

# Timeline

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## **The End of Our War Against the Earth**

**By Amory Lovins**

What will historians record as the two great intellectual shifts at the end of the 20th century? According to Amory Lovins, cofounder of the Rocky Mountain Institute, the more obvious one was the fall of communism and the “apparent” victory of market economics and capitalism. In reality, however, Lovins maintains that industrial capitalism

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will eventually be recognized as a “temporary aberration which defied its own logic by liquidating and not valuing its largest source of capital, namely Nature.” And thus the much more significant shift in thinking, Lovins says, was “the beginning of the end of our war against the Earth, and the rise of a new way of doing business as if Nature and people have value.”

Lovins expounded these ideas and others in a talk at Stanford University in connection with Earth Day 2001, drawing on the book he wrote with his wife and partner, L. Hunter Lovins, and Smith & Hawken cofounder Paul Hawken: *Natural Capitalism: Creating the Next Industrial Revolution*.

## NATURAL CAPITAL

In explaining why he refers to Nature as our largest source of capital, Lovins pointed to Biosphere II, an experiment in the Arizona desert in which people tried to create a self-sustaining ecosystem in a large closed dome. Despite a \$200 million investment and a lot of good science, they proved unable to provide reasonable air for eight people. By contrast, Lovins noted in his typical dry style, reasonable air is one of the “nifty ecosystem services” that Nature provides free every day for six billion of us. Other such services include “drinkable water, the flow of nutrients, the regulation of pathogens and pests, detoxifying and assimilating society’s wastes, the regulation of climate (until we started experimenting with it!), and a lot of other things we can’t live without.” When scientists try to place a monetary value on all these services, they typically come up with numbers “about as big as gross world product.”

As a result of the “take-make-waste” philosophy of industrial capitalism, Lovins notes that we all know that our natural capital, in the forms of living systems, is deteriorating under increasing pressure, and every major ecosystem on Earth is in decline. And with that decline, the limits to the human prospect are coming to be set by “how many fish there are in the sea, not by how many boats and nets we have; by forests, not chainsaws; by fresh water, not pumps; by fertile land, not plows.”

## THE FIRST INDUSTRIAL REVOLUTION

Today’s conditions are very different from those that existed at the beginning of what Lovins refers to as the “First” Industrial Revolution, a quarter millennium ago. In Lovins’ words: “At that time, the notion of increasing labor productivity was unknown. If you wanted more cloth, you had to hire more weavers, just as if you wanted two horsepower, you needed two horses. So if somebody had come into Parliament around 1750 and said we don’t have enough weavers to make enough affordable cloth for the mass of people, so we’re going to make weavers 100 times more productive, nobody would have understood what this meant—and if they had, they would have thought it a ridiculous idea. But it did actually happen, because technical innovators got together with profit-maximizing capitalists, and soon a mechanical spinner produced the cloth that had

previously required 200 weavers. This spread through one sector after another of the economy and created affordable mass goods, purchasing power of the middle class, and everything you see around us. It was rightly called the Industrial Revolution.”

The guiding principle of that revolution, according to Lovins, was straightforward—“at a time when the relative scarcity of people was limiting progress in exploiting seemingly boundless Nature, the obvious response was to make people 100 times more productive.”

That logic is still correct today, says Lovins; i.e., economics teaches us to economize on our scarcest resource. What’s changed—what has reversed—is the pattern of scarcity: “In the next industrial revolution, which is already under way, we have abundant people and scarce Nature, not the other way around. Therefore, it is now not people, but Nature we need to be using far more productively, bringing four or ten or a hundred times as much work from every unit of energy, water, materials, topsoil, or whatever else we’re borrowing from the planet.”

## THE SECOND INDUSTRIAL REVOLUTION

### Principle 1: Radical Resource Productivity

That fundamental change, which Lovins refers to as “radical resource productivity,” is the first of four “interlinked and mutually reinforcing” principles of natural capitalism set forth in the book of that title.

