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C. Sherry Immediato

SUSTAINABILITY IS ONE OF MANY FOCUSED AREAS OF INTEREST within the SoL community, and the theme of this issue of *Reflections*. Many of our corporate members became interested in the subject of sustainability when they recognized that they needed to lessen or neutralize the environmental impact of their processes, services, and products. Their need and desire coalesced interest, and SoL has been home to the SoL Sustainability Consortium since 1999. The Consortium supports its members' intention to create value and change by combining the analytical rigor of systems thinking with insight into how social networks improve the triple bottom line (people, planet, and profit). SoL has also spawned a number of related initiatives in which SoL members participate, including The European Sustainability Group, Project ELIAS, and the Sustainable Food Lab. In addition, SoL's newest publication, *Profit for Life* by Jay Bragdon, represents a commitment to promote research and dialogue on the relationship between corporate practices, social and environmental impact, and business results.

In the opening feature of this issue, Peter Senge offers his view on "Systems Citizenship: The Leadership Mandate for This Millennium." When asked if the basic fundamentals for sound leadership remain the same in a changing world, Senge responds "yes." He offers a range of examples which highlight the fundamentals as he sees them: a deep capacity for systems intelligence, and building partnerships with the "other" in a context of openness of mind, heart, and will. These ancient and currently underdeveloped capacities are essential for helping us see the world we now inhabit, and to guide us in acting as good systems citizens.

Karl-Henrik Robèrt was recently interviewed by Manfred Mack for *Les Cahiers de SoL* – SoL France's version of *Reflections*. "The Natural Step: A Vision for Sustainable Societies" offers an overview of a systemic effort to affect the systems intelligence to which Senge refers. Many readers will already be familiar with the start of The Natural Step, a grassroots initiative in Sweden which resulted in widespread awareness of four principles of sustainable societies. Robèrt describes their work with companies to adopt and integrate these principles into practice.

Of course we all know that we tend to focus on and value what we measure. Inspired by the nation of Bhutan's measure of "Gross National Happiness," investment analyst Frank Dixon explores how we can measure real social wellbeing. In this article, based on an address to senior leaders in Bhutan, he summarizes the implications for an economy where social wellbeing is a critical indicator of success. Recognizing that significant social wellbeing requires collaborative effort between corporations, government and civil society, he offers "total corporate responsibility" as the way companies can and should work toward system level change in their role as system citizens. SoL research and Sustainability Consortium member John Ehrenfeld comments.

In a recent conversation hosted by the Sustainability Consortium, CEO Jeffrey Hollender discussed his company's founding and evolving purpose. The article developed from that conversation, "Seventh Generation: Education for the Consumer Products Business," provides a good example of a practical

approach to total corporate responsibility. He discusses the company's quest to continue to improve product design, product delivery and customer education. This ongoing process of reflection, conversation, experimentation, and correction is one they see as strengthening relationships within the company, and with customers and other stakeholders. Readers can download the audio from the original conversation on the *Reflections* website, and view the full list of conversations at the Sustainability Consortium website.

While a clear corporate purpose can inspire innovations in management, we also need to consider how management education should change. In a contribution to *Reflections*' Emerging Knowledge Forum, Jeff Lindstrom, a SoL Connections member, shares the story of the birth of the Institute for Sustainable Development in eastern Russia. This new graduate program is a great example of thinking globally and acting locally, with a goal of establishing an international perspective while focusing on regional and national development.

However we accomplish it, new forms of education remain an important leverage point for systems citizenship. John Sterman and Linda Booth Sweeney began research many years ago to investigate how well-educated people make sense of data that requires an underlying appreciation of basic systems principles. In "Cloudy Skies: Assessing Public Understanding of Global Warming," they document the results of their research, showing the reasoning and faulty logic that cause many to support "wait and see" attitudes toward climate change at the personal, corporate, and national levels.

If indeed we decide that now is the time to act on climate change, and are persuaded that our action must be at a system level, what type of policy change should we pursue? Tom Fiddaman, this year's winner of the System Dynamics Society's Jay Forrester Award offers a commentary. In "Changing the Landscape for Profitable Control of Greenhouse Gases," he discusses the intended impact and unintended consequences of a variety of policy initiatives and their implications for management.

Finally, we're delighted that there is good evidence to support what we've all believed to be true – that a commitment to life-sustaining business practices is actually good business. This issue's book excerpt features the introduction to Jay Bragdon's new book, *Profit for Life: How Capitalism Excels*. While we all recognize that there are many aspects of our economic system that do not encourage us to be good systems citizens, he reports on a group of firms – some of which will surprise you – that have been able to adhere to their values and produce the kind of financial results revered by conventional investors.

One of SoL's guiding principles is titled "Aligning with Nature." This guiding idea speaks to how we learn not only from each other, but from the living world around us: "It is essential that organizations evolve to be in greater harmony with human nature and with the natural world." We hope the range of articles in this issue will help you both harmonize and influence the systems of which you are a part.

C. Sherry Immediato
Managing Director, SoL

Systems Citizenship:
The Leadership Mandate for this Millennium

Peter Senge

Peter Senge

For all of human history, societies that endured appreciated that their economies could be no healthier than the larger natural and societal systems upon which they depended. Historian Jared Diamond, in *Collapse: How Societies Choose to Fail or Succeed*, has shown how many one-time flourishing cultures that forgot this truism passed into oblivion, often with surprising speed. But there is one big difference today. The society whose future is in question is increasingly a global society. Speaking at the fiftieth anniversary of Japan's entry into the post–World War II "Bretton Woods" monetary accords, World Bank Vice President for South East Asia Mieko Nishimizu pointed out just how unprecedented our interdependence has become:

> The future appears *alien* to us. It differs from the past most notably in that the Earth itself is the relevant unit with which to frame and measure that future. Discriminating issues that shape the future are all fundamentally global. We belong to one inescapable network of mutuality: mutuality of ecosystems; mutuality of freer movement of information, ideas, people, capital, goods and services; and mutuality of peace and security. We are tied, indeed, in a single fabric of destiny on Planet Earth.
>
> Policies and actions that attempt to tear a nation from this cloth will inevitably fail.

As individuals and organizations, we have never had to be concerned about how our day-to-day decisions, like the products we make and buy and the energy we use, affect people and larger living systems thousands of miles away, even on the other side of the planet. This is the real message of "globalization," and it is, indeed, an *alien* one for all of us. We've never been here before.

Societies Waking Up

Societies and their governments around the world are waking up to the fact that industrial growth as we have known it is now encountering severe social and environmental limits, whose costs are getting harder and harder to ignore.

For example, CO_2 in the atmosphere is 30 percent higher than at any time in the past 400,000 years, and the rate of CO_2 emissions, which itself is rapidly rising, is approximately four or five times the rate at which CO_2 is being removed from the atmosphere through carbon sequestration, according to the September 2005 *Scientific American*. This means that stabilizing CO_2 in the atmosphere will require cuts in emissions of 75 percent or more, far beyond what the Kyoto protocols or any other current plan call for. While environmentalists have been warning about possible CO_2 effects on global climate for a long time, the human

and economic costs are starting to become hard to ignore for governments and insurance companies faced with the consequences of weather instability and spreading tropical diseases.

Or consider the simple fact that, to support the average American's lifestyle, we cause over one ton of waste to be generated, per person per day. Closely related to the volume of waste is the chemical footprint of manufacturing industries and the related toxicity of everyday products and the processes that produce them. Like the $C0_2$ effects, these costs are also starting to show up, in terms of waste disposal, cancers in middle-aged people that were unheard-of two decades ago, and overall public health.

As these costs become recognized and their sources understood, they are starting to be allocated back to the businesses and industries where they originate. For example, the European Union (EU) recently began to require that makers of automobiles take them back for recycle or remanufacture at the end of their lifetime. Similar EU regulations are now in effect for many consumer electronics products. The EU has also begun a systematic phasing out of diverse sources of toxicity in products, starting with heavy metals like mercury, cadmium, and hexavalent chromium. These regulations are part of historic steps in the direction of making "extended producer responsibility" the norm for industry. Similarly, President Hu of China speaks frequently about an idea that takes extended producer responsibility to its logical conclusion: the "circular economy," an economy that works like natural systems, where there is no "waste" and all materials move in continuing cycles of reuse.

In short, whether it's weather instability, waste disposal, health effects of rising toxicity levels, or depletion of aquifers, fisheries, and agricultural topsoil, formerly "externalized" costs for businesses are starting to show up on the profit statements of insurers, health care providers, and producers of diverse products and services. The era of privatizing profit and socializing many social and environmental costs is passing. These costs are growing and they can no longer be regarded as somebody else's problems at some indefinite time in future. For more and more, the future is now.

The future appears alien to us.

Insurers, Consumers, and Investors Taking a Stand

Ironically, the business stakeholders leading the charge in coping with privatized environmental costs are traditionally conservative insurers – because increasingly they are paying the bill. Writing in *Fortune* in January 2006, Eugene Linden says that "Corporate leaders could soon feel the heat too" regarding climate change. In 2004, Swiss Reinsurance, a $29 billion financial giant, sent a questionnaire to companies that had purchased its directors-and-officers coverage, inquiring about their corporate strategies for dealing with climate change. D&O insurance protects executives and board members from the costs of lawsuits resulting from their companies' actions. If Swiss Re judges that a company is exposing itself imprudently to climate-related lawsuits, it may in effect say, in the words of Christopher Walker (who heads Swiss Re's Greenhouse Gas Risk Solutions unit), "Since you don't think climate change is a problem, and you're betting your stockholders' assets on that, we're sure you won't mind if we exclude climate-related lawsuits and penalties from your D&O insurance."

Social and environmental imbalances are also becoming salient to more and more consumers. For example, growing numbers of consumers are realizing that the terms of global trade often unfairly favor the rich. For example, Oxfam's report on global trade's "rigged rules and double standards" has catalyzed a growing "make trade fair" consumer movement in Europe,

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which more and more businesses are watching closely as an indicator of shifting consumer values. Today, "Fair trade" coffee, once assumed to be a small niche product for well-off consumers, is the fastest-growing segment of the coffee business in the United States and Europe.

The terms of global trade often unfairly favor the rich.

Even the presumed last bastion of business-as-usual growth at any cost, investors, are seeing the risks in present strategies and starting to be a force for change. Today, over 10 percent of equity capital in the United States goes through a social or environmental "screen," a number that has grown from virtually zero a decade ago. A small but increasingly influential group of investors are making sustainability the cornerstone of their thinking. I learned this firsthand from the president of one of the world's largest pension funds four years ago when, in a private meeting, he shared his 10 criteria for managing his investment portfolio: each an aspect of social and environmental responsibility that he regarded as the best indicators of "good management and long-term financial return. The current corporate social responsibility (CSR) movement seems to be just a first step in major shifts ahead, driven by one simple fact: As Frank Dixon, former research director of a major investment advisory firm, notes, "The current economic and political systems essentially force firms to be irresponsible and unsustainable by not holding them fully accountable for negative impacts on society."

Businesses Discovering They Cannot Go It Alone

A small but growing group of global firms are seeing these historic changes in their environment as being truly strategic. In the fall of 2005, Wal-Mart CEO Lee Scott committed the company to long-term goals of zero waste, 100 percent renewable energy, and selling sustainable products. Six months earlier, GE's CEO declared the firm's intent to invest in a broad range of more sustainable products. By these actions, GE and Wal-Mart joined a small group of industry leaders who have been pursuing strategic opportunities relating to sustainability for many years. For almost a decade, Unilever, one of the largest consumer goods companies in the world, has had three strategic imperatives: sustainable agriculture, sustainable fishing, and water. In the late 1990s the company began working toward a global certification process for sustainable fisheries, now established as the independent Marine Stewardship Council. BP and its CEO John Browne have spurred the oil industry to take global climate change seriously, starting with Browne's historic speech at Stanford in 1997, the first ever by an oil company CEO on the subject.

The global food system is the world's greatest generator of poverty.

But what even the most powerful firms cannot achieve in isolation is limited. The goals of these companies, in Dixon's words, "cannot be achieved without large-scale change in areas including supply chain, regulatory and consumer awareness." All businesses sit within much larger commercial systems, and it is these systems that must change, not just individual company policies and practices. In a real way, the most important role of leading organizations like GE, Wal-Mart, Unilever, and BP is to catalyze development of larger learning communities and to, as Dixon says, "proactively work with others to achieve system changes." And the partners in these larger communities will be not only other companies *but NGOs and governmental organizations as well.* There is very little historical precedent for such learning partnerships. But then, there is very little precedent for learning challenges of the scope we now face.

For example, in 2002, Unilever, Oxfam, and the Kellogg Foundation began conversations about the challenges of shifting global agriculture systems. Despite little public recognition in rich northern countries, the global food system is arguably the greatest generator of poverty, and consequently social and political instability, in the world today. Prices for agricultural commodities have fallen 30 percent to 90 percent over the past 50 years, making cheap food readily accessible for the rich northern societies and simultaneously making living incomes increasingly inaccessible in poorer food-producing countries. For example, a 2002 Oxfam report showed how falling prices for coffee have created a "crisis for 25 million coffee producers around the world," many of whom "now sell their coffee beans for much less than they cost to produce." Rich northern countries spend $500 billion dollars a year in subsidies to protect their farmers against falling prices, something that is not possible for poorer southern countries.

Only by getting enough of the key players in this system working together is there any chance of reversing the tragic "race to the bottom." Today, the "Sustainable Food Lab" involves more than 50 major businesses, NGOs, and governmental organizations working together to "bring sustainable food practices into the economic mainstream." While there is a long way to go, an extraordinary and diverse network of committed actors has developed and a host of initiatives demonstrating alternatives have been launched. For example, a "business coalition for sustainable agriculture" that includes many of the largest food businesses wants to establish clear and agreed-upon standards for sustainability that could guide all. Others are working to make the total distribution of profits in food supply chains visible to

all key actors – including consumers. Imagine going to the grocery store and seeing two bins of green beans: one 30 percent more expensive than the other. Atop each is a picture showing where the money goes in each supply chain, along with an assessment (verified by an independent body) of the extent to which each provides a living income to all the players, including the farmers. Which would you purchase?

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What Does All This Mean for Leadership?

A simple, penetrating question led me to write this article: "Are the basic fundamentals for sound leadership the same and we are just responding to a different world, or are the fundamentals shifting?" After some thought, my response is an unequivocal, "yes."

For me the fundamentals start with a set of deep capacities with which few in leadership positions today could claim to have developed: systems intelligence, building partnership across boundaries, and openness of mind, heart, and will. To develop such capacities requires a lifelong commitment to grow as a human being in ways not well understood in contemporary culture. Yet, in other ways, these are the foundations for leadership that have been understood for a very long time. Unfortunately, this ancient knowledge has been largely lost in the modern era.

Systems Intelligence

Problems like those created by our global food systems are largely invisible because people do not know how to see such systems. "The inability of leaders to see the systems and patterns of interdependency within and surrounding our organizations threatens our future," says Ford's former CIO and head of strategy, Marv Adams. "Many big problems that could be solved are sitting there unsolved because of this failure."

Two particular systems thinking skills are vital: *seeing patterns of interdependency* and *seeing into the future*. It is one thing to say "we are interdependent," and it is another to actually understand what this means *specifically*, especially for problems created by the present systems that no one knows how so solve. Before the members of the Food Lab could work together effectively, they needed to share understanding of the systemic forces driving the "race to the bottom" and how they were all part of creating these forces: as companies pursuing business-as-usual business models with little regard for the effects on farming families and communities or on environmental systems, as farmers unable to moderate pressures for

continual production growth, and all of us as consumers whenever we buy food at the cheapest price with little thought as to where the food comes from.

Once people start to see systemic patterns and understand the forces driving a system, they also start to see where the system is headed if nothing changes. The power of the "race to the bottom" metaphor for the Food Lab participants is that it helps everyone think about what "the bottom" means to them and their organizations, and to realize why this is not a future in which they want to live.

Once people start to see systemic patterns and understand the forces driving a system, they also start to see where the system is headed if nothing changes.

"Seeing into the future" is not a prediction in the statistical sense; it is simply seeing how a system is functioning and where it is headed. Today, the world is in desperate need of seeing into the future regarding problems like CO_2 emissions and climate change, the globalization of food and other industries, and the spread of poverty. The inability or unwillingness to see where we are headed is a massive failure of leadership foresight.

Building Partnerships with "The Other"

In some ways the most challenging aspect of the Food Lab has been simply getting such diverse actors to be willing to work together. "Doing something about sustainable agriculture will require bringing parties together that normally do not cooperate," says Andre van Heemstra, recently retired member of the Unilever management board. This not only means diverse businesses collaborating across complex supply chains, it means leaders from NGOs and government who would never normally work with business counterparts.

Transforming larger systems will not arise from the traditional transactional relationships that characterize interactions among business, government, and NGOs. "The relationships among leaders across normal boundaries might be the most crucial ingredient to major change," says Hal Hamilton, director of the Sustainable Food Lab. Building genuine partnerships takes time and real commitment. It is not just that those who might form potential partnerships have never worked together; they have mostly fought each other, often seeing one another as the primary obstacle to progress as they defined it. When they have interacted, it has been almost entirely to pressure one another to achieve their individual aims. It took many months of close work in a process that fostered deep reflection and candor before participants in the Food Lab found themselves developing real connections, trust, and respect for each other, gradually recognizing that their strength as a team *came from their differences*.

This same challenge of working with those who are very different from us arises within organizations as well. "Organizations are coercive systems," as Edgar Schein says. They tend to enforce a party line, either overtly or subtly. Listening to the periphery, those who do not share the views of the management mainstream, is a skill that more and more leaders will need because, more and more, the management mainstream will have only limited understanding at best of the forces shaping change.

Openness

Leaders who can build partnerships for seeing larger systems must also be open to not having all the answers. There is no "right model" for a complex system. To all intents and purposes, the global food or energy systems are infinitely complex. Good system models like those used in the Food Lab are by their nature incomplete and flawed. The criterion by which they must be judged is usefulness, not absolute accuracy.

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This means that effective leaders must cultivate open-mindedness in order to challenge continually their own favored views and to learn how to embrace multiple points of view in the service of building shared understanding and commitment. This is easy to say but extraordinarily difficult to do. The Sustainable Food Lab was designed so that its members have to continually face their very different ways of seeing. For example, after a visit with a small farmers cooperative, a list of observations from the team included the following items: "hard working, very political, not sustainable, very sustainable, needs to be modernized, needs time to mature, an excellent model." One lab team member commented, "I am so amazed that this number of people can look at the same thing and see something so different. . . . There is so much I don't understand about others' perspectives."

To become a leader, first become a human being.

But open minds ultimately also require open hearts, becoming vulnerable to see how *we are all part of the problem*. If people do not see how they are part of the problem, they will remain in blaming mode and never tap the deeper forces for partnership and change. Their attitude will always be that "they need to change," an especially disempowering signal when it comes from leaders at the top of an organization.

The third opening, of the will, involves discovering that our deepest commitments arise almost despite ourselves. It involves letting go of the last remnants of what Otto Sharmer in the book *Presence* calls "our small 's' self" and letting come "the future that comes into being through us and with what we are here to do." This opening has been described by countless poets and mystics—indeed it is one of the oldest and most universal aspects of diverse spiritual traditions. It is what George Bernard Shaw called, "The true joy in life, the being used for a purpose you regard as a mighty one." Or, as one of the Food Lab team members said, "We had come to a profound place of connection, with one another and with what we are here to do."

