

THE NECESSARY REVOLUTION

How Individuals and Organizations
Are Working Together to Create
a Sustainable World

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DOUBLEDAY

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DEDICATED TO THE INSPIRED INNOVATORS EVERYWHERE
WHO ARE SHOWING ALL OF US THE WAY TOWARD
A DIFFERENT FUTURE.



DOUBLEDAY

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Positioning for the Future *and* the Present

While most businesspeople understand that the landscape of risks and opportunities is changing rapidly, many are unsure of how to act on that knowledge. Leaders want to learn how to ride the wave of sustainability innovation into the future while still maintaining a healthy and viable business in the present. Those leading their industries today are doing so because they have recognized the new reality of business and positioned themselves accordingly. Yet many leaders have found that the challenge of embracing broader issues of sustainability leads to conflict, confusion, “analysis paralysis,” and inaction. And as diverse and passionate external stakeholders get involved (including non-governmental organizations, consumer activists, community groups, and leaders in government), frustration and perceived misalignment can escalate.

Fortunately, this doesn’t need to be the case. Not only is it possible to bridge daunting gaps between stakeholders, but you can create focus and *declencher* unleash enormous energy for progress in the process. When you align business priorities with the new forces at play in the world (as Google did), you create long-term sustainable value for all stakeholders, beginning with shareholders.

Doing this starts with stepping back and thinking about value creation (your contribution to both shareholders and society) along two dimensions. In “**The Four Elements of Shareholder Value**” (Figure 9.1), originally developed by Stuart Hart and Mark Milstein, the vertical axis (time) reflects an organization’s need to manage business in the present while simultaneously creating technology and markets for the future.¹ The horizontal axis (space) reflects the firm’s need to grow and protect internal organizational capabilities while simultaneously incorporating new perspectives and knowledge from the outside. **This dimension reflects the tension between staying focused on core operations and at the same time remaining open to fresh perspectives and new, disruptive models and technologies.**

Juxtaposing the time and space dimensions produces a matrix of four distinct areas—**risk reduction, reputation, innovation, and growth**—each of which is absolutely crucial when it comes to generating shareholder value.

Companies that perform well in all four quadrants maximize shareholder value over time by thinking more comprehensively about their business, which also enables them to attend to all stakeholders more effectively. Focusing on only one or two quadrants can spell poor perfor-

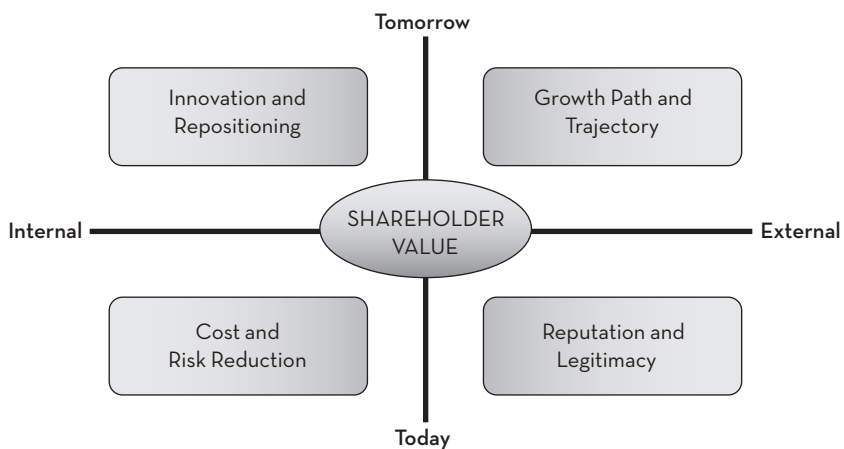


FIGURE 9.1 The Four Elements of Shareholder Value

mance—or, at the very least, can lead to many missed opportunities and a failure to build long-term future value. Companies such as Kodak, for instance, which failed to adequately invest in digital technology, illustrate how overemphasis on today's business (to the exclusion of tomorrow's technology and markets) may generate wealth for a time but will eventually erode shareholder value as competitors flood the market with superior products and services. An overemphasis on the present, of course, is not the only pitfall facing an organization. The experience of many Internet companies early in the dot-com era stands as testimony to how a preoccupation with tomorrow's business (to the exclusion of current performance) may be exciting and challenging but short-lived. Furthermore, focusing too much on internal aspects of a business (such as pouring too many resources into a key product) may enable short-term execution but ultimately blind the company to the competition. And, of course, an overemphasis on external forces can hamper an organization's ability to get things done.