Lovins capsulizes our current dilemma as follows: “Just to take materials flow as an example, the things we extract from the planet, process, use, move around, and throw away are on the order of 20 times your bodyweight per person per day in this country. Globally that’s a half-trillion tons a year, of which only one percent ever gets into durable products. The other 99 percent is waste,” which Lovins calls “a vast business opportunity.” Not only that, he said, “a lot of the waste we’re throwing away is toxic, so when it gets assimilated back into Nature, it harms the regenerative capacity that we need to grow things and to get the ecosystem services without which there is no life and therefore no economic activity. So this sounds like a design problem.”

Lovins practices what he preaches. At the headquarters of his Rocky Mountain Institute, at 7100 feet, not far from Aspen, Colorado, he created a “passive solar banana farm,” where the outside temperature sinks to minus 47 degrees Fahrenheit on occasion, frost can occur any day of the year, and they’ve had 39 days of continuous midwinter clouds. In that challenging environment, Lovins has harvested 27 banana crops without a heating system, with a 90 percent electric saving, “because if you have enough insulation, then you will be kept warm by the sun coming through the windows, even on a cloudy day. Also warming the place “are the people, lights, appliances, and our dog,” whom Lovins refers to as a “50-watt portable supplementary heating system,” adding that “she is adjustable to 100 watts if you throw the ball a bit.”

Lovins notes that the conventional notion of energy conservation is that the more energy and resources you save, the more steeply the marginal cost rises, with diminishing returns, “until you hit the wall on cost effectiveness and have to stop.” By going further, however, he was able to save much more by eliminating costly heating and cooling equipment, an approach which he refers to as “tunneling through the cost barrier.” Explaining the phrase, he added: “It turns out that enough super-insulation, and super-windows, using Krypton fill and heat-mirror, thin-film coatings on plastic film, and air-to-air heat exchangers, can make the design 99 percent thermally passive. And it costs less to build that way, because those things add less to the capital cost than you save upfront by not needing to install furnace ducts, pipes, wires, controls, and a fuel system.”

Given these incredible savings, why doesn't all construction incorporate the same principles? According to Lovins, it's because our laws and contracts don't offer the right incentives. Lovins uses electrical wire as an example. The wire-size table in the National Electrical Code is designed to prevent fires, not save energy. So the minimum code wire, spec'd by all low-bid contractors, is skinny, gets hot from resistance, and is very energy inefficient, whereas wire twice as fat, while it would cost more, would save much energy—and therefore money—in the long run.

“These problems are not trivial,” Lovins adds. “For example, the United States has misallocated about a trillion dollars of capital for 200 million tons or so of air conditioning equipment, and about 200 gigawatts of power supply to run it,” all of which would not have been needed in the first place “if we had designed the buildings to produce the best comfort at the least cost. Why didn't we do that? Well, for example, we pay our architects and engineers according to what they spend, not what they save. That's pretty easy to fix—offer your design professional, say, three years worth of measured energy savings on top of their normal fee, and you'll really get their attention. They can double or triple their fee: it's fair compensation for the extra work, and actually, you'll save money even upfront, because you'll typically save more on the capital cost.”

Lovins has been increasingly called on to furnish such services himself. One famous case is the flagship Condé Nast Building in Manhattan: “We got into the process a bit late, so we could only help save half the energy instead of a lot more. The opaque wall in between the view glass on the south and west elevations is photovoltaic, and there are also fuel cells up on the roof. The developer was able to sign up premium tenants at premium rents rather quickly, because they really liked having the two most reliable power sources built right into the building, and not have to worry about whether Con Ed would have a problem keeping their computers going.”

