



Business & Society Conference

TUCK SCHOOL OF BUSINESS AT DARTMOUTH

Is Capitalism Sustainable?

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Capitalism has been rushed to the intensive care unit, condition critical, a trillion dollar bailout about to be injected into the IV if the Obama administration has its way. Anyone who picks up a newspaper knows that almost a million homes were foreclosed in 2008. The stock market has tanked, iconic financial institutions have failed, and, rather amazingly, one Bernard Madoff was able to sucker investors into a \$50 billion Ponzi scheme—all symptoms of a very sick patient.

In spite of the dire diagnosis for our economic system, attendees at Tuck's Business & Society Conference were optimistic in their prognosis. "Capitalism is bruised; it is on crutches," Tuck Dean Paul Danos stated. "But I officially predict that it will survive." He then added, "I predict that in five years, there will be a whole new array of indicators of the health of a society and an economy, and many of those indicators will be based on the kinds of things that have been talked about at this conference."

While the conference title, "Is Capitalism Sustainable," is provocative, it is hardly hyperbole. The subject cuts to the bone, with invited attendees—experts on economic theory, energy, government policy, and sustainability—willing to tackle the hard questions that many people do not want to answer. Will our current economic system survive the international crisis? Are free markets fair? Does capitalism encourage environmentally friendly behavior? Is the survival of our economy intertwined with the health of the environment? Held in a panel discussion format over two days, answers, solutions, and opportunities were presented as these experts dissected the various elements of a capitalist economic system, including market mechanisms, energy use, supply chain efficiencies, and green buildings, among other vital topics.

The opening panelists immediately questioned long-held free-market beliefs, the nature of capitalism, the system's ability to contend with the disruption we're witnessing, and capitalism's symbiotic relationship with the environment. Robert Hansen, senior associate dean at Tuck and the panel moderator, admitted that he is a big free-market proponent and believes in self-correcting forces. However, he offered a "really big caveat" by asking, are we within the bounds of self-correcting forces? He then explained, "When you subject the economy to the kind of shocks that we have and when you subject the climate system to the kind of greenhouse gas forces that we're subjecting ours to, it's unclear if they are going to be self-correcting outside of those bounds." This crisis has the potential to reach the level of the Great Depression, according to Hansen, but nobody anticipated its severity. Taking an objective viewpoint, he concluded that the current economic and environmental situation provides a great framework within which to contemplate whether capitalism is sustainable and he believes it will be interesting to see how it plays out.

Fellow panelists Michael Dworkin, director of the Institute for Energy and the Environment and professor of law at Vermont Law School, and Anant Sundaram, visiting professor of business administration at the Tuck School, reinforced that capitalism has been a successful economic model. However, like Hansen, their statements were followed by loaded caveats as both also acknowledged that the model requires change to be sustainable over time.

"I start with a premise that capitalism has been an extraordinarily successful way to allocate goods and resources and for people to deal with each other in order to meet a lot of their needs," said Dworkin. "I also start with the premise that in its current form, it is heading for substantial pain and that the process that you call self-correction is certainly an inherent part of anything that survives, but that it may not be automatic."

Dworkin believes it is necessary to look at other episodes of distress and failure in our nation's history to gain perspective. The first major crisis he pointed to was the Civil War, which dealt with the issues of slavery and property rights and was a "society-changing event." Then, in the late 1870s, the concept of the limited liability company unleashed a tremendous flow of money and unprecedented economic growth. But by the early 20th century, there was a high concentration of wealth, with large companies exerting too much influence on the economy. These trends ultimately resulted in the 1929 stock market crash and the Great Depression—the second crisis. "With it came isolation and the collapse of world trade," Dworkin explained. Fascism became a preferred model, democracy retreated, and the capital market's credibility had to be restored, which did not happen until after World War II.

A third crisis now is at hand, according to Dworkin. He observed that beginning in the 1960s through the 1990s, an increasing concentration of wealth rose again, accompanied by falling productivity—a repeat of the cycle witnessed after the Civil War. A third of all things in the United States are now owned by 1 percent of the population, and the bottom 80 percent of the population owns less than a tenth, said Dworkin. "When you combine this with awareness that periods of concentration have led to economic problems...you have to think of this as an unhealthy pattern." He concluded, "You hope for a third rebirth, a third renaissance."

With the alternative economic models "not making sense" to him, Sundaram offered an optimistic appraisal of the free-market system. "There are three very critical things that are the hallmarks of capitalism that make the invisible hand happen: One, the profit motive. Two, the price mechanism. Three, as far as I'm concerned, it is this economic system that gets the maximum out of our capacity as human beings." Combine profit, pricing, and innovation, and good things will happen. "Capitalism is sustainable in every sense of the term," he said, "with extremely important caveats." "Caveats" was the operative word of the day, with Sundaram acknowledging that capitalism may not be sustainable in its current form.

One weakness that concerns him is the notoriously short-term pressures and measures for success. "Capitalism inherently is short in the horizon in nature." In dealing with problems that require a 50- or 75-year horizon, which is a significant issue when factoring in environmental impact and resource use, he explained, capitalism fails because we won't care about today's cash flows 100 years from now. "And by the way," Sundaram added, "you have an average CEO who has a horizon of five years. [He or she has] no incentive to make a 50-year decision." Sundaram believes we need an entity in our society to push us to attach greater value to those long-term cash flows and factor that into the decision-making process. He also called for sensible regulation; you need a police force because you can't assume all people are well-behaved. A consensus at the conference was that there must be a regulatory component to capitalism.