Speaking in ways like this may seem romantic for today's times, but the subtle developmental processes behind these three openings have been understood for a very long while—and the loss of them may be a major reason we now struggle. In the famous "The Great Learning," Confucius described "seven meditative spaces" through which those seeking to become leaders must pass in letting go of old ideas and identities and coming to a place of stillness and peace where the mind no longer imposes itself on reality. He summarized by saying that to become a leader, "One must first become a human being." The meaning of this simple assertion remains hidden so long as we think we understand humanness. On the other hand, if we regard the human as a great mystery, if we understand humanness as being connected to the universe in ways that we can barely imagine, if we believe that the journey to discover and actualize who we actually are is the journey of our lifetimes, then there may be some chance that the leadership required for this new millennium will come forward.

ABOUT THE AUTHOR

Peter Senge is a senior lecturer at the MIT Sloan School of Management, and the founding chair of SoL. A renowned pioneer in management innovation, he is the author of the widely acclaimed *The Fifth Discipline: The Art and Practice of the Learning Organization* (Doubleday/Currency 1990).

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The Natural Step:
A Vision for Sustainable Societies

A conversation with Karl-Henrik Robèrt and Manfred Mack

Karl-Henrick Robèrt

Manfred Mack

SoL France wanted to discuss the idea of shared vision with Karl-Henrik Robèrt because the originality and power of his undertaking have made him a striking innovator and inspirator in the sustainability arena. Trained as a medical doctor, Robèrt was a cancer scientist at the University Hospital of Huddinge in 1989 when he launched an initiative aimed at making his country, Sweden, a model of sustainable development. He began by pulling together scientists who, through an innovative consensus-building approach, collaborated in crafting a description of the basic scientific principles underlying sustainability in language which the general public could easily comprehend. The approach lent the effort enormous credibility and engendered strong support. The text the scientists created became the basis for a booklet and audio-cassette which were sent to every household and school in Sweden. The project was financed by a network of major Swedish companies to which Robèrt had "sold" the idea. Later, the work of the scientists enabled the development of a strategic methodology designed to help companies and local communities identify and implement measures to prevent environmental degradation. Today, The Natural Step Institute is established in a dozen countries, and helps many large enterprises and municipalities develop strategies to preserve the health of our societies and the planet. We know of few examples for which a shared vision approach has produced such a powerful impact.

— Manfred Mack

SoL: *Could you give us an overview of the main aspects of your work and of the approaches you have conceived?*

Karl-Henrik Robèrt: It is a long story, but it boils down to the idea that leaders today, to be qualified as competent, need to integrate new understandings focused on systems thinking. They must acquire shared representations regarding the notion of sustainable development. What does sustainable mean? The term was invented because our societies develop in ways that intrinsically include design errors that, despite all of our progress, lead to an increasingly negative impact of human activity on our habitat, the Earth; therefore, we need to rethink these approaches to insure the durability of our societies. If the current erosion continues, it will, as a consequence, lead to a major collapse of the system, including the global human society.

We came to visualize this trend toward erosion as a funnel. We say that each company, each community, is somewhere in this funnel, the walls of which are leaning more and more inward. This metaphor expresses the general decrease in manoeuvering space. At TNS, we recommend a reflection process that helps decision-making and behavior so that these organizations and our societies move through the funnel toward its exit.

What are the main reasons for the funnel's walls leaning inward, for the loss of manoeuvering space?

The future must be invented; it is not an extension of the past.

There are several explanations. The first is reductionism, which is the tendency to try to reduce a complex problem to its individual elements and to deal with each one by one. Thus, there are efforts to deal with deforestation, with overexploitation of fishing zones, with water pollution, etc., without trying to understand the deep causes which are the source of these multiple problems. What we need is a common perspective, a global vision.

A second explanation for the coming closer of the walls has to do with our dominant work methods, which are forecasting and problem solving. We start with the present to anticipate the future (forecasting); we look at present problems and seek solutions to these problems for the future. We thus manage to build the future as an extension of the past. In a world that is changing and, worse, one that is deteriorating, such approaches are erroneous.

We need to find a way to act in the present, from the perspective of a desired future, a shared vision. We call this approach backcasting.

A Future Described in the Form of Basic Principles

SoL: *In the TNS approach, how does one go about describing, inventing, imagining such a "desired future"?*

KHR: Here is where we, at TNS, have made a real breakthrough. The planet is an extraordinarily complex system. Each expert has his or her own opinion on how it works, but each is based on a viewpoint which has to do with his or her domain of expertise. How can one, in such a situation, describe a desired future on which all can agree? Again, we have proposed a way to visualize our approach: the image of a tree. It is an illusion to try and imagine a future at the level of details, symbolized by the leaves. It is possible to arrive at a more plausible description of the future by adressing the level of the trunk, in other words, the basic principles which are at the source of everything else.

This is where the work I did with our network of scientists really proved to be useful. By going through a process, which I will describe later, we defined four basic principles (see box below) for sustainable societies. We believe that these principles are necessary for sustainability, general so that they can be understood by experts and enterprises from different fields, concrete so that they really guide planning and actions, and distinct to allow comprehension and make it possible to monitor the transition towards sustainability. If these principles are not followed, human activity will continue to have negative consequences regarding the environment and society, thus further reducing our manoeuvering space.

SoL: *When I look at these four principles, two questions and a remark come to mind. First, how did you arrive at these definitions of the four principles? And, second, how do you work with companies in applying these principles? Listening to you, one becomes conscious of the difficulty that one is likely to encounter in establishing a link between individuals and the interactive processes with our planet, which are part of the way we live and over which we feel that we have little influence.*

The Four Basic Principles ("System Conditions") for Sustainable Societies

In the sustainable society:

1. Nature is not subject to systematically increasing concentrations of substances extracted from the Earth's crust. Concentration tends to increase because such substances are dispersed outside the Earth's crust faster than the pace at which they would naturally return to it (through burying or through absorption as part of slow processes after fossilization), thus causing a dangerous increase in concentration of elements in the biosphere.

2. Nature is not subject to systematically increasing concentrations of substances produced by society. Concentrations tend to increase because the substances are spread faster than the pace at which they can be broken down and transformed into new resources for nature.

3. Nature is not subject to systematically increasing degradation by physical means (including disproportionate extractions and manipulation of ecosystems). Examples of disproportionate extractions include clearcutting of forests over excessive areas and over-fishing in seas and lakes. Examples of manipulation of ecosystems include, modification of groundwater levels, soil erosion by poor management of forests or cultures, and risks from the utilization of GMOs (genetically modified organisms).

4. Human beings are not subject to conditions that systematically diminish their capacity for meeting their needs. It is necessary, while following the preceding three principles, not to allow the abuse of economic and political power to erode the capacity of people to meet human needs world-wide: subsistence, protection, participation, leisure, affection, understanding, creation, identity, and freedom. (Needs as defined by Manfred Max-Neef, Chilian economist).

— Adapted by Manfred Mack

KHR: You are right, and it is precisely the need to build such a link that has made it so important to have our network of scientists play their role. In our work with them in producing the big mailing to all Swedish households, we did not arrive at the formulation of the four principles. We started by writing a text that gave an overall description of the system, with emphasis on the cycles of nature and the self-benefit that would follow from becoming part of the solution rather than the problem. I wrote the first draft myself and then handed it out, progressively, to about fifty scientists who were among the most reputable in Sweden. In sending out this document, I was inviting them to a dialogue. They were asked to comment on, or modify, the draft and return it to me.

After 23 successive versions, we finalized the document in December 1988. We now had a solid platform on which to build the next part of our approach. And at the same time, I had invented a consensus-building process that we later refined. It was, one could say, another way of creating a shared vision. Since they had participated in the writing of a foundation document, my scientific partners of course agreed to its content!

I used the same approach, starting in 1992, to produce a first version of the four principles for sustainable societies. These principles evolved through the consensus-building process to arrive at the version presented above, unchanged since 2002. It is important, however, to emphasize that this does not mean that these principles will stay unchanged forever. The Natural Step approach is open and the principles will evolve if it is shown to be necessary. It is on the basis of this second platform, written in more concrete terms than the first, that we developed our strategic methodology we call backcasting and the other tools that companies use to begin acting.

Tools to Translate the Principles into Concrete Action

SoL: *Could you describe the methodology and the corresponding tools used and, if possible, illustrate the way they are applied in companies?*

KHR: The basic set of tools is derived from the elements and the "pictures" that I already talked about: the funnel, the tree, knowing that for the latter, the focus will be on the trunk and the backcasting process.

We start by organizing a seminar for the top executives. We present to the management team what we call the TNS Framework, which includes our approach, the basic principles and going through the funnel metaphor. We also discuss how to develop strategies that are approaching the company's visions, informed by the sustainability constraints and will systematically decrease the company's financial risks and foster redesign and innovation toward new markets. We invite members of the management team to imagine that their company has come out of the far end of the funnel. The objective is, based on such a desired future, to assess the present situation (backcasting) in order to move strategically toward the exit of the funnel, guided by the "compass" represented by the four principles.

The approach then proceeds through 4 steps:

1. Make sure the methodology and the corresponding rules of the game have been assimilated. Be certain that the participants have a shared understanding.

2. Assess the present situation of the company in relation to the desired future. Practices that are critical with regard to the four basic principles for sustainability are listed, as are assets and conditions that will be favorable in solving the problems.

3. Imagine solutions which will need to be implemented by the company in the future so that the basic principles are followed, without, for the time being, worrying about necessary means (financial, technical, organizational).

4. Select, from the solutions suggested in step 3, the initial actions to be launched now (backcasting) in such a manner that they will (1) take the company in the right direction, (2) act as "flexible platforms" which make other improvements possible (to avoid costly dead-ends later on), and (3) enable money-making in the short and medium term so that a virtuous cycle is set in motion.

The management team is encouraged to become actively involved in the process starting on day one of the seminar. It is important for the participants to become aware of the fact that it is possible to trace a strategic path, which, in the future, will enable the company to operate while being fully in agreement with the four basic principles and also be able to generate financial profits.

Create the Conditions for Wide Participation

Normally, following this seminar, management decides to extend the approach to the whole company organization. To do so, we train most of the managers and the employees in the application of the framework, the final objective being that all salaried personnel play an active role in the general transformation of the organization. The Scandic Hotel Group is a good example. All 5,000 workers were trained in applying the TNS approach and they generated some 2,000 ideas for action, of which 1,500 were implemented in the first year.

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SoL: *Could you explain what you meant by "flexible platforms," mentioned in your description of step 4 of the approach?*

KHR: These are, in most cases, actions which are good solutions to a problem that needs to be dealt with immediately and which, at the same time, can accomodate an array of different subsequent solutions which brings the company closer to its "desired future." An example would be a measure to save energy, and thereby fossil fuels, in order to be able to afford a transition to renewable energy later on. If such savings are made in a way that "marries" the company to fossil fuels for the future, it is a mistake. And vice versa, it is important to not unnecessarily "lock on the target" too early in a process, but to launch moves that can be furthered along optional development paths.

SoL: *Which companies have successfully implemented the TNS approach?*

KHR: Quite a large number. Among these we can speak of IKEA, Electrolux, Scandic (Hotels), McDonalds (Sweden), Carillon (UK), Banco Real (Brazil), Interface (U.S.), and Matsushita (Japan). The approach has also been applied by several local communities, including the municipality of Whistler in Canada which will host the next Winter Olympic Games. The TNS approach made it possible for policy makers, businesses and a large part of the local population to define and implement a regional development plan that took into account actions both global (climate changes which, longer term, could affect the whole economy of the community) and local (ensuring that persons hired to do local jobs could be housed near their place of work despite high real estate prices). The way Whistler applied the TNS framework to lay out this plan is documented in their "2020 vision" statement. For this undertaking, Whistler was awarded first place in the "Planning for the Future" category of a United Nations sponsored, international competition called the "LivCom" Awards.

SoL: *What impressive results! And what about TNS's future projects?*

KHR: So far, in the twelve countries in which we operate, we have worked with one organization at a time. We believe that in order to have a more significant impact, it is necessary to get several sectors of activity to work together. We are therefore going to launch programs that go in the direction of multidisciplinary and multi-sectoral cooperations.

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More information about The Natural Step can be found at *http://www.naturalstep.org/com/nyStart/* . Other articles by SoL members about The Natural Step can be found online in the SoL Library.

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Gross National Happiness:
Measuring What Matters

Frank Dixon

Frank Dixon

This article is adapted from a paper presented at the Gross National Happiness conference in Thimphu, the capital city of Bhutan, in February, 2004. Frank Dixon was invited to speak about GNH from a business and economic perspective. The conference was sponsored by UNDP and organized by the Center for Bhutan Studies, a Bhutanese policy group. Attendees included members of the Royal Family, the Prime Minister, senior Bhutanese government officials and Western experts in various fields. The GNH program was established by the King of Bhutan in 1972. The four pillars of GNH are: sustainable and equitable socio-economic development, good governance, preservation and promotion of cultural heritage, and environmental preservation. The original paper, and additional articles by Dixon, can be accessed online through the SoL Library.

Bhutan's interest in developing a Gross National Happiness index (GNH) reflects great wisdom. GNH is intended to be a more accurate measure of social well-being than Gross National Product (GNP), the primary indicator of social well-being in Western nations. GNP is a crude measure that counts many social negatives as positive (ie: incarceration, illness). It fails to count services that enhance social well-being (ie: parenting, volunteering), degradation of critical assets (ie: forests, water, air), and intangible factors, such as happiness (the ultimate goal of many people). It probably is no coincidence that Western economies are rapidly degrading environmental life support systems and making many people unhappy (as indicated by factors including growing obesity and anti-depressant drug use). What doesn't get measured doesn't get managed.

Systems Perspective

Western economic systems have produced great improvements in many areas including technology, medicine, and the provision of essential and non-essential goods and services. However, as industrial economies continue to grow in a finite world, the overall impact of these systems is increasingly negative. Inefficient use of resources, high levels of pollution and numerous social disruptions resulting from industrialization have caused human society to be grossly unsustainable.

Unsustainability is driven largely by the failure to adopt and act from a systems perspective. A cell cannot survive apart from the body. So the relevant perspective for human health is at the total body level. In the same way, a human cannot survive apart from the Earth. So the relevant perspective for human survival and prosperity is global. Every person, plant, animal and thing on this planet is part of one interconnected system. This total system is too complex for any one person to understand. As a result, systems are broken into parts (reductionism) and studied in isolation rather than in relation to each other.

Modern economic and business theories were developed from this limited perspective. Firms are seen as being separate from each other and the rest of society. It is believed that they must compete with each other for scarce resources. Modern economic theory also says profits must grow indefinitely: Failure to grow equals death. However, in the real world, failure to restrain growth equals death. Encouraging subcomponents of a system to compete with each other and grow indefinitely is analogous to cancer in the human body. Ultimately, the cancer kills the host, then dies itself. Despite the best of intentions, this is exactly what modern economic systems are doing to the Earth.


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This shortsighted action on the part of humans is completely understandable. Nearly all academic knowledge has been developed from the perspective of the individual human mind (since that is the mechanism doing the contemplating). However, as noted above, this is not the relevant perspective for human survival and prosperity.

The wisdom of Buddhism is in seeing beyond the illusion that the individual is separate from the rest of the world (fostered by the five senses) to the reality that everything is interconnected (a reality being shown by quantum physics and other branches of science). Through the experience of millions, Buddhism and other traditional religions have shown that expanding one's perspective from being an isolated individual to being part of one interconnected system leads to a more fulfilling, sustainable and effective existence.

This wiser, larger perspective is as relevant for business and other human organizations as it is for the individual. Businesses actually are part of one interconnected system (whether they realize it or not). Raising business consciousness means helping firms understand and act upon this knowledge of interconnectedness. From this perspective, firms maximize their own well-being by working to maximize the well-being of the overall system.

Gross National Product

In all fairness, GNP was never intended to be a measure of overall social well-being. Instead, it was intended to be a measure of economic growth. Western economic theory makes the assumption that economic growth will enhance social well-being. In some ways this is true, for example when basic human needs are better met. However, GNP is an incomplete measure. It does not account for the environmental and social degradations that often accompany economic development.

Social well-being is a complex measure consisting of many tangible and intangible factors. The measure cannot be reduced to one quantitative, monetized number. GNP is a misleading indicator of social well-being because it counts growth of many social negatives as positive, such as incarceration, medical costs, anti-depressant use, environmental damage, and related

Western System Flaws

Many things that appear to be logical from the individual person, company, and country perspective are not logical from a system perspective. For example, time-value-of-money, a foundational economic concept, makes sense to the individual because it's better to have resources, such as food, today rather than in the future. But this concept also says that people and resources beyond 50 to 100 years are worthless, therefore, protecting them would be a foolish economic decision.

Additional system flaws include things like limited liability structures, which provide unlimited upside potential to investors, but cap the downside by transferring risk mostly to low- and middle-income taxpayers. This is a major factor driving the widening gap between rich and poor. The failure to incorporate externalities into prices causes nearly all prices in our market system to have very large distortions, which drives waste and inefficiency. The demand for ongoing economic growth in the finite Earth system makes it difficult for human society to voluntarily achieve stability and balance. And by giving priority to only one aspect of society's success (economic growth – GNP), other aspects are not adequately addressed. This causes the overall well-being of society to decline.

In the political area, the ability of regulated entities to influence regulators through campaign finance, lobbying, and other processes makes it effectively impossible for government to hold firms fully responsible for negative impacts on society. Failure to hold firms fully responsible in a competitive market means firms must negatively impact society to remain in business. Companies attempting to fully mitigate negative impacts would put themselves out of business because costs would become too high relative to firms that were not fully mitigating.

remediation. The measure also does not value many of the services which contribute to social well-being, such as parenting, mentoring, and volunteer work.

GNP also fails as a measure of social well-being since it does not account for assets. Businesses gauge financial condition and performance by using a balance sheet and income statement. Using GNP to measure social well-being (or even economic performance) would be like a firm using only an income statement to measure financial condition. A more accurate indicator of social well-being would decline when assets, such as forests, clean air, and clean water, were consumed. Finally GNP fails as an indicator of social well-being because it does not measure intangibles, such as inner peace and happiness (factors that many consider to be the ultimate goal of life).

It is critical that an alternative to GNP be developed in large part because society tends to manage what is measured. If humanity does not measure the state of its life support systems or the happiness of people, these issues will continue to be low priority. Failing to measure environmental and social conditions will drive further declines and cause human society to become even more unsustainable.

Developing and Implementing Gross National Happiness

In most important areas, Bhutan appears to be ahead of many Western nations. The country is one of the few regions where humans live at or near a sustainable level. In addition, the country seems to have higher levels of happiness as measured by family stability, lack of violence, and other metrics. However, life is hard for many Bhutanese. Western technology, products and know-how could help improve living conditions and better meet basic needs in many cases. The difficulty will be gaining these benefits while avoiding the environmental and social degradations that nearly always accompany Western-style development.

Development is a misleading word since it implies improvement. Countries often wind up

Total Corporate Responsibility

In the corporate responsibility (CR) and sustainability movements, nearly all efforts to lower environmental and social impacts have focused on corporate-level issues. But most impacts are systemically driven, and therefore cannot be mitigated without system change. Total Corporate Responsibility (TCR) integrates corporate-level CR efforts with mid-level and high-level system change efforts. Mid-level efforts focus on lowering sector-specific environmental and social impacts. This involves working with suppliers, regulators and other stakeholders as well as raising public awareness. High-level efforts involve addressing broad economic, political and social system flaws.

