities are being lost as high-skill immigrants are steered elsewhere. We

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need to polish our welcome. For starters, Wadhwa argues, the United States could reduce the huge backlog of visa requests simply by making more visas available to skilled immigrants and by accelerating the processing times. His is one voice in a growing chorus that hopes to wrest the spotlight from illegal immigration and illuminate the larger wave, its potential, and the consequences of inaction.

But the academic studies, while critically important, do not seem to cut through the noise and connect with the American people. The American people are not demanding high-skill immigration reform. They don't see it as a job-creation opportunity. The word "immigrant" almost automatically summons an angry response that immigrants "take jobs." Something else is needed.

Time for a New Narrative ▲ [19]

Stories connect us to each other. Drawing from the same well of human aspiration, triumph and failure, our personal stories create an emotional bond that transforms strangers into familiar faces. As America once again struggles with the question of whether and how to welcome the immigrant stranger, the telling of new immigrant stories is needed to help heal the chasm between "us" and "them," and between our personal immigrant past and our nation's immigrant present and future.

During this Great Recession, with unemployment near 10%, the immigration narrative also needs to offer hope for Americans—hope that tomorrow will be better. Hope today comes in the form of good old American jobs. We have been told that maybe 4 million blue and white-collar jobs may be created by advances in alternative energy technology, and that wind, solar, thermal, and other sources of energy will move us closer to energy independence, greater national security and a healthier planet.

But so far, we haven't been that interested in asking the question, "who will create and commercialize this new green technology? Much like the role that immigrants played, in partnership with American-born colleagues, in the information technology revolution and the elevation of Silicon Valley to almost mythical status, immigrants are now emerging as key drivers of America's quest for world-class clean energy technology.

A glance at recent research on the contributions of immigrants supports the expectation that immigrants are helping to lead the green economy and other emerging industries:

- Immigrants are nearly twice as likely as native-born Americans to start a business.
- Immigrants are filing patents at twice the rate of the American-born.
- Immigrants founded more than half of the high-tech companies in Silicon Valley.
- Immigrants are much more likely to earn an advanced degree than the native-born.

But cold, hard data on this phenomenon is not enough to nudge American back to its embrace of immigrants. Personal stories of overcoming hardship, loss, and eventually achieving success—this will resonate and help re-capture the imagination of Americans. In the book, *Immigrant, Inc. — Why Immigrant Entrepreneurs Are Driving the New Economy* (and how they will save the American worker) (John Wiley, 2009), we explore some of these stories of immigrant entrepreneurs who have invented or helped commercialize groundbreaking green technology. This is an exciting story of immigrants leading America into a new world—creating, not taking, jobs. This is the story of America.

The Story of Xunlight ▲ [19]

When they decided to plant roots in Northwest Ohio, in America's Midwest, Xunming Deng and Liwei Xu went looking at houses in the suburbs of Toledo. There were plenty to choose from in 2008. A region that long relied on traditional manufacturing jobs was suffering the decline of the American auto industry, based an hour up Interstate 75 in Detroit, Michigan. The real estate agent who greeted them at an open house one day told them it was a good time to buy. Local property values could soon be rising, she said. There was a new company in the area doing big things.

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“It’s a solar energy company,” she confided. “That’s the future.”

Liwei smiled and said, “Yes, we’ve heard of it.”

Soon after, she and her husband resolved to get extra busy at work, fast. They were the creators of that company, Xunlight Corp., a clean-tech start-up that the real estate agent—and much of the region—seemed to be looking toward with hopeful eyes.

A scholarship brought Xunming Deng from China to the University of Chicago to study physics in 1985. His future wife followed two years later with a scholarship to study chemistry. Both had graduated at the very top of their high-school classes in Nanchang, China. In addition, both scored near the top of national exams designed to identify China’s brightest college students. They were, in other words, two of the sharpest young minds in a nation of more than one billion people. Now they were the hope of Toledo.

Working in photovoltaics—the conversion of light into energy—at the University of Toledo (UT), Xunming designed a new means of capturing sunlight. His lightweight, flexible solar modules offered greater versatility than conventional glass solar panels, which are heavy and bulky and often require reinforcing a roof. Xunming’s thin-film solar sheets could be rolled out across rooftops like hallway runners, allowing a factory or retail center below to generate clean electricity from the sun.

To bring the idea to market, Xunming and Liwei became entrepreneurs. In the fall of 2007, they moved their start-up from a UT innovation lab to a vacant warehouse in an industrial park one mile from campus. Venture capitalists flew in from the West Coast and from Europe to see the works. Multimillion-dollar investments followed. By early 2009, a newly trained workforce stood ready to roll out next-generation solar panels in the heartland of the American auto industry.

Xunming Deng, a cheerful man restless with energy, beamed to see it. “We came here with empty pockets,” he said. “All we had was a desire to work.” That, and some world-class brilliance.

Xunming Deng and Liwei Xu are part of an elite immigrant wave, one that seems to be guided by an invisible hand. It’s as if a global jet stream lifts the best and brightest from hometowns around the developing world and flies them toward America, often for advanced degrees. Once exposed to American life, many of the stellar students decide to stay.

