

Case #1-15-008, July 14, 2015



LUMINOUS POWER TECHNOLOGIES

From Failure to Success to Sale

After graduating from India's Jadavpur University in 1983 with a degree in electronics and telecommunications engineering, Rakesh Malhotra went through a few jobs in about a year before settling at Siemens Energy. Almost immediately, he started doing well, and in 1985 he was given an opportunity to move to Siemen's London office. Instead, he quit his job and set up his own venture.

Malhotra had been looking for a practical problem to focus on, something that would prove more rewarding than working for a bureaucracy. His neighborhood in the southern part of Delhi was prone to power failures. As a result, his family had been forced to use a power generator, and after years of use, it too was prone to failures. When Malhotra had been a budding electrical engineer, his mother would often ask him to fix the generator and squeeze more life out of it. In addition to saving money for the family, Malhotra actually enjoyed this work. Machines fascinated him, and he loved tinkering with them. Over time, he began to see an intersection of three things: a real-world problem to solve, an activity he enjoyed, and a venture where he could put his education to use.

This case was prepared by Professor Iqbal Qadir and casewriter Nicolas Sullivan as a basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

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The Legatum Center at MIT gratefully acknowledges the generous support of The MasterCard Foundation.



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Malhotra had also noticed that people in India were starting to buy personal computers (PCs). However, the intermittently available and voltage-fluctuating power supply was damaging to these expensive machines. To protect them, people were buying equipment, such as uninterruptible power systems (UPS), that kept power supply uninterrupted even momentarily. However, the UPS devices, imported from the United States, generally from American Power Conversion Corporation (later renamed APC), cost about \$800 USD apiece.*

Malhotra knew that computer purchases were trending upward, and the unreliable power in his neighborhood was by no means unique. Load shedding, power failures, and voltage surges were common throughout India. Therefore, the potential market for UPS was large and growing. After checking the prices of locally available parts, Malhotra realized he could bring a new UPS to market at a dramatically lower price by manufacturing in India. Among other things, the customs duties on imports were about 20%–30%, and importers' markup was about 50%. For Indian products, retailers required much smaller margins. Manufacturing wages were low enough in India that most of the cost of production would be in the materials. Malhotra figured he could cut the retail price at least by half.

These calculations led Malhotra to conclude that he should set up his own UPS business. However, his father was apprehensive about the idea. All his adult life he had been a civil servant and had seen many entrepreneurs give up when faced with the mountains of red tape involved in negotiating with the Indian bureaucracy. “An entrepreneurial venture was what you did if you couldn't do anything else,” Malhotra said in an interview with the Legatum Center. His father also felt that the opportunity cost was too high: Malhotra was giving up a good position with a world-class company to enter a market that was a “new thing,” untested in India. “But I was ready to leave Siemens,” Malhotra emphasized. “Big companies are like big governments. You are a small cog in a big wheel. Moreover, my point was simple: I did not want to work for someone else.”†

Malhotra's mother, however, was in favor of her son's decision. She had seen his unhappiness at a big company that kept him away from actual problems in society and required only that he respond to instructions from above. Her support helped to change Malhotra's father's mind, and eventually he even became supportive, helping Malhotra with seed capital from his retirement savings. With that money, Malhotra rented a 600-square-foot space in his neighborhood and started his “factory” with four people.

Later Malhotra connected with Dilip Bhide, a brilliant man with great technical skills. Bhide had some experience in developing a version of an off-line power backup system for PCs; the system would come online whenever power supply stopped, but it did not supply continuous power as the online UPS does. In other words, this system from Bhide involved a momentary interruption. Malhotra and Bhide worked together to develop a new system that would compete with the U.S. UPS products available in the market. “Within 15 months, our offline UPS was ready for marketing, and we formed Oak Power Systems,” Malhotra recalled. As he had calculated, they were able to cut the retail price of a UPS by half, from \$800 to \$400. This was accomplished through frugal design, locally procured parts, and avoidance of custom duties. (For information about Malhotra's progress throughout the years, see **Timeline: Luminous Power Technologies.**)

*Unless otherwise noted, all monetary values in this case are stated in U.S. dollars (\$).

†Unless otherwise noted, all subsequent direct quotations in this case study are from interviews with the Legatum Center, MIT.