The Risk of Chopping Off the Tail

Another inherent weakness in the current economic model is the evaluation of long-term risk. There is a propensity for financial models to ignore the long or fat tails of distribution curves in calculating the probability of an event. The tails are simply chopped off because only past experiences are taken into account, while extreme events, such as a massive spike in oil prices or large corporate failures, are not taken into consideration. There's an aversion to factoring in fat tails because of the additional risk they imply. Mark Borsuk, assistant professor of engineering at the Thayer School of Engineering at Dartmouth, put it succinctly: "Financial risk analyses are based on normal conditions with disregard for the probabilistic 'tails'...but absence of evidence is not evidence of absence...and the tails are where all the 'action' is."

This concern also applies to climate change. "Climate change scientists recognize that there is some potential for temperature changes that are catastrophic to society...but the probability of such a collapse is unknown." For example, global temperatures by 2100 are graphed with a finite limit—tails are chopped off—but the models do have tails that continue to infinite values. What this philosophical and statistical discussion leads to is a disturbing question posed by Borsuk: "How do you begin to assess a reasonable cost associated with carbon offsets when you're facing situations of infinite damages?"

"Research and policy emphasis shouldn't only be within the scope of what we know," Borsuk said. We need to look at what situations could lead to catastrophe and figure out how we guard against them. What extreme measures do we need to take? The current system is not sustainable because we're potentially imposing infinite cost on future generations in terms of climate change. Borsuk concluded that small incremental solutions won't work.

Building on Borsuk's conclusion, Greg Hintz T'05, an engagement manager at McKinsey & Company, asked a pointed question: with the consensus being that GDP will be reduced if action on climate change is not taken, why is more action not being taken? Hintz said companies simply are not eager to sign on with a Kyoto-type treaty. Is it because corporate leaders refuse to delve into the fat tails because of the uncertainty implied? "Uncertainties prevent precise quantification of the economic impacts," Hintz said. But what makes this externality different is "the risk of irreversible change really comes with nonmarginal economic effects."

Scarce Resources and the Food Crisis

If an environmental disaster and accompanying agricultural collapse are lurking in the fat tail, a mere hint of what the future holds presented itself last year in the form of the global food crisis. During a panel discussion of resources within the framework of capitalism and free markets, it was clear that food supply is an imperative topic. Consider that in 2008, the cost of such staples as corn, wheat, and rice hit record highs, which resulted in cut food rations and rioting in a number of countries, including those in west and central Africa, as well as Bangladesh, Haiti, and Mexico, among others.

The massive scope of the situation was summarized by Lutz Goedde T'97, deputy director of the Global Development Program at the Bill & Melinda Gates Foundation. The food shortages are a long-term problem, he said, "especially with population growth, increased GDP, and commitment to source a portion of our energy from biomass creating a significant strain for our agricultural production systems." He asked attendees at the conference to consider that a billion people live on under \$1 a day, which most likely means they get one meal a day, have no electricity or running water, and lack immunization. Another 1.5 billion people live on between \$1 and \$2 a

day, with almost all disposable income going to buy food even if the family farms. "It's a pretty dramatic situation," he observed.

These food shortages exist in spite of significant improvements in productivity driven by innovation within our free-market system. For example, in the U.S., the yield of corn per acre has doubled in the last 40 years and is expected to double again over the next 25, according to Hunt Stookey, managing director at HighQuest Partners, LLC, a management consulting firm with expertise in the global soy industry. Stookey also noted that in the last 30 years, the price of a bushel dropped from \$7 to \$2 until it spiked back into the \$7–8 range in 2008, along with oil prices and the demand for corn-based ethanol. The price then fell below \$4 by December of that year.

With this tremendous increase in U.S. production, the question arises, where is the market failure in either providing affordable corn to poor countries or transferring new technologies? One of the trade-offs of vastly improved production is industrial farming, which has resulted in a massive consolidation that has essentially brought about the end of the family farm. It also has created tremendous dependencies between countries, which results in less self-reliance. So, when the price of corn triples, the poor countries that import are put in a very tough position, and that's what occurred in last year's food crisis. These wild price swings are the result of a free-market system in need of repair.

In the arena of agribusiness, Stookey said, the free market has its limitations. "The market does a fantastic job of improving productivity and reducing costs, but there are trade-offs.... Free-market forces alone will not provide a 'just' allocation." There are a number of reasons: rich countries are wasteful consumers, taking more than they use; a disproportionate amount of staples, such as corn, wheat, and soybeans, goes toward feeding animals for those wealthier consumers; and government policy that encourages the use of corn for ethanol further disrupts the market for these staples, driving up prices. The bottom line, said Stookey, is "the world's poorest cannot compete."