Motorists traveling the Ohio Turnpike south of Toledo are accustomed to driving past the huge Chrysler Machining plant in Perrysburg and feeling a surge of pride. The massive complex looms like an emblem of American industrial might. Or long did. By early 2009, however, the highway view no longer inspired confidence, only questions about layoffs and when and whether the plant might close. It was the huge factory next door that raised hopes, the one with “First Solar” scripted across its facade. The busy plant had more than 700 workers producing solar-energy components for world export in early 2009. It had a demoralized region hoping for a fresh start.

Legendary glass pioneer Harold McMaster co-founded the company with technology invented in his lab at the UT, a world leader in glass technology. Most solar panels are made of glass coated with chemical semiconductors, like silicon. For years, civic leaders and union workers alike held out hope that Toledo’s glassmaking expertise, long valued by the auto industry for windshields and car windows, could lead to jobs in the growing solar industry.

Suddenly, things seemed to be happening. As First Solar rolled out solar panels for overseas markets, a German solar giant talked of expanding its research and design operations in the area. In a demonstration project, the federal government helped a solar-energy entrepreneur install a solar field at an Air National Guard base near Toledo Express Airport. In the spring of 2009, a Toledo-based solar company announced plans for a new, 400-job plant.

However, it was the newest solar company to spin out of UT that created the biggest stir. In April 2008, Xunlight announced it had received a $22 million shot of confidence from Trident Capital, a leading clean-tech venture capital firm. It was the start-up’s third large infusion of private cash and

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it would launch a production line. A Trident executive told Toledo's newspaper, The Blade, that he expected Xunlight to become a world leader in the blossoming photovoltaic industry.

More encouraging to local residents were statements coming from Xunming Deng and Liwei Xu that their company would be based in Toledo, would build its products in Toledo, and that they, too, would settle in the area, which they had come to call home. A region weary of unstable jobs in auto plants and smokestack industries dared to dream. Xunlight became a must-see stop on any economic development tour. Chamber of Commerce officers, county commissioners, the governor, and a U.S. senator stopped by to greet the owners and to offer encouragement. Probably few of the well-wishers had a clear idea of how the couple came to be in Toledo or fathomed the forces that brought them from the top of the class in China to a struggling Midwest community in need of their skills.

Love, Study, and a Start-up ▲ [19]

After 23 years of marriage, Xunming and Liwei still blush to recall their meeting in college in China. It was a time and a culture when dating was taboo. But China was changing in ways that would tip the trajectory of their lives.

Xunming Deng knew a humble childhood. His father was a tax clerk, and his mother labored in a textile plant. The family lived on about $10 a month. But their son posted one of the top scores on a national collegiate exam. Destiny called. It was 1985 and reformist leader Deng Xiaoping was trying to modernize China by sending top college students abroad for advanced training in science and engineering, hoping they would return to enlighten the nation. American universities, eager to host bright international students, cooperated with scholarships. What resulted was a process that skimmed elite students from Chinese colleges and sent them to graduate schools in America. When Xunming was accepted to the University of Chicago, he and his secret fiancé Liwei plotted their strategy. She would try to follow his path. Astonishingly, Liwei also scored near the top on the national exam. She also was offered a chance to study at the University of Chicago. Xunming loaned her the $70 application fee.

The daughter of engineers, Liwei grew up in a happy family that lived better than many. But her parents urged her to seize the opportunity. China was poor, and the world was opening up. "By that time we realized that, 'Wow, America is prosperous,'" Liwei explained.

The young couple reconnected at the University of Chicago, where Xunming, then 22, pursued a doctorate in physics. Liwei, then 21, pursued her doctorate in chemistry. China had been sending students abroad for a few years now, and a small expatriate community welcomed the newcomers. With their fellow Chinese students looking on, the couple exchanged vows at a simple wedding on Christmas Eve 1986. All but the foreign students had gone home for the holidays, "and we had the campus to ourselves," Liwei said, laughing at the memory. "Our total wedding budget was one hundred dollars."

Their plans to return home changed abruptly in 1989, as they did for thousands of Chinese students abroad. The People's Army fired on students in Tiananmen Square, killing scores. "We thought we'd go back, to help," said Liwei, in voice that still carries the weight of that conflicted decision. "But now it was clear it was better to stay."

The pair now focused solely on succeeding in America. Xunming earned his doctorate in physics in 1990 and went to work for a suburban Detroit company pursuing alternative energy systems. He became a senior scientist and a project manager specializing in solar energy, a focus of his research in college. "I envisioned that alternative energy would grow more and more important," he said.

Liwei gave birth to the couple's son in 1990 and the next year achieved her doctorate in chemistry. After post-graduate research at the University of Michigan-Ann Arbor, she joined her husband at Energy Conversion Devices, working on batteries for electric cars.

The couple's daughter was born in 1993. They had steady jobs and a young family to support. But Xunming was just getting started. In 1996, to the dismay of his colleagues, he quit his job to join the

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department of physics and astronomy at the University of Toledo.

The new position meant accepting about a 50 percent salary cut, but it also opened up new horizons. The university offered Xunming the chance to assemble a research team and build his own program in alternative energy. Soon, Liwei quit her job in Michigan and moved with the two children to Toledo to join him.

In 2002, the couple took the oath of citizenship and launched their solar-energy company. Family savings and state grants saw them through small successes and failures as they sought to use solar energy to create hydrogen for fuel cells and to generate electricity.