The product was a big hit. Oak Power Systems took off like a rocket. Modi Xerox, its first client, placed an order worth \$420,000. By the end of its first year of operations, Oak Power had posted \$1 million in sales and had eight employees. This was stellar performance by Indian standards in 1986. Malhotra was 24 and just three years out of engineering school.

Lesson of a Lifetime

“It was almost like a fairy tale,” Malhotra recalled. “All the big corporations were our customers. The product was ahead of its time and offered a strong value proposition.” Companies that purchased PCs needed UPS, and thanks to Oak Power, they could slash their UPS costs by 50 percent.

But the fairy tale came to an abrupt end. Within a year, the Oak Power UPS product began to fail. Malhotra’s UPS turned out to be as unreliable as the power grid. The problems came from the manufacturing process. Malhotra had put a lot of time and care into designing the product, but he had underestimated the problem of quality control. He realized that a rigorous testing process was needed before products were placed on the market.

The problem was grave. Oak Power’s systems were not working at many customer locations. The company’s fledgling reputation was at stake, and Malhotra felt morally responsible for the nonfunctioning equipment. Bankruptcy was not an option. Unlike in the United States, where bankruptcy was basically a reorganization process, in India it meant liquidation. The Indian courts generally appointed a liquidator to sell the company’s assets, which in Oak Power’s case were largely manufacturing parts. Bankruptcy would also have liquidated Malhotra’s reputation.

Instead, Malhotra set to work paying back his customers for faulty equipment. He spent the next 18 months visiting all of his customers to fix their systems or take back their faulty equipment and refund their money. “The big companies probably didn’t care, but I didn’t want to compromise, and I wanted to maintain a good reputation,” Malhotra noted, admitting that “pride was a factor.” He also felt guilty about losing his father’s investment. “I was taught the lesson of a lifetime—never go to market unprepared. I was \$100,000 in debt, mostly to family.”

Still, Malhotra looked to the bright side. After all, Oak Power was nascent and still small. His loans were mostly from family members who were unhappy but understanding. “If something like this had happened to a matured and bigger company, I probably couldn’t have started again. A near-death experience is certainly useful to an entrepreneur, especially if it comes early. And I was still young enough to do it again.”

Rising from the Ashes

Why give up? Why waste his expensive education? Malhotra was determined to start over. Among other things, he knew he had designed a popular product. He also knew he needed to pay attention to quality control and not take anything for granted.

In 1988, Malhotra formed a new company, SAR Silicon Systems Pvt. Ltd., with two other partners. (SAR represented the first initials of the three partners: Sita, Anil, and Rakesh.) SAR worked on “systems integration” for large companies, which generally involved making sure their electronic equipment (PCs, hard drives, monitors, and associated networks) was set up correctly and worked smoothly. This also gave SAR an opportunity to make money through commissions by selling branded products, with the revenues from systems integration being only secondary. By 1989, Malhotra had managed to pay off his debts. By 1991, he had amassed

enough capital, \$150,000, to start a new business. Despite the advice of many that he take a corporate job, Malhotra was itching to try his hands again and “prove my father wrong.”

While doing system integration in SAR, Malhotra had a new market-related insight. While the market for UPS was still fledgling and going strong, Malhotra felt that it would soon become super competitive. Other players were seeing the growth taking place and getting ready to enter the market. PC sales were still trending up despite no corresponding improvement in the reliability of the power grid. Malhotra did not give up on UPS for PCs but he decided to focus on a new market: inverters to back up household electronics, such as TVs, radios, refrigerators, fans, and lights. Inverters and UPS are similar technologies, providing backup power to electric devices. However, the inverters are less expensive because they provide backup power when power is unavailable rather than ensuring continuous power. (See **Appendix. What Is the Difference between a UPS and an Inverter?**)

Malhotra also sensed that the consumer market, made up of individuals and households, could become a better market for him than the corporate market. “Even a back-of-the-envelope logic, linking potential demand with lack of electricity, predicts that the consumer market will be very large,” he said. (See **Exhibit 1.**)

Because households had less purchasing power, they needed lower-price products than online or offline UPS. At the same time, simpler and cheaper-to-produce inverters would suffice for consumer appliances, fans, and lights. Total revenues from the consumer market, though, were likely to be much larger because the number of households was far greater than the number of companies in the corporate market. The size of this market would more than compensate for the lower price-per-unit of inverters. In addition, although consumers could more readily live with power interruptions than could corporations, the lower-price solutions offered by SAR would be a more attractive and more convenient alternative to the diesel or kerosene generators consumers were using.