Wal-Mart is one company that illustrates the successful integration of mid-level system change efforts. The company is implementing an aggressive CR strategy, working with suppliers and other partners to improve environmental performance in specific sectors, functional areas, and geographic regions. Gazeley Ltd, a wholly owned but independently operated Wal-Mart subsidiary based in the UK, is going even further by implementing TCR and integrating high-level system change efforts. A global real estate developer of distribution warehouses, Gazeley provides Wal-Mart and many other clients with environmentally-superior facilities that lower energy use and carbon emissions by as much as seventy percent. To drive mid-level system change, the company is working with suppliers, contractors and other partners to improve environmental and social performance. To address high-level issues, the company is implementing a collaborative system change effort, called the Sustainable Systems Initiative (SSI).

Through SSI, Gazeley is working with business, government, academic, NGO and civil society leaders to articulate a vision of a sustainable world, identify systemic barriers to sustainability, and develop practical means of addressing them. While dialogue is a key aspect of collaborative efforts, the strong focus of SSI is on generating quick wins that build enthusiasm and support for addressing longer-term, more complex issues.

More on TCR can be found at *www.globalsystemchange.com.*

worse off in many ways from their exposure to Western ideas, marketing, technology and business practices. For example, Western business models force companies to focus primarily on growth. To increase sales, advertising is used to get people to buy products, often by making them feel inadequate without the advertised product.

In many cases, this type of advertising causes young people in developing countries to lose interest in their parents' values – values that have sustained these cultures for many years. As a result, young people often move from villages to cities where they frequently cannot find work. Through this process, advertising and Western media can cause social degradation by divorcing a country from its traditional values.

Economic development is often prompted by Western corporations seeking new markets and new sources of raw materials. Financial institutions, such as the World Bank, provide funding for infrastructure construction, which in turn provides revenues to Western firms. To pay off debt, developing countries are often compelled to adopt an export-oriented economy, which is usually built upon export of their natural resources.

Through corruption, weak legal systems and intense economic pressure, countries often wind up selling their resources for much less than market value. This infrastructure-debt-export cycle can cause living conditions to worsen as economies shift from meeting internal needs to generating foreign exchange through exports. In addition, this process frequently results in severe environmental degradation and disruption of indigenous cultures.

GNH can be the measurement component of an overall plan to maximize social well-being. The first step in developing GNH would be to identify a preferred society in the greatest detail possible. This information would be used to identify the relevant components and metrics of GNH. Finally, a practical plan for achieving GNH goals would be developed and implemented.

Establishing Goals

With input from all stakeholder groups in Bhutan, the components and goals of a preferred society should be identified. Social goals and priorities are implicitly known and conveyed through cultural processes in Bhutan. However, it will be important to make these goals more specific as Bhutan considers Western-style development. Having more specific social goals and priorities will help Bhutan determine which development actions would enhance social well-being and which would degrade it.

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Social goals should be established in great detail. The process would comprehensively look at all tangible and intangible aspects of society. Goals would be established in areas including education, health care, housing, clothing, food and nutrition, shelter, environmental and habitat protection, parents spending time with and raising children, arts, business practices, infrastructure, legal and regulatory issues, and reported levels of happiness.

This process could be achieved through various mechanisms. For example, an interdisciplinary group of experts might develop a report that addresses all these issues and makes proposals over the short, mid and long-term. This would serve as a starting point for dialogue among Bhutanese stakeholder groups. Over time, a consensus document could be produced that would guide development of GNH.

Developing GNH Metrics

Using the ideal state defined above, specific metrics can be identified to measure performance on every tangible and intangible aspect of social well-being. For each metric, current performance would be quantified and short, mid and long-term goals would be established. This process may be highly complex as many intangible factors will be difficult to quantify. As a result, proxies will be needed to track performance for some intangible factors.

Complexity will be further increased by the likely need to develop alternative means of measuring success. Literacy and education provide good examples of this. Illiteracy is high in Bhutan. This would be seen as bad from a Western perspective. However, Bhutanese children may be far better educated on the most important aspects of life than American children. Bhutanese children spend much more time with their parents. In doing so, they learn cultural values, social skills, and the agricultural and other skills needed to sustain them over their lives.

In the U.S. education system, children must learn the same set of knowledge (math, science, English, etc.). A competitive grading system teaches children to see peers as obstacles to their success (which weakens social skills). It also makes children feel inadequate if they are not good at a subject in which they may have no interest. This system encourages conformity, rather than encouraging children to find their own unique passions and interests to build their lives upon.

In addition, children are made to sit for up to seven hours per day, five days per week and listen to an adult talk to them, something few adults would want to do. Children are meant

to be moving around and learning by doing. To an increasing degree, when children won't sit still in class (ie: when they act naturally), they are given powerful drugs that numb their minds into obedience and passivity.

Add to this obesity, drug use, teenage pregnancy, depression, suicide and weak academic performance relative to other nations and it appears Bhutanese children are far better educated than American children. This illustrates why it is critical to identify the preferred state of society and use this to guide selection of performance metrics. Simply accepting Western social performance standards might be a mistake.

In the U.S., children see an average of over 100,00 commercials and advertisements by the time they graduate from high school.

Once metrics and performance standards have been established, they can be assembled into an overall GNH measure. Rather than attempting to render the state of society down to one number like GNP, GNH would provide a suite of performance indicators. The performance of society is highly complex and needs to be expressed on many dimensions. By following this approach, GNH would provide a far more accurate measure of social well-being than GNP.

Developing a Strategy to Achieve GNH Goals

The above process of identifying ideal and actual social performance will reveal performance gaps. Through a stakeholder dialogue process, these gaps can be prioritized. This process could be expedited if the expert report noted above contained suggestions for prioritizing areas needing improvement. Again, this report could serve as a basis for initiating stakeholder dialogue.

A specific action plan for maximizing GNH cannot be developed until social performance gaps are identified and prioritized. Once these are established, the following guidelines may be useful in developing a successful plan.

Minimize the Need for Foreign Exchange

As noted above, less developed countries often pay a high environmental and social price for incurring debt and developing an export-oriented economy. This is why it is important to understand the trade offs that would occur from importing Western products and technology. Development strategies should be focused on getting the benefits of Western technology and products without having to pay high social costs. For example, rather than importing products, Bhutan may be able to work with other parties to build low cost factories that produce the desired products in Bhutan. This would create jobs and minimize import costs, thus reducing the need for foreign exchange.

Because Bhutan would be developing a more effective and sustainable economic system that could be used as a model by other nations, it is likely that several parties would help in this process. For example, foundations, non-governmental organizations, high net worth individuals, national governments and other organizations probably would provide some funding for such projects. These organizations could also help in developing creative strategies for minimizing the cost of factory construction and sourcing raw materials.

An emphasis should be placed on importing or building only products and technologies that are environmentally and socially responsible. Priority probably should also be given to essential goods and services, rather than non-essential items. Areas to consider might include

renewable energy, housing, organic agriculture and foods, clothing and medical care.

Develop More Effective and Sustainable Business Models

In the West, especially the U.S., the means have become the end. Society appears to be focused on helping business prosper (as indicated by the short-term focus of government, the corruption of social values through advertising and many other factors). However, business is meant to serve society rather than dominate it.

Guiding principles, laws and regulations should be established to ensure that business always serves rather than dominates Bhutan. These principles should ensure that business is always held fully responsible for negative environmental and social impacts. If quantification of impacts is difficult (as it might be with intangible social impacts), a panel of unbiased experts would estimate the cost and include this in prices. In this way, being fully responsible would be the profit-maximizing path. As noted above, not holding firms responsible forces them to be irresponsible.

Another key guiding principle is that there should be no pressure for businesses to grow. Instead, firms should be incentivized to seek optimal size and become more efficient over time. This process could be modeled after the infinitely more sophisticated natural systems of which humanity is a part. In nature, systems grow then level off, achieving an optimal balance with other systems. Of course, it is much simpler to say firms should always grow. But this simplicity is destructive. The more difficult and sophisticated approach is to take a systems view and determine firms' optimal roles and sizes in the region(s) they serve.

Emphasis should be placed on importing or building only products and technologies that are environmentally and socially responsible.

In addition, as firms become more efficient, they should be delivering more value at a lower cost. This implies the ideal state for a business whose size has stabilized would be to have revenues declining. This raises concerns about the ability to attract investment. However, these and other problems can be solved if solving them becomes a priority for society. Nature is amazingly sophisticated and complex. Being part of nature, humans have the ability to replace their overly simplistic and destructive economic and business systems with ones that are more sophisticated and sustainable.

Prohibit Western-Style Advertising

The primary goal of Western nations is economic growth (as indicated by the focus of government and business and by the method used to measure success, the GNP). To achieve economic growth, businesses must continually sell more goods and services. Failing to do this often means organizational death in Western economic systems.

To continually increase sales, businesses use advertising to compel consumption. This is often done by taking advantage of human needs for love, self-esteem and acceptance by peers. Cultural messages define what it means to be successful and how one can be accepted by peers. Traditionally these messages were communicated by parents and the larger community. Traditional cultural messages taught and encouraged young people to be honest, kind, and respectful to elderly people.

Advertising takes advantage of the strong influence cultural messages have over the way people live their lives. It often seeks to redefine social standards for the purpose of selling products. Rather than encouraging young people to be fair, honest and respectful (something firms make no money on), advertising usually implies that the way to be successful and

admired by peers is to buy and consume certain products. Ads often show attractive people having a good time by owning or consuming the advertised product.

In the U.S., children see an average of over 100,000 commercials and advertisements by the time they graduate from high school. Each of these is a mini-sermon on the religion of materialism. They tell young people that the way to be accepted is to be attractive and to buy certain products. This drives an obsession with appearance, especially among young girls. This in turn drives depression, eating disorders, obesity, drug use and other compulsive behaviors. As a result, advertising is one of the most destructive influences in Western society.

It is highly likely that Western advertising would be very destructive to the Bhutanese culture. Values are not fully formed until people mature. Therefore, young people are vulnerable to commercial messages that define success by appearance and material prosperity. The capacity for discernment and wisdom generally is acquired as one matures and goes through life experiences. As a result, it is often difficult for young people to see the emptiness that lies behind a life based only on material prosperity. Because of this, every society should keep tight control over the cultural messages communicated to young people. Bhutan should guard against having their young peoples' values corrupted by commercial messages – messages designed to make them feel empty so they will buy something to fill the void.

If business has no artificially induced need to grow, then advertising is not needed to compel purchases. There are other ways to let people know that products and services are available. For example, public service announcements could be used, or honest advertising with no implicit or explicit suggestion that purchasing the product would enhance one's status in society.

Jealousy and competitiveness are characteristics of the immature, unwise, ego-based human mind. These characteristics would exist regardless of the presence of advertising. However, Western-style advertising greatly increases these traits in society, and greatly lowers social well-being. As a result, Western-style advertising should be prohibited in Bhutan.

Infrastructure, Jobs, Barter

Other guidelines for development in Bhutan relate to infrastructure, jobs, and barter. The Western development model often includes infrastructure development projects such as roads and railways. While these obviously provide benefits to society, there are also costs. For example, industrial nations often promote transportation enhancements in developing countries to facilitate resource extraction. This frequently leads to environment degradation. In addition, building roads can increase pressure to switch to an unsustainable fossil fuel-based economy.

Wisdom must increase if humanity is to become sustainable.

This is not to suggest that Bhutan should not increase the comfort and convenience of its people. But only that it should carefully consider the costs and benefits of doing so. For example, it may decide that priority should be given to strong families, community-based living and inner prosperity. If this is the case, then it may be better to pursue a slower infrastructure development path, rather than the aggressive path usually sought by Western nations.

To provide jobs, especially for young people, Bhutan might consider developing a conservation corps and other groups like those developed in the U.S. during the New Deal. These would provide adventure and experience to young people. Projects might include environmental restoration and protection, some infrastructure development, sustainable agriculture, and housing.

Much good work also has been done around the world in developing sustainable business and economic models, such as those based on greater use of bartering. Bhutan should consider sustainable economic systems that have worked in other regions.

Conclusion

Western economic systems are unsustainable because they were developed from a reductionistic perspective that does not take the whole system into account. From a broader perspective, one sees that the economy and business are not separate from any other part of society or the total Earth system. From this perspective, it is understood that all impacts must be considered and factored into prices. The system now operating in the West is a destructive form of capitalism that sends grossly distorted price signals, makes illogical growth assumptions, under-values future generations, and compels irresponsible behavior by not holding firms fully responsible.

By developing GNH, Bhutan will show other nations that it is possible to organize society in a sustainable manner, one that reflects great wisdom.

Bhutan could greatly benefit other nations by demonstrating that it is possible to develop an economy based on a total system perspective. Wisdom must increase if humanity is to become sustainable. Wisdom involves recognizing that all things are interconnected and acting from this perspective. Bhutan can help Western nations recognize this by showing how a more effective and sustainable economy can be developed.

Western economies have demonstrated great creativity and progress in technology, medicine, business and other areas. In addition, Western nations have sacrificed greatly to support democracy, human rights and freedom from oppression and tyranny around the world. In the U.S., business and political leaders appear to be strongly committed to doing what is best for society. However, economic and political systems often force well-intentioned leaders to do the wrong thing for children, the environment, and society overall.

Western economies are so large and entrenched that it will be difficult to improve their destructive, unsustainable systems. However, these systems can only negatively impact the environmental and social realms for so long before there is a price to pay. There is no free lunch. Sooner or later system change will be forced upon Western nations if they cannot develop the wisdom to act first.

Change is difficult. People often defend a destructive system because uncertainty is frightening to the human ego. If feels safer to stick with a destructive, familiar system rather than to deal with the uncertainty involved in trying to improve it. Frequently people will irrationally defend a destructive system by pointing out its benefits. It is as if they are saying Western economic systems should be allowed to continue degrading life support systems and making people unhappy because they provide benefits.

There appears to be a profound lack of leadership wisdom, especially in the U.S. (driven by the subjugation of leadership free will to the omnipresent need to maximize earnings and economic growth). Given the young and immature nature of the U.S., this is perhaps understandable as wisdom is acquired through age and maturity. It should be made clear however that there is great wisdom in the American people, as there was in the work of its Founders. Many U.S. citizens strongly disagree with the policies of their government. Unfortunately, at the highest levels of government and business, a simplistic corporate structure forces leaders

to place short-term profits above all else and often not act on their best intentions. Wisdom is lacking in the U.S. system, not in its people.

Bhutan also has problems. However, Bhutan appears to be more advanced in key areas than many Western nations – it is sustainable (or nearly so) and its people appear to be happier. GNH can help Bhutan address internal issues and further enhance social well-being. And, by developing GNH, Bhutan will show other nations that it is possible to organize society in a sustainable manner, one that reflects great wisdom.

ABOUT THE AUTHOR

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Commentary

By John Ehrenfeld

John Ehrenfeld

Frank Dixon's speech to the Bhutanese is most appropriate in this special issue on sustainability and points out a compelling alternative to our Western ways. The idea of an index of happiness is a welcome change to our customary use of GDP, which is, at best, only loosely connected to real human satisfaction. Although it is not possible to measure happiness any more than to quantify beauty, it has great metaphorical and visionary power. But this fundamental property of happiness makes prescriptive approaches problematic.

I define sustainability in similar terms as the possibility that human and other life will flourish on Earth forever. Flourishing is, like happiness, an emergent property of the whole system. Further, the system in this case is complex, meaning that such properties cannot be connected to the parts by mechanical laws. They will show up only if all the relationships among the parts of the system are functioning properly. It is the relationships that count.

On the other hand, it is possible to identify and frequently to quantify properties that point to dysfunction and negative outcomes. Dixon indicates such items as obesity, drug use, and crime. The implication of this discussion of indices is that if these are reduced, then happiness or sustainability will increase in some sort of positive proportion. This is a common mistake that arises from the failure to accept that complexity is truly disconnected from our everyday understanding of the complicated world. Our culture approaches complicated systems by reducing them to pieces that we can describe, often in analytical terms. And, unlike Humpty Dumpty's case, we believe we can put them all back together such that we can know and control the system at hand.

But complexity is more like Lewis Carroll's original verse. We cannot put all the pieces of complex systems back together again. In most cases, the interesting properties of such systems are exactly those that emerge and make themselves known to us as observers. As many of those who will read this are members of a strongly normatively-driven learning community, it follows that we want to learn how to push the world towards our vision. Unfortunately, learning about complexity is idiosyncratic. It is difficult and maybe misleading to attempt to generalize. Using knowledge gleaned by experience in our Western, modern culture to govern other societies is at best not likely to be effective, and worse may be counterproductive. Some of Dixon's prescriptions reflect this, as they are warnings to keep our hands off the Bhutanese economy. However, it will take more than a ban on Western-style advertising. In a world highly connected by travel, commerce, and the communication media, the importation of Western cultural values and norms is going to happen with or without advertising. It is our values and norms that are the problem.

But to raise these questions about the solutions that Dixon discussed is by no means to diminish the importance of his basic message. Something is dreadfully wrong with our Western, modern ways and our prescriptions for less economically developed societies. One only

has to look at another Himalayan enclave, Ladakh, a semi-autonomous region in the Jammu-Kashmir province of India. Helena Norberg-Hodge has poignantly chronicled the sad story of Ladakh in her book, Ancient Futures. Norberg-Hodge first went to Ladakh, became of the few Westerners to learn Ladakhi, and subsequently established a foundation to help the Ladakhis recover from a neat-fatal dose of Western-style development. To me the most disturbing part of her story is the transformation of a culture of happy people to one of social and economic dysfunction.

It was not the case that life in Ladakh was ever idyllic or utopian. The region lacked what we call basic comforts; illiteracy was high; and life expectancy lower than norms for modern societies. The solution imposed by the Indian government and others was to introduce our concept of "economic growth." But this cure has been worse that the "disease." Slums and unemployment have appeared. The peaceful relationships between Buddhists and Muslims who shared the region in peace for at least 500 years dissolved. The air and water have become polluted.

Like Dixon, she points to ways to reduce the negative impacts of development, but her primary stress at the end of book is aimed not at Ladakh but at us. It is our culture and society that lacks happiness. In her words, "Perhaps the most important lesson of Ladakh has to do with happiness. It was a lesson that I was slow to learn. Only after many years of peeling away layers of preconceptions did I begin to see the joy and laughter of the Ladakhis for what it really was: a genuine and unhindered appreciation of life itself . . . . I have learned another way is possible."

It may be too late for us to learn from the Ladakhis how happiness emerges from the whole society. Perhaps Bhutan has resisted the forces that buffeted their Himalayan neighbors and can still serve as a living laboratory. Bringing sustainability forth as happiness or flourishing needs much more than indices. It needs the kind of learning that can come only from practice, from living there, from bringing back the lessons. As Candide said, ". . . let us cultivate our garden."

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Seventh Generation:
Education for the Consumer Products Business

Jeffrey Hollender

Jeffrey Hollender

This article was adapted from a conversation between Jeffrey Hollender, the CEO of the highly successful Seventh Generation, and Peter Senge, founding chair of SoL. It is one of several conversations with sustainability leaders convened by the SoL Sustainability Consortium. You can listen to an excerpt of the audio portion of this conversation on the *Reflections* website at *http://www.solonline.org/repository/file?item_id=9001446*

About 18 years ago when I started Seventh Generation, I was attracted to the idea that the more products we sold, the more positive an impact we would have on the planet. But in truth, it's more like our products simply have a less adverse impact than traditional products. Our products range from paper and cleaning products, to baby diapers and, most recently, feminine care products. We sell in natural food stores, grocery stores, some mass merchants, as well as through the Internet.