In 2006, they changed the company name to Xunlight, reflecting a sharpened focus on transforming sunlight into electricity.

Working with wafer-thin stainless steel, Xunming had designed a solar panel far lighter and more flexible than traditional modules. He also designed machinery that could manufacture it more efficiently than the competition. The result, he hoped, was a product simpler to build and cheaper to buy. "That's the innovation," he said. "We cut the equipment cost." In 2007, they moved the company off campus and into a warehouse big enough to hold their dream, becoming the brightest light in Toledo.

At Home Far Away ▲ [19]

On a winter's morning in early 2009, a quiet factory exuded energy. Only exhaust fans sounded in an open, 120,000 square-foot plant bathed in bright lights. Computer-controlled machines the size of semi-trailer trucks were not yet rolling out solar film. The shipping dock was still. But deadlines and anticipation charged the air. Eighty-five employees—10 with doctorate degrees—were nearly ready to commence production.

Xunming and Liwei, surveying the scene in suits and safety glasses, could hardly believe it. "We went through some pretty tough stages in our life," Xunming explained.

Falling back on a comfortable position in academia at times looked tempting, but the couple never seriously considered quitting this venture. "Usually, immigrants do not mind putting in effort, a lot of effort, to find success," Xunming said. "And you do not give up hope. That green card might take five years to come. You do not give up hope."

Xunming describes two components of working hard: working smart and pooling resources to achieve a vision. His company is pursuing a solar niche. Its thin-film sheets are meant not for homes but for factories and retail centers. They will carpet large, flat roofs that cannot sustain the weight of traditional glass solar panels, as most houses can.

Xunming, Xunlight's president and CEO, and Liwei, its vice president of finance and administration, initially expect to export most of their product to Europe, until solar energy takes hold in America. They envision manufacturing more than $200 million worth of solar cells each year. That will require more physicists and chemists, but also traditional business people and rank-and-file factory workers.

They also plan to stay in Toledo, and not only because they bought a house and their daughter likes her high school. Xunming and Liwei said they were surprised by some of the advantages the Midwest offers to manufacturing start-ups, like cheap and available factory space. They found a huge pool of talent from the auto industry, and universities and cities eager to support their ideas. "There's a whole community that has a new hope because of Xunlight," Xunming said he realizes.

They wonder if their neighbors realize how they came to be here, and why there may not be many more following their lead. Twenty years ago, they rose to the top of a process that singled out China's bright strivers and flew them to America. "The United States is very unique in the way it is open to foreigners," Liwei said, and she is grateful.

But the immigration process she navigated—from student visa to green card to citizenship—was far

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easier than the one facing international students today. As China is expanding opportunities at home, America offers a chillier welcome. Liwei suspects that young educated Chinese probably feel less compelled to emigrate. As she stood at the cusp of a new industry, one she is helping to propel, Liwei observed that, today, she and her husband could probably launch Xunlight in China.

Cowboys of a New Frontier ▲ [19]

On a cold New England night in early 2009, the windows glowed bright in a red-brick building standing like a lighthouse on a bluff overlooking the Charles River. Its brick smokestack, wreathed in blinking red lights, towered high into the winter sky. This was the old powerhouse of what was once a mammoth munitions complex in Watertown, a working-class suburb a few miles upriver from Boston. Today, the Arsenal on the Charles, as it's been renamed, is a smart park owned by nearby Harvard University. Fiber-optic cables course through old cannon factories that are home to software developers, business consultants, and engineering design firms. In an intriguing re-use, the historic powerhouse hosts the research and development lab of A123Systems Inc., a start-up striving to power the car of tomorrow.

The lab was still busy at 7 p.m. on a Thursday, but the air was more charged in a renovated warehouse just up the block, where A123Systems keeps its corporate offices. In a bright, open, barn-like warren of cubicles and conference rooms, a mix of native-born and immigrant Americans were hard at work. Much of the office staff had gone home for the day, but company executives and top engineers sweated to make a deadline.

Behind a glass door, casually dressed men and women slapped equations onto a white board as others fired questions and suggestions. Near a display of cordless power tools, a designer bent over a drawing table as a colleague juggled conversations on two cell phones. A relaxed energy permeated the scene, allowing for deep breaths and occasional smiles, despite the hour and frenetic pace.

Probably no one was under more pressure this night than Ric Fulop, a boyish-looking 34-year-old from Venezuela. The science of his Taiwan-born partner, Yet-Ming Chiang, had brought them far in their quest to build a battery more powerful than anyone thought possible. The third co-founder, New England native Bart Riley, provided the engineering expertise. Boston venture capitalist Gururaj "Desh" Deshpande, an immigrant from India, offered advice and key support.

Now the researchers and advisors could relax a bit while Fulop, the company's marketing director, strived to sell their product to industry and to a major new investor. An apple-cheeked young man with disheveled black hair, Fulop this night wore jeans and a blue A123 polo shirt. He and his wife had just welcomed their first child, and the new father was parenting via phone calls home. But another responsibility consumed his attention. He was to catch a flight to Washington, D.C., in two hours. In the morning, he would walk into the U.S. Department of Energy and deliver A123's application for a share of federal stimulus money designed to jump-start a new American battery industry. His colleagues were helping him to put the finishing touches on an audacious request: $1.8 billion to build battery cell factories in America's Midwest.