SUSTAINABLE VALUE CREATION

Sustainability, like shareholder value creation, is also a multidimensional challenge. Yet most managers (particularly those operating at the non-compliance or compliance stages of the five-stage model we introduced on page 115) frame sustainability “not as a multidimensional opportunity, but as a one-dimensional nuisance,” as Hart and Milstein note. The Sustainable Value Framework they originated addresses this in a simple and elegant way.

It is built around the same two dimensions—time and space—described earlier but this time includes the social and environmental challenges businesses now face. It's been used by companies of all sizes in many industries, and by broader coalitions of business and non-business leaders. The city of Sarnia, Ontario, for example, in the heart of Canada's “Chemical Valley,” brought together leaders from government, business, and civil society to look at both the current state of each of their sectors and possible opportunities for the future. During a period of intensive work, they used the matrix to create a plan for achieving their vision of

evolving to a cleaner “bio-hybrid” economy, in which bio-based inputs or feedstocks replace conventional oil and gas feedstocks.

The framework demonstrates the connection between sustainability and the core functions of any business. As Hart and Milstein point out, many executives look at this model and realize that *this connection simply has not been made before*. If managers and employees are apathetic about their organization’s sustainability efforts, it is most likely because they don’t see how it ties in to business goals. As a result, efforts are generally piecemeal, reactive, and poorly integrated into the company’s core mission and business plans.

The framework helps people place their organization’s activities in perspective, and shows how they can work together to create and maintain value and simplify strategic decision making.²

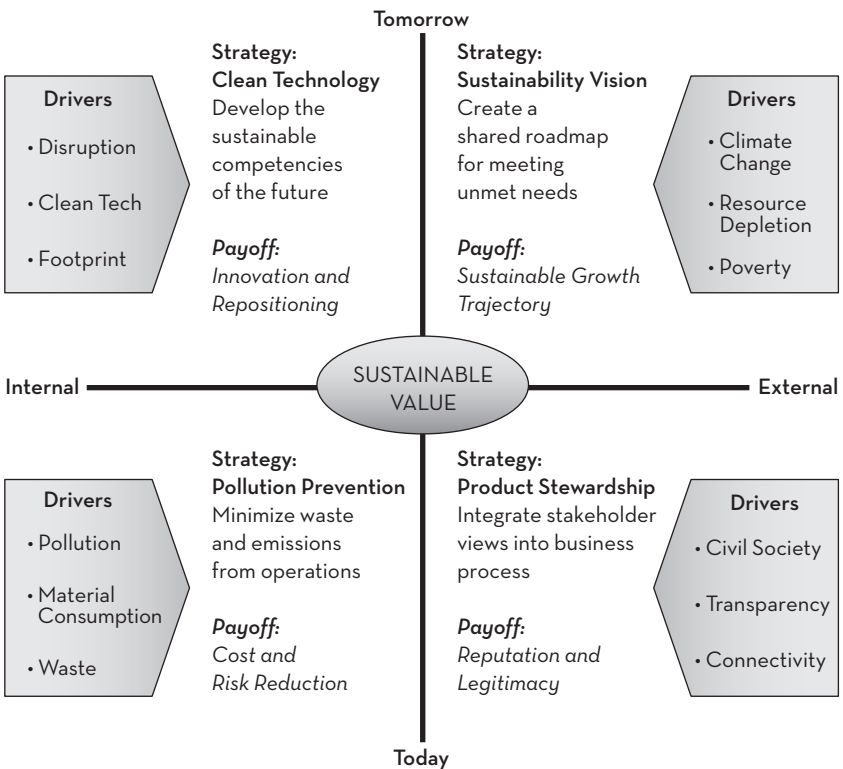


FIGURE 9.2 Sustainable Value Framework³

Sustainability Drivers

Contraindre, obliger

There are many distinct forces **compelling** businesses toward the regenerative economy, but the **Sustainable Value Framework helps us categorize them into four broad groupings**—and allows us to better understand how sustainable practices are directly related to a company’s core strategies.

The first, and perhaps most obvious, relates to the increasing industrialization of the last two centuries and its side effects, material consumption, pollution, and waste generation among them. **Firms can create immediate value by reducing the level of material consumption and pollution associated with their activities.**

A second set of forces concerns the proliferation of “civil society stakeholders.” As the power of national governments has eroded in the wake of global trade regimes, **non-governmental organizations (NGOs) and other civil society groups have stepped into the breach, assuming the role of monitor** (and, in some cases, enforcer) **of social and environmental standards.** At the same time, the spread of the Internet and information technology has enabled these groups to communicate with members and with each other in ways that were unimaginable even a decade ago. Internet-connected coalitions of NGOs—such as **Banktrack, Rainforest Action Network**, and others—are making it increasingly difficult for governments, corporations, or any other large institution to operate in secrecy. Moreover, companies that operate at greater levels of transparency and responsiveness to the public’s desire for sustainable practices will see the direct impact of improved brand image on their bottom line.