When we started the company, we knew education was going to be a fundamental part of our business. Back then many people had very little understanding of some of the issues that concerned us. People understood the importance of using recycled paper, but they didn't understand why how paper was bleached made such a big difference. They understood the need to keep water clean, but they didn't understand that the air in their homes was probably more polluted than the air outside of their homes.

In a sense, the products become a vehicle for ongoing education. Right on the wrapper of every product, we try to tell a story, and to quantify the impact that the use of this product has on the planet. It includes an environmental saving statement that calculates things like how much water, energy, and trees will be saved. We see our products as an opportunity to give people hope, and to define for them how their actions, as small as it might seem to choose which roll of bathroom tissue to buy, actually make a difference.

Business has become a dominant force in our societies, and people are beginning to say that some responsibility should go along with having that power. If you are in the position of determining the fate of our environment, you need to take some responsibility for the impact that you're having. That's something that business is just beginning to adjust to. Business is not well-schooled in thinking about its responsibility for things like human rights, its impact on the environment, even its responsibility to be educators of the society that they operate in.

One of the underlying challenges is that businesses haven't learned to think systemically, so that they often don't even fully understand the impacts that they have. But even if you're just manufacturing in the United States, it is highly likely that pollution and other externalized costs from your business end up all over the planet. This really requires new thinking.

We struggle with learning how to break out of the patterns that got us to where we are so that we can see outside of them to come up with solutions.

The best companies know they have to begin to move in this direction if they're going to survive. Systems thinking and corporate responsibility (CR) are best practices, not just nice things to do. They are critical from a strategic perspective if business is going to succeed over the long run. Unfortunately, there's no way you can realize the potential of systems thinking or CR if you consider them as add-ons to what you're already doing. You have to integrate thinking systemically into the way your business operates. You have to think about how you educate your own staff. You have to think about your supply chain. You have to think about everything you do in a different way.

There are lots of examples of businesses doing that, even if no one is doing it perfectly. Nike has made great strides over the past decade. British Petroleum has said, "We're going to stand for Beyond Petroleum." They can see that even though 95 percent of their revenue comes from selling petroleum, petroleum is a limited resource and they need to move into an entirely different business. Starbucks is thinking about fair trade coffee and the supply chain in a whole new way. You can argue that businesses are not doing enough, but you can also celebrate what they are doing. Starbucks actually spends more money on healthcare than they do on coffee. They're recognizing a whole new paradigm in the way they need to take care of their labor force for the organization's long-term health.

Investing in Education

We've spent a lot of time trying to understand our corporate assets – the heart and soul of our company – and our global imperatives – what we want to achieve in the world over the next 50 to 100 years. Knowing that part of our essence is about transparency, social justice, and equity helps us recognize when these systems are colliding, and we need to do something different. For instance, about a year ago we were looking at the promotions that we run and realized, "Hey, we're just giving away stuff." Now, maybe it's good stuff – Prius cars and high-efficiency washing machines – but the giving away of stuff doesn't create any real systemic change. Problems won't be fundamentally changed because we give away a couple of cars.

When we asked, "What could we do that would be more in keeping with who we are and the change that we want to see in the world?" we went back to the notion of education. Helping other people to be educators who could have an impact on all the people that they interact with for the rest of their lives seemed like a better thing to do.

On Earth Day this year, instead of giving away washing machines, we entered into a partnership with Greenpeace to train high school and college-age children how to be effective social and environmental change advocates. We are sending 100 kids to a ten-day training program in Washington, where they are committed to learning how to have an effective, positive impact on the world. We still have promotions for washing machines, but in this one, which we called "Change It," we encouraged people to search out the students with the most passion for these issues, and get them involved. The students downloaded a form from our website, and wrote an essay to submit. More retailers wanted to participate in this program than when we were giving away washing machines.

It's hard to say at the moment how much better that approach is than what we were doing before, but that is part of this process. We're learning and educating ourselves too. I'm not

sure that we'll ever know what the exact right thing to do is. But because we're clear about who we are and what we want to accomplish, we can keep reflecting on our actions to measure how aligned they are with that vision. In the beginning this reflection process was scary, because as we awakened to a clearer sense of who we are, we began to notice all the things that were out of alignment. We had a series of pretty intense conversations throughout the company. The process only worked because at some level people here do connect the essence and the purpose of the company to their own aspirations. It becomes an incredibly powerful and exciting thing that they want to be part of.

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I was talking with someone who works in accounts payable, and she said, "I don't really get how this is going to relate to me. I've got a pile of invoices, and I just write checks." As we talked, it dawned on her that she had the authority and the power to pay certain bills before other bills. She didn't have to pay them in alphabetical order. She realized that she could pay an independent contractor – for whom getting the check a couple of days early would make a huge difference – before one of our billion-dollar company partners who wouldn't notice whether the check came Monday or Wednesday. In this self-education process, lots of different people made all kinds of discoveries and connections.

Measuring What Matters

People are incentivized by what they do over the course of a year, not over the course of five or ten years. Most people don't want to hear where a business is going to be in ten or twenty years, because they don't think that far out themselves. It's a broken system that we need to fix. At a very fundamental level, we do a lousy job of measuring things. We measure the wrong things, so people's attention is focused on the wrong things. We don't measure the impact that things are going to have in the future. Everybody knows what the prime rate is, but very few people could tell you how much CO_2 we're emitting into the atmosphere. And that's a huge predictor of what will happen in the future.

We went through a process of measuring some of our impacts a couple of years ago, and we were amazed at how little we understood. We knew that things like transportation and

manufacturing generate a lot of CO_2, and we thought we had a pretty good understanding of what our impact was. It turned out we had to look beyond what we make and what we do, and include the impact that consumers have when they use our products. We discovered that the single greatest impact we had was the result of formulating laundry products that were designed to be used in hot or warm water. The energy consumed to warm all of that water was by far our biggest single negative impact. We used those measurements to create priorities for our product innovation process, and reformulating our laundry product so that it would work in cold water went to the top of the list. If the measurement isn't connected to your core business strategy, then what's the point of taking the measurement? Knowing without a commitment to doing something with what you know doesn't generate a lot of change.

Building Relationships

Another driver to changing our promotion approach was the notion that we want to have a relationship with the people we sell stuff to. When we discount the product, incentivizing people to buy more, we're not building a relationship. We believe that change isn't going to happen if you're not in a relationship and in dialogue with people. We wanted to move beyond a transactional mode, in which our products are just commodities that people buy. It's a two-way street. We're not only telling them what we know and what we've learned, but we also constantly learn from them.

One of the reasons this makes so much sense to us is that we hope and believe that by taking the responsibility and doing the thinking that we're doing, we can generate a level of trust and commitment and loyalty amongst our stakeholders and customers that transcends the usual transactional relationship. If we can incorporate that social value – feeling good and being part of a community – into buying a product that's good for the environment, and supporting a company that's making the world a better place, we open up some powerful possibilities. From a competitive perspective, it's a way that we can transform our products from commodities into things that generate more value for the people who buy them.

Bill McKibben, who wrote *The End of Nature*, the first book on global warming, gave a talk recently. After talking about oil, and CO_2, he cited some amazing statistics about the positive impact of relationship and community. To me, business has the opportunity to begin to be a partner in solving the challenges that face the world. That opens up the possibility of creating very powerful relationships with other people. Business can transform itself and must transform itself to be the leading edge of this new relationship-building process. There are many companies, like Cliff Bar out in San Francisco and Eileen Fisher in New York, that are built around mission and values, and are also having tremendous success in the marketplace.

As part of that relationship-building process, we are mindful that we want to make products locally and sell them to people who live near where they're made. We know that in the

world of food production, for example, food travels thousands of miles before it's consumed, losing nutrition and creating environmental havoc in the process. We have tried to keep all of our manufacturing close to where products are sold. So far that's been primarily in the United States, but America is such a big country that we're still just scratching the surface of what is possible here.

Ninety-nine percent of our sales today are through retail outlets like grocery stores and natural food stores, but we're increasingly turning our attention to the institutional market. There is very little control over the types of chemicals that are used in many products. The people who get the worst exposure are those who are doing this professionally. We're concerned about that, and that concern is aligned with our values. We know that many people in institutional settings – municipalities, universities, hotels – would like to use our products. We're now designing a new business that will focus on that market. The task is to redesign the products to work in those institutional settings. For instance, most cleaning products are made up of water. In an institutional setting, they don't want to pay to move the water around. They buy products in a concentrated mode and then dilute them onsite. The laundry detergent in a large hotel is actually injected into the washing machine in a very concentrated form. Many years ago, all our products were more concentrated than they are today, but we couldn't communicate that effectively to consumers. People would see a small bottle of our laundry detergent next to a big bottle and think, "Why are we paying so much for so little?"

Recently, we decided that our past inability to communicate effectively with the consumer is not an acceptable reason not to try again. From a sustainability perspective, it's very hard to rationalize selling a window cleaner that is 98% water. We are committed to figuring out how we can effectively educate the people we're selling to. We're selling and helping people evolve their preferences simultaneously. It's a real challenge to know when to do the right thing regardless of what anybody else says, and when you have to balance that with what the consumer will accept. You have to be very thoughtful about where you make those compromises. It's not about getting it right, it's about keeping the conversations going. We're sustaining a process of continual learning. I always have to remember that I'm in a process. And the process of continual reflection, conversation, experimentation, making mistakes, and correction is actually what builds relationships among people in an organization. Those relationships are the foundation of your relationships with your customers. And that's where our products will finally make a real difference in the world.

ABOUT THE AUTHOR

Jeffrey Hollender, President and Chief Inspired Protagonist for Seventh Generation, is a well-respected leader in the socially and environmentally responsible communities. Jeffrey has led Seventh Generation from its humble beginnings to its current position as the nation's leading and fastest growing brand of natural home and personal care products.
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Building a Sustainability Institute in Russia

Jeff Lindstrom

Jeff Lindstrom

In the farthest recesses of Russia, beyond the spans of Siberia, on the "krai" (edge) of the Asian continent, a few miles from the border of China and North Korea lies an area infamous for its exploitation by criminals, speculators, and outcasts seeking untapped riches. Today, the remote Russian Far East (RFE) remains inhospitable, wealthy in resources, and populated by the descendants of internally displaced persons, political prisoners, and forced labor. But it is here that a new generation of young leaders has emerged, seeking long-term opportunity for themselves and generations to come.

In the early months of 2003, a small group of students and I met in the port city of Vladivostok to discuss the immediate future. As a former U.S. Peace Corps volunteer, I had created and built a Model United Nations debate program focused on leadership development that had attracted these students from various cities into one locale. We had debated several times over the course of three years the phenomenon of "brain drain" that we felt was in part a result of the rather dismal state of higher education in Russia. The students were as talented as any I had encountered as a college instructor in the U.S., but very few of them believed they would enjoy the benefits of quality higher education in their home in their lifetime. Unlike many imminent graduates concerned with prospects for employment, hopes for starting a family, or dreams of going abroad, this group was aware of their chance to do something different. "I had plenty of opportunities at home and abroad," said Slava, one of the students, recently, "but I thought if we could build something at home there would be more opportunity. We needed a hands-on approach, mixing theory and practice, to develop something new for our region." But for Slava and the rest of us it was easier to say than do.

Although Russia has benefited from a high literacy rate (98%), and a majority of high school students attend institutions of higher learning, the combination of egregiously low salaries for overworked professors, unfavorable conditions for school loans (interest rates of 20% and higher), and scant resources for research has provided little motivation for universities to make graduate programs a priority. The students I met with hoped to fill a need and provide an educational environment conducive for change by attracting excellent scholars, providing affordable tuition, and developing incentives to conduct research. Located in one of the world's most resource rich, yet economically impoverished regions, it made sense to focus our thinking on the challenge of how to redistribute the surfeit wealth gained from abundant natural resources to fill local needs. If graduate education was to become a priority, then sustainable development was a discipline that could provide a sense of urgency to do so. Thus the idea for the Institute for Sustainable Development (ISD) was born.

Building an entirely new graduate program from scratch was a challenge. Improving entrance requirements, enhancing curriculum, and reforming pedagogy, albeit necessary objectives, were not the most immediate concerns. "Someday, when we are old alums, the students will forget that we actually had to create everything before we could even be students – course outlines, descriptions, the Institute's

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logo, a motto, vision and mission statements," says Evgennia, a member of ISD's first graduating class. "We even had to create our own grading system, because our host university had never had full-time graduate students actually sitting in classes." The first ground-breaking group of graduate students even determined what constituted academic probation for failing to live up to the standards they were setting for themselves. "Before we even sat down in our first course the first year, we had already learned the equivalent of degrees in business and education administration."

The progress of ISD was threatened from its very inception by the tension of trying to replace the old habits of a deteriorating educational system – manifested in the bureaucratic lethargy and anachronistic requirements of the State – with new personal standards of excellence. Since the study of sustainable development was a novel idea unrecognized as formal science in Russia, attempting to build a credible graduate program required reform the State was unwilling to undertake. Integrating lessons in adaptive strategy for systems change, dialogue, the metaphysics of indeterminacy, and the management tools needed during periods of great socio-economic change into standard project management curriculum, for example, was viewed as radical and taboo. So, if a course was too "unorthodox," an administrator of the host university would peremptorily forge the signatures of ISD professors, claiming the course strictly followed the requirements of the State. Administrators outside the Institute weren't interested in building a program that would foster generative institutional change as much as they were interested in accumulating new tuitions to sustain the status quo, and their actions bore this out.

The initial challenge in setting up the institute was a simple one. If a group of extraordinarily gifted and voracious post-graduate students could be gathered in one location, then could a group of pedagogically talented, eager professors be gathered to support them? "When I was first approached about teaching

at ISD I was naturally concerned about two things – time and money," remembers marketing professor Yelena Yaskevich. "But when I was told I would be guaranteed that my class would be full of committed, talented students, I agreed immediately. The market always has time and money for something valuable." When the doors were opened on the first day, ISD had assembled a part-time faculty comprised of professors from three different universities along with several former professors now working in industry as leaders of companies. Despite the legions of naysayers and doubters, a host of eager students and professors had joined forces to lead the change necessary to improve higher education.

Yet creative change alone was not enough. Eighteen months after the program had started, the host university had still failed to process the necessary documents to accept tuitions and accredit courses. With less than six months to go before the first class's graduation, students had no guarantee that a diploma would be waiting for them. And by then the first group of ISD graduate students had recruited a second group, putting into practice their ideal of an evolving leadership process of development. The power of this ideal outweighed the pragmatics of the situation at hand. Born from this tense struggle was the Institute's motto – *abeunt en studia mores* (practices zealously pursued become habits) – an audacious belief in the power of emergence and presencing.

The faculty and first class of students' resilience and determination to succeed despite short-term hindrances was also a test of principles and ethics. At the first state exam the graduating Class of 2005 was incensed by the fact that they were to be tested by professors from the outside, who had no interest or experience with sustainable development theory. "It was typical Russia, which was disappointing," Masha reported. "I was being harangued by one professor, who couldn't understand my research on systems of sustainable growth because, for one, he read my work a few minutes before my defense. And two, he was framing questions as though we were still in the Soviet Union when growth had to be perfectly planned." All during the exam one examiner's seat remained unoccupied. Just before the end of the exam, the missing professor appeared. Balancing himself precariously in the doorway, he beseeched the Chairman to excuse him from the proceedings due to the fact that he was "presently completely inebriated." Without hesitation the professor was granted his reprieve, but not before he sloppily signed each and every official paper, noting his appearance and approval of all degrees. "I had to laugh," recalled Andre (Class of '05), "because to dwell upon it would have been impossible. I was there to celebrate my education, not prove to him or anyone else I was educated." Accreditation, at this point, seemed trite.

Yet along this precarious path, our adaptive strategies generated large rewards. Within a year of ISD's opening, businesses curious about the idea of sustainable development approached the students for small consulting and project management contracts, immediately enhancing the practical side of their education. Visiting scholars and business leaders arrived from American and Russian universities and companies, legitimizing and adding excitement to the effort. Incrementally, this attracted more local scholars and regional recognition. "After we had our first seminar for the public, several businessmen approached us to better understand who we were," explained Pavel (Class of '05). "I sensed that the real question behind their curiosity was, Why are you doing all of this? I felt excited by their interest and sad that they had to ask." In the first year graduate students and faculty teamed up to generate over $15,000 in consulting fees – an amount equal to the entire income generated by tuition. More importantly, graduate students were in the field as much as in the classroom. "My first meeting was with a millionaire who owned a major holding company." Andre said. "I knew I could help him, but I didn't know if I was going to be able to bridge the gap between the assumptions and perceptions of his generation and mine. That's when I realized sustainable development had everything to do with dialogue."

By far the most significant project created by the

graduate students was developing a metric system and accompanying award for a "sustainable development company of the month," which encouraged local business owners to develop in a more sustainable way. "We recognized that local leaders of companies who were doing a good job at building sustainable businesses for our community often didn't know they were doing a good job," explained Svetlana (Class of '06), who built her dissertation theme upon the results of this project. "At minimum, it was good marketing for us and them, but it turned out to be so much more. We gave them recognition for a job well done and hope for the next generation. They gave us moral and financial support. It was the first time I saw the business and academic communities energized to work together." For a year companies vied for the prestige of being honored by the Institute, changing internal policies and reforming strategies in order to live up to the standards set by the graduate student committee. After the first year of the project, ten local companies were recognized and one was selected as the "company of the year" at the Class of 2006 graduation ceremonies. "My shock and delight in winning this award," shouted the exuberant CEO at the award ceremony, "is only outweighed by my amazement and gratitude that these students of our community created such an idea!"

With strong relationships in the community from consulting and the company of the month award process, ISD now boasts a prestigious Board of Trustees comprised of local business leaders and scholars who serve as role models for the graduate students and faculty. In a society not known for philanthropy, a half-dozen business people have joined the Board, donating time and money toward creating a scholarship fund that distributes monies based on academic merit and innovative research.

In the past six months, ISD has formed institutional ties with universities and non-profits on in the U.S. In addition, for the past two years ISD graduates have been awarded prestigious fellowships by the U.S. government to continue advanced studies in American universities so that they may return with broad outlooks and international experience for their endeavors in Russia. Beginning its fourth year, ISD has plans to conduct field research in the unique regions of the RFE – Lake Baikhal, Sakhalin Island, and Kamchatcka Pennisula. And, with project management skills increasing in demand, ISD is continuing to develop radical multi-disciplinary courses in order to afford its graduates the most viable opportunities to affect change in the region.

Despite our successes, numerous roadblocks remain. At present the Ministry of Education in Moscow has shown no interest in granting ISD an educational license due to their small size and part-time faculty. Local universities remain fearful of collaborating with the Institute and losing graduate students and faculty. It is too early to conclude that our efforts will eventually result in positive institutional change, but the experience of trying to build a progressive graduate program in an environment still mired in the past has been invaluable in developing our leadership capacity. The path to sustainable development will doubtless be as exciting and challenging.

ABOUT THE AUTHOR

Jeffrey S. Lindstrom is the founder of Model United Nations of the Russian Far East, Leadership Development International, and the Institute for Sustainable Development, all based in the Russian Far East. After serving as an adjunct history instructor and assistant football coach at Modesto J.C. in California, he volunteered for the U.S. Peace Corps in the Russian Far East. A graduate of Whittier College with degrees in Political Science and History, his research focuses on the process of human and organization development during periods of great change. He is currently seeking admission to the Doctoral program of the MIT Sloan School of Management.