A humble start-up was poised to take a giant leap forward. Having recharged Black & Decker power tools, the people behind A123Systems were ready to propel all-electric cars. They represented not only a provocative idea—clean, powerful, renewable energy—but also a new kind of team, a crew uniquely qualified to exploit the opportunities of the New Economy.

A New Kind of Entrepreneur ▲ [19]

The word entrepreneur conjures many images, not all of them flattering. Labels assigned to people who launch their own businesses include self-promoting and obsessive. On the positive side, the men and women who launch their own businesses are widely seen as hardworking, persistent, daring, and smart. Both of those typecasts miss some of the characteristics that shape entrepreneurs succeeding in today's knowledge-based, global economy, research and interviews with successful entrepreneurs show.

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The captains of team A123 exhibit most of the traditional traits of entrepreneurship. They are bold and energetic people, highly skilled, and prone to optimism. They share a thirst for adventure and an ability to work under pressure. But the founders also display traits borne of their immigrant experience or their understanding of immigrants. Most speak more than one language. All are well travelled. They bring different ethnic perspectives to a task and an ability to work across cultures. As their quest unfolded, they proved to be flexible and adaptable, as strangers in a strange land learn to be. When Chiang's initial battery formula failed to work as expected, the team scrambled and found a better one. Experts say nimbleness and resiliency are crucial qualities when banking upon unproven technology. As mathematician James York observed, "The most successful people are those who are good at Plan B."

Finally, the founders were good at working as a team; that is, realizing their personal strengths and weaknesses and those of their colleagues. Some experts say the ability to size up a challenge and select the right partners to take it on may be the most critical quality of all among the era's successful entrepreneurs. "The key to success is selection," writes Bill Wagner, author of the book The Entrepreneur Next Door. "You must select an opportunity that suits your personality, then hire or select the right people to surround yourself with."

With a blend of new and traditional skills, the founders of A123 trekked confidently into the unmapped terrain of clean technology. They could speak the language of Chinese scientists and of West Coast venture capitalists. They could push the scientific envelope and do the engineering. They were a new kind of entrepreneur, bold but tech savvy. They, and others like them, are driving the New Economy and pulling companies and industries along with them. It is no small motivation that they believe they can change the world. Along the way, they just might save the American worker.

A Melting-Pot Dream Team ▲ [19]

The next time Ric Fulop caught his breath it was late February 2009. He had just returned from a three-week trip to Japan and China, where A123 manufactures battery cells. He would be leaving the next day for a trip that would take him to South America, Los Angeles, and Detroit, where A123 hoped to soon be doing more business. He was a catalyst for a young company on the rise.

In 2009, at the start of its eighth year, A123's high-energy, lithium-ion batteries powered Black & Decker's Proline cordless power tools. They started airplane engines and propelled hybrid buses. A company that spun out of a lab at the Massachusetts Institute of Technology (MIT) had recruited an experienced CEO, David Vieau, a veteran of successful high-tech start-ups. It now had more than 2,000 employees, about two-thirds of them overseas, and big plans in America. A123 was involved in 18 separate projects with nine auto companies. Its researchers were trying to design a mega-battery to store excess energy from electric grids. They were racing against other advanced battery makers, most of them overseas, to power the future.

As vice president of business development and marketing, Fulop stood hip deep in every aspect of the venture: planning, plotting, engineering, and selling. The work was all consuming, so much so that he rarely, if ever, paused to consider how he does what he does—and why.

"I'm very hungry. I have always been hungry," Fulop finally said, after thinking for a long moment. His appetite is not for food but for the next new thing, which he wants a role in inventing. "You get started on something and it just becomes more and more real," he said. "And before you know it, it's all you're doing."

In fact, the soft-spoken immigrant has made a career of hatching bold ideas and rallying a team to pursue them. Known for his infectious enthusiasm and his ability to work across cultures, Fulop, who speaks five languages, played a role in five start-ups before age 27. He's credited with pioneering the broadband Internet industry before charging into renewable energy.

Born in 1974 in Caracas, Venezuela, Ricardo Fulop used his bar mitzvah savings to launch his first company at age 16, when he finished high school. His software distributorship was soon earning

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nearly $1 million a year. He came to America in 1994 to attend Babson College but never finished. The high-tech industry was exploding in and around Boston and its world-class universities. Fulop wanted in on the action. He started Arepa in his dorm room in 1996. It survived as Into Networks, whose software is used in the Windows Vista operating system.

He dropped out of college and became a full-time entrepreneur. He burned through tens of millions of dollars with Chinook Communications and Broadband2Wireless, promising companies that soared and crashed in spectacular fashion. He picked himself up and looked ahead. Red Herring, a magazine that covers the technology industry, named him one of America's Top 10 Entrepreneurs in 1999. He was 24 years old.

In 2001, Fulop was thinking of clean energy and concepts like fuel cells and battery storage, years before Al Gore warned of an inconvenient truth. He still had only a high-school degree, but he's a quick study, a voracious reader. Before he came scouting the halls of the Massachusetts Institute of Technology for battery experts, he had read the latest research reports and mined databases to read the unpublished research. He knew a cathode from an anode particle. He knew the Arctic ice was turning to slush and that fossil fuel supplies had peaked. He suspected the internal-combustion engine would soon give way to electric motors powered by batteries—which burn no petroleum and spew no harmful gases.