Another set of trends includes emerging “disruptive” technologies that challenge the status quo and could render many of today’s energy- and material-intensive industries obsolete. Genomics, biomimicry, nanotechnology, information technology, and renewable energy all hold the potential to drastically change both the way we do business and our effect on the planet. There are **few more effective ways for companies to invest in the future than by developing new, potentially game-changing technologies.**

Finally, a fourth set of drivers relates to global problems like resource depletion, deteriorating ecosystems, and climate change; poverty and

inequity in the developing world; and an equally broad set of sustainability drivers in the developed world, including global security issues and their close links to climate, resource consumption, and energy supply and security. Social development and wealth creation on a massive scale, especially among the world's poorest 4 billion, are essential to sustainable development. However, development everywhere must follow a fundamentally new course if it is not to result in ecological meltdown. But not only is responding to this final set of drivers essential for the health of the planet; firms can also create value by pursuing sustainability-related opportunities that are rapidly emerging in all industries. One example is meeting the basic needs, including food, sanitation, and health, of those at the bottom of the world income pyramid in a way that facilitates wealth creation and distribution.

Global sustainability is so complex that it cannot be addressed by any single corporate action. Therefore, companies that hope to thrive in the years to come must address each of the four broad sets of drivers. Deciding how much to invest in each quadrant and over what period of time will differ for every organization; insight into this process is one of the real values of using this framework. Ultimately, a balanced portfolio of investments in all four quadrants is necessary to maximize value creation.

TRANSFORMING DUPONT

Few companies of any size and scope have done as comprehensive a job of reinventing themselves as the \$29 billion, 206-year-old chemical giant DuPont. The company's story offers important lessons for how best to use the Sustainable Value Framework and translate it into action.

Despite DuPont's countless breakthrough products—many of which are emblematic of the exploding growth and prosperity of post-World War II America, such as nylon, Lycra, cellophane, and Teflon—the Wilmington, Delaware-based company's reputation for innovation eventually soured. In 1989, Greenpeace demonstrators infiltrated a DuPont manufacturing plant site in Deepwater, New Jersey, climbed the plant's 180-foot-high water tower, and hung a huge banner across it that declared DuPont, the developer of the refrigerant gas Freon, the world's number one polluter.⁴

Responding to that claim and others like it became a top priority for the new chairman and CEO, Edgar Woolard, who announced shortly after that incident: “I don’t know what color this company is going to be in the future, but I can assure you it will be some shade of green.” In the future, he said, his CEO title would stand for “chief environmental officer” in addition to “chief executive officer.” He coined the phrase “corporate environmentalism” to indicate his belief that public trust, not just legal compliance, would be DuPont’s environmental focus. Twenty years and many changes later, environmentalism has proved to be, as Woolard described it, “the most empowering and unifying initiative I’ve ever seen in this company.”

Well before their public “outing” by Greenpeace, however, DuPont executives had begun to seriously rethink the company’s entire value proposition. They made a strategic decision to strike out in a new direction from their petrochemical-based past into a new position as a world leader in plant-based chemicals and new, environmentally friendly products. The move was prompted in part because that’s where DuPont’s executives and scientists envisioned future growth, and also because they recognized that the company’s existing chemicals and polymers business would, over time, become commoditized and far less profitable. Today DuPont is focused on biotechnology, chemistry, and natural systems, as opposed to synthetic ones. “It clearly is a transformational change,” says Paul Tebo, now retired from his position as vice president of Health, Safety, and Environment. DuPont’s reputation has also improved significantly. In 2005, *BusinessWeek* ranked it number one on their list of “The Top Green Companies.” And Ceres, a well-respected environmental watchdog, ranked DuPont number one in the United States and number two globally for meeting the business challenges associated with climate change.

DuPont’s Approach to Sustainable Value Creation

When he describes DuPont’s efforts, Tebo uses the sustainable value matrix to shed light on the strategic thinking behind the company’s actions and to explain how he and others achieved widespread buy-in from stakeholders for their efforts. Those involved in the march toward sustainability began with meeting basic requirements in the lower left quadrant—by address-

ing current issues of cost, risk, and footprint reduction—and turned them into transformative business initiatives and technologies that not only have led to innovation but promise growth and profitability far into the future.