The underlying reason for the demand—to address unreliable electricity—applied to both corporate and consumer markets. However, as indicated above, Malhotra systematically thought through several reasons why the consumer market was a more logical option for him:*

1. He had noticed that Indian consumers were already buying large numbers of motorbikes, televisions, and diesel generators for home use. This trend, possibly spurred on by remittances from migrant labor in the Gulf region, was noticeable even before the 1991 economic reforms in India put the country’s economy on the path to greater growth.
2. He could see that, given the glacial pace at which the government moved to fix infrastructure problems, electric outages would remain an issue for years. More than 20 years later, although capacity had increased significantly, the electric grid was still highly unreliable. In 2012, 620 million Indians were without power for two days.¹ In states like Uttar Pradesh, Bihar, Haryana, Andhar Pradesh, Tamil Nadu, and Kamatak, power was available for only 8–10 hours a day.²
3. Diesel generators were the primary means of backup for most homes—but they were noisy, dirty, unattractive, and too big for small apartments. Malhotra

*In 1991, Malhotra did not know about soon-to-be-implemented economic reforms and privatization in the television industry, changes that would only strengthen his strategy.

believed people would switch to a cleaner and quieter backup device, especially one that was small and designed for the home.

4. Even though India's middle class was still quite small (less than 10% of the population), it had grown steadily during the previous two decades. In 1991 it represented 100 million people,³ and signs pointed to improving incomes and increased consumption.
5. Declining prices for computers meant more and more households could purchase them, pushing up demand for inverters.
6. Consumers working at offices with UPS wanted to replicate the experience at home. This created additional demand.
7. As a small business owner, Malhotra had little leverage in getting his invoices paid and was at the mercy of large corporate customers. In the consumer market, he would have more flexibility and, if he could build a brand of his own, would be able to command higher prices with better margins.
8. Bigger volume also meant greater opportunities for efficiency and economies of scale in manufacturing and distribution.

Malhotra convinced a younger cousin, Navneet Kapoor, a trained engineer who was planning to attend graduate school at the University of Michigan, to join the startup in 1991. They began to design battery-powered inverters as a cleaner and more convenient alternative to the widespread diesel and kerosene generators.

Over the next two to three years, SAR developed new offline UPS and inverter products, which it then rigorously tested through, in Malhotra's words, "an obnoxiously cautious" process before slowly introducing them to customers. Malhotra's newfound caution was also extended to outside investors.*

SAR launched an inverter in 1991 and an offline UPS in 1993. However, these products were introduced under a new brand name — Luminous. Then Malhotra focused on building this brand and a distribution network.

Establishing the New Business and the "Luminous" Brand

By 1997, as Malhotra had figured five years earlier, it became clear through surveys conducted by the company that the market for home inverters was much bigger than that for offline UPS. While inverters were cheaper and simpler than offline UPS, SAR was essentially selling consumers products for residential use that were previously used by corporate customers. This required building of a brand, something that aligned with Malhotra's vision for a good reputation and a direct connection to consumers. If he succeeded in establishing a good brand, it would also allow him to set a price that would correspond to the products' reputation. In addition, Malhotra sought to alter consumers' attitudes toward backup products, which were viewed as necessary evils. He believed that by injecting a degree of emotion into the purchase, the product could be made aspirational. An attractive product would be part of the plan:

*Although Malhotra took out some bank loans early on, he did not seek outside investment until 2007.

I am proud of the fact that my company was a pioneer in making inverters visually appealing. Since the other products in the market were ungainly, people would keep them tucked out of sight, under the staircase. However, we made innovative covers and designer trolleys that looked aesthetically pleasing, and as a result, our customers were able to install their units even in their living rooms. The product looked contemporary—people started talking about it.

SAR also advertised the Luminous brand on television, a first in this product category in India. In the early years, Malhotra plowed 8%–10% of revenues into television and radio, advertising during cricket matches and Bollywood entertainment shows.*By the end of the decade, the company's products were outselling Honda and Yamaha generators. Kapoor explained, "Despite their well-known brand names, our attention-grabbing advertising put us on the map, and people realized we had a new kind of product."