"You don't buy market research reports," he said with genial disdain. "You do your own. You have to figure it out."

Armed with expert knowledge, Fulop was willing to present himself to key people, strangers with no idea who he was or how he found them.

"You have to be scrappy and street-smart," Fulop said. "I think an important part of being an immigrant is desperation. Failure is not an option. You've landed here, you're alone, you have to make a new life for yourself."

In fact, one of the reasons Fulop became an entrepreneur, he said, is because he feared no one would hire him in Boston, a class-conscious city not known for its warm welcome to strangers.

"I didn't have a platinum background. All the rubber stamps on my passport," he explained. "I didn't have a Harvard-like degree."

He does now. In an uncommon gesture, MIT offered him a scholarship to its graduate business school despite his lack of a bachelor's degree. In 2006, Fulop earned his MBA from one of the world's elite universities.

That's also where he found his teammate.

The Super Prof ▲ [19]

Yet-Ming Chiang, the calm to Fulop's storm, was 41 years old and an esteemed professor when Fulop knocked on his door and said he wanted to talk about battery power. He presented himself as Red Herring magazine's Entrepreneur of the Year, Chiang recalled, laughing at the memory. Fulop told Chiang about his interest in starting a company that would tap alternative energy, perhaps using carbon nanotubes. Chiang told him a little about his research with materials that seemed to imbue conventional batteries with remarkable power. He suspected he had achieved a breakthrough, really.

So what are you waiting for? Fulop asked.

Chiang looked at the young man in sneakered feet and weighed his response. A career MIT professor, he was happy in academia. He's a cheerful scientist who enjoys fishing with his three children and tinkering with machines.

"I love engineering. I was always a gearhead," he explained.

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But he also possesses a sense of adventure. He owns three motorcycles. In the late 1980s, he took MIT technology and helped to create American Superconductor, which built high-temperature wires to deliver electric power.

He said he saw in Fulop not just energy but talent, "A skill set I didn't have." He takes pride in the aspect of his personality that allowed him to defer to the young entrepreneur, a trait he attributes to the meritocracy that is America.

"If you had a hierarchical mindset, you'd be asking yourself, 'Who is this kid? Why should I be working for him?'" Instead he wondered, "Could this be the time?"

Chiang is a hybrid, a man of dual cultures. Born in 1958 in Kaohsiung, Taiwan, he was raised in America by parents who instilled in their children the best of both worlds. He grew up disciplined but inquisitive, smart but playful. He does not think his relaxed personality would have been rewarded in the rigid academic systems of Asia. "All my life, I've felt fortunate to grow up in America," he said.

He arrived at age six with his parents and his three siblings. His father, a mechanical engineer who fled mainland China after the communist revolution, had visited America on business and liked it. He brought his family to Brooklyn, where he earned his master's degree at Brooklyn Polytechnic. The children were raised to revere learning. "You could get away with a lot in my family, but you couldn't get away with not doing well in school," Chiang said. At age 18, he followed a sister to MIT, a crucible of entrepreneurship on the banks of the Charles River in Cambridge.

Joining a New England Tradition ▲ [19]

The French political writer Alexis de Tocqueville, in his mid-nineteenth century classic, Democracy in America, observed that the English government considered "New England as a land given over to the fantasy of dreamers, where innovators should be allowed to try out experiments in freedom." Freedom is the driver of prosperity, and "nowhere was this principle of liberty applied more completely than in the states of New England," Tocqueville wrote.

Within this growing community of innovators and dreamers, an idea for a university was discussed and founded shortly after de Tocqueville's book was published. The Massachusetts Institute of Technology, considered by many to be the most productive university in the world, is a beehive of entrepreneurism and innovation. It leads the nation's universities in the licensing of technology to start-up firms. From its Cambridge campus, MIT virtually spins out jobs in advanced manufacturing, software, and biotechnology. In 2008, nearly 100 biotech companies stirred in the Kendall Square neighborhood adjacent to campus, according to a census by the Kauffman Foundation. If companies founded by MIT graduates formed their own country, MIT nation would possess the 17th largest economy in the world, the Kauffman researchers concluded.

Immigrants play a key role in that entrepreneurial ecosystem. About 30 percent of MIT's international students start companies, researchers found, and half of those companies take root in America. In 2008, immigrant alumni of MIT employed about 100,000 people in 2,300 American companies, generating $1.6 billion in sales.

Yet-Ming Chiang walked into that tradition a wide-eyed freshman in 1976. A stellar engineering student, he became a research assistant to W. David Kingery, the father of modern ceramics and 1999 winner of the Kyoto Prize for advanced technology. Chiang joined the faculty upon earning his master's degree. In 1990, he became the youngest tenured professor in the history of the Department of Material Science and Engineering.

When Fulop appeared in 2001, Chiang was applying nanotechnology to battery chemistry. Lithium-ion batteries were starting to power small electronics, like cell phones and laptop computers. But they were expensive and hobbled by power limitations. By adding trace amounts of metals to the formula, Chiang found he was able to generate exceptional bursts of power.