There is another factor, which Goedde discussed: the role of subsidies. "When we talk about agriculture, we're actually not talking about a market-based system," Goedde said, because the subsidies provided to farmers in wealthy countries hurt those in poor countries. For example, he noted that because Hawaiian and Puerto Rican coffee farmers are subsidized, they can't leave the industry to grow other crops competitively; consequently, there is too much coffee on the market and prices are depressed. This protectionism, coupled with an unwillingness of multinational corporate roasters to pay more, adversely impacts some 20 million small coffee growers, mostly in developing nations.

A specific project that Goedde hopes will build the farming industry in poor countries is the Alliance for a Green Revolution in Africa (AGRA), established by The Rockefeller Foundation and the Bill & Melinda Gates Foundation in 2006. AGRA works with African governments, nongovernmental organizations (NGOs), the private sector, and African farmers to improve the farmers' productivity and income. This cooperation is necessary because there has been a disconnect in getting the benefits of research and science to the small farmers, Goedde explained. AGRA's key role is to bridge that gap with specific goals, including the development of better seeds, the improvement of soils and water use, and better access to markets.

In terms of helping the small farmer, Hal Hamilton, co-director of the Sustainable Food Lab, a consortium of 70 businesses and social organizations dedicated to promoting a sustainable food model, offered a success story that also involved a partnership. A purchasing agent for the giant retailer Costco was curious about the small farmers in Guatemala from whom the firm bought french-cut green beans. Specifically, before pursuing additional purchases, she wanted to know if some 4,000 struggling farmers who participated in a co-op were earning a fair return. The only way to determine the answer was for everyone—Costco, the co-op, and the farmers—to open

their accounting books and share their concerns. Once all information was written up by an independent researcher, the parties to the supply chain designated six different improvements in the way the chain works—not exactly the capitalist way of doing things. Also, a new process unfolded to improve the supply chain and increase the quantity of green beans making it to market. Subsequently, a foundation was created in Guatemala to serve the small farmers' needs and enable thousands more Mayan farmers to improve their lives.

Whether it be Costco or the United Nations' World Food Programme, Hamilton believes, "the global demand isn't so much coming from people who don't have much to spend, but it's our hypothesis that the social responsibility commitments by major buyers will drive a lot of positive change." In the french-cut green bean case, capitalism did not offer a solution, and in subsequent debate, the consensus at the conference was that a free-market system does not work for these small farmers without infrastructure to support them and new business models to enable them to get to scale.

Socially Responsible Investing and Performance

If consumers and government, among other entities, push corporations to adopt more sustainable practices that are not always aligned with a pure free-market system, will financial performance suffer? One gauge is to study socially responsible investing (SRI) and whether the companies within this realm perform competitively. From their observations and experience, the panelists stated that it doesn't appear that SRI mutual funds perform worse than others. (Studies support this observation, although better data are needed to determine the relative performance of SRI funds.) For Jack Robinson, president and chief investment officer of Winslow Management Company, there is a definitive reason why: the elimination of risk.

In fact, Robinson asserted that if you screen out companies that are risky or anti-green, investors' portfolios will outperform the market. The kind of risk he referred to is avoiding companies like W. R. Grace, which had 250,000 asbestos-related lawsuits filed against it at one time, or General Electric, with its 120-plus Superfund sites. "The hard economics of sustainability," said Robinson, "is that it reduces risk, lowers cost, and grows revenue." And then there is "the soft economics of sustainability," which is customers, employees, shareholders, and the environment. Shareholders are more active and attracted to socially responsible companies, and customers and employees are more loyal to such companies. Robinson cited Green Mountain Coffee Roasters as a company that is attractive to investors because it has grown its revenue by being appealing to the socially conscious consumer.

Taking an opposing, textbook view of investment allocation, Kent Womack, professor of finance at Tuck, asserted that when you cut out non-SRI companies, investors potentially limit their returns because they're limiting the population of available investments and therefore the optimal portfolio mix. The difference between textbook portfolio theory and SRI investing boils down to different definitions of risk. In the panel discussion, it was pointed out that to some degree, every analyst and fund manager incorporates socially responsible investing by screening companies for risk of loss or unwise corporate investments. Obviously, investors look at the growth potential of sectors like solar and the risks of sectors like tobacco. For Robinson, risk is a company that makes environmentally unfriendly products.

SRI and Renewable Energy Opportunities

Robinson recalled that when he entered the SRI realm in 1983, no one was particularly interested in SRI except for a few wealthy individuals and nonprofits. Back

then, the main concern was to screen out companies that made products or services that could kill you. The screen of companies included tobacco, nuclear, munitions, fossil fuels, and companies with Superfund sites. Then, in 1993, the focus shifted to a positive light; for example, investors started looking for companies offering green solutions such as clean energy and energy efficiency.

Robinson believes there are ample opportunities in renewable energy. These companies include Vestas Wind Systems, Energy Recover, Inc., and First Solar, all of which have been generating double-digit growth and creating green jobs. He further noted that worldwide revenue in renewables grew 40 percent in 2007 to \$77 billion, and the sector's revenue is projected to triple to nearly \$255 billion by 2017 (a 12.7 percent compound annual growth rate). To meet global energy demand, it is estimated that a \$16 trillion investment in renewables will be needed by 2030. Currently in the U.S., about 2.3 million people work either directly in renewables or indirectly in supplier industries. According to Robinson, clean energy could produce as many as three million new jobs over the next 10 years.