Cost and Risk Reduction: The Lower Left Quadrant

Given the pressure on companies to meet quarterly targets and Wall Street's expectations, it is difficult for many to get past focusing on the here and now.

For DuPont, the first step toward sustainable growth focused on reducing risks and cutting costs. That meant reductions in waste, air emissions, and energy usage. What such industry leaders come to understand quickly is that their sustainability efforts will end if they don't demonstrate a viable commitment to cutting their environmental footprint and reducing risks today. In other words, it is within the lower quadrant of risk and cost reduction that a company gains credibility for all future sustainability efforts. After all, as soon as you start making statements about the future (the above-the-line quadrants in the matrix), stakeholders will declare, "Show us what you are doing today! Don't talk to us about grand visions of the future until we see proof of your engagement and commitment today."

DuPont set out a series of aggressive reduction goals in 1990, and Edgar Woolard charged Paul Tebo with ensuring that managers across the company made the commitment to meet them. By 2004, global air carcinogens were down over 90 percent, global hazardous waste by over 40 percent, global greenhouse gas emissions by over 70 percent, and total energy use by over 5 percent. Tebo calls these "footprint reduction goals" and points out that they were able to calculate what DuPont had saved by keeping energy costs flat while production increased by 40 percent. The number was a stunning \$3 billion, and it quickly was embraced by the media and began to appear everywhere in reports or discussions about the impact of going green. "A few simple numbers like that make the case very, very clearly," Tebo says. Interventions to reduce the internal carbon footprint carry a low risk—paybacks can be calculated in advance, and they represent real cash, not just an optimistic sales forecast for some new green product.

This became a virtuous, self-reinforcing cycle. The money DuPont saved could be reinvested in the innovative new options they viewed as most important. In 2005, the company extended their cost and risk reduction goals to 2015. These included:

- Further reduce greenhouse gas emissions by at least 15 percent from a 2004 base.
- Reduce water consumption by 30 percent at sites where freshwater supply is either scarce or stressed. For all other sites, hold water consumption flat.
- Ensure that 100 percent of DuPont's off-site fleet of cars and light trucks represent leading technologies for fuel efficiency and fossil fuel alternatives.
- Further reduce air carcinogens by at least 50 percent.
- Ensure that 100 percent of global manufacturing sites have successfully completed an independent third-party verification of the effectiveness of their environmental management goals and systems.

Demonstrating significant progress on reducing waste and emissions was crucial for external credibility, but seeing the numbers was equally powerful inside the company. Anything that reduces costs goes straight to the bottom line, improving competitive edge and reducing risks. It's also empowering: There is no need to convince customers or count on any outside forces. And as Tebo says, "It's a powerful motivator, particularly for younger employees today, to know your company is working in the right areas and doing the right things. Clearly, when you move from being a laggard to a leader, that's important to employees. The focus on sustainable growth and innovative products has built on this, creating a new level of excitement and commitment for everyone."

Great!

Reputation and Legitimacy: The Lower Right Quadrant

Reaching out beyond internal borders to engage outside stakeholders, including powerful community groups, NGOs, and regulators, is unusual for most companies. For a company such as DuPont, that type of engagement

had often been defensive and combative. Tebo and many others, however, saw the need to reach out and talk with these groups, including Greenpeace, which had spent decades aggressively attacking the company.

In spite of some discomfort, Tebo defined this work as “an extraordinary learning opportunity” and sought advice on how to address the reduction challenges that had been set, as well as ideas about the future direction of the company. He went so far as to engage Paul Gilding, the former executive director of Greenpeace International, as a direct advisor. He eventually brought Gilding inside DuPont to meet with the CEO and other senior executives about sustainability issues. By engaging hundreds of “outsiders” such as Gilding, they eliminated destructive sparring and focused on simply fixing problems (especially environmental problems), creating shared goals for the future, and collaborating in the quest toward achieving them.

Real engagement with outsiders can be a cathartic experience for executives. Listening to many people with whom they don’t usually interact and taking their input seriously are crucial to the process. But chief executive officers such as DuPont’s current CEO, Chad Holliday, are starting to change their thinking and, as a result, see a very different landscape.