He had, he suspected, found a path to a stable, long-life battery—the Holy Grail of clean-tech.

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Chiang shared his discoveries with Bart Riley, a friend from his days at American Superconductor. An engineer with a Cornell University doctorate and more than 40 patents, Riley thought they should maybe start a battery company, but neither knew how to go about it.

Enter Fulop, the missing ingredient. In July 2001, the trio sat down to dinner and mulled their potential roles: Chiang, the professor with the key technology; Riley, the experienced engineer; and Fulop, the money-raiser and start-up wizard. The chemistry seemed right. Handshakes ensued, and dreams soared. Within weeks, they had chosen a name, A123Systems, which sounds casual but refers to an important equation in nanotechnology.

"We all thought it was an appropriately geeky name for an MIT spin-off," Chiang observed. "Early on, I ran into a fellow at a Harvard networking event who ran a PR firm, and he said that when we got serious about our company, he would be happy to help us come up with a real name." That name soon become one of the most respected in the industry.

The Guru ▲ [19]

With a team, a promising technology, and a PowerPoint presentation, the trio went looking for investors. They needed tens of millions of dollars to fund research into Chiang's technology, which they had licensed from MIT, and to develop a product. Fulop mapped out visits to 30 different venture capitalists on the east and west coasts. Early into what Chiang called "the road trip," the founders took their idea to the mountaintop. They visited Gururaj Desh Deshpande in Chelmsford, Massachusetts, where he was running his latest successful start-up.

Deshpande is legendary in high tech circles. To South Asians, he is known as a "karma yogi," a man who follows a path of action to ultimate success. To American venture capitalists, he is a big thinker with a Midas touch. He left India at age 22 for college in Canada, moved down to Boston, and pioneered the architecture of optical fiber networks, super-fast communications systems. He founded two hugely successful companies on his way to becoming one of the richest men in America.

When the A123 founders sat before him in 2001, he was president and chairman of his latest start-up, Sycamore Networks. He was also a venture capitalist and a mentor to hungry young entrepreneurs who hoped to follow his path. Deshpande liked what he heard and liked what he saw in Chiang, Fulop, and Riley. He agreed to invest in their battery quest and help them to find other backers. Later, he agreed to chair their company's board of directors. The promising trio became a quartet anchored by a seasoned talent. "He was sort of the grown-up guy," Fulop said later. "He validated the idea."

A123 soon attracted a Who's Who of investors that included the U.S. Department of Energy, fabled Silicon Valley venture capital firm Sequoia Capital, General Electric, Procter & Gamble, Motorola, and Qualcomm.

Deshpande's endorsement, like the king's imprimatur, did not come casually. He is both a practitioner and a student of entrepreneurship, which came to him unexpectedly. The craft fascinates him, partly because he never saw himself as a natural. Born in 1952, Gururaj Deshpande was raised in small towns in the southern Indian state of Karnataka. Dad worked for the government. There was no business history in the family.

After graduating from the Indian Institute of Technology (IIT) Madras with a bachelor's degree in electrical engineering in 1973, Deshpande considered job offers with Indian firms. But when the University of New Brunswick offered a full scholarship, he left for Canada. His father borrowed the money for his plane ticket. Deshpande earned his master's degree in electrical engineering and went on to earn a doctorate in data communications at Queens University. In 1980, he married Jaishree, a physicist and a fellow graduate of IIT Madras. He had found his life partner and he believed he had found his vocation. He liked teaching and he was good at it. He envisioned a career as a university professor and a researcher. Then he experienced the risky side of his craft.

He was teaching college in 1984 when, as a favor to a friend, he joined "a little start up in Toronto"

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which had just lost its head engineer. Deshpande assumed control of Codex Corporation and took it to new heights. Everyone made money. He still relishes the memory. "Once I had a taste of that," he said, "I knew I was going to work for myself."

He decided he did not want to build other people's companies. He would go to America and build his own. He joined Motorola's headquarters in Boston in 1984 and worked for three years waiting for his green card, which provided status as a lawful permanent resident. (The card proving that status is no longer green, but the nickname endures.)

While working for Motorola, Deshpande launched his first business, a communications company that he nurtured in the pre-dawn hours. The venture failed and he and his partner lost their small but dear investment. In 1988, he and Jaishree launched Coral Networks with the family savings. The technology succeeded, but a conflict with a partner forced the Deshpande to quit the venture. It was another bitter defeat. He rebounded with Cascade Communications, a public computer network and a one-man start up that hit the jackpot. The company sold in 1997 for $3.7 billion. Soon after, Deshpande co-founded Sycamore Networks, a maker of advanced optical networking products. Its public stock offering caused a sensation in 1999. The next year, Forbes magazine ranked him the 32nd richest person in America.

New Era of Innovation ▲ [19]

By early 2009, Deshpande had stepped down from the presidency of Sycamore. He still chaired the board, but he no longer went into the office daily. His passions were philanthropy and mentoring, efforts channeled through the Deshpande Foundation, which supports entrepreneurship and innovation in America and in India, and the Deshpande Center for Technological Innovation, which helps MIT professors make the leap from research to commercialization. As a venture capitalist, he likes to help launch one start-up a year.