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Cloudy Skies:
Assessing Public Understanding of Global Warming

John D. Sterman & Linda Booth Sweeney

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This article is adapted from the original paper of the same title that appeared in *System Dynamics Review,* Vol. 18 No. 2. SoL members can access the full article, as well as other articles by the authors, through the SoL Library at *www.solonline.org/library*. An online climate change simulator, where you can try your hand at creating climate stabilization scenarios, is available at *web.mit.edu/jsterman/www/GHG.html.*

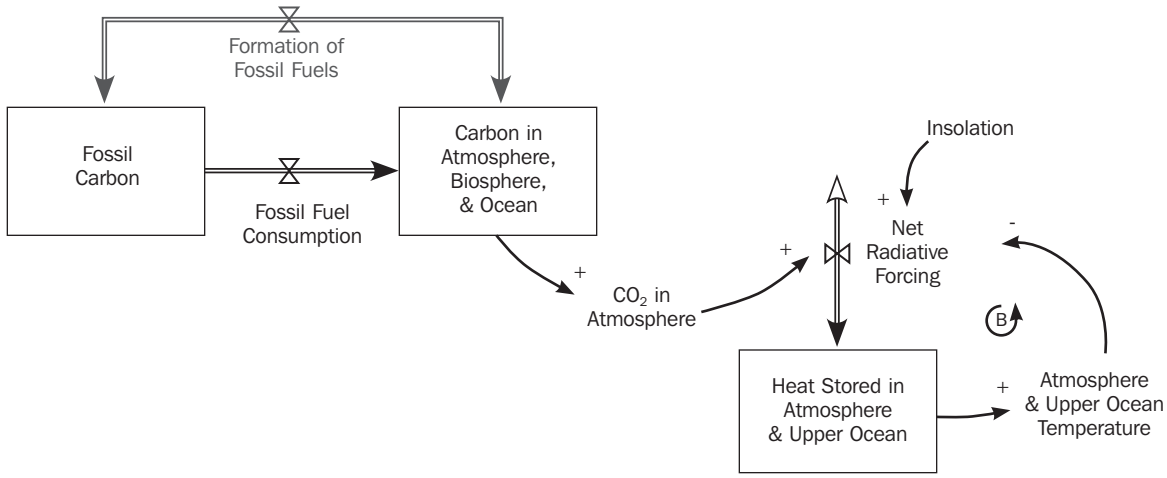
Climate change presents a classic systems problem. The spatial scale is global; the time scale dwarfs normal human concerns. The dynamics of the climate are exquisitely complex and imperfectly understood. "Climate" is an aggregate average of varied local weather over long time frames and broad geographical extent and can only be perceived with a long delay; many effects of climate change will be hard to attribute properly. As a global resource shared by all, the climate is vulnerable to the "tragedy of the commons"[1] dynamic since individuals, firms, and nations benefit in the short-run from high greenhouse gas (GHG) emissions, while the costs are borne by all. Worse, the costs and benefits are distributed inequitably, both between rich and poor and between future generations and ourselves. Small wonder that the challenge of implementing policies to reduce the impact of warming remains unanswered.

While surveys show the vast majority of Americans believe global warming is real, the majority also believe, as a recent survey found, that "its effects will be gradual, so we can deal with the problem gradually" or that "until we are sure that global warming is really a problem, we should not take any steps that would have economic costs."[2] The lack of government support for the Kyoto Protocol, carbon taxes, and other policies designed to reduce GHG emissions can be traced to public indifference. Many people believe that there is plenty of time to act. Why take costly action today for uncertain benefits tomorrow? Instead, they say, it is better to wait and see – if warming turns out to be greater and more harmful than expected, policies to mitigate it can then be implemented.

Wait and see policies, however, often don't work in systems with long time delays, significant accumulations, multiple feedback processes, nonlinearities, and other elements of dynamic complexity (Sterman 1994). When there are long time delays between actions and their effects, as in the climate system, wait and see can be disastrous. Actions to halt warming must be taken decades before we can know what the consequences of warming will be, and before scientific certainty about the dynamics of the global climate can be gained.

Much of the complacency about climate change arises from inadequate systems thinking skills. If people don't recognize the existence of important feedbacks, time delays, and stock

Figure 1. Simplified representation of the carbon cycle and global temperature



and flow structures in the climate system, or if they are unable to relate these structures to the dynamics of the climate, they are likely to draw erroneous inferences about the response of the climate to human activity. Without such understanding people are likely to rely on the intuitive "wait and see" strategy that works well in a range of everyday tasks.

Structure and Dynamics of the Climate

Despite the complexity of the climate, the essentials are simple and can be easily understood with basic knowledge of stocks and flows. The temperature at the earth's surface – the land, lower atmosphere, and surface layer of the ocean (the top 50 to 100 meters, where most sea life exists) – is determined primarily by the balance of the incoming solar radiation (insolation) and the energy the earth radiates back to space. The earth is a warm mass surrounded by the cold of space and like all such masses emits black body radiation whose frequency distribution and intensity depends on its surface temperature. The warmer the earth, the greater the flow of energy radiated back into space. The result is a negative feedback process: Incoming solar energy heats the earth until it is just warm enough for the energy radiated back to space to balance the solar energy input.

The amount of energy radiated back into space depends on the composition of the atmosphere. Greenhouse gases such as carbon dioxide (CO_2) absorb some of the energy radiated by the earth, instead of allowing it to escape into space. Thus an increase in GHGs causes the earth to warm. The earth heats up until the energy escaping through the atmosphere rises enough to again balance the incoming solar energy. Naturally occurring greenhouse gases – including water vapor – reduce the emissivity of the atmosphere enough to warm the surface of the earth (including the oceans) to a life-sustaining average of about 15°C (59°F). Without GHGs in the atmosphere, the mean global temperature would be about -17°C (0°F) and a blanket of ice would perpetually cover the earth.

Natural biogeochemical processes have caused the concentration of carbon dioxide in the atmosphere to fluctuate over geological time, and surface temperatures have fluctuated with

it. Human activity has now reached a scale where it affects these processes significantly: GHG emissions have been growing exponentially since the beginning of the industrial age. Consequently, atmospheric concentrations of CO_2 and other GHGs have been growing exponentially. The preindustrial atmospheric CO_2 concentration was about 280 ppm; today it is nearly 380 ppm and rising. Atmospheric CO_2 concentration is now higher than any time in the last 420,000 years, and growing faster than any time in the past 20,000 years. The high concentration of CO_2 and other greenhouse gases (GHGs) generates significant radiative forcing that contributes to warming. To reduce radiative forcing and the human contribution to warming, GHG concentrations must fall. To reduce GHG concentrations, emissions must fall below the rate at which GHGs are removed from the atmosphere. Anthropogenic CO_2 emissions are now roughly double the removal rate. Emissions must therefore fall by half even to stabilize CO_2 at present record levels. During the period when emissions drop towards removal, atmospheric CO_2 would continue to rise.

When the data for this article was first gathered in 2000, the atmospheric CO_2 concentration was 370 ppm. Today, six years later, it has increased to nearly 380 ppm.

Two Challenges

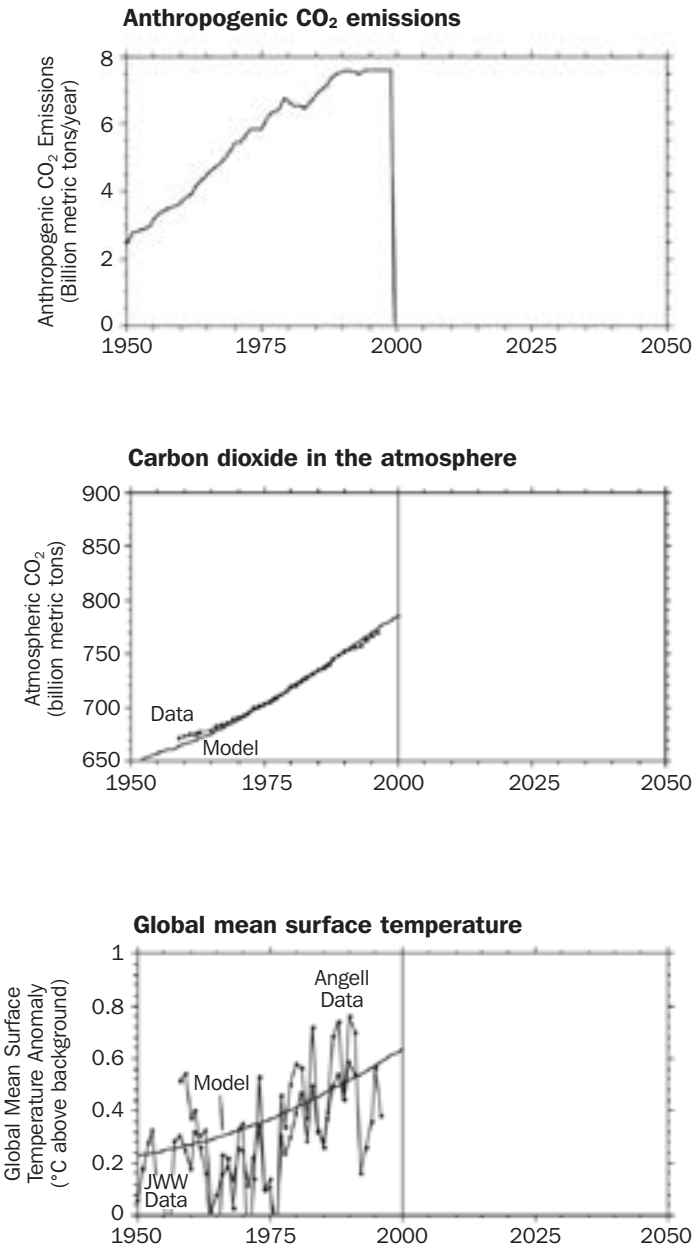
We wanted to assess people's understanding of global warming and of the structure and dynamics of the global climate. To do so, we created two challenges: the Zero Emissions (ZE) challenge and the Stable CO_2 Concentration (SC) challenge. (See following sidebars) Each consists of a short description of the climate system, graphs showing the history of human CO_2 emissions, the concentration of CO_2 in the atmosphere, and global mean temperature. We asked the participants, highly educated graduate students at MIT and the University of Chicago,[3] to identify the likely response of the system to various scenarios for CO_2 emissions or concentrations. Both challenges can be done without use of mathematics beyond simple arithmetic. As will be evident, performance was weak. The challenges, and the results can be seen in the following sidebars.

The University of Chicago MBA students did about the same on the Zero Emissions task. About 64% of those in the CO_2 graph condition drew incorrect trajectories (compared to 78% of the MIT students, but the difference is not significant). About 80% of the Chicago students receiving the CO_2 graph condition drew erroneous trajectories for temperature, compared to 64% of the MIT students; again the difference is not significant. In the No CO_2 condition, 79% of the Chicago students drew erroneous temperature trajectories, compared to 46% of the MIT students, a significant difference ($p = 0.004$). There were no significant differences in temperature patterns between the CO_2 and No CO_2 treatments among the Chicago MBAs. Like the MIT group, about three-quarters of the Chicago MBAs drew temperature trajectories correlated with their CO_2 trajectories – if they showed CO_2 peaking and then falling, they were also likely to show temperature peaking and falling – providing more evidence that people believe temperature and CO_2 concentrations should follow the same pattern.

Discussion

The people we tested were highly educated, yet their ability to understand the most basic stock and flow structures governing the climate was low. They did quite poorly, and their

Figure 2. The Zero Emisions Challenge



Consider the problem of global warming. Carbon dioxide (CO_2) is a greenhouse gas that traps heat and contributes to warming. CO_2 emissions from combustion of fossil fuels like oil, gas, and coal have been increasing since the start of the industrial revolution. The curve labelled "Anthropogenic CO_2 Emissions" in the first image (left) shows the worldwide emission rate of CO_2 from fossil fuel combustion since 1950. The second image (center) shows the stock of carbon dioxide in the atmosphere, along with a trend line trend line generated by a global climate simulation model. The third (bottom) shows data on average global temperatures since 1950, along with a trend line.

In 1995, a UN scientific panel concluded that these emissions were contributing to global warming, stating that "The balance of evidence suggests a discernible human influence on climate." In 1997 the industrialized nations agreed to stabilize their CO_2 emissions near mid 1990 rates. Implementation, however, remains elusive.

Now let's do a mental exercise we call an extreme conditions test. What do you think would happen to the average global temperature if anthropogenic CO_2 emissions suddenly stopped completely, so that annual emissions were zero? This imaginary scenario is shown in the top image. In the year 2000 anthropogenic CO_2 emissions drop instantaneously to zero and remain there forever.

Assume anthropogenic CO_2 emissions follow this scenario. Sketch the likely path (the continuation of the simulation) for atmospheric CO_2 for the next 50 years using the space provided in the right half of the second image. Then sketch the likely path (the continuation of the simulation) for the average global temperature for the next 50 years using the space provided in the right half of the bottom graph.

Table 1. Performance of MIT Students on the Zero Emissions Task

	CO_2 Trajectory	
1	**Correct:** CO_2 peaks at or very shortly after the year 2000, then declines at a diminishing rate.	22%
	Incorrect:	78%
2	CO_2 stabilizes in or after 2000 and never drops	31%
3	CO_2 keeps rising forever	8%
4	CO_2 immediately drops and continues to go down (shows a sudden, discontinuous jump down at or very shortly after 2000)	4%
5	CO_2 stabilizes, then decreases	7%
6	CO_2 increases, then decreases	16%
7	The CO_2 trajectory is discontinuous (has a sudden jump up or down at some other time than at or very shortly after 2000).	1%
8	The CO_2 trajectory follows some other path.	10%
	N =	97

	Global Mean Temperature Trajectory	Total	CO_2 Graph	No CO_2 Graph
1	**Correct:** Temperature continuing to rise for about 20–30 years, then falls (slowly).	36%	**28%**	**46%**
	Incorrect:	64%	**72%**	**54%**
2	Immediate peak and drop in temperature in or very shortly after the year 2000	22%	23%	20%
3	Temperature rising forever	11%	13%	9%
4	Temperature stabilizing in or after 2000 and never declining	18%	**25%**	**9%**
5	A fluctuation in temperature	1%	0%	3%
6	A discontinuous path (temperature has a sudden jump up or down)	3%	4%	1%
7	Temperature stabilizing then decreasing	2%	**3%**	**0%**
8	Temperature decreasing, then increasing.	2%	2%	3%
9	Some other path for temperature	6%	3%	10%
	N =	186	106	80

responses exhibited systematic errors. The concentration of CO_2 in the atmosphere must continue to rise as long as emissions exceed uptake; surface temperature must continue to rise as long as incoming solar energy exceeds outgoing radiation and heat transfer to the deep ocean. Participants, however, regularly violated these basic physics. They consistently underestimated the delay in the response of temperature to changes in CO_2 concentration, selecting trajectories in which temperature responds far too much and too fast. The vast majority believed that temperature should follow the same pattern as CO_2 concentration, rising when CO_2 is rising and falling when CO_2 is falling. In fact, temperature can rise even as CO_2 drops. Similarly, most believe that stabilizing CO_2 concentrations can be accomplished by stabilizing emissions near current rates, when emissions must fall significantly, to the removal rate, for concentrations to stabilize.

Before discussing the implications we consider alternative explanations for the results. One possibility is that the participants did not apply much effort because there was insufficient incentive. It is also possible that the participants were given insufficient time. Both questions will be left for future research. It may also be argued that performance would improve if participants were given more extensive data and background on climate dynamics. We did not examine variations in information provided. We note, however, that the stabilization challenge includes explicit information on the rate at which natural processes remove CO_2 from the atmosphere. Participants' written explanations show that a number used this information, some effectively. Yet many others explicitly point to the past correlations among emissions, concentration, and temperature as evidence justifying pattern matching, ignoring the cues in the challenge description increasing the salience of the stock and flow structure. Many more use the information incorrectly, violating conservation laws and reaching erroneous conclusions. Most discussions of warming in the media do not present information on the removal rate by natural processes, and do not draw attention to the stock-flow structure as in our challenges. We hypothesize that performance without this information would be substantially worse than observed here. We also note that in our prior work (Booth Sweeney and Sterman 2000) similar participants did poorly and exhibited the same systematic violations of conservation laws in much simpler tasks such as filling a bathtub.

An evolutionary perspective suggests the errors people exhibit in our challenges should be expected. It is not necessary to understand the relationship between flows and stocks to fill a bathtub – nature accumulates the water "automatically." It is far more efficient to simply monitor the level of water in a tub and shut off the tap when the water reaches the desired level – a simple, effectively first-order negative feedback process, which, experiments such as Diehl and Sterman (1995) show, people can do well. As Laplace remarked, "Nature laughs at the difficulties of integration."[4] That is, stocks in nature always properly accumulate their flows even when mathematicians cannot solve the equations of motion for the system. Thus for a wide range of everyday tasks it is better to simply wait and see how the state of the system changes, and then take corrective action: decision makers have no need to infer how the flows relate to the stocks – when you are hungry, search for food; when the fire dies down, put more wood on it. In such settings intuitive understanding of stocks and flows offers no survival value and is unlikely to evolve.

Unfortunately, the wait-and-see strategy can fail spectacularly in systems with long time delays, multiple feedback processes, and other elements of dynamic complexity (Diehl and Sterman 1995, Sterman 1989a, 1989b). More and more of the pressing problems facing us as managers and citizens alike involve long delays. The long time scale means there is little

Figure 3. The CO_2 Stabilization Challenge (Part 1: Description)

Figure 1. Global CO_2 emissions resulting from human activity (billion tons of carbon per year)

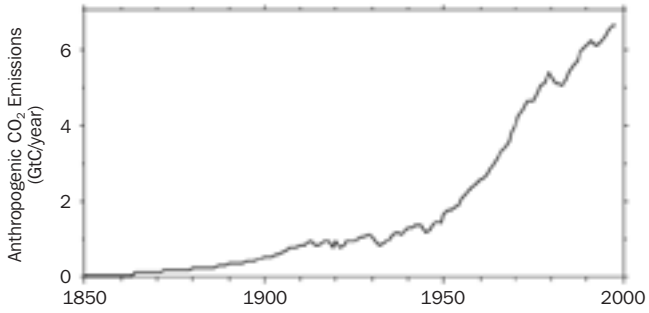


Figure 2. Atmospheric CO_2 concentrations, parts per million.

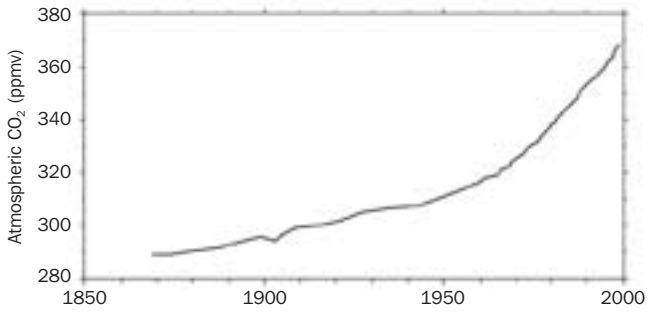
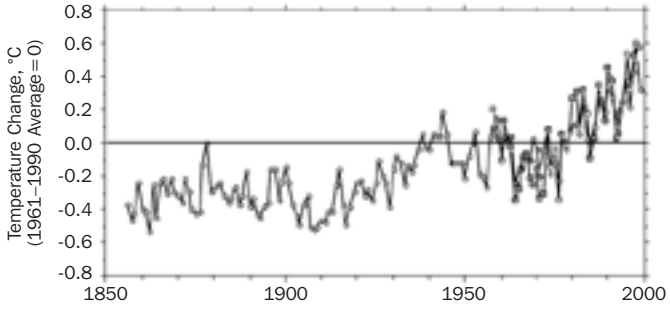


Figure 3. Average global surface temperatures, °C. The zero line is set to the average for the period 1961–1990.