“The view of scientists locked away in a laboratory inventing something new and wonderful to spring on the world has given way to a market-back approach,” says Holliday. “For innovation to be successfully introduced into the marketplace and accepted by society, it must be based on many forms of partnership and continuous dialogue with stakeholders, including governments, NGOs, and academia. Science and innovation that do not address pressing human needs will not advance sustainability. Likewise, a vision of sustainability detached from science and technology will not succeed. We need both the commitment to sustainability and the accomplishments of science.”

The urgency of these revolutionary new partnerships can’t be overstated. As Hart and Milstein point out, “Engaged diverse stakeholders are an essential source of feedback, direction, vision, and innovative new ideas.”

“If you are thinking about addressing societal issues, that probably includes helping the 4 billion people in the world who are on the edge of survival meet their needs for protein and nutrition. There’s no way the

business community understands or knows that population,” Tebo says. “Yet many local NGOs know it very well. Unless you have a way to reach these people, you really can’t bring them the products and services that businesses can create.”

In other words, even if a business such as DuPont wants to commit to sustainable practices, partnerships with non-governmental organizations are essential to make any real progress. Because of its sullied reputation, DuPont had to form these partnerships from scratch in most cases. And that proved to be difficult initially, given the inherent mistrust both sides had when they started. Many business executives are convinced that people who don’t have profit-and-loss responsibility just can’t understand the pressures companies, and the people who work inside them, are under. And people who work for government or non-profits just don’t believe businesspeople have a serious commitment to improving the environment and addressing the needs of people in developing countries.

Nonetheless, companies are starting to realize that positive relationships with thought leaders in society can be extremely useful. In order for these relationships to bear meaningful fruit, NGOs must be involved in developing your business strategy. Engaging public groups is starting to become well accepted within modern multinational corporations. For Tebo, this activity is key. He believes it directly impacts a company’s ability to innovate, reposition itself, and grow into the future.

Innovation and Repositioning: The Upper Left Quadrant

When a company begins to look toward the future, the shift in focus is transformational. DuPont, for example, is really reinventing itself for the second time—having already shifted from its origins as a maker of explosives to a petrochemical company. The next century will involve a focus on the combination of biotechnology and chemistry, as the company embraces organic chemistry and natural systems that mimic real life. These efforts to move from fossil fuels to biofuels and from chemical feedstocks to more natural materials represent a transformation of the highest order. Current chairman Chad Holliday refers to this as moving from synthetic systems to natural systems, toward the way nature does things. Moreover,

DuPont is focused on three “mega sustainability trends” that they believe will shape the markets of the future: the drive for renewable energy and materials, the demand for greater safety and security, and the need for increased food production.

Currently, DuPont makes eight of the products necessary for the manufacture of solar panels. It’s also led the efforts on the Integrated Corn-Based Bioproducts Refinery, and along with BP is introducing biobutanol, a biofuel that has many advantages over ethanol as a gasoline substitute. Tyvek, one of its signature products, along with the newer AtticWrap helps consumers save enormous energy costs by improving the insulating capacity of buildings. Among the company’s most recent innovations is a new polymer, Sorona, based on a starch found in the kernels of corn. It is being used to create carpet and to make cloth for apparel that is soft, durable, and absorbs color well.

One of DuPont’s more ambitious goals is to double investment in R&D programs with direct, quantifiable environmental benefits for customers and consumers. There is a great deal of internal dialogue at DuPont about modeling its processes on natural systems. For example, scientists there have been working for years on trying to produce Kevlar by learning how silkworms make silk.

In order to create these ambitious, higher-value, higher-margin products, companies must collaborate with all the stakeholders identified in the “reputation and legitimacy” lower right quadrant—non-governmental organizations and local civic leaders—as well with other companies, large and small, to lay out investments over different time horizons.

Growth Path and Trajectory: The Upper Right Quadrant

A company’s growth trajectory is what will propel it to create sustainable value and provide it with the ability to make a significant positive difference in the world.

It is here that companies ask questions like: “How are we going to bring our products and services to a larger world and shift our way of thinking about global social and environmental issues? How are we going to reach people who want and need to improve their quality of life and standard of

living?” Many of the advancements pertaining to sustainability work to date have been achieved within manufacturing plants. **But as companies reach out to new markets, they may realize that their products have far greater impact than their manufacturing facilities.** At DuPont, for example, as part of a broad nature-inspired strategy, the company has set and publicized bold goals to be achieved by 2015. Among them, the company has promised to:

- Grow annual revenues by at least \$2 billion from products that create energy efficiency and/or significant greenhouse gas reduction for customers.
- Nearly double revenues from non-depletable resources to at least \$8 billion.