The Jevons Paradox

From the statistics shared by the conference panelists, the argument is compelling that unprecedented investment is necessary in renewable energy. Consider the facts presented by Brandon Stafford, principal engineer at GreenMountain Engineering. U.S. consumption of energy continues to rise, as does the import of energy. World energy consumption is also continuing to rise and is projected to increase by 50 percent from 2005 to 2030, according to the U.S. government's Energy Information Administration. The efficiency in making and using energy also has increased, so the hope had been and should be that total consumption will decrease. It hasn't, of course. Stafford noted that this is the Jevons Paradox. Named after William Stanley Jevons, who observed coal consumption in England as the steam engine was introduced, the paradox is the proposition that technology that increases the efficiency of a resource also tends to increase the consumption of that resource. In effect, because improved efficiency lowers the relative cost of using a resource, people use more of it. The fact that we're using less energy per capita is not a defense, says Stafford. "I don't care how you scale it, if we can't limit our consumption, we will lose."

The problem with renewables as a solution, according to Stafford, is that they suffer from "really low power density." You just don't get a lot of power out of them per square meter. But there is hope, he said. For solar power, we're about a factor of 2 away from grid parity, which isn't bad considering 30 years ago, we were about a factor of 100 away. He believes that in a few years, solar will be justified, with wind right behind. In places like Arizona, solar already makes sense.

Nevertheless, there has been a lack of progress in absolute terms, which was put in perspective by Joseph Helble, dean of the Thayer School of Engineering. According to Helble, in 1956, the U.S. was the world's biggest consumer of primary energy and 50 years later still is. In 1956, 57 percent of the electricity generated came from burning coal. Fifty years later, it is 51 percent. In 1956, 20 percent of electricity came from renewables. Fifty years later, it is at a dismal 9 percent. What is different now, Helble noted, are the factors and motivation to seek different sources of fuel.

Clean Tech Opportunities

With the expected exhaustion times for various nonrenewable energy sources, such as coal and oil, falling in the 40–150 year range, the interest in clean technology has indeed heated up. However, there remain technological, economic, political, and

legal barriers, which, along with solutions, were discussed by the clean tech panel at the conference.

Jim Lang T'89, an energy expert and former president and chief operating officer at Cambridge Energy Research Associates, recalled that in 1978, U.S. President Jimmy Carter said energy is a clear and present danger to our nation. So, what happened? Plain and simple, the U.S. government's interest in promoting renewables has hardly been enthusiastic, said David Hague, vice president of business development at GreenMountain Engineering. The 1982 federal budget for the National Renewable Energy Lab was projected, before Reagan cut it by 65%, to be \$135M;¹ in 2007 the same budget expressed in 1982 dollars was \$100M,² which says something about public policy and funding. In Hague's opinion, government ties to big oil may be a factor.

For Lang, it's a matter of being realistic in our approach to renewables. "The first place we've got to get realistic is that the renewables that are out there are needed to solve the issue, so we shouldn't battle them against each other," he said. "We should figure out a way to enable advances on all of them." Nuclear needs to be a big part of our future and people need to accept that, according to Lang. Wind has come of age, and solar is close to coming of age, while ocean thermal will be in the distance but not in the next 10 to 20 years. There are legal and policy issues holding up development, however. For example, although wind-power technology is here and ready, there are permitting issues—that is, the NIMBY (not in my backyard) factor. There have to be incentives, and government agencies have to set policies to eliminate uncertainty so that energy companies are willing to make massive investments.

While the panel's consensus was that there is ample opportunity to invest in clean tech, the traditional venture capital model isn't always a great fit with clean tech, according to Mark Barnett, a lawyer and energy specialist with Foley Hoag. Investors want to put money in and get out relatively quickly, but that's not going to happen with capital intensive clean technology applications. This is why Barnett believes government needs to take a much more active role in funding what venture capitalists might have, even funding early stage firms making products not yet commercially proven. Barnett also believes we need to be able to build large-scale solar projects in the desert and large wind farms. Energy companies need to be able to get those sites permitted and then get the energy to places where people can use it. He feels there needs to be some real leadership, especially from the Obama administration, that will create a collective sense of mission on why these products can and should be built.

The Carbon Dilemma

While the clean tech panelists were divided over how quickly we need to move away from coal-burning electrical plants, Lang made the observation that coal is too cheap to not have it in the mix over the next 5 to 15 years. His argument was that we have to be realistic, and too often people are unrealistic about carbon sequestration. Carbon must be dealt with on many levels, which prompted Tuck's Sundaram to warn the audience, "There's a six-letter word you're going to hear about a lot...carbon.... I'm telling you, learn everything you can about it." He then explained why. "There will be two groups of companies over the next decade or two: those who get it and grab opportunities and profit from it, and those who don't and will be left behind and lose trillions."

Sundaram framed the big picture: if we're going to deal with climate change, carbon is the central piece, with 80 percent of carbon emissions coming from the

¹ Source: <http://www.csmonitor.com/1981/0702/070237.html>

² Calculated using Consumer Price Index

production and use of fossil fuels. And this, in turn, occurs in a handful of sectors, including electric, gas, oil, and transportation; so this is where the action is going to be. Looking ahead, he observed, we also need to consider gross domestic product (GDP) growth versus greenhouse gases (GHG) growth. In other words, at what cost to the environment do you grow GDP, and, in turn, how will the cost of these environmental problems impact GDP? It is on this macro level that the relationship between the health of the economy and the environment is made obvious. As for these issues, said Sundaram, "it's going to take a tremendous amount of cross-border cooperation and government action to deal with this."