But in terms of radical resource productivity, Lovins seems most proud of his “Hypercar,” which is being developed in a for-profit company which he chairs. He gave it a loving and lengthy description, of which the following is representative: “It's perhaps the first uncompromised super-efficient car. It's comparable in class to a Ford Explorer or a Lexus RX 300. It can haul half a ton up a 44 percent grade, handle five sizeable adults and 69

cubic feet of cargo. Yet it's less than half the weight of cars of that class, because it's made not of metal but of carbon fiber composites.

“Because it's light, it's quite peppy—zero to 60 in 8.2 seconds. Average is 99 miles per gallon equivalent, but it doesn't use gasoline; it uses safely stored compressed hydrogen gas and a fuel cell. It can cruise at 55 mph using the same amount of energy that the Lexus uses just for its air conditioner on a hot day. It has an air conditioner, too, but it's five times more efficient than usual. The only emission is hot water, so I'm tempted to put a coffee machine in the dashboard.” In addition, the Hypercar “has none of the top 20 causes of road breakdowns in today's cars; the body does not dent, rust, or fatigue; and it can bounce off a six-mile-an-hour collision undamaged.

“The Hypercar concept can be applied to vehicles of any shape, style, and size, and ultimately worldwide they'll save about as much oil as OPEC now sells. They permit a rapid transition to a hydrogen economy that is profitable at each step, starting now. Such cars could be in production in five years. I think they could be dominant in new sales in ten years, and the old way of making cars would be in serious trouble in 20 years.”

Lovins gave numerous other examples of how radical energy saving can also save money. For example: “Protecting the climate is not costly but profitable, because it's cheaper to save fuel than to buy it....Twenty-five years ago I was heavily criticized for suggesting that over the next 50 years, rather than following the very high official forecast, U.S. energy demand could support the same economic activity, and deliver the same or better services, with an amount of energy that would stabilize and go down as we wrung out losses. Well, actually, that's just where consumption is right now. And we now know how to do a lot better than that target set 25 years ago. In fact, already, just in the past quarter century, efficiency has become a bigger energy supply than oil. It's the biggest and fastest growing energy supply we've got, it provided two-fifths of our energy services last year, it's over five times the size of domestic oil output, twice our oil imports, twelve times our Persian Gulf imports—and in fact we've doubled our oil productivity in 25 years.”

## **Principle 2: Biomimicry**

Lovins calls the second principle of natural capitalism “biomimicry,” which involves “closed-loop production with no toxicity and no waste.” As an example, he cited a case in which green architect Bill McDonough (see *Timeline*, July/August 2001) was asked by the Steelcase Company to design a textile to cover the backs of office chairs, replacing a cloth whose edge trimmings had been declared by the Swiss government to be a toxic waste. McDonough and his partner, a chemist, looked at 8,000 chemicals used in cloth treatment. They rejected any that caused cancer, mutations, birth defects, endocrine disruption, persistent toxicity, or bioaccumulation, narrowing the choice to 38 chemicals. All 38 could make any color, make the cloth look better, and last longer. And, because the natural fibers they used were no longer being harmed by harsh chemicals, “the cloth would also cost less to produce because you were using ordinary, not exotic, chemicals,

and you no longer needed to have any of those embarrassing conversations with OSHA and EPA, because there was nothing left in the process that could harm either the workers or the neighbors. When the Swiss environmental inspectors came, they thought their measuring equipment must be broken, because the water coming out of the plant was cleaner than the Swiss drinking water going in: the cloth product was acting as an additional filter. And by the way, when you're through with this cloth, you can use it to compost your vegetable garden, or if you have a fiber deficiency you can eat it."

Where are all these developments taking us? According to Lovins, it is to an emerging business world in which the "successful firms take their values from their customers, their designs from Nature, and their discipline from the marketplace. It's a world in which conventional environmental regulation starts to look like a quaint anachronism, because the companies that need it will already be out of business, having devoted too much of their time and money to making things nobody wants—things that in the 20th century we used to call wastes and emissions, but now we have a better name: We call them 'unsaleable production,' which focuses our attention on why are we making this stuff if we can't sell it. Let's stop making it, let's design it out."