The ability to reach out to underserved populations—the 4 billion people who live on less than \$4 per day—begins with products that meet basic human needs. DuPont is now fast on the track of introducing a wide variety of products and services that address basic Industrial Age imbalances in energy, food, water, and other areas.

These new products are essential to its growth strategy: DuPont recently announced a goal of achieving 35 percent of revenues from products introduced in the past five years—up from 20 percent—and **many of those new products with the highest growth potential will be bio-based.** Astute outside observers of DuPont’s progress over time say it’s unlikely the company will stop when they meet these goals; this is just the beginning. The introduction of new products at such a rapid rate is not surprising given the company’s history of innovation; what is surprising is the approach the company is now taking. **The shift to bio-based feedstocks, including crop and other waste streams, signals a dramatic change in their scientific focus from polymer chemistry to biology.**

Through the work of catalysts such as Tebo and other passionate people inside DuPont, **the commitment has clearly reached the executive suite and is transforming the core of the business.**

“Sustainable growth is not a distant goal but an immediate reality,” Holliday says. “For DuPont, 2015 begins today. Sustainable growth is

about products and services we are working on right now. Our 2015 Sustainability Goals are our investment in the future of our business, the future of our customers, and the future of families around the world. They are also about the future of our planet—the one we live on today and the better, safer, and healthier planet we aspire to leave for tomorrow.” The sustainability drivers create a whole set of unmet needs, and it is in this growth quadrant that leaders such as Holliday can set the strategies for meeting those needs.

Sustainable Growth as a High-Margin Strategy

For DuPont and many other companies, **the sustainable value model is a useful tool to break sustainability issues into understandable, “actionable” areas. It broadens the concept of sustainability beyond the traditional view of environmental impact, risk, and cost reduction.** It gives companies a way to see the benefits of making value creation through sustainability a central goal, not simply an add-on. The more quadrants a company chooses to build strategies in, the more stakeholder value is created. And it was an invaluable tool for bringing sustainable value onto the corporate agenda at DuPont. “**Sustainable growth became adopted as the corporate mission,**” Tebo says. “**Not the *sustainability* mission but the *core corporate mission* for DuPont for the twenty-first century.**”

One of the biggest challenges is to provide specific ways for every part of the company to embrace the mission. **Everybody**, after all, **can figure out ways to reduce waste.** But with sustainable growth, the challenge is more difficult. “How do you really orient your products and services to more closely match societal needs?” Tebo asks. Because this is still an emerging concept at so many companies, the effort is still considered a fringe activity performed by someone outside the core business. But in the long run, **those who recognize the alignment between sustainability and value creation** understand that sustainable growth is truly **a high-margin strategy.** If environmental and societal good come at the expense of a company’s financial performance, then it is not practicing a sustainable business strategy. The sustainability effort has to provide an enhanced

financial bottom line, and the way to do this is through increasing market share, reducing cost of product, and improving value for the customer.

Savvy CEOs such as DuPont's Holliday have made sure this future-facing work has not been relegated to the corporate extremities. "We never forget that we are a business and our first job is to create value for our shareholders," Holliday points out. "Sustainable growth means creating value for our shareholders and for society by developing products that the market demands—and which also are good for the environment and for the health, safety, and well-being of people everywhere. Many companies say that what's good for the environment can also be good for business. We have the view that what's good for business *must* be good for the environment and for people worldwide or you are not moving toward sustainable growth."

INVESTING IN THE FUTURE

Corporate giants such as DuPont are not the only organizations that are investing in the future. Venture capital (VC) trends in "above-the-line" investments have been posting remarkable growth rates in the last few years. Since VC typically provides financing for smaller, entrepreneurial enterprises, often at the start-up stage, it's natural to assume these external investments have little in common with the significant internal investments of large corporations. But venture capital has long been viewed as an important lead indicator of the future flows of mainstream capital investments, and frequently predicts rapid growth in entirely new sectors and industries. One of the unique talents of the best venture capitalists is to spot high-growth industries—such as telecom, semiconductors, and biotech—early. So it's not surprising to learn about the emergence of "cleantech VC," a category that was barely visible in 2001.

The Cleantech Venture Network was instrumental in defining this investment category and acting as a catalyst for its growth. Now part of the Cleantech Group, it was launched in 2001, in the early days of investing in "clean technology." Co-founder Nicholas Parker had experience investing in environmental funds in the 1990s but was concerned about where a lot of the money was going. "I particularly disliked that the more pollution

that occurred, the more money there was to be made in that industry,” he says. “The more soil that was contaminated, the more remediation projects there were. The more coal-fired plants built, the more scrubbers had to be put on smokestacks. I didn’t want to be part of that; I wanted to leapfrog past it.”