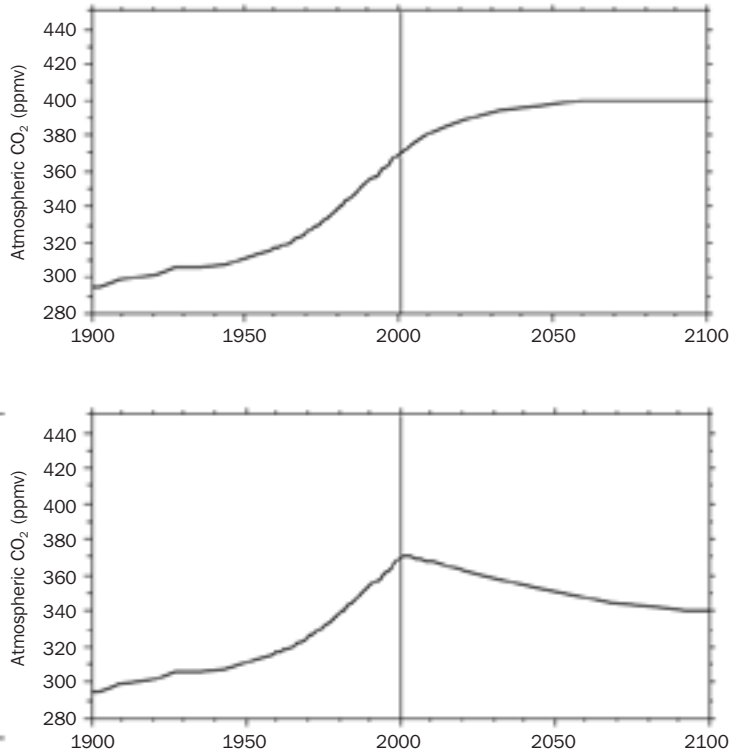


Consider the issue of global warming. In 2001, the Intergovernmental Panel on Climate Change (IPCC), a scientific panel organized by the United Nations, concluded that carbon dioxide (CO_2) and other greenhouse gas emissions were contributing to global warming. The panel stated that "most of the warming observed over the last 50 years is attributable to human activities."

The amount of CO_2 in the atmosphere is affected by natural processes and by human activity. Anthropogenic CO_2 emissions (emissions resulting from human activity, including combustion of fossil fuels and changes in land use, especially deforestation), have been growing since the start of the industrial revolution (Figure 1). Natural processes gradually remove CO_2 from the atmosphere (for example, as it is used by plant life and dissolves in the ocean). Currently, the net removal of atmospheric CO_2 by natural processes is about half of the anthropogenic CO_2 emissions. As a result, concentrations of CO_2 in the atmosphere have increased, from preindustrial levels of about 280 parts per million (ppm) to about 370 ppm today (Figure 2). Increases in the concentrations of greenhouse gases reduce the efficiency with which the Earth's surface radiates energy to space. This results in a positive radiative forcing that tends to warm the lower atmosphere and surface. As shown in Figure 3, global average surface temperatures have increased since the start of the industrial revolution.

Figure 3. The CO_2 Stabilization Challenge (Part 2: Response)

Now consider a scenario in which the concentration of CO_2 in the atmosphere gradually rises [falls] to 400 ppm [340 ppm], about 8% higher [lower] than the level today, then stabilizes by the year 2100, as shown here:



1. **For this to occur, CO_2 emissions resulting from human activity would have to:**
   - ❑ **Continue to rise through the year 2100.**
   - ❑ **Gradually rise about 8% and then stabilize by the year 2100.**
   - ❑ **Gradually rise less than 8% and then stabilize by the year 2100.**
   - ❑ **Stabilize now at current rates.**
   - ❑ **Gradually fall about 8% and then stabilize by the year 2100.**
   - ❑ **Gradually fall more than 8% and then stabilize by the year 2100.**
   - ❑ **Immediately drop more than 8% and then stabilize by the year 2100.**

2. **Assuming CO_2 concentrations follow the scenario above, the average global temperature would most likely:**
   - ❑ **Continue to rise through the year 2100.**
   - ❑ **Continue to rise, then stabilize by the year 2100.**
   - ❑ **Rise for a few more years, then peak, gradually fall and stabilize above current levels.**
   - ❑ **Stabilize now at current levels.**
   - ❑ **Rise for a few more years, then peak, gradually fall and stabilize below current levels.**
   - ❑ **Rise for a few more years, then peak and continue to fall through the year 2100.**
   - ❑ **Immediately drop, then stabilize by the year 2100 below current levels.**

3. **Why? Explain your choices** (*briefly*)**:**

opportunity for learning through outcome feedback. Instead, we must rely on models of various types to help us project the likely dynamics of the system. These models typically present information in the form of spreadsheets, graphs, or text – the same type of data presentation in our experiments. Managers are called on to evaluate spreadsheets and graphs projecting revenue and expenditure, bookings and shipments, hiring and attrition. These modes of data presentation are not unique to business. Epidemiologists must understand the relationship between the incidence and prevalence of disease, urban planners need to know how migration and population are related, and everyone, not only climatologists, needs to understand how emissions of greenhouse gases alter global temperatures. For global warming, and many of the most pressing issues in business and public policy, the mode of data presentation in our tasks *is* the naturalistic context.[5]

The results suggest that highly educated people have extremely poor understanding of global warming. There are several lessons. Most people drew trajectories in which CO_2 and temperature followed the same pattern – they intuitively feel CO_2 and temperature should be correlated. But the human contribution to global warming cannot be proven or disproven by simply correlating emissions and temperature: The stock/flow structure means climate dynamics are fundamentally incompatible with such naive "common sense" approaches. For example, the full impact of past emissions has not yet been observed. Since the industrial revolution the oceans and terrestrial carbon stocks have been absorbing carbon out of the atmosphere at higher rates, suppressing the rise in atmospheric CO_2 concentrations. As these stocks increase, their absorption capacity diminishes. The impact of future emissions on atmospheric CO_2 is likely to be larger than that observed in the past.[6] The inertia of the system means further warming and climate change are already underway. Actions to halt warming must be taken decades before we can know what the consequences of warming will be, and before scientific certainty about the dynamics of the global climate can be gained. Yet many people drew trajectories in which global temperature responds immediately to changes in emissions of greenhouse gases, significantly underestimating the time delays and inertia of the system.

The IPCC considered 40 scenarios for future GHG emissions (IPCC 2001b, 62). In many of these, greenhouse gas emissions eventually stabilize or even fall. Yet in every scenario, CO_2 concentrations continue to rise through 2100, to levels ranging from 540 to 970 ppm. In every scenario, net radiative forcing increases. In every scenario temperatures continue to climb, with warming over the next century of between 1.4 and 5.8 °C (2.5 to 10.4 °F). For comparison, the mean global temperature during the last ice age, when sheets of ice thousands of feet thick covered much of the northern hemisphere, was only about 5 °C colder than today.

At the 1997 Kyoto conference, 38 industrialized nations agreed to reduce emissions to about 95% of 1990 rates by 2012. While the agreement is better than business as usual, the United States, the world's largest emitter, and rapidly developing nations like China are not signatories. Their emissions continue to grow. The policy debate has become a fight over whether to stabilize the emission *rate*, not the *stocks* of greenhouse gases that drive the climate. Even if Kyoto were fully implemented, emissions would continue to exceed removal and GHG concentrations would continue to rise. The fight over implementation of the Kyoto Protocol, therefore, has become a debate about how much more GHG concentrations in the atmosphere will rise, and how much faster the global climate will warm. Halting warming, much less reversing it, is not even on the table.

Table 2. Performance of MIT Students on the Stable CO_2 Concentration Task

	CO_2 Emissions would have to...	CO_2 Scenario: 400	340
1	Continue to rise through the year 2100	6%	1%
2	Gradually rise about 8% and then stabilize by the year 2100	**21%**	**0%**
3	Gradually rise less than 8% and then stabilize by the year 2100	**20%**	**2%**
4	Stabilize now at current rates	14%	7%
5	Gradually fall about 8% and then stabilize by the year 2100	**7%**	**23%**
6	Gradually fall more than 8% and then stabilize by the year 2100	18%	22%
7	Immediately drop more than 8% and then stabilize by the year 2100	**14%**	**44%**
	N	85	86

	Temperature would most likely...	CO_2 Secnario: 400	340
1	Continue to rise through the year 2100	**31%**	**16%**
2	Continue to rise, then stabilize by the year 2100	**38%**	**7%**
3	Rise for a few more years, then peak, gradually fall and stabilize above current levels	26%	15%
4	Stabilize now at current levels	1%	0%
5	Rise for a few more years, then peak, gradually fall and stabilize below current levels	**2%**	**41%**
6	Rise for a few more years, then peak and continue to fall through the year 2100	**1%**	**9%**
7	Immediately drop, then stabilize by the year 2100 below current levels	**0%**	**11%**
	N	84	85

	Emissions Trajectory		Temperature Trajectory	
Scenario	400 ppm	340 ppm	400 ppm	340 ppm
Correct Response	Item 6	Item 7	Items 1 or 2	Items 1 or 2
Fraction Correct	**18%**	**44%**	**69%**	**23%**

The situation is, in fact, even worse. The G. W. Bush administration formally repudiated the Kyoto treaty in 2001. Instead, the administration explicitly adopted the wait-and-see approach. In February 2002, President Bush proposed the so-called "Clear Skies Initiative,"stating

> My administration is committed to cutting our nation's greenhouse gas intensity – how much we emit per unit of economic activity – by 18 percent over the next 10 years. This will set America on a path to slow the growth of our greenhouse gas emissions and, as science justifies, to stop and then reverse the growth of emissions. This is the common sense way to measure progress.... If, however, by 2012, our progress is not sufficient and sound science justifies further action, the United States will respond with additional measures....[7]

Even if achieved, the nonbinding target would not "stop or reverse" warming. It would not lower GHG concentrations. It would not even reduce emissions. It proposes only to slow the *growth* of emissions. Emissions will continue to grow. Greenhouse gas concentrations will therefore continue to rise, and warming will accelerate. The language used to describe Clear Skies plays upon the public's inadequate understanding of stocks and flows. By focusing on the GHG intensity of economic output, the proposal can be presented with words like "cutting" and "reduction." In fact, at the rate of real economic growth assumed in the administration's 2002 budget, emissions in 2012 would rise by 17%.[8] The target 18% cut in emissions intensity over 10 years is designed to sound like a large amount, but it is about the same as the 17.4% drop in emissions intensity that occurred from 1990 to 2000 with no policy intervention. Clear Skies is the continuation of business as usual. A more accurate statement of the policy would be "My administration is committed to further growth in our nation's greenhouse gas emissions, ensuring higher greenhouse gas concentrations and continued global warming. If it turns out that sound science justifies further action, it will be too late."

Here lies both a challenge and an opportunity. The challenge: The majority of Americans believe warming is real and should be addressed. But, as we have seen, people's intuitive understanding of even the simplest dynamic systems is weak. As long as people's common sense tells them that stabilizing emissions is sufficient there can be little political will or public pressure for policies that could stabilize climate and prevent further warming. As long as people believe the delays in the response of the system are short, they will conclude it is best to "wait and see" if warming will occur and how much more harmful it will be before taking action. Such heuristics often work well in everyday tasks with low dynamic complexity, where delays are short, outcome feedback is unambiguous and timely, the opportunities for corrective action frequent, and the costs of error are small. But none of these conditions hold in systems with high dynamic complexity, where delays between actions and impacts are long, outcome feedback is ambiguous and delayed, many actions have irreversible consequences, and the costs of error are often immense. The same decision making heuristics that serve us well in simple systems may lead to disaster in complex dynamic systems such as the climate.

Initiatives like Clear Skies present two possibilities: Perhaps cynical policymakers and special interests are taking advantage of the public's poor understanding of stocks and flows to make do-nothing policies sound like major initiatives. Alternatively, policymakers themselves may not fully appreciate the dynamics of the climate and sincerely believe a wait-and-

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see policy is prudent. In free societies, the media are supposed to act as a check on such misinformation. Yet, judging by the poor performance of the highly educated participants in our experiments, many honest policymakers, members of the media and citizens do not understand the most fundamental principles of dynamics, much less the immensely complicated models developed by climate scientists. People judge the plausibility of model-based projections such as those of the IPCC by whether the projections "make sense" relative to their intuitive understanding of the system, and their intuitive ability to relate flows and stocks, understand time delays, and account for simple feedbacks. The results of such models are presented, even in nontechnical reports such as those of the IPCC (2001a), in the form of text, charts and graphs – the same mode of data presentation used in our challenges. Supposedly nontechnical reports such as the IPCC's (2001a) *Summary for Policymakers* are far too technical for the average person – and elected official – to understand. Such presentations are unlikely to overcome the power of "common sense" and "wait and see." In such an environment, the corrective feedback of a free press may be ineffective.

The opportunity: Dana Meadows (1989), explaining why she wrote a weekly newspaper column to communicate systems concepts to the public, noted that "Even the simplest systems concepts help. The level of public discussion is so simpleminded that it doesn't take much to raise its quality. The most fundamental tenets of system dynamics can clear up significant muddles in public thinking." While the complexities of the global climate are daunting, the essence of the problem is as simple as filling a bathtub. Learning about stocks and flows may go a long way in overcoming people's poor intuitive understanding of dynamics. To illustrate, consider the following letter to the editor of *The Chemical Engineer*, by A. Lodge (1999), in response to an article about the complexities of global climate policy:

> The article…gives a fascinating insight into the way international politics struggles with complex technical issues. I was inspired to set up an experiment to test some of the ideas, and hit upon the analogy of using my bath instead of the Earth and taking the water as carbon dioxide. I jammed the plug firmly, and turned one tap to full. I observed that the bath was filling with water. I turned the flow down to 80% – a massive 20% reduction – only to discover that it was still filling but slightly more slowly. At this point I was joined by my neighbour, an American. He pointed out that reducing the flow by 20% was out of the question; we haggled for a bit before

> agreeing on a reduction to 94.8%. We thought the 5.2% reduction had a nice ring to it. Oddly, the bath was still filling up with water at almost the same rate that it had been initially. My friend then gave me a five pound note to turn the tap down by another 20%. I did so. He then turned on the other tap to exactly counter the 20% saving. I complained, only to be told that he had "bought my credits," whatever that means. He then rushed out, returning with a bucket which he put under the second tap. I was so impressed that I did not notice for a moment that the bath was still filling up and that the bucket would soon overflow. We decided we had experimented enough for one day and went off to the pub. We were on our third pint when we remembered that the experiment was still running.

The letter is a fine example of the power of basic stock and flow logic. The higher the concentration of greenhouse gases in the atmosphere, the higher the global temperature will eventually become. The stock and flow structure of the global climate means stabilizing emissions near current rates will not stabilize the climate, but ensures continued growth in GHG concentrations, and continued warming. The climate is complex and our ignorance great. Yet at another level it is as simple as filling a tub: Humanity is injecting CO_2 into the atmosphere at about twice the rate it is drained out. Stabilizing the concentration of CO_2 requires substantial cuts in emissions. Kyoto, while better than business as usual, will not stabilize GHG concentrations at even the record levels they have now attained, much less end the inadvertent experiment in global climate change humanity is now conducting. The sooner people understand these dynamics the sooner they will call for leaders who reject do-nothing wait-and-see policies and turn down the tap – before the tub overflows.

Endnotes

1 "The Tragedy of the Commons," Garrett Hardin, *Science*, 162(1968): 1243-1248.

2 A Center on Policy Attitudes poll in November 2000 showed that while most Americans believe global warming is real, Only 39% agreed that "global warming is a serious and pressing problem [and] we should begin taking steps now even if this involves significant costs." 19% agreed that "Until we are sure that global warming is really a problem, we should not take any steps that would have economic costs" while another 39% agreed that "the problem of global warming should be addressed, but its effects will be gradual, so we can deal with the problem gradually by taking steps that are low in cost." (*www.pipa.org/OnlineReports/GlobalWarming/buenos_aires.html*). A Harris poll conducted in August 2001 (*www.harrisinteractive.com/harris_poll/index.asp?PID=256*) found that 88% of Americans have heard about global warming and most (75%) believe it is real (compared to 19% who don't). Most who have heard about the Kyoto and Bonn accords approve (by 70% to 22%), but Republicans much less likely to believe warming is real or support Kyoto than Democrats. See also Immerwahr (1999).

3 The challenge tasks were given to students from MIT and Harvard enrolled in the introductory system dynamics course at the MIT Sloan School of Management, and to students at the Graduate School of Business at the University of Chicago. A full description of participants can be found in the original paper in SoL's library.

4 Quoted in J. W. Krutch, (1959) "The Colloid and the Crystal," in I. Gordon and S. Sorkin (eds.) *The Armchair Science Reader*, New York: Simon and Schuster, p. 510.

5 Advocates of the naturalistic decision making movement argue that many of the apparent errors documented in decision making research arise not because people have poor reasoning skills but as artifacts of unfamiliar and unrealistic laboratory tasks. While emphasizing the bounded rationality of human decision making, they argue that people can often perform well in complex decision making

settings because we have evolved "fast and frugal" heuristics that "are successful to the degree they are ecologically rational, that is, adapted to the structure of the information in the environment in which they are used…" (Gigerenzer et al. 1999, vii).

6 The IPCC (2001b, 51) concludes "The fraction of emitted CO_2 that can be taken up by the oceans and land is expected to decline with increasing CO_2 concentrations…. [Despite uncertainties] current models consistently indicate that when the effects of climate change are considered, CO_2 uptake by oceans and land becomes smaller." The limits on sinks include a decline in the uptake of CO_2 by forests, including North America, where a great deal of land cleared for farming through the mid-19th century has been abandoned and allowed to return to forest over the past century; that process is saturating and may reverse due to development.

7 See *www.whitehouse.gov/news/releases/2002/02/20020214-5.html.*

8 The administration's proposed 2002 budget projects real GDP will grow from an estimated $9,382 billion in 2002 to $12,973 billion in 2012, a 38.3% increase (a compound rate of 3.24%/year); see *w3.access.gpo.gov/usbudget/*. US GHG Emissions would therefore grow to 1.383/1.18 = 1.17 times the projected 2002 rate.

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Linda Booth Sweeney has worked with SoL during the past twelve years as a project leader. She has published several books desgined to simplify understanding of systems frameworks, concepts and tools and to provide visual and experiential examples of systems-in-action. Linda received her doctorate in education from Harvard University and is currently the director of SoL's Education Partnership.
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A new article on this theme by the authors entitled "Understanding Public Complacency About Climate Change: Adults' Mental Models of Climate Change Violate Conservation of Matter' is forthcoming from *Climatic Change* and can be accessed at *http://web.mit.edu/jsterman/www/Understanding_public.html*.

Commentary

Changing the Landscape for Profitable Control of Greenhouse Gases

By Tom Fiddaman

Tom Fiddaman

John Sterman and Linda Booth Sweeney show that even highly educated people have a low level of understanding of the bathtub dynamics of greenhouse gases and temperature. As a result, they favor "wait and see" policies that perform poorly given the long delays between emissions and perceptible climate damage. Ironically, the most common policy for emissions control, tradable permits, also promotes a "wait and see" approach because volatile short-term dynamics overwhelm long-term considerations. Carbon taxes provide a stable alternative that aligns economic incentives with environmental goals, making it easier to act now in spite of uncertainty.