### **Principle 3: Service-and-Flow Economy**

The book refers to the third principle of natural capitalism as a "service-and-flow economy." Lovins describes it as changing the business model so that "both the provider and customer make money the same way, by doing more and better with less for longer—in other words, following the first two principles of natural capitalism." He also calls it a "solutions economy."

For example, "Schindler would rather not sell you any of its excellent elevators. They believe that their elevators use less electricity and maintenance than competing models. So they prefer to lease you the elevator, pay its running costs themselves, and just provide you what you want, which is not a bunch of metal but the service of moving up and down—a vertical transportation service. They can do that cheaper. The better the elevator is, the cheaper it gets for both of you, the more money you both make."

### **Principle 4: Reinvest In Natural Capital**

According to the book, the fourth and last principle is to "reinvest in natural capital...so that the biosphere can produce more abundant ecosystem services and natural resources." Lovins says this is the easiest of the four to follow, "because Nature does the production. All we have to do is get out of the way and let life flourish wherever it wants to—it's very good at that." He gave a California example: "In this state we used to burn the straw after harvest in dryland rice farming. The straw is rich in silica, so this created suspicions of silicosis downwind. But then the Rice Growers Association got together with the environmentalists, and they said let's try flooding the rice fields after harvest to create a seasonal wetland. This will invite in millions of ducks and geese, which will provide free

fertilizer and cultivation. We'll harvest that high-silica straw as a valuable construction material, because bugs don't like to eat it, and as long as we have the ducks and geese there, let's sell some lucrative hunting licenses, and we'll get paid for recharging the groundwater. We'll still grow rice, but now it's merely a byproduct of a much more lucrative value web."

## **THE END OF THE WAR**

Some have criticized Amory Lovins for being over-optimistic and underestimating the cost of his recommendations. However, it is hard to argue with his thesis that traditional capitalism has squandered natural capital and wrought environmental disaster. And his concept of the Second Industrial Revolution, in which companies preserve and restore that capital by seizing the "vast business of opportunity" of eliminating waste, is an inspiring vision of how to recover from that disaster. Lovins' term "war against the Earth" is an appropriate metaphor for the mess we have created, and he offers a path toward ending that war and at last making peace with the marvelous system that supports all life.

- Walter Hays

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**These articles on solar and green business were researched and written by FGC's Outreach Director Debbie Mytels**

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## **Solar Power Shines**

Larry Hassett had no idea that his desire for an electric-powered delivery truck would lead to a doubling of his hardware store business. Yet that's been only one outcome of his decision to "go solar." The more predictable outcome of his installing an array of photovoltaic (PV) collectors on his store's roof-top this spring was a credit on his June electric bill of \$6,148!

It all started when Hassett applied for an award as the first certified "Green Business" in Santa Clara County, the heart of Silicon Valley. The award, which his Palo Alto Hardware store subsequently won, required evaluating all aspects of the business for its ecological impact. Hassett was concerned that his delivery truck was creating air pollutants and adding CO<sub>2</sub> to the greenhouse effect, so he decided to get an electric vehicle and charge it from photovoltaic panels on the hardware store roof.

Hassett's first stop was at Palo Alto Utilities, a municipally-owned system which offers a 50 percent solar rebate program similar to that of California's major utilities. Because the system would be installed in a highly visible location, the city utility decided to exceed its cap of giving rebates only up to 10 kW of capacity. So Hassett began designing a system that would power not only an electric vehicle, but provide all his power needs.

The next step was to choose the panels. After interviewing a number of PV panel manufacturers, Hassett decided on a system made by Siemens. His reasoning: While several companies put out catalogs of good solar components, putting together a complete system of PV panels, inverters, and mounting hardware can be a complex and daunting task. "With most companies," he said, "you really need to talk with a specialist who can custom-engineer a system for you." Siemens, on the other hand, offers a generic system with uniform modules that can be easily sized to different needs.