Taxation Versus Cap and Trade

As policy makers evaluate the best path to reduce greenhouse gases, there is heated debate between the effectiveness of a carbon tax versus a cap-and-trade policy. Conference panelists fell on both sides of the fence with strong supportive arguments.

One of the roadblocks to reducing GHG is capitalism itself, according to Barnett, because it's not effective at pricing externalities and greenhouse gases are an externality. If we don't build the harm of fossil fuels into the energy price, then renewables will remain at a disadvantage, he noted, a view shared by other panelists.

Toward that end, Barnett is a big fan of a carbon tax, although he fears American consumers won't buy it. To assuage their concerns, he advises using a carbon tax to reduce taxes elsewhere. It's no small change. In Europe, they played with a \$30-per-ton carbon tax, which, according to Barnett, would equate to \$150 billion in tax revenue a year in the U.S. Barnett would find a \$20-per-ton tax acceptable. Other panelists supporting a tax did so because they felt it would create an incentive for efficiency, the revenue could be used to fund clean-tech startups, it involves fewer middlemen muddling the system and less bureaucracy, and it is more transparent. But there are downsides too, of course.

"With the tax, there's very little incentive to innovate, there's very little incentive to develop new technology," argued Kyle Cahill, director of corporate engagement at Environmental Defense Fund, a nonprofit that brings together private and public interests to achieve breakthroughs in environmental problems. "If you go with a carbon tax," he said, "it is a complete stab in the dark as to how high that tax should be to get the environmental impact we absolutely need." He wondered whether the tax revenue would even be used to invest in renewables. Cahill also worries that a tax simply could be passed on to consumers without motivating companies to change. He concluded, "There's no guarantee that a tax would reduce emissions, and is that a chance we want to take?" And if science tells us we need to reduce emissions a certain amount, how can we be certain a tax will achieve that amount?

Cahill believes that the best market approach is the cap and trade, which sets a carbon cap for a sector, with each company receiving an allocation or a tradable pollution permit, and then allows a company to trade any carbon credits to a company that can't meet its cap. He explained that it doesn't matter if company X does better than company Y as long as the total cap comes down over time. In a cap and trade, companies would decide if and how to innovate or whether to reduce production of a specific product and go into something else. Cahill noted that cap and trade worked with the problem of acid rain even though industries said it wasn't possible. He also added that while you will find some economists who favor a carbon tax over cap and trade, you won't find scientists on that side of the debate; after all, it is a scientific issue at its core, not an economic one.

Those panelists who supported the tax also agreed that a cap-and-trade policy would be more beneficial in certain markets to get rid of pollutants. Sundaram said he

thinks there will be a hybrid of tax and cap. Lang elaborated that there needs to be a balance of incentives across the entire mix—carbon and renewables. This approach should also include consumer incentives to use solar or drive hybrid cars. It was also suggested that developing countries need to have carbon caps, high caps if necessary, so everyone gets on board.

Can the Market Be Trusted?

If a cap-and-trade policy is implemented, it could be as much as a \$3 trillion market, according to the conference panelists, with carbon credits being bought and sold on a scale that would dwarf the dotcom era. This tremendous prospect raised significant questions. Can a carbon market be trusted? Will speculators and manipulators hijack it? Will they benefit from arbitrage? Sienna Rogers T'06, manager of greenhouse gas commercial strategy at Pacific Gas & Electric (PG&E), noted that you have to separate the speculators from the manipulators. "You need market makers and speculators...ultimately, they're going to have to value those assets appropriately and create a market or they will lose their shirts." To thwart manipulators, Rogers said that the market has to be designed so it is transparent. Also, the larger the market, the more stable and safer it will be. Cahill, like Rogers, believes an open market with global participation will control some of these issues. Because the cap-and-trade market would become a global liquid market, it would also be less susceptible to regional influences.

PG&E: A Carbon Case Study

Every business unit of PG&E is regulated and made more complex as it operates in a decoupled market, meaning the production of more electricity doesn't equate to more profit. These units' incentive is driven by efficiency, noted Rogers, who has been dealing with sticky GHG issues. Given these circumstances, PG&E must be forward thinking, and the company's CEO is leading the charge. Because production of electricity and natural gas are the biggest contributors to GHG, PG&E feels the industry has an obligation to respond. According to Rogers, in California, about 25 percent of emissions comes from electricity production, while 35 percent comes from transportation. PG&E's CEO supports partnering with environmental groups, so the firm joined the United States Climate Action Partnership (USCAP), a group of businesses and environmental organizations calling for strong government action to reduce GHG. PG&E is doing so because the company and California are already heading in that direction and it is important that corporate representatives be at the table helping design carbon programs, so companies can manage the process and the costs that will ultimately be passed to the consumer.