With partner Keith Raab, Parker decided to build a “community of entrepreneurs and their financial backers” who could learn together how to grow businesses in these rapidly growing markets. They started by collecting data that had never been organized—showing, for example, that, in 2002, 4 percent to 5 percent of venture capital flows were already going into cleantech investments, and that many of these investments were being made by large and reputable companies such as Intel and Coca-Cola. Then they organized large forums bringing investors and entrepreneurs together, created a membership service so people could get online access to deal flows, and put information packages together for large pension funds to show that investing in this category made sense.

Since then, VC investments in cleantech have been growing at an annual rate of over 50 percent, the highest growth rate of all investment categories. And momentum continues to build: VC investments in cleantech companies more than doubled in the fourth quarter of 2007 compared to the fourth quarter of 2006. From its small beginnings, the Cleantech Venture Network has grown to a membership organization of 8,000 cleantech investors, 9,500 companies and professional services organizations worldwide, and a core group of 1,300 elite members with assets exceeding \$6 trillion. They include venture capital firms, investment banks, governments, and major corporations.⁵

From Mercenaries to Missionaries

Now many of the most credible, successful leaders in the venture capital field are calling cleantech the greatest investment opportunity in the twenty-first century. These include John Doerr of Kleiner Perkins, one of Silicon Valley’s most respected and influential figures; Vinod Khosla, founding CEO of Sun Microsystems; Steve Case, co-founder of AOL; and

Richard Branson of the Virgin Group. As Parker points out, “Whether you are a missionary or a mercenary, there is room for everyone here. **People who come in for mercenary reasons end up as missionaries**, because they can’t help but get informed about the bigger issues.”

Yet venture capital is now a small part of a much larger influx of mainstream investment capital into cleantech; pension funds such as CalPERS, insurers including Swiss Re and AIG, and major investment bankers such as Goldman Sachs, JPMorgan Chase, and Citigroup are all building multibillion-dollar portfolios.

And increasingly, connections are building between small companies and large ones. **The Cleantech Venture Network has formed explicit “accelerator projects”** with Wal-Mart and Microsoft to encourage small firms to bring forward innovative cleantech solutions. But for almost all large companies, participating in venture capital networks can be a window on innovation that they otherwise wouldn’t have. Many are coming to realize they can’t innovate their way out of unsustainable boxes; they need access to new technologies, business models, and market opportunities. Moreover, big companies bring more than just money to the table: things such as large-scale market access, logistics, a big fleet of vehicles, a regional or global set of plants, or refineries that they want to clean up and redesign.

Big and Small Can Work Together to Provoke Innovation

General Electric, the \$173 billion global conglomerate, is just one example of a large firm proactively exploring this synergy with smaller entrepreneurial companies. GE Energy Financial Services, a capital and financing division of GE, announced in early 2008 that it had raised its 2010 renewable energy investing target by 50 percent to \$6 billion, a major acceleration of a previously announced target of \$4 billion.

It’s notable that many of the investments from GE Energy Financial are for projects that don’t use GE wind turbines or other GE equipment. They have recently invested directly in other companies for projects in solar, landfill gas, electricity grid efficiency, and lithium-ion batteries. **Their**

placement of capital in a wide range of small and mid-sized companies is clearly improving the growth prospects for the entire renewable energy and cleantech sector.

This business unit of GE crossed the \$3 billion mark in early 2008 with its single highest-value wind deal, a \$300 million investment in wind projects spanning four U.S. states—Oregon, Minnesota, Illinois, and Texas. By 2010 the company expects clean investments will comprise 20–25 percent of its overall energy and water portfolio, up from about 10 percent in 2006.

GE'S INVESTMENTS IN THE FUTURE

In addition to these external capital commitments to other growing companies, GE has also been successful at developing an internal culture that bears some important similarities to the “vibrant, creative community” that Nicholas Parker sees building among entrepreneurs and investors in the cleantech venture capital field. Mark Little, GE’s director of global research and development, describes it this way: “In the 26 years I have been at this company, there has never been a more exciting time to be at GE. The kind of impact our innovations could have on the well-being of the planet is vast and incredibly motivating—I can’t tell you what that does for the morale of our engineers, marketers, financiers, and leadership team. . . . These technological moves are big, they’re expensive, and they take being able to make some mistakes and being able to recover from them. This is not for the faint of heart. It requires staying power.”⁶

His comment raises an important question about the source of this staying power and how GE started down this path. The answer lies in embracing a new way of thinking about investments in innovation and growth.