Malhotra also focused on building a distribution network, moving closer to the customer. SAR, for example, installed and serviced all its products. By 1997, Malhotra had built a 24/7 call desk for customer service. SAR also used customer relationship management (CRM) software to develop loyalty programs (e.g., sending out birthday greetings), and it developed maintenance contracts tied to dealers, thus pulling them into the SAR "family." Besides training dealers, SAR also developed workshops for electricians, who were influential in selling technical products to consumers.

But, due to the failure of his first venture, Oak Power, Malhotra was far more risk averse than most entrepreneurs and hesitated to take outside capital, preferring to fund growth with internal accruals. Without investment capital, SAR wasn't growing fast, naturally. However, Malhotra was also able to maintain independence while building the foundation for a strong company—with good partnerships, reliable products, and a strong customer base. Paresh Pradhan, who joined SAR in 1992 as a sales engineer (when the company had only 11 employees), noted that SAR was "resource constrained" during its first 15 years:

But we were always focused on creating a sustainable business and setting a good foundation for growth. We weren't just out to make money but to develop relationships with employees, distributors, and customers by developing a strong local presence. Customers typically came back to buy more or to upgrade to more powerful units.

SAR's Luminous inverter, unlike Oak Power's offline UPS, was rock solid—backed by superior customer service that replaced or repaired any defective products. However, SAR did not manufacture the batteries; they were outsourced and 8%–10% of batteries turned out to be defective.

By 2004, revenues were in the \$12 million range. Although modest for such a well-known brand (consumer research showed the brand was in the top three in top-of-mind recall, both aided and unaided), sales were still high enough to create a strong demand for the inverter batteries that stored power and released it in the absence of grid power. SAR had been packaging its Luminous inverters with Exide batteries, sold under an exclusive private label (CEIL) to SAR. As Luminous sales grew, Exide decided to sell directly to consumers under its own brand name. Unfortunately, because Exide-branded batteries were more lucrative than the CEIL batteries, Exide pushed its CEIL battery production to its older plants. As a result, "Exide started to pinch

*The advertising budget later shrank to 3% of revenues, largely due to growth in revenues.

us on supply and quality,” Malhotra complained. Most important, since the battery was a critical component of the inverter system, its quality essentially determined the quality of the inverter.

A Bold Gamble

Malhotra was, as he acknowledged, “obnoxiously cautious” in testing products before putting them on the market and in accepting equity investments; he cared deeply about his reputation. This was revealed in his handling of the Oak Power offline UPS system, where he withdrew faulty products and refunded customers, and later in his Luminous brand-building efforts. Ironically, when the quality of the Exide-supplied batteries began to fall in 2004, again threatening his reputation, the cautious Malhotra had no choice but to become a gambler. He started looking for alternatives. These included the option of owning a battery factory and being in full control of battery supply. But opening a manufacturing facility for batteries was risky. Exide had been a leader in India’s battery market for 75 years. Many other companies (such as AMCO and Standard Batteries) had tried to compete with Exide and had failed. As Malhotra described the situation, you were “damned if you pursued your own battery factory and damned if you did not.”

What was not an option was remaining with Exide, and so, as the quality of CEIL batteries began to deteriorate, Malhotra felt he had no choice but to free SAR from its main battery supplier. After all, in the consumer’s mind, batteries and inverters were one and the same. They would blame Luminous for Exide’s lack of quality. Even if consumers understood that the fault lay with the battery supplier, it was SAR who was supplying the package to them; one way or another, the Luminous brand was adversely affected.

SAR had a contract with Exide that guaranteed warranty replacement for defective batteries, but never considered legal action because battery life is a function of usage condition, not just a function of design and manufacturing quality. Since every battery may be used in different conditions, Malhotra felt legal action would be unproductive.

SAR could have imported batteries, but with India’s tariffs that would be an expensive option and would not eliminate quality-control issues. Malhotra could not risk losing the brand reputation he had worked so hard to build. Therefore, he took “the risk of a lifetime” and decided to go into battery manufacturing, essentially competing with Exide and its 75-plus years of experience. With that decision, SAR faced multiple challenges. Kapoor explained the difficulties:

We had three challenges. One, we had no experience in manufacturing batteries. Two, Exide was very aggressive and would try to knock us out before we got going. Exide, for example, had tried on three different occasions to enter the inverter market and failed. They didn’t understand that the business requires a high degree of involvement with the customer, both during installation and in service. But they likely would do their best to make sure an inverter company would fail when entering the battery market. Third, we did not have enough capital to start a manufacturing facility.