California already has a tough GHG law that requires emissions to be reduced to 1990 levels by 2020. To meet the desired goals, unprecedented investment in renewable energy will be required. In California, there already are penalties in place if energy companies don't achieve certain levels of investment in and use of renewable energy. PG&E supports California's GHG law's adoption on the national level because there are "different political dynamics state by state" that may result in a patchwork of regulations if a federal program doesn't emerge. PG&E wants to reduce risk and wants certainty in making investment decisions that benefit its investors and customers.

PG&E has some certainty now in California, said Rogers, but still "has some strategic planning issues around what happens if there is a federal program" and what would happen to existing permits for carbon. To account for the uncertainties, the company is forced to do a good deal of risk analysis on how to approach the future. While PG&E has been making the needed investments, which gives the firm a

competitive advantage, Rogers made it clear that the rest of the country must come on board for it to work and share the costs. "You're going to need innovation," she concluded. "One of the greatest instigators of innovation is the market, and the cap-and-trade market is well designed to do that." She believes the market needs to decide what it's going to cost and where money should be allocated.

Buildings within the Greenhouse Gas Puzzle

Another big piece of the sustainability and GHG puzzle is a basic need for shelter. John Vogel, adjunct professor of business administration at Tuck, noted how big the piece is and why going green matters. "Buildings account for 40 percent of U.S. energy consumption, and that breaks down as 55 percent from residential buildings and 45 percent from commercial buildings. Buildings account for 68 percent of electricity consumption. And buildings contribute 40 percent of CO₂ emissions and 60 percent of nonindustrial waste. So if, for example, we can cut the energy consumption in buildings by 30 to 50 percent, it can make a big difference."

For a building to be designated green, it must meet certain standards. The most widely used standards are "a rating system designed by the Green Building Council, called LEED...Leadership in Energy and Environmental Design," Vogel explained. "The way this system works is that buildings get assigned points based on their energy efficiency, water and waste treatment, and similar categories. Then, based on the number of points, the building gets rated as certified, silver, gold, or platinum." The LEED system was introduced in 2000, with its mission to promote sustainable green building and development practices. While there is some debate as to what the standards should be, LEED provides independent, third-party verification that a project is green. All the panelists were sanguine about opportunities in this sector, with construction starts for sustainable buildings at \$12.3 billion in 2008 and projected to be \$60 billion in 2010, according to the U.S. Green Building Council.

Dartmouth College has made a concerted effort to build sustainable projects, said Paul Olsen, the school's director of real estate. Dartmouth has three LEED-certified buildings on campus, others that are registered, and current projects that will be certified. According to the College Sustainability Report Card, Dartmouth earns an A- for sustainability. For Olsen, it's about marrying principles of smart growth and green design. He doesn't focus on just one building but rather planned development that may include modular construction that has a tighter shell and less construction waste, LEED streetlights that use 25 percent less electric consumption, the ability to dim lights between midnight and dawn, curbed parking to control runoff, and the construction of biomass heating plants.

Green building is also taking hold in the corporate world. Jerry Pucillo, president of Centergreen, discussed his involvement in the design of General Motors' new engineering center in Michigan. Almost 10 years ago, GM brought in a team of 20 individuals from around the country to work on the center's design and development. It involved the renovation and construction of 8.2 million square feet. What was special about the project, said Pucillo, is that the goal was to be sustainable before there was LEED. GM gave the team carte blanche, which amazed Pucillo, and permitted the group to pursue sustainability and energy usage guidelines set by the Rocky Mountain Institute, a nonprofit that focuses on resource issues.

Shortly thereafter, Pucillo consulted for Genzyme, a biotech company that wanted to build a LEED-certified building in Cambridge, Massachusetts. Opened in 2003, it is one of the most visited offices in the country. Why? Because the 350,000-square-foot building features a soaring 12-story central atrium with skylight, a living roof, extensive indoor gardens, and natural light enhancement systems. More importantly, it

uses 34 percent less water than a comparable building, its electricity costs are 42 percent less than a comparable building, more than 75 percent of all construction materials included recycled content, and more than 90 percent of all construction waste was recycled. Did it make financial sense to build? Probably not in the strictest real estate economics sense, said Pucillo. He thinks the president of the company was also interested in it because of its marketing value since it was one of the first platinum buildings in the country. While the Genzyme building costs were high, due in fact to the early initiative and the learning curve, a typical LEED building has a cost premium of 0 to 5 percent, depending on what standard you're shooting for. This is more than acceptable to developers like Olsen, who currently has a project he hopes to have certified either silver or gold, with a cost premium of \$12 on \$250 per square foot.

Regardless of Genzyme's motivations, Jim Boyle, founder and CEO of Sustainability Roundtable, Inc., said that CEOs of Fortune 500 companies are concerned about carbon emissions. As building owners or tenants, these companies want the operation savings, so developers and suppliers are being driven to go green. Boyle wants to see municipalities become more LEED conscious. Pucillo thinks we're just at the beginning of a green building revolution and pointed to 2006 as the year when attitudes started to change. He credited former Vice President Al Gore's movie *An Inconvenient Truth* in helping to promote awareness. Since then, dialogue about sustainability has increased at a rapid pace. As for the green building market, Boyle believes it has been underestimated. Of the \$5 trillion global building industry, only .005 percent is sustainable, so if that goes to just 5 percent, it would result in a huge opportunity.