The U.S. is primarily investing in research and development, which creates options for future reductions of greenhouse gases, but also triggers rebound effects that offset reductions by making driving, lighting, and other energy services cheaper to use. European countries are pursuing a wider range of measures, including carbon taxes and tradable emissions permits, with varying success. Market design is proving time consuming and controversial.

Many companies, however, are not waiting for policy to catch up, and are pursing initiatives that reduce greenhouse gas emissions profitably. Because little attention has been focused on emissions in the past, there are many opportunities for such reductions. The payoff is not only short-term operational savings, but also long-term benefits from moving down learning curves, promoting turnover of capital, public relations, and hedging against future contingencies (e.g. high oil prices or carbon taxes).

Eventually, though, these "no regrets" actions will be fully exploited, and further reductions in emissions will be costly. It is clear that some technologies – e.g. geologic carbon sequestration – will never be adopted without regulatory mandates or a price on carbon, because they entail fundamental efficiency and cost penalties. Firms may continue to pursue reductions altruistically, but in doing so will place themselves at competitive risk. To make further progress, some kind of measures will be needed to change the competitive landscape so that the profit incentive supports action in the benefit of society. Business can have a substantial influence on the kinds of policies that are adopted – but what to ask for?

So far emissions trading schemes have attracted the most attention. They fit conceptually with the Kyoto Protocol, which consists of a set of commitments by developed countries to emissions reductions with respect to 1990 rates and a set of side agreements that facilitates trading. Cap and trade schemes set hard limits on emissions, allocate them as property rights, and permit firms to trade those rights so that there is flexibility to make emissions reductions where they are cheapest to achieve. The principal attractions of cap and trade schemes are that they use market mechanisms, they are compatible with international trading, and (if some permits are given away)

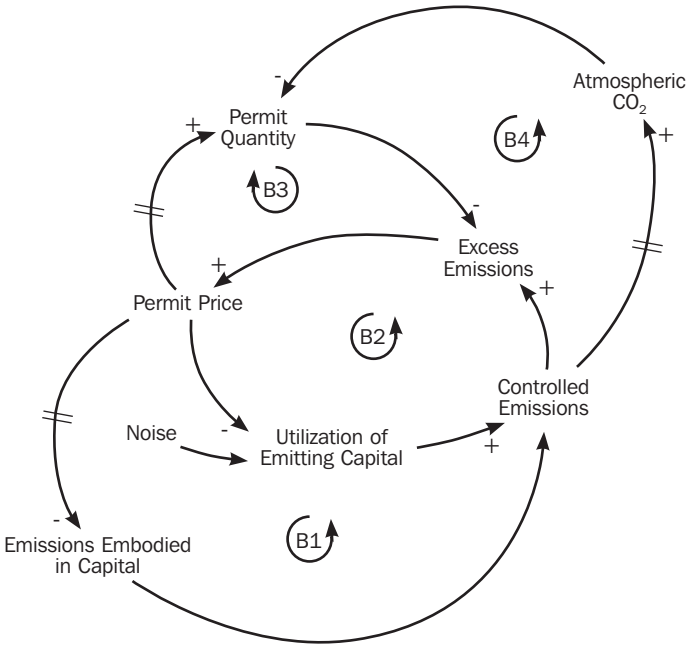
they buy participation by compensating carbon-intensive firms for stranded assets.

However, as the recent volatility of European carbon markets shows, there are also serious problems with the cap & trade approach. Emissions markets differ from most commodity markets because governments determine the supply of permits, and only the demand side adjusts in the short run. This immediately creates tensions about the allocation of permits: auction them, or give them away to past polluters? Should the electric power sector or the transport sector bear the greater burden? How can real emissions reductions be distinguished from actions that would have happened anyway, or reflect corruption rather than honest effort?

Permit markets are difficult to manage because emissions are subject to seasonal and business cycle fluctuations, but difficult to change in the short run because energy demand is associated with long-lived capital equipment. To reconcile fluctuating demand with constant permits, businesses have to maintain an inventory of permits as a buffer, with all of the problems that entails. Commodity and derivative markets will help to fill the gap, but with high transaction costs and volatility, as seen in Europe. Electric utilities, which already have trading departments for other commodities, can handle this. But imagine the challenges for individuals who have to balance their carbon account along with their checkbook, and wonder whether it will be cheaper to visit grandma this month or next.

The potential for drastic short term volatility in emissions markets gives risk-averse leaders strong incentives to set modest goals (high emissions cap levels) in order to avoid triggering damaging high price episodes. Uncertainty about the costs that will result from a given commitment level grows as one looks further

The goal of emissions controls is to reduce the greenhouse gas intensity of the long-lived capital in the economy (loop B1). With a permit system, long term reductions are conditioned on expectations of permit prices, which are driven by short term costs of changes in utilization of capital needed to meet emissions constraints (loop B2). Noise from the business cycle and other sources triggers volatility in prices. Price spikes put pressure on politicians to increase permitted emissions to ease the situation. The long-term need to meet atmospheric constraints (loop B4) gets lost in the short-term shuffle.



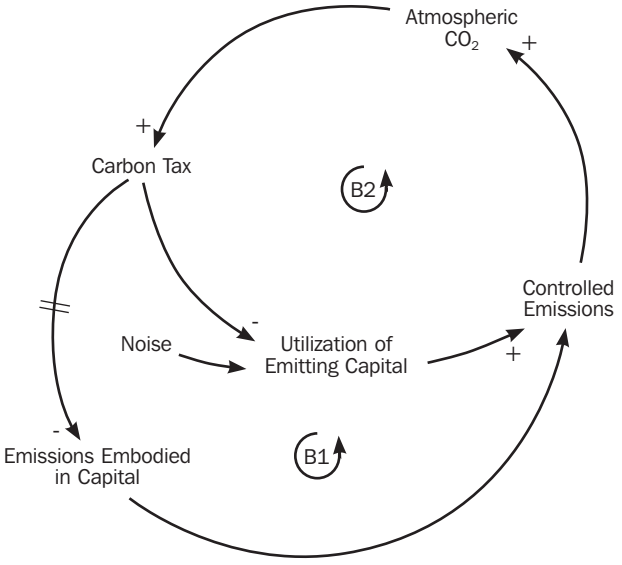
into the future, because it is hard to reconcile a fixed emissions trajectory with unknown behavior of population and economic growth. Choosing an appropriate cap is doubly hard because the dynamics of the climate system and the value of avoided climate damage are also uncertain.

Since climate damages are the real risk we should be worried about, we should seek policies free of short-term dislocations and focus on the long term challenge. Fortunately, the global carbon cycle does not much care whether emissions occur next Friday or next year. The stock of carbon in the atmosphere, biosphere, and oceans is a large buffer. Therefore we have no reason to worry about day-to-day fluctuations in emissions or the choice of a particular path to a stable atmosphere; we just need to put emissions on a generally downward trend.

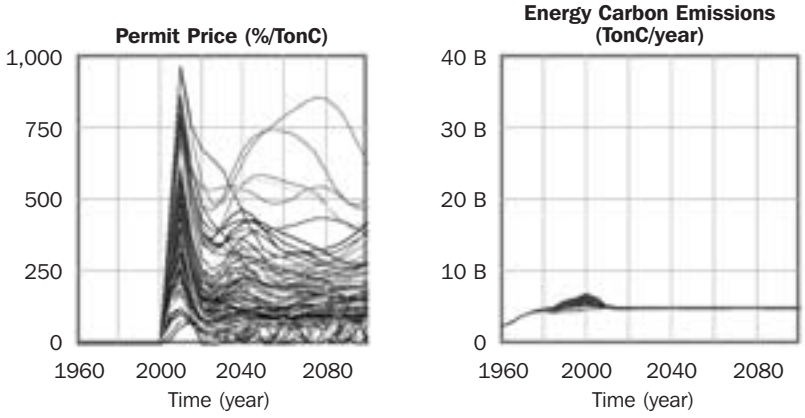
Several options exist. Permits can be given safety valve price limits, beyond which an unlimited quantity is available, or auctioned in variable quantities. Better still is to switch to a scheme in which governments set prices and markets determine the quantity of emissions to avoid. Ordinarily this means carbon taxes – which have the added benefit of generating revenue that can be used to reduce distortionary taxes on goods like labor and profit. There may be other, more creative means of achieving the same goal, which have not yet been explored.

With carbon taxes, the discussion starts with the prospective benefits of reducing emissions, to establish a dollar value for carbon (unlike permits, easily harmonized with the value placed on other greenhouse gases like methane). The resulting price of carbon can be relatively stable, so that firms and individuals have concrete long-term expectations and can make investments with confidence. Better still, a tax can be adapted easily in response to environmental conditions, so that for example it increases as the concentration of CO_2 in the atmosphere rises.

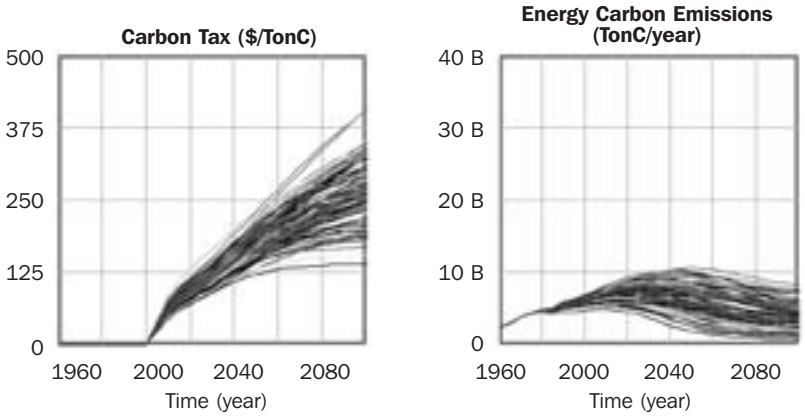
A carbon tax has the same effect as a permit price on short-term utilization of capital and thus equivalent cost for a given price. However, the tax is not volatile because it only needs to respond to long-term changes in the atmosphere (and perhaps other slow-moving inputs), and noise is filtered out by large stocks (loop B2). With a stable tax, there is less incentive to discount or play games and investors have clear targets, so loop B1 is more effective as well.



Permits achieve a stable emissions trajectory through volatile and highly uncertain future carbon prices, making emissions reductions unnecessarily costly.



An adaptive tax trades some uncertainty in the emissions path for a stable emissions trajectory, and achieves better climate outcomes at lower cost.



With any kind of emissions control, some firms (energy-intensive industries, for example) will wind up as losers, because their sector shrinks. Permits are not the only way to compensate for this; it is straightforward to divert a small amount of the revenue stream from emissions taxes by creating exemptions for a portion of emissions (declining over time) or lowering taxes on profits. Sadly, to date attention has focused almost exclusively on compensating shareholders, though they are accustomed to and diversified against volatility. Much more attention must be devoted to mitigating impacts on workers in affected sectors.

Even with its current implementation problems, the Kyoto Protocol has substantial net benefits for society (unless you discount the welfare of future generations and poorer nations, as many economic models now do). What's needed is a graceful transition to a set of commitments and instruments that make it easy to focus on the long term without confounding short-term dynamics. Imagine the benefits of redirecting the effort currently dissipated negotiating market design and the distribution of permits could be directed instead at finding ways to make money through real emissions reductions. Technologies we want will flourish as the economic playing field is leveled to reflect their true value to society. The scope for firms to profit from emissions reductions will grow. The world will be the better not only for reducing climate damage in the long run, but also for improving a host of short term problems: traffic, noise, air quality, and energy security.

Recommended Reading

This article is adapted from the author's acceptance speech for the 2006 Forrester Prize, awarded for the paper, "Exploring policy options with a behavioral climate-economy model," which appeared in *System Dynamics Review*, Vol. 18, No. 2 (Summer 2002). A copy is available at *www.sd3.info*.

From Donella Meadows' *Global Citizen* column at *www.pcdf.org/meadows*

Polar Bears and Three-Year-Olds on Thin Ice, February 1, 2001

Mother Gaia Reflects on the Global Climate Conference, December 4, 1997

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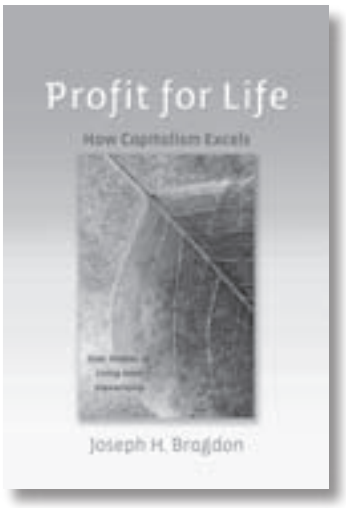
**Profit for Life:
How Capitalism Excels**

Joseph H. Bragdon
SoL, 2006

Profit for Life: How Capitalism Excels

Joseph H. Bragdon

Profit for Life: How Capitalism Excels was published by SoL in October, 2006. The book's premise – that aligning with nature is good business – is based on author Jay Bragdon's nearly forty years of research on the empirical connection between stewardship and profitability. Drawing on a "learning laboratory" of 60 companies whose average credit ratings, longevity, and growth rates far exceed those of their peers, Bragdon makes the case that those companies that affirm life in their mission, vision, values, and management practices attract the most loyal employees, strategic partners, customers, and investors – and produce exceptional financial results.



"The new theory sees the fundamental mission of a business not as profit, but as value creation. It sees profit as a vital consequence of value creation – a means rather than an end, a result as opposed to a purpose. . . . The new theory also makes loyalty a truer litmus test of corporate performance than profits ever were or could be."[1]

"[L]oyalty-based management is about people. . . . It is about motivation and behavior, not marketing or finance or product development. . . . It is about humanistic values and principles of the kind people devote their lives to. . . . People have always been far more motivated to devote energy to organizations with a service goal than to organizations that exist simply to make a buck."[2]

— Frederick F. Reichheld, Director Emeritus, Bain & Company, *The Loyalty Effect*

Introduction

Why is it that mature, cyclical firms such as the steel manufacturer Nucor, Southwest Airlines, and Toyota, have returned from 4 to 100+ times the Standard & Poor's 500 Index during the 31 years from 1974 to 2005 — a period during which many of their once-giant competitors died or neared bankruptcy?

How did Nokia emerge from its identity as a forest products firm in the nineteenth century to become a giant in radio and electronics for most of the twentieth century, and finally, a global power in wireless communications in the past decade?

What is it about Stora Enso's culture that has enabled it to survive for seven centuries when most publicly traded corporations today live for fewer than 50 years?

How did Canon, Intel, HP, and 3M become the hotbeds of learning and innovation that they are today?

All of these companies have long had stewardship cultures rooted in systemic caring. They think and act like living communities that are integral to the larger living systems in which they exist – society, markets, and the biosphere. This conceptual framework is very different from the more traditional, mechanistic view that corporations are moneymaking machines that exist separate from society and the biosphere, both of which conventional economics views as "external" to the legitimate concerns of business.

During the past half-century, as world population and GDP (gross domestic product) have soared, and the Earth's biospheric carrying capacity has declined, these stewardship cultures have become more clearly articulated.[3] Their thought leaders now look more deeply into the connections between the firm, its individual employees, the communities it serves, and Nature. Their quest has been to discover more harmonic and sustainable

ways of operating, and more effective ways to leverage one of our few unlimited resources – the human imagination.

Although still outside the corporate mainstream, the stewardship ideas and practices I will describe have made impressive inroads into every major industry and sector. Companies that have pioneered in the evolution of these practices have rolled up huge market share against their traditionally managed competitors.

Interestingly, the shift in management thinking I have observed parallels similar shifts in scientific thinking – away from deterministic theories, such as Newton's laws of physics, and toward theories based on complexity and the interrelatedness of all things, such as those in the newer sciences of quantum mechanics and ecology. We find a similar shift in medicine and psychology as practitioners explore mind-body connections that manifest in consciousness, free will, empathy, spirit, and ethics.

My goal in this volume is to distill the trends I have followed in management practices and other fields into a coherent and unified theory. This effort has been a personal quest that began in the late 1960s when I first saw a connection between corporate ethics and profitability.[4] The depth of that connection largely eluded me so long as I approached the matter in a traditional, linear (Newtonian) manner. However, it became a good deal clearer in the mid-1990s when I began thinking in a more holistic, systemic framework premised on the new sciences.

Living Assets

The most important feature of this new theory is the distinction between living assets (people and Nature) and nonliving assets (capital). I believe that, contrary to the mores of traditional capitalism, *living assets are more important to the productivity and longevity of companies than nonliving, capital assets*. Though this may seem a small matter of emphasis, its policy implications are enormous.

Why are living assets more important? In a word, they are the source of nonliving capital assets. Capital assets could not exist absent the knowledge and productivity of people and Nature. Our most intelligent capital assets, including supercomputers, cannot function without human guidance and natural resources.

I link people and Nature together in my definition of living assets because they are so tightly coupled in the web of life. According to biologist Edward O. Wilson, people have an instinctive reverence for life and Nature, which he calls "biophilia."[5] This instinct became wired into our genes through thousands of generations because people who respected life and Nature were more likely to survive and reproduce than those who did not, and were therefore better able to pass on their DNA to future generations.

If you accept the distinction between living and nonliving assets, then the logic of Living Asset Stewardship (LAS) makes sense. We take care of the things we most value. It's as simple as that. LAS, I believe, is the core of an emergent new theory of management.

Caring for the Things We Most Value

I define Living Asset Stewardship as "caring about people and the things people care about." In the context of Wilson's biophilia thesis, we can further condense the definition to "respect for life."

"Caring," as used in this sense, is not the soft, sentimental variety, but a more-disciplined, systemic caring that looks to the general health of the larger world (society, markets, and the biosphere) in which we operate.

Deep caring exists when we look beyond the end results of our actions to the processes we use to deliver those results. Traditional companies – those that rigorously manage by objectives – generally receive poor LAS ratings, even if their objectives are praiseworthy, because their linear-thinking, mechanistic behaviors inevitably clash with our human sense of individual value and the ways in which we most effectively learn and innovate. Doing "whatever it takes" to produce a number or result is risky because the linear thinker often cannot see beyond the objective to possible unintended consequences.

Alternatively, the best living asset stewards look to the integrity of their management processes by deeply caring for their employees' health and welfare, respecting their values, and serving the growth of their professional competence – trusting that when these things

are done, the firm's goals will be met. This has been aptly dubbed "management by means."[6]

According to physicist and management consultant Danah Zohar, when companies operate in such ways (i.e., when their processes reflect our biophilic respect for life), they engage our higher thinking capacities. In such environments, people are more apt to transcend their logical, linear-thinking minds and enter their more intuitive and insightful "quantum" minds. We call this inspiration.

It is no accident that corporate LAS leaders attract and hold the best employees, customers, strategic partners, and investors. Their Living Asset Stewardship inspires us to affiliate with them. Whatever the costs of deep caring may be, they are returned many times over in sales and profit.

The Global LAMP Index™

To test the economic potential of LAS, I constructed a "learning laboratory" of 60 global LAS leaders, collectively called the Global Living Asset Management Performance (LAMP) Index.™[7] Each company in the index was selected for the consistency of its commitment to LAS relative to that of industry peers. To facilitate comparisons, the industry/sector balance of the Global LAMP Index™ closely approximates that of the Standard & Poor's 500 Index (S&P 500) and the Morgan Stanley Capital International (MSCI) World Index. A comparison of the investment performance of these indices yields useful feedback on the market's assessment of LAS.