After a worldwide search for battery factories that could be purchased, they found a few possibilities, mainly because developed economies were moving away from this type of manufacturing. Malhotra considered four plants on the European continent: one each in France, Slovenia, the United Kingdom, and Cyprus. The first three had already been closed for years, and their equipment had been sitting idle. The Cyprus plant was smaller than the others but was still functioning, which suggested that the equipment was in good working order.

Finding enough capital was also a challenge. When SAR began its search for a battery plant in 2004, it had \$2 million on its balance sheet; it would need around \$11 million to get started as a battery manufacturer. Raising that money was going to be difficult because, while SAR had some manufacturing assets, the buildings in which the company worked were mainly leased. Scaling the production of inverters was easy and rapid when the buildings were leased; assembling of inverters does not require specially constructed buildings. (Moving an inverter factory from one building to another when SAR wanted to scale production was relatively easy.) Thus, except for its prestigious Luminous brand name, SAR had no collateral to back a loan. Given the lack of physical collateral and a rather thin balance sheet, every bank Malhotra approached said “no” to a loan.

The Name Game

Malhotra then tried a new and unusual tack—pledging the Luminous brand as collateral. He persuaded Corporation Bank, which had worked with SAR for 12 years, that the Luminous name was acceptable loan collateral. If Luminous did not pay back the loan, the bank would have the right to take over what was arguably the company’s most valuable asset and sell it to someone else, perhaps to a competitor. After some thinking, the bank found this acceptable. By this point, the Luminous name was well known and conveyed a message of quality and customer care. Despite the crisis with Exide’s defective batteries, Luminous had made replacement batteries available without question, and consumers had accepted this solution. Moreover, while consumers usually do not take the trouble to distinguish the Luminous name and the source of batteries, the Bank understood the underlying problem and placed its faith in the cautious Malhotra. The Bank felt that someone could technically acquire the name and sell inverters, perhaps outsourced. For the first time in the bank’s history, it decided to accept a brand name as collateral and extended a loan of \$9 million. Of course, Malhotra explained his options and the pros and cons of each possible purchase.

M.S. Mallya, as the general manager at Corporation Bank, sanctioned the loan to SAR. He described Malhotra as “an enthusiastic and focused entrepreneur.” He continued, “banks are always eager to support viable enterprises with successful business models with the right trade-off between risk and return.” Malhotra explained that, in addition to the loan:

We put in \$2 million from our balance sheet. My father, who was then chairman of the board, was against it, as was the rest of the board. They all thought getting into batteries was way too risky—a total gamble. I persuaded them that we could not afford to rely on external providers for such a key component of our inverters.

In 2005, once the loan was secured, Malhotra moved to purchase a plant, and he closed a deal on the 20-year-old Cyprus plant. For \$400,000, SAR bought the plant for 8 cents on the dollar, as it was not running and being shut down, sent a team of Indian engineers to Cyprus to dismantle it, and shipped it back to India. For two years, as a stopgap measure, SAR imported batteries from Thailand.

Relocating the Cyprus plant and getting it up and running again was not a trivial matter. Among other things, the Cypriot batteries were starter batteries, meaning they had high-voltage discharge for a short period of time. The ideal inverter batteries, however, required high-quality, long-lasting, and deep-cycle products. Therefore, the Luminous team had to make numerous adjustments as it redesigned and retooled the plant.

While the Cypriot equipment was being refurbished in a warehouse, Kapoor oversaw the building of a new factory space in Himachal Pradesh. However, equipment and space in which to operate it were only two-thirds of the equation; to be successful the factory needed people with experience and expertise. Therefore, Malhotra went to the United States in 2005 to arrange a licensing deal with EaglePicher, a private battery manufacturer (revenues of \$700 million at the time) and an established player in the industry. From EaglePicher, Malhotra obtained designs, drawings, and equipment to establish an assembly line. Soon thereafter, EaglePicher filed for Chapter 11, and its chief technology officer (CTO), Ajoy Datta, moved to India to become CTO at SAR. Separately, SAR hired Ranbir Chakravorty, a 40-year veteran of battery manufacturing at Exide, as a project consultant to oversee plant development and manufacturing.