In his 58th year, Deshpande lived discreetly despite his wealth and success. His work environment reflected his modesty. The Deshpande Foundation, housed in an unremarkable office building off a freeway interchange near his home, lacked even a receptionist. Visitors walk in and start looking for someone.

Deshpande arrived on a Friday afternoon in slacks and an open-collared shirt, cordially introduced himself, and led the way to a conference room. He's a slight man with a wide, kind face and a professorial bearing. He nods as he listens, and he pauses in thought before delivering his opinion. He is firm in his views, but he does not push them. Instead, he serenely shares lessons learned from some of the greatest runs in the game. "Entrepreneurship is always about changing the game," Deshpande said. "The magnitude of the change depends on where you are."

He advises aspiring entrepreneurs to consider the field of play. In smaller places, small changes can lead to big success. In big, technologically advanced cities and nations, big changes are required to make an impact. He also advises them to break tradition, to deviate from established patterns habitually, and to adopt the concept of entrepreneurship as a career. "There's no lack of problems to be solved," Deshpande said. "There's plenty of things to do."

He said he sees a new era of innovation emerging, thanks in part to the deep recession of 2008 and 2009 and the humbling of Wall Street. Over the last 10 to 15 years, some of America's best young talent was drawn to investment houses and the stock market, "where creators became gamblers," Deshpande said. Now, bright minds were returning to meaningful work. "The thrust is coming back to actually creating new things—products, services, technology," he said.

He believes innovation springs from hard times. In 2000, Deshpande told students at his IIT alma mater in India that one of his early failures, with Coral Networks, made him a better entrepreneur. It showed him he could survive defeat. "I am now more comfortable taking on bigger challenges, because I am not afraid of failure," he said.

He advised the students to make no small plans. "People do not do more than what they can dream of. So I dream big," he declared.

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When the A123 team came calling in 2001, the phrase “alternative energy” was just entering the national lexicon. Deshpande liked the idea of a super battery, but—more than that—he liked the people behind it. Fulop, Chiang, and Riley struck him as smart, open-minded leaders who would change course if a path were blocked. “Perseverance can go too far,” he counsels. “Just because you have a conviction doesn’t mean your conviction is right. It’s usually the second or third idea that works.”

Also, he liked that two of the three founders were immigrants, and not out of any feelings of kinship. With less to lose, he thinks immigrants are bolder players. With a fresh look at the landscape, he thinks they are better at spying opportunity. “It always takes an outsider to see the advantage,” he said.

He also believes immigrants are better equipped to persevere the rigors of entrepreneurship, having endured a pilgrim’s journey. Launching a business always takes more time, money, and sacrifice than anyone imagines, Deshpande said. He agrees with legendary venture capitalist and Sequoia Capital partner Michael Moritz, who in 2000 wrote, “Force a venture capitalist to choose between a well-healed Ivy League student and a smart and impoverished immigrant, and we’ll pick the latter every time.”

Deshpande liked the immigrant personality of the A123 team. But mostly, he thought the team was on to something big. Power storage was the unanswered challenge of renewable energy. Electric cars could not eclipse gas guzzlers until they could run long and steady. Solar fields and wind farms could not dependably power a city until energy could be stored in the calm and in the dark. The world needed a better battery. “The need for this technology is absolutely obvious,” Deshpande said. “It’s a good play.”

Made in America? ▲ [19]

The ensuing years proved Deshpande right. Chiang’s lithium-ion battery generated 10 times the power of a conventional battery, ran cool and constant, and recharged quickly. As cordless power tools whirred with A123 batteries—and with more power than plug-in tools—investment grew and the product line broadened.

General Motors delivered a blow in late 2008, when it disclosed it had chosen a Korean company to build battery cells for its much anticipated plug-in hybrid, the Chevrolet Volt, due to debut in 2010. Fulop shrugged off the setback. A123 remained a partner with GM as it sought a domestic battery source and the entire auto industry was coming its way. All-electric vehicles were perhaps decades away from mass popularity, but most every carmaker was working on a hybrid—cars and trucks powered by a mix of electric and gasoline power. His company was one of the major players in a $2 billion market projected to grow to $20 billion by 2020. “Just like the PC (personal computer), it could explode,” Fulop said.

The question that nagged Fulop and other members of the team was one scarcely raised by established American companies: where would the batteries be made? At the dawn of the renewable energy era, battery-makers in Japan, Korea, and China dominated the technology and the manufacturing. Most American companies that needed advanced batteries turned to foreign suppliers. A123Systems and Johnson Controls were two of only a handful of advanced U.S. battery companies, and even they were making a lot of their product overseas. That pattern needed to change, the founders agreed.

Their belief in American jobs rested in part on a common immigrant sentiment—patriotism. Like generations of immigrants before them, Fulop, Chiang, and Deshpande all felt indebted to a nation they say gave them an opportunity to flourish. “There’s not too many places in the world where a person can show up with nothing in his pockets and start to do things. The United States is special,” Deshpande said.

“Why do it in the USA?” Fulop asked. “We’re American, and we’re going to kick butt.” Yet-Ming Chiang put it more academically. If America was going to avoid trading dependence on foreign oil

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for dependence on foreign batteries, it needed to produce its own supply. "You have to have a domestic source for key components," he said. "You don't want your supplier having higher priorities in their own country."