As one might expect, all 60 companies in our LAS learning laboratory are also prominent on global ethics and sustainability indices. But here the similarity to those indices ends. Our system for selecting LAMP companies looks beyond objectives and outcomes (the triple bottom line) to the additional dimensions of means and process. (See Chapter 1 for more on the triple top and bottom lines.) This deeper, more demanding approach to stewardship is more congruent with the ways in which living systems operate. Its authenticity resonates with stakeholders and makes a huge difference in financial returns.

To explore the inner workings of LAS, I have extracted from the learning laboratory 16 companies whose stories we will follow throughout this volume. Notably, these companies, collectively called the Focus Group, are overrepresented in mature, cyclical industries that typically operate in traditional, mechanistic ways –the airline, auto, chemicals, forest products, primary metals, and steel industries. The risk in using this configuration was a weakening of the argument for LAS by skewing the Focus Group toward slow-growth industries. However, the benefit is in highlighting the huge gains LAS leaders have earned at the expense of traditionally managed firms in these industries, as illustrated in appendices 2 and 5.

Chapter 5 will discuss in greater detail the selection processes I have used. Table 1 shows how the Global LAMP Index™ and the Focus Group have performed; the results are stunning.

Table 1: LAMP Investment Performance

Returns for both LAMP benchmarks* – the 16-company Focus Group and the larger Global LAMP Index™ – were consistently superior to the most commonly used benchmarks of global and domestic equity performance.

Annualized Total Returns (as %) at Year-end 2005

Index	1 Year	3 Years	5 Years	10 Years
Focus Group	9.53	17.90	4.98	14.93
Global LAMP Index™	11.63	22.62	8.26	17.37
S&P 500	4.91	14.38	0.54	9.07
MSCI World	9.49	18.69	2.19	7.04

* LAMP returns are based on an equal-weighted back-cast with dividends not reinvested. The S&P 500 and the MSCI World indices are weighted by market capitalization with dividends reinvested. Unlike the benchmark indices, which regularly drop laggard companies and add faster growers, there were no changes in the Global LAMP Index™ for the indicated period.

The Global LAMP Index™ returns of the past decade (1996–2005) were more than double those of its closest proxy (the MSCI World Index) on an annualized basis, and beat the S&P 500 by a large margin, as well. The consistency of the LAMP's performance lead over both benchmarks – in both up and down markets – is extraordinary and can be seen in greater detail in Table 5-1 and Appendix 2. During that 10-year period, the performance of the more cyclical Focus Group was also exceptional, although it lagged behind the larger LAMP index because of its greater exposure to mature, slow-growth industries.

These results defy the conventional Wall Street wisdom that risk and reward are closely linked. By such logic, stocks that outperform in rising markets should underperform in declining markets. Though I do not argue with such reasoning as a general rule of thumb, I think it can be trumped when, as we are now witnessing, a superior strategic model begins to overtake an inferior one.

The results shown in Table 1 are based on back-tests rather than on actual returns. This is appropriate for a learning laboratory, in which our objective is to discover the effects of stewardship best practices. For the sake of consistency, results of the two LAMP averages are based on the same companies – equally weighted at the start of each year – for the entire 10-year test period. We assume no trades that might have heightened performance.

Shared Principles of LAS Leaders

All of the companies in the Global LAMP Index™ share core philosophical and organizational principles. These are consistent with the idea that firms are living communities whose primary assets are living assets, and whose existence utterly depends on the health of larger living systems.[8] Because all life and living systems are inherently organized as networks, this mental model sees the optimal corporation as a living network that is closely integrated into the web of living networks in which it exists, where everything is related to everything else.

Although this mindset, or "theory of system," is rarely explicit in the policies of corporate LAS leaders, it is certainly implicit and increasingly expressed in corporate communications.[9] We typically find among LAMP companies:

- corporate mission, vision, and value statements that reflect life-affirming, sustainable ideals;
- operating principles that respect the environment and conserve resources;
- organizations that are decentralized and networked, with localized decision-making authority;
- workplaces where employees are trusted, empowered, and held accountable;
- leaders who mentor and serve the professional growth of employees;
- cultures that support continuous learning, collaboration, and idea sharing;
- fiscal policy designed to sustain the firm for generations and create a legacy for stakeholders; and
- management systems that regard profit primarily as a means to higher-quality service, rather than as an end in itself.

These principles and policies are consistently applied, and are congruent with a theory of system centered on the tight coupling of people and Nature in the web of life. In global LAMP companies we find that theory expressed in cultures that manage primarily by means (symbiosis) rather than by objectives. We also find it expressed in the fast-growing field of "industrial ecology."[10]

Shared Practices of LAS Leaders

Global LAMP companies' management practices are integral to their theories of system, ensuring that LAS principles are implemented at every level. Such consistency and congruency build commitment, trust, and loyalty from within – the foundations of strong relationships throughout the enterprise. Strong "relational equity" is the surest way to build financial equity.

Although the practices of LAMP companies may differ in emphasis or degree, they typically exhibit the following characteristics:

- CEOs and senior leaders continually support LAS in word and deed;
- management and employees are evaluated on their understanding of LAS principles and advancement of stewardship practices;

• sustainability and respect for life are embedded in all strategic thinking and planning;

• IT infrastructure supports ubiquitous networking between employees, customers, suppliers, and other important stakeholders;

• reporting systems are open and transparent, and include robust, balanced scorecard metrics;

• results are continually audited and evaluated to advance learning;

• investments look to long-term synergies rather than quick returns; and

• borrowing is limited and well within the firm's means – even in the worst of circumstances.

In the opening quote of this Introduction we find strong affirmation of the foregoing principles and practices. Bain & Company has built a dynamic franchise on its "loyalty practice." Frederick Reichheld, who led this practice, puts a high premium on "mutual caring, respect, responsibility, accountability . . . and trust" as ways to build loyalty.[11] This is not to say that Bain and Reichheld endorse Living Asset Stewardship, but they do affirm qualities that are deeply embedded in LAS cultures.

Leverage

The operating leverage in corporations comes from *synergies*, not from financial (i.e., mechanistic) gearing. Synergies arise when individual transactions benefit not only the transactors, but also the larger living systems in which they exist. When this happens, the whole becomes more than the sum of its parts. Gearing works differently. It involves a linear and finite *transfer* of energy rather than a continuous and cumulative *cycling* of energy. It also invites risks. Obviously, companies that borrow extensively to leverage their operations must repay the money they borrow.

LAMP companies' aversion to debt is evident in the strength of their balance sheets. More than 58 percent of LAMP companies have Moody's credit ratings of A-1 or higher. (See Appendix 3 for credit ratings for the Global LAMP Index™ companies.) As seen in Table 3-1, this is more than double the ratio for the global corporate average. Also important, all LAMP companies are rated as investment grade, whereas nearly one-third of the companies comprising the global corporate average are rated below investment grade – a gap that has widened during the past decade. This is not random happenstance, but an integral function of the way the firms operate.

LAMP leaders seek leverage through inspiring employees and nurturing their professional growth. This creates huge synergies, as will be discussed in chap-

Table 5-1: Performance Comparisons (1996–2005)

Global LAMP Index™ vs. MSCI World and S&P 500 Indices
Total Returns: Principal + Dividends (as %)
LAMP Excess (% pts.) vs.

Year	LAMP	MSCI	S&P 500	MSCI	S&P 500
1996	27.72	13.47	22.94	14.25	4.78
1997	33.91	15.76	33.35	18.15	0.56
1998	29.23	24.31	28.57	4.92	0.66
1999	47.66	24.94	21.04	22.72	26.62
2000	2.02	(13.19)	(9.10)	15.21	11.12
2001	(6.02)	(16.80)	(11.88)	10.78	5.86
2002	(13.80)	(19.88)	(22.09)	6.08	8.29
2003	40.61	33.10	28.67	7.51	11.94
2004	16.78	14.72	10.88	2.06	5.90
2005	11.63	9.49	4.91	2.14	6.72
Totals as %:					
Cumulative:	**394.42**	**97.37**	**138.31**		

Returns for the Global LAMP Index™ are back casts based on equally weighting each LAMP company at the start of each year. The foregoing LAMP results assume dividends are taken rather than reinvested. Returns for the S&P 500 and the MSCI World indices are weighted by market capitalization and assume reinvestment of dividends as earned. There can be no assurance that any of the performances or performance patterns indicated in this chart will continue into the future. Source of MCSI data: Morningstar.

ters 1 through 4. These leaders also understand that the carrying costs of debt can overwhelm companies during economic hard times, causing unplanned asset disposals, service interruptions, layoffs, and even bankruptcy. This reality is nowhere more evident than in the auto, steel, and airline industries – a fact that only underscores the outstanding performance of LAS leaders Toyota, Nucor, and Southwest Airlines. All three have been consistent profit and quality leaders in these very industries for more than three decades, with no layoffs. Not surprisingly, they are renowned for the spirit and professionalism of their employees, as well as for their humanistic and caring cultures.

Durability

LAS cultures are more durable than traditional ones because networks are more adaptable than management hierarchies. By engaging all their human resources, rather than just a select few at the top, LAMP companies develop quicker reflexes and deeper insight, which generally feed back to generate superior innovation.

The longevity of our learning laboratory supports this observation. The average and median ages of companies in the Global LAMP Index™ exceed 100 years, as shown in Appendix 4. According to a famous study by Royal Dutch/Shell, this is more than double the average life expectancy of exchange-listed corporations, which is in the vicinity of 40 to 50 years.

Successful networking isn't related to company size, as some might imagine, with advantages accruing mainly to smaller, community-based companies. Some of the world's largest companies – Alcoa, Canon, Hewlett-Packard, HSBC Group, Intel, Johnson & Johnson, Royal Dutch/Shell, 3M, and Toyota – are radically decentralized and networked, with authority pushed as far out to the local level as possible. Within each operating unit these companies foster cultures of community, mutual caring, and shared responsibility.

The role of leaders in such organizations is to serve the professional growth of people working within the network – the means of the network's productive capacity – rather than to manage them by "command and control." Robert Greenleaf has called this approach "servant leadership." In his words, "The first order of business is to build a group of people who, under the influence of the institution, grow taller and become healthier, stronger and more autonomous."[12]

The durability of global LAMP companies is further enhanced by an ethic of freely sharing important business information. Employees are closely linked through corporate intranets so people in diverse business units can readily draw on each other's knowledge and experience. They regularly rotate through different business units and functions as a way of building relationships and exchanging skills within the firm. Employees are encouraged to form communities of practice wherein people with similar interests congregate to exchange ideas – both virtually and face-to-face. Those who make significant contributions are quickly recognized and rewarded without regard to their professional status. When business is good, LAMP companies are quick to share their prosperity with employees. When it is bad, they find creative ways to avoid layoffs or to help displaced employees retrain and find new work.[13]

Institutional Investors

Institutional investors today control most of the world's publicly traded shares. As public fiduciaries, they must act prudently and in their customers' best interests. If LAS produces better value and investment returns than traditional business practices do, these investors must favor the winning model. As the relative growth of the Global LAMP Index™ attests, they have, indeed, done so.

The more institutional investors come to understand how the dynamics of LAS contribute to profitability, the more active they are likely to become in encouraging better stewardship in portfolio companies. This is already happening on an ad hoc basis among members of the Council of Institutional Investors (CII), a consortium of more than 140 pension funds with approximately $3 trillion under management.[14]

Looking to the future, I believe that institutional investors who learn the ways of LAS and promote it in the marketplace will

gain market share. Those who take the opposite course and hold to traditional methods will be left behind. Such incentives will further accelerate the demand for corporations to implement LAS practices.

Ideas That Change the World

A simple shift in thinking – that the world is round instead of flat – gave rise to the sixteenth-century Age of Exploration. The simple act of placing living assets ahead of capital assets on a company's value scale offers analogous opportunities for advancement.

Such ideas usually arise for compelling reasons. The round-world theory emerged at a time when Europeans felt constrained and were looking to find new resources, markets, and trade routes for their expanding commerce. The practice of Living Asset Stew-ardship arises from a similar sense of constraint. World civilizations today feel hemmed in by the explosive growth of populations and by the decline of Earth's carrying capacity. Commercial thought leaders know we must find ways of producing and trading that are more resource-efficient and harmonious than those now in mainstream use.

Humanity abhors constraint. We want to explore, experiment, learn, and find new ways of living that expand frontiers for generations to come. In today's world of limited physical resources, we know that ideas are our only source of unlimited potential. Increasingly, we recognize that the way forward must be about the primacy of the great web of life. Networked organizations that respect life, that care about people and the things that people care about, inspire us to think and create. Their deep stewardship engages our higher thinking capacities in ways that mechanistic, command-and-control hierarchies could never do.

These realities are so compelling that, once companies get on the LAS path, there is usually no going back. People become wedded to it, will fight fiercely to protect it, and, if they believe they can't protect it, will leave. This kind of passion, as much as the market's validation of LAMP companies, is why Living Asset Stewardship is here to stay.

Endnotes

1 Frederick F. Reichheld, *The Loyalty Effect* (Boston: Harvard Business School Press, 1996), 5.

2 Ibid., 28.

3 Edward O. Wilson, *The Future of Life* (New York: Alfred A. Knopf, 2002), 42. Biologist Edward O. Wilson puts our economic dilemma bluntly: "The wealth of the world, if measured by domestic product and per-capita income, is rising. But if calculated from the condition of the biosphere, it is falling." The book goes on to explain why this is so and to make a case for better stewardship.

4 In 1972 I co-authored, with John T. Marlin, an article titled "Is Pollution Profitable?" in *Risk Management* 19 (4) (April 1972): 9–18. According to professors Joshua D. Margolis and James P. Walsh, this was "the first empirical study" linking stewardship behaviors to the bottom line. See J. Margolis and J. Walsh, *People and Profits?* (Mahwah, NJ: Lawrence Erlbaum Associates, 2001), 1.

5 Edward O. Wilson, *Biophilia* (Cambridge: Harvard University Press, 1984).

6 The term "management by means," or MBM, was introduced by H. Thomas Johnson and Anders Broms in their classic, *Profit Beyond Measure*, (New York: The Free Press, 2000). I have adopted the term because it neatly frames my theories of system and Living Asset Stewardship.

7 I formally began the process of assembling the Global LAMP Index in 1997; the final, 60-company composition of the index was set in 2002.

8 Arie de Geus, *The Living Company* (Boston: Harvard Business School Press, 1997). The author, former director of Global Planning at Royal Dutch/Shell, convincingly argues for the proposition that corporations are living communities rather than profit-making machines.

9 Many LAMP companies metaphorically describe themselves and/or their markets as "ecosystems." Toyota's widely imitated production system is explicitly based on cybernetic principles found in Nature.

10 Industrial ecology looks to create companies that mimic Nature by aiming for "closed loop" manufacturing processes in which the wastes of one become the food for another. The *Journal of Industrial Ecology*, published by MIT Press, is an excellent resource on this subject (www.mitpress.mit.edu/JIE).

11 Reichheld, *The Loyalty Effect*, 15.

12 Robert K. Greenleaf, "The Servant as Leader," essay first published in 1979 by the Paulist Press (repr., Indianapolis, IN: The Robert K. Greenleaf Center, 1991), 30.

13 The financial stability of LAMP companies, reflected in their low debt ratios, is their first line of defense against layoffs. To protect employees' jobs, some firms, such as Nucor, will ask everyone to take a percentage pay cut, with executives taking the deepest cuts. At others, such as Toyota, employees are reassigned to new work. If layoffs cannot be avoided, LAMP companies generally give generous severance packages as well as job training and help in finding new work.

14 The Council of Institutional Investors uses shareholder proposals to effect change in corporate governance. In 2005 more than 80 majority-voting shareowner proposals were submitted for inclusion in company proxy materials. Supporting votes on these proposals averaged approximately 45 percent – a large increase from the 2004 average of 12 percent. Most institutional shareholder initiatives never get to the proxy stage because they are settled by negotiation. The trend of institutional shareholder activism is rising as investors see the benefits to shareholder return.

ABOUT THE AUTHOR

Joseph H. (Jay) Bragdon is a money manager for high-net-worth families, and a pioneer in the field of corporate stewardship. As a result of his early work in the field, Jay cochaired the first national Conference on Corporate Responsibility in Investments at the Harvard Business School. A member of SoL, he is currently a director of the Sustainability Institute in Hartland, Vermont.
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Recommended Reading/ Resources

If this issue leaves you with questions about what you can do, the Sustainability Consortium maintains a list of resources at *http://www.solsustainability.org/toolkit.htm*. The Consortium also periodically hosts audio conferences and forums on Business Innovation for Sustainability which are open to the public. Consult their website for more details: *http://www.solsustainability.org/.*

In addition, two recent publications may be of interest.

Our friends at Pegasus Communications recommend:

- ***The Low Carbon Diet – A 30-Day Program to Lose 5000 Pounds***
  by David Gershon

  The typical American household generates approximately 55,000 pounds of carbon dioxide annually (compared to Sweden's 15,000 pounds per household). We know we have an "overheating" problem; but what can we do about it? This entertaining workbook helps you make the cool choice to quantify and reduce the impact you are having on the planet. Go on this low carbon diet with family, friends, co-workers, and neighbors, and learn as much about each other as you do about climate change.

Peter Senge recommends:

- ***Child Honoring: How to Turn This World Around***
  by Raffi Cavoukian and Sharna Olfman (Eds)

  "At this critical point in the history of humankind, the irreducible needs of all children can offer a unifying ethic by which the cultures of our interdependent world might reorder their priorities. Child Honoring is a vision, an organizing principle, and a way of life – a revolution in values that calls for a profound redesign of every sphere of society. – *Raffi*

  Joanna Macy calls the concept of child honoring one that "brings us back to life."

  This anthology includes contributions from Penelope Leach, Lloyd Axworthy, Riane Eisler, Barbara Kingsolver, ecological economist Ron Colman, indigenous educator Lorna Williams, Matthew Fox, author Joel Bakan, and physicist Fritjof Capra.

  As a small taste, the book includes "A Covenant For Honoring Children":

  "We find these joys to be self-evident:
  That all children are created whole, endowed with innate intelligence, with dignity and wonder, worthy of respect.
  The embodiment of life, liberty and happiness, children are original blessings, here to learn their own song.

Every girl and boy is entitled to love, to dream, and to belong to a loving 'village.'
And to pursue a life of purpose.
We affirm our duty to nourish and nurture the young, to honor their caring ideals as the heart of being human.
To recognize the early years as the foundation of life, and to cherish the contribution of young children to human evolution.
We commit ourselves to peaceful ways and vow to keep from harm or neglect these, our most vulnerable citizens.
As guardians of their prosperity we honor the bountiful Earth whose diversity sustains us.
Thus we pledge our love for generations to come."

As a subscriber, you have access to back issues of *Reflections* that feature the following articles on sustainability:

- "Metanoic Organizations in the Transition to a Sustainable Society" *by Charles F. Kiefer and Peter M. Senge*
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- "On the Plural Attentions Necessary for Catalyzing and Implementing Sustainable Development" *by Hilary Bradbury*
- "The LAKES Story' *by Marlow Hotchkiss, Colleen Kelley, Robert Ott, and John F. Elter*
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- "Living-Asset Stewardship: How Organizational Learning Leads to Exceptional Market Returns" *by Jay Bragdon and Richard Karash*
- "Confronting the Tyranny of Management by Numbers: How Business Can Deliver the Results We Care About Most" *by H. Thomas Johnson*
- "Searching for Sustainability: No Quick Fix" *by John R. Ehrenfeld*

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