Kapoor, Datta, and Chakravorty worked hard for nearly two years and ultimately arrived at a level where they were producing batteries with a high degree of reliability. They then began to replace some of the second-hand equipment with new equipment from the United States and China. According to Chakravorty, they “wouldn’t put a battery on the market until it had been tested for six or seven months at the factory, and tested with all kinds of equipment, to make sure it was reliable.” In 2006, the battery factory started producing 5,000 units a month; by 2010, it had ramped up to 50,000 a month.

Malhotra’s financial projections for getting the battery business up and running were perfect. SAR had borrowed \$9 million and put in \$2 million of its own money. Of the \$11 million, \$400,000 went to buy the Cyprus plant, \$7.5 million went into refurbishing the second-hand equipment and building factories, and the rest (roughly \$3 million) went toward research and product development.

Malhotra’s choice to import a plant from Europe and enter an industry already dominated by another player was risky. But it paid off. By 2013, more than half of the company’s revenues came from battery sales. Malhotra, the entrepreneur, was proving his father—the quintessential, honest, hard-working government bureaucrat—wrong.

Expansion, after the Foundation

Until 2007, SAR had not done anything about power generation; it had only helped smooth and better manage power consumption. Someone else had to produce power for SAR products to be useful. However, the rapid expansion of mobile telephony created a demand for power generation in places where power was not available. SAR was already working with telecom companies, providing them with backup support, and soon realized it could capitalize on the telecoms’ need for power generation in remote areas.

Desire for a new market and the company’s need for greater cash flow to support its bank loan created pressure to expand. So, in addition to exploring new markets, SAR set out to raise private equity—the first time the company had taken outside investment since being formed nearly 20 years before. Acting on a suggestion from advisors, Malhotra changed the company name from SAR to Luminous Power Technologies in order to leverage the well-known Luminous brand name and attract capital.

CLSA Capital Partners, the private-equity arm of Credit Lyonnais Securities Asia (CLSA), along with a few other investors, invested \$21 million in 2007 to help form a spinoff company, Luminous Tele Infra. This company would provide back-end solutions and backup power for telecom transmission towers. With this capital investment, Malhotra also bought a wind-turbine company. Pradhan, who had become director of Tele Infra, moved beyond backup and back-end

systems into energy-saving products for telecom operators, developing controllers to manage hybrid sources of power, including solar, wind, diesel, or battery power.

During the global financial crisis, which hit India in the latter half of 2008, Luminous not only survived but also expanded. Malhotra commented:

The biggest blow to us was the pressure on our margins. The financial downturn pushed people away from stocks and into commodities. With rising prices of raw materials—copper iron, steel, and lead—our bottom line was hit by 25%. It limited our growth to an extent. But rather than cut employees or salaries, I cut costs relating to raw materials and electricity.

Instead of seeing the economic downturn as a setback, Malhotra took charge of the CTO role (while holding on to his CEO position) and invested in what he called “frugal innovations.” This resulted in 20 additional patents. One of the company’s innovations was a deep-cycle battery using tubular construction that made batteries long lasting at a low price. Luminous later used this technology as the competitive edge it needed over Exide.

In 2008, Luminous opened a plant in China (run by Chinese executives) to manufacture inverters, UPS, and other electronics for export. Kapoor shuttled back and forth between India and China to get the plant up and running. By that time, Luminous had eight plants in India, two of which were devoted to battery production. Luminous began exporting to countries with unreliable electricity. Bangladesh and Nigeria were its two biggest markets, but the company also made sales to Nepal, Iraq, Uganda, and Indonesia. Eventually, it was exporting to 34 countries.

Exiting Luminous and Moving into New Businesses

Luminous started slowly, developing products and setting the foundation for a sustainable business. After entering the market, growth was steady but not spectacular. Revenues were \$6 million in 1995, but they did not double until 2004. After the bank loan and private equity investment and the moves into batteries, telecom, and export markets, the company’s revenues jumped dramatically. Revenues hit \$80 million in 2009 and \$107 million in 2010 (see **Exhibit 2**). Luminous had a leading 14% share of the home inverter market in India, and it was number two (to Exide) in the Indian inverter battery market. Overall, annual revenues of Luminous increased 20-fold from 2004 to 2013, reaching \$336 million. (Growth between 2011 and 2012 was flat, due to the Schneider buyout and switching of the management team, and 2012-2013 was a “catch up” year.)