Another trend Pucillo sees taking hold is how we solve problems presented by nature. He explained that we used to engineer our way through problems, whether it be air conditioning or changing the natural flow of water (as in New Orleans, with ultimately disastrous results). Moving forward, he believes we will study nature to find the answers to our problems. He said we're going to hear words like "regenerative," "natural capitalism," and "bio-mitigate," and that we're going to see a move toward more urban centers and development around transportation. Eventually, sustainability is going to become more of a requirement or a baseline. At the moment, however, investors are still hesitant to invest in green buildings until proven beyond doubt that it is their fiduciary responsibility to do so. In other words, as long as a green building costs a few cents more, they won't invest in it.

Product Innovation and Supply Chains

With so much discussion centered on greenhouse gas emissions and climate change, the impact of the entire supply chain can get lost. Conference panelists emphasized that we must look upstream for opportunities to reduce our carbon footprint and for capitalism to be sustainable. Green products and processes must drive innovation throughout the supply chain. For example, Timberland, a footwear and outerwear maker, pushes sustainable practices all the way to its suppliers in Southeast Asia. A number of these suppliers who need warm water, such as tanneries and dye houses, have been encouraged to install domestic hot water plants that rely on solar to save money, said Peter Girard, senior analyst for Timberland's environmental stewardship team. It makes sense because it's warm there year-round.

"Why is Timberland focused on a green supply chain?" posed Girard. "The first thing we think about is transparency." It's about showing rather than telling the customers that their products are green. It empowers employees and supports the employee code of conduct. "We're actually telling employees what's happening and letting them make changes," said Girard. People are more engaged in a process when

they think that they are doing a better job making a product with fewer impacts. This engagement with the supply chain really matters, according to Girard, because Timberland discovered that 75 percent of the firm's carbon footprint is in the longer supply chain. It also leads to innovation as the company deconstructs the processes and materials of a product. "We have clear cases where we have found resource and cost efficiencies by pursuing environmental performance in our supply chain," he said. A better supply chain model leads to better margins.

Because Timberland contracts 90 percent of its production, it can be difficult to track what facility a material comes from, let alone what goes into the material. We need to "dig in" and understand what we know, Girard explained. Toward that end, in spring 2007, Timberland introduced its Green Index, a labeling initiative that measures the environmental impact of its products. A label on the products' packaging includes a climate impact score, the chemicals used, and resources consumed.

While the company is to be lauded for its efforts, Timberland really can't set the framework for such an index, Girard explained. It would not be credible. Timberland has to reach out to other businesses, industry associations, and NGOs and do it in a transparent way. For example, the Outdoor Industry Association has developed a product eco-benchmarking tool kit that includes points of measure for various stages of the supply chain and production, such as land-use intensity, water, toxics, and waste. It's about coming up with generally accepted environmental principles, as has been done with accounting—or supposedly has been done with accounting, Girard joked.

The Making More Stuff, Doing Good Conundrum

While Johnson & Johnson (J&J) is in completely different business sectors and dwarfs Timberland in revenue (\$60 billion in 2007 versus Timberland's \$1.4 billion), the two companies share the same sustainability concerns. As chief design officer for J&J's consumer products, Chris Hacker worries about putting more "stuff" in landfills. This concern leads to an issue intertwined with capitalism: can you keep growing as a company and selling more stuff without catastrophic consequences for the environment? This conflict is the conundrum of selling more but having less impact. The complication, Hacker pointed out, is that not only do people want more things, but by selling more stuff, companies are able to do social good with their profits. Case in point, the panel discussion was being held in a room donated by General Motors. Hacker wryly pointed out that General Motors probably could not donate that room today.

Regardless of the conundrum, we need to be lighter in everything we do, Hacker said, and make stuff a better way; that's key. Toward that end, employees must be engaged and sustainability must be driven from the top. Hacker read from J&J's credo, which is why he feels the company is a good fit for him: "We are responsible to the communities in which we live and work and to the world community as well. We must be good citizens—support good works and charities.... We must maintain in good order the property we are privileged to use, protecting the environment and natural resources." This triple bottom-line approach, Hacker observed with a smile, was written back in 1942 by company founder Robert Wood Johnson. At that time, the company was about to go public, so Johnson wanted to make sure it was going to be run in the same socially conscious manner as the family had.

J&J has walked the talk. As of April 2008, it was the second largest corporate user of on-site solar energy, according to the World Resources Institute, with plans to install more than 10 major solar energy systems in the U.S. In addition, there are 60 renewable energy projects in the works to save 115,000 tons of CO₂ per year. On the consumer side, over the last 12 months, the company's Band-Aid box supplier in Brazil, which produces 90 percent of J&J's packaging for this product, has switched from

noncertified paperboard to 100 percent Forest Stewardship Council (FSC) certified paperboard. And in 2008, the Listerine package was redesigned to reduce the overall weight of the package by 30 percent.

One of Hacker's goals is to make sustainable products, so, since joining the firm, he has challenged basic assumptions by asking, why do packages have to be so much bigger? Why do we need two layers of cardboard when one will do? Hacker recalled that he battled with the marketing department when he wanted to reduce the size of packaging, but he won when he explained that it would cost less. Girard has found himself with the same problem. "We're in a position where we're telling our marketers to cut their packaging space by 30 percent and triple the amount of information we put on it in order to provide environmental information." Hacker advised the audience to keep asking questions and evaluating processes. Keep asking the same questions because you get different answers. And don't take glib answers at face value.