GE’s CEO, Jeff Immelt, does an annual strategic review of every business in the company—the products they’re funding, how each will fit into the market, and how that market is going to grow and change. In some cases, this means redefining the market. What he observed, beginning in 2003, was that every one of the businesses had an emerging imperative from their customers to improve efficiencies and reduce emissions. This

was true for GE's big infrastructure businesses such as energy, water, aviation, and rail, as well as its appliance and lighting businesses—there were no exceptions. As fuel prices were starting to rise, so too did interest in alternative energy.

A New Way of Thinking Emerges

Lorraine Bolsinger, VP of GE's ecomagination initiative, describes what happened this way: "Jeff's a student of all kinds of trends, and saw the importance of thinking about these issues very differently. Our chief marketing officer at the time, Beth Comstock, was also a very keen observer of trends. She did a lot of work bringing outside firms in—which was a first for us—to talk about megatrends: everything from demographics and changing population trends, energy, water scarcity, to the building of megacities. We began to think differently about these issues, and not just read about them in *Newsweek*. We brought experts in to talk to our marketing people, our product leaders across the company, and leaders of our global research centers. We began to redefine our long-range strategic planning, particularly resource scarcity. We asked ourselves, 'What if we actually used this as a rallying cry to our colleagues within the company to think creatively about this, to be able to use it as an inspiration for new product ideas, because we know these trends are coming?'"

To validate this internal rethinking, leaders from the company saw the importance of listening to all parts of the larger community surrounding GE, including customers. They hosted a number of two-day "dreaming sessions"—asking customers where they thought their industries were going to go and what they and their own customers would want well into the future. Given that many of these customers were making twenty-, thirty-, and forty-year decisions, GE leaders challenged them to think about what their world was going to look like in 2015 and well beyond that. They also met with governments and NGOs to ask how they saw future regulations and legislation evolving and how they could work together to align GE's interest in innovation and growth with their interest in reducing environmental footprints.

Bolsinger points to one of the most powerful forces they saw in their

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rethinking of the future: “We saw early on—and still see—that the trend with the biggest impact is economic growth in the emerging markets, in the emerging economies of the developing world. Trends will have the most impact in those markets because they’re big, they’re growing fast, and they need solutions quickly. We see it as crucial to get the future technology out there. If it doesn’t get deployed right now, that means they continue to buy older technology; that just proliferates the amount of greenhouse gas emissions, energy consumption, and environmental contamination. If we can’t forestall the continued use of old dirty technology, then we’re going to get more of what we already have.”

A Commitment to Investing in the Future

As their internal rethinking process and the feedback from external stakeholders around the world came together, GE developed the confidence to launch their bold ecomagination initiative. The four commitments that frame this initiative match the four quadrants of the sustainable value matrix. Their first two address the “below-the-line” quadrants—reducing their internal greenhouse gas footprint while growing, and maintaining proactive communications with all external stakeholders. Their second two commitments focus on innovation and their growth trajectory—the “above-the-line” quadrants.

Launched in May 2005, ecomagination is GE’s company-wide platform to “imagine and build innovative technologies to help customers solve their toughest environmental problems.” It is based on the belief that “financial and environmental performance can come together to drive GE’s growth, while taking on some of the world’s biggest challenges.” Now in its third year, GE’s ecomagination portfolio has grown from seventeen to more than sixty energy-efficient and environmentally advantageous products and services. Their offerings include renewable energy (wind, solar, biomass, and geothermal); high-efficiency power generation (including advanced gasification systems that support carbon capture and storage); next-generation jet engines for aviation and hybrid systems for locomotives, buses, and other vehicles; advanced lighting systems such as organic

light-emitting diodes (OLEDs); and solutions for water use, purification, and reuse around the world.

GE invested \$1 billion in cleaner technology research and development in 2007 and plans to invest \$1.5 billion annually in ecomagination R&D by 2010, more than doubling their baseline annual investment. R&D investment in sustainable products, one of four areas GE committed to focusing on in 2005, has reached a total of more than \$2.5 billion since the program's inception.

And they are well on their way to overshooting their initial growth target, which was to double revenues to \$20 billion by 2010. Revenues reached \$14 billion in 2007, and their total orders and commitments since launch had soared past \$70 billion by the first quarter of 2008. The company continues to demonstrate that they understand the powerful reinforcing cycle between innovation and growth—the two most enduring dimensions of GE's corporate DNA—to ensure that they are well positioned in the present and for the future.