A Frost & Sullivan market analysis in 2011 by senior research analyst Vivekan and Roy predicted “the Indian power inverter market to exhibit double-digit growth rates during . . . 2011–2017.” Roy attributed this strong growth forecast to the “increased purchasing power of the Indian consumers,” combined with “increasing power deficit throughout the country . . . and frequent planned and unplanned power cuts across most of the states.”⁴

With the company’s exponential growth and strong industry forecasts, Malhotra and Kapoor had many choices open to them. Private equity firms were interested in investing in their growth, several potential buyers were courting them, and they were considering an IPO. In 2011 they settled on a good offer made by France-based Schneider Electric, which also owned American Power Company, the U.S. company that started making UPS for PCs in the 1980s. Schneider made the offer because it had other operations with which Luminous would have good synergy, and Schneider could reach the vast Indian population through the Luminous brand name.

Malhotra and Kapoor sold a 74% stake to Schneider for \$307 million.⁵ The transaction was valued at 16 times the company's 2010–2011 earnings before interest, depreciation, taxes, and amortization.

“When your company is a market leader, growth engines are firing, and you have processes in place, entrepreneurs like me do not make good managers,” Malhotra said, explaining that he agreed to the sale because “the company needs access to global markets for scaling up, it needs the strength of a balance sheet to take sizeable risks on growth, and it needs to access a product and technology platform which will widen the offerings around the brand.” A 2012 *Forbes* article discussed the sale:

Luminous' strong distribution network through 25,000 retail outlets gave Schneider the advantage they needed in this market. Before the acquisition, Schneider had little end-user retail presence. Schneider also planned to capitalize on Luminous' leadership in the energy-solutions industry.

What does Schneider bring to the table? Schneider had a 1,000-person R&D center in Bangalore as well as 31 manufacturing plants throughout India. They were also committed to expanding distribution centers and adding more sales and service staff, which resulted in faster shipping and customer service for Luminous' products. Manufacturing some products of both brands in the same factory would lead to cost savings.⁶

To be clear, the retail outlets mentioned above did not belong to Luminous; the company did not own any stores. By the end of 2013, Luminous had a customer base of 8–10 million homes, more than 3,000 employees, and 1,000 distributors. Inverters were the company's leading product, with 3 million sold in 2013. Customers could buy any battery to go with the inverter, but 70% bought Luminous batteries. Inverters and batteries accounted for 80% of revenues, but battery sales were growing faster, and margins were higher, so revenues for the two product categories were roughly equal. The telecom business and consumer products (lights, fans, etc.) accounted for the balance of revenues.

Malhotra believed that Luminous had probably saved its customers \$3–\$4 billion dollars that would have been lost in productivity if it were not for his energy-regulating and -delivery products.*

In 2011, Malhotra and Kapoor turned their attention to new ventures. They started Ncube Capital Partners, which provides venture capital to micro, small, and medium enterprises. They also started their own companies focusing on the environment, in the areas of water, clean technology, and telecom. One of these companies, Luminous Water Technologies (Malhotra had use of the Luminous name until 2014 per the terms of the Schneider deal), built water purifiers for the home market. Another converted agricultural waste (wheat, chaff, etc.) into biofuels. “Emotionally, it was difficult but I knew I wanted to do something beyond Luminous,” said Malhotra, who replaced his father as chairman of the board after selling the stake to Schneider.

* His back-of-the-envelope calculation was as follows: 80 million UPS devices sold, saving customers annually about 100 hours of lost time at \$.5/hr.

Exhibit 1. India's Growing Middle Class (1990–2010)

METRIC	1990	2000	2010
GNI per capita (\$)	390	460	1290
GNI PPP per capita (\$)	870	1540	3390
Electric power consumption (kilowatt hours per capita)	270	395	641
Internet users (per 1,000 people)	n/a	0.5	7.5
Motor vehicles (per 1,000 people)	n/a	9	18

GNI = Gross National Income

PPP = Purchasing Power Parity

Source: World Development Indicators, World Bank.