An advanced American battery industry needed the support of the federal government, Chiang argues, because Asian battery companies are supported by their national governments, which helped them to come to dominate the consumer electronics industry. Deshpande said America holds a technological advantage, thanks to A123, but could lose the lead if it does not invest quickly in manufacturing.

The idea of such a loss incenses Fulop. He said that, with increased automation in modern factories, American-made batteries can compete with Asia. "There's no reason we have to build batteries overseas," he insisted, "especially when the technology was created in North America."

Reviving the Motor City ▲ [19]

In April 2009, the news out of Detroit buzzed through a troubled American auto industry. Chrysler had chosen a new American battery company to power its next generation of electric cars. In selecting A123Systems Inc., Chrysler bypassed the foreign battery-makers that controlled nearly 90 percent of the market. The partnership not only endorsed an American battery company, but a battery made in America.

Addressing the media at the New York Auto Show, Chrysler president James Press emphasized the salient point. "In our tradition of being the quintessential American company, we're partnering with A123Sytsems, which is Massachusetts based, and we're going to build a factory in Michigan, and build all-American batteries for our cars," he said.

A123 planned to build the first lithium-ion battery cell plants in North America in southeastern Michigan, the heart of the American auto industry. The batteries would propel hybrid Jeep Wranglers and Chrysler vans. Two months deeper into a brutal recession, a bankrupt Chrysler announced a life-saving alliance with the Italian car-maker Fiat. The Michigan battery plant remained on the drawing board of the new car company, raising the prospects that A123 batteries could also power some of the smaller, lighter vehicles built by Fiat. In addition, A123 was preparing to power the electric vehicles of Volvo and the products of other manufactures in an increasingly battery-driven world.

The advanced American battery industry had begun, A123Systems president and CEO David Vieau declared. His company was still counting upon a nearly $2 billion stimulus loan from the Advanced Technology Vehicles Manufacturing Incentive Program to build battery plants. Regardless of the decision by the U.S. Department of Energy, it planned to build battery cells in Michigan and tap Detroit tradition and expertise. Vieau projected more than 14,000 people working in more than 7 million square feet of factory space in the years ahead.

Throughout Michigan and the Midwest, civic and union leaders cheered the made-in-America strategy. U.S. Senator Debbie Stabenow of Michigan told the national media that a company founded by immigrants was moving the country in the right direction. "We need a twenty-first century manufacturing strategy in this country," she said. "Companies like A1234 are not only creating quality, good-paying jobs in Michigan, but are insuring that we do not move from a dependence on foreign oil to a dependence on foreign technology." John Dingell, a member of Congress from Michigan, called the A123-Chrysler partnership momentous on two levels. "The future of this country is dependent upon addressing two vital challenges—stopping the spread of global warming, and creating the next generation of manufacturing jobs here in the United States," he said. "This project gets us closer to achieving both of those goals."

Spirits High, Lights Aglow ▲ [19]

Back on the banks of the Charles River, the lights continued to burn bright into the night in brawny buildings where scientists once designed armaments and now experimented with battery

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chemistries. Yet-Ming Chiang shuttled between labs at A123 and at MIT as if on air. When he realized he had the formula for a better battery, he envisioned cheaper energy, a cleaner environment, less dependence on foreign oil. Now he eyed the prospects of thousands of new jobs in his adopted country. "It's almost an unimaginable opportunity, to be in a position to make this kind of impact," he said.

After allowing its lead in computer battery technology to slip away, America had a do-over, a lead in a crucial new industry. "You could almost say high-energy lithium batteries give us a second chance," Chiang said. "We're part of that second chance. We have world-class technology." His BlackBerry vibrated on the tabletop. He excused himself for a call from China. The race was on.

Richard T. Herman is the founder of Richard T. Herman & Associates, an immigration and business law firm in Cleveland, Ohio which serves a global clientele in over 10 languages. He is the co-founder of a chapter of TiE, a global network of entrepreneurs started in 1992 in Silicon Valley. He has appeared on National Public Radio, FOX News, and various affiliates of NBC, CBS, and ABC. He has also been quoted in such publications as *USA Today*, *InformationWeek, PCWorld, ComputerWorld, CIO, Site Selection* and *National Lawyers Weekly.

Robert L. Smith is a veteran journalist who covers international cultures and immigration issues for the *Cleveland Plain Dealer*, Ohio's largest newspaper. Bob grew up in Cleveland, where he lives with his wife, Cleveland Orchestra violinist Chul-In Park, and their two children, Jae, 5, and Sun-Hee, 3. He has written extensively about immigration issues and has interviewed people at all points of the immigrant experience, from undocumented field workers to hugely successful entrepreneurs.

Parts of this paper were excerpted from the book "Immigrant Inc.: Why Immigrant Entrepreneurs are Driving the New Economy (and how they will save the American worker) [20]" (John Wiley & Sons, 2009) by Richard T. Herman & Robert L. Smith. Available wherever books are sold.

For more information on immigrant entrepreneurship in America, see www.ImmigrantInc.com [21] and this short video http://www.youtube.com/user/Immigrantinc2010 [22], or contact the authors at Immigrant.Inc@gmail.com [23].

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