Why Should Businesses Care about Green?

Why do we think businesses care today about being green? Why should business care? Cahill posed these basic questions. His answers? Because there are direct business opportunities, cost savings to be realized, new revenue streams, better hedging against risk, future resource constraints, and pricing considerations. Businesses also should care because sustainable practices can lead to better access to capital. Wall Street and investors are scrutinizing how well companies are positioned for managing climate change, dealing with regulatory changes, and reducing exposure to potentially hazardous nanomaterials. As more sophisticated consumers are demanding environmental sensitivity, companies can cultivate brand attractiveness. "There are supply chain pressures no matter where you are in the supply chain," Cahill said. For example, he noted, if you are a supplier to Wal-Mart, you're going to be asked to improve your packaging.

When Wal-Mart said it was going to make an effort to be more sustainable, Hacker's reaction was that it was "greenwash" to compensate for bad public relations concerning labor practices. But now he realizes he can use Wal-Mart as a hammer to get his suppliers and designers to be more green. He can get the size and weight of packaging reduced more easily. If Wal-Mart thinks it's just an economic thing that helps its bottom line, concluded Hacker, that's okay because it will change the way manufacturers like J&J and everyone else who sells something to them operate. Wal-Mart is also driving consumer understanding of sustainability.

Getting consumers to rally around something can drive change, said Paul Ligon T'03, senior director at Waste Management Upstream. Through his experience in recycling, he believes that consumer product makers are beginning to feel they can engage consumers and build a customer base by being green in the disposal of waste. The biggest part of this effort is trying to figure out what aspects of it the consumers want to hear, a sentiment echoed by other conference panelists. "Making it a consumer engagement strategy rather than a public policy strategy that only affects a small segment of this stream, that's how you make it work," Ligon said.

The ultimate goal is to "extract maximum value out of the streams that we handle." In Ligon's opinion, "There are real opportunities to reduce impact by going towards these kinds of closed-looped systems." In other words, we need to keep reusing and recycling materials, especially those that have an endless loop. Ligon's Upstream unit goes into organizations and studies how to drive waste out of their processes through design improvements and back-end operations improvements. He noted that most companies don't have the expertise that Waste Management has and or the incentives to invest in such expertise.

Risk Management as a Driver

Cahill reflected on the evolution of corporate environmental strategy that now has the Wal-Marts of the world jumping on board. Thirty years ago, it was all about compliance and sticking to the laws. Then we witnessed the start of a more philanthropic approach by corporations as social and environmental causes became important to establish relationships with communities. In the next stage of the green evolution, corporations realized there could be significant cost savings by improving energy efficiency and reducing resources used and waste generated. Environmental Defense Fund's (EDF) first partnership was with McDonald's 20 years ago, a time when NGOs and corporations simply didn't partner. EDF helped McDonald's reduce packaging and waste; for example, the Styrofoam clamshells were eliminated, which saved 300 tons of supply chain waste globally.

Risk management now has entered the equation. As various constituencies push for sustainability and climate change poses the threat to negatively impact the economy, corporations recognize the need for risk management. In the banking sector, for example, 60 international banks have joined together to set principles, called the Equator Principles, that provide a benchmark, or baseline, for determining and managing environmental and social risk for a given project that requires financing. The participating banks will ask clients to provide mitigation plans when needed or to follow certain guidelines for GHG emissions in order to reduce legal and political risk. In another example, EDF worked with DuPont on risk management to avoid issues pertaining to nano materials and pollution. The two partnered in September 2005 to develop a process for assessing and addressing the risks of nano materials. To share their findings, they have made their work available in several languages. What is particularly interesting is that we are witnessing more open cooperation rather than corporations taking a protective, proprietary approach to environmental issues.

A collaborative approach is necessary to overcome our energy, climate, and sustainability challenges, a theme repeated at the conference. As the student conference planning team and the Allwin Initiative for Corporate Citizenship at Tuck continue to explore and promote a triple bottom-line approach to business, this recurring theme really boils down to a basic concept: how to do well while doing good. Although a simple statement, it's wrought with tension as corporations strive to generate profits as they seek to behave in a more sustainable way. At PG&E, Rogers explained, they have set up a dual principle approach that involves conducting business in a way that is environmentally sensitive at "a reasonable cost to our customers. If you push out your time horizon, often you can find ways to come to terms with that tension."

Solutions won't come easy as capitalism and sustainability have traditionally not been considered very compatible. The situation is even more complex when you consider the increasingly symbiotic relationship between the health of the economy and the environment. Also, in evaluating the future of our economic system, the experts generally agreed with panelist Mark Barnett, who quoted Winston Churchill to make his point: "Democracy is the worst system in the world except for every other system." In other words, we shouldn't be too quick to dismiss capitalism because our options are limited. Perhaps Paul Danos summarized it best in referring to the conference title, "Is Capitalism Sustainable?" when he said these are "fighting words." And what that fight entails couldn't have been made more apparent at the conference.