<http://databank.worldbank.org/data/views/reports/tableview.aspx>

Exhibit 2. Luminous Revenues (and Profit) 2009–2013

Fiscal Year [†]	INR Crore*		Million US\$	
	Revenue	Profit after Taxes	Revenue	Profit after Taxes
FY13	2017	126	336.17	21.00
FY12	1121	-62	186.83	-10.33
FY11 [‡]	1109	75	184.83	12.50
FY10	644	61	107.33	10.17
FY09	483	41	80.50	6.83

*INR = Indian National Rupee. One crore is INR 10 million or roughly \$162,000 as of late 2014.

[†]Indian fiscal year is April 1 to March 31.

[‡]Year of Schneider acquiring 74% equity.

Appendix. What Is the Difference between a UPS and an Inverter?

An inverter converts (i.e., inverts) an alternate current (AC) into a direct current (DC) that is stored in batteries. When grid power is unavailable, it resupplies the stored power in AC form, generally to household appliances. When an appliance is connected to an inverter, the appliance experiences an interruption in power supply, however short. Therefore, an inverter simply inverts AC power to DC, stores it, and returns it when needed.

An offline UPS has more sophisticated circuitry than an inverter and makes the interruption very short. But there is an interruption. Both offline UPS and inverters provide backup power when grid power is unavailable, delivered through batteries that either are integrated into the product or are separate from it. Oak Power Systems and Luminous Power Technologies both manufactured offline UPS.

An online UPS has two converters that work continuously to regulate power for use by sensitive equipment—that is, it smooths fluctuations in voltage to ensure that the power going to the appliance is constant for all practical purposes. This makes it more appropriate for corporate systems. Because it has more sophisticated circuitry, an online UPS is more expensive to manufacture than an inverter or an offline UPS (approximately 3.5 times the cost of the latter).

TIMELINE. Luminous Power Technologies

- 1985 Rakesh Malhotra leaves job at Siemens, starts Oak Power Systems to manufacture UPS for PCs.
- 1986 Oak Power Systems' revenues hit \$1 million.
- 1987 Oak Power Systems goes out of business as its products in the market break down and malfunction.
- 1988 Malhotra starts SAR Silicon Systems as a systems integrator.
- 1989 With earnings from SAR and outside consulting, Malhotra pays off \$100,000 in debts and has \$150,000 to invest in SAR Silicon.
- 1991 After several years of design and testing, SAR introduces an inverter under the Luminous brand name.
- 1995 SAR introduces an offline UPS under the Luminous brand name.
- 1997 SAR introduces a 24/7 customer support call desk and begins advertising on TV.
- 2004 SAR, which has been packaging private-label Exide batteries with its inverters, decides to manufacture its own batteries and borrows \$9 million by pledging the Luminous brand name as collateral.
- SAR buys a second-hand battery plant in Cyprus, which it ships to India and refurbishes as a new battery factory in Himachal Pradesh.
- SAR buys battery technology from U.S. company Eagle Picher.
- 2007 SAR changes its company name to Luminous Power Technologies as it seeks investment capital; it raises \$21 million to expand into new businesses and markets.
- SAR opens its first manufacturing facility in China.
- 2011 Luminous Power sells 74% stake to Schneider Electric for \$307 million.

PROGRESSION OF COMPANIES. From Oak Systems to SAR to Luminous

Rakesh Malhotra has been in the same business since he finished graduate school and started his first company to design, manufacture, and market backup power systems.

Oak Power Systems: In 1985, Malhotra founded Oak Power Systems, designing and manufacturing offline UPS systems to backup computers for businesses. Thanks to unreliable electricity in India, sales quickly hit more than \$1 million. Within a year, however, the UPS product began to fail due to faulty manufacturing/quality control, and the company went out of business.

SAR Silicon Systems Pvt. Ltd.: After Oak Power failed, Malhotra took on consulting work to repay customers who had bought the product. In 1988, he started SAR Silicon Systems Pvt. Ltd., initially as a systems integrator to help big companies combine PCs, hard drives, backup systems, and networks, then later to build backup systems for consumer electronic devices (appliances, fans, and computers) under the brand name Luminous.

Luminous Power Technologies: In 2007, looking to expand into other businesses (backup power and clean-energy infrastructure for telecom operators) and to enter export markets, Malhotra sought equity capital for the first time. Malhotra changed the company name to Luminous Power Technologies, leveraging the power of the brand name.

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