Hassett ended up buying a \$220,000 system capable of generating 30kW, more than enough power to cover his store's needs during the long, sunny, summer days. With his store's electric meter running back-wards, the excess power would feed back power into the city's utility grid, accumulating credits to offset his usage bill in the winter. It took four weeks to install the 432 PV panels, including the inverter which changes the DC current the PV panels generate into AC current the store uses. Finally, in mid-March, Larry accepted a \$110,000 rebate check handed him by Palo Alto Utilities at a gala "Flip the Switch" party attended by city dignitaries, local business leaders, environmentalists, friends, and passers-by.

Considering his electricity bill last year of \$600-700/month, Hassett estimates he will save \$7,000 a year for a 15-year payback on the whole system, at present rates. As rates are likely to go up, his payback period will actually be shorter. But a payback calculation is only part of the financial picture. Hassett points out that one's tax liability can be reduced dramatically by using the five-year accelerated depreciation schedule for capital equipment costs. Plus, he notes, there's a 10 percent Federal tax credit for businesses installing solar systems (and this can apply to a home office, too, he adds).

In addition to its being a sound financial investment, Hassett notes that the huge amount of publicity his solar installation has generated has resulted in a new line of business for his store: selling PV panels. He liked the Siemens system so well that he worked with them to further refine their retail package, and now within the first year, "We have become a major retailer of solar cells." Where Palo Alto Hardware did about \$3 million in sales last year, he sees it doubling to \$6 million in 2001. The fact that California's energy crunch has been in the headlines recently didn't hurt, Hassett adds: "When we started, the headlines weren't there, but as rates go up, these products become even more attractive."

There is other good news for solar. The new pre-engineered systems are easier to install: about 40 percent of the solar systems Hassett sells are installed by homeowners themselves. In many areas, building permit fees for installing alternative energy systems are being reduced. Hassett also advocates other regulations to help jump start the shift to solar, such as a "no net energy gain" policy that would require all new construction (or significant remodels) to generate their own power.

The market for PV systems will also grow with more streamlining of products, Hassett believes. "Solar installations used to be a time sponge, but with the development of

package systems, anyone on my staff can provide you with a system. You pick up a package and everything is there. There's no need for electrical engineers to sell this product."

A different kind of benefit also comes from Hassett's venture into solar energy: continuation of a family business. A few years ago, when Larry Hassett inherited the hardware business started by his father in 1957, his son Eric was just in his teens. Today, 24-year old Eric has become manager of Palo Alto Hardware's solar department, climbing up on roofs, taking solar system measurements, handling State rebates, and reviewing utility bills so homeowners can determine the right package for their needs.

While some define success in business as "a healthy bottom line," Larry Hassett looks beyond monetary profits and strives for a healthy "triple bottom line," one that enhances people, planet, and prosperity. Hassett also has a sense of pride in serving his community. "It's really more than just having a zero bill. I'm a generator during the time that the city considers most critical, from 9 a.m. 'til 6 p.m. It feels good to know I'm doing my part so others will have power. And it's proof that what's good for our Earth can also be good business."

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## Helping the ACE Chain Go Green

Go into any hardware store and you'll find the smelly corner with pesticides, the place where your nose tells you it's not very healthy. While Palo Alto Hardware still stocks typical garden chemicals, there is also a whole range of nontoxic alternatives, and a staff and customer education program that point you to the "green" options. Owner Larry Hassett says his store sells more of these alternative products than the poison kind. While Hassett's Palo Alto Hardware is independently owned, it's part of ACE Hardware, a nationwide buying cooperative for thousands of individual stores. "I was a thorn in the side of ACE for a long time," Hassett explains, "talking about fewer toxic pest control products, and other environmental concerns. Then I was appointed head of a 'Green Team,' and with about 30 other ACE dealers, we set up workshops at the ACE conventions held twice a year.

"We started disseminating ideas like battery recycling, removing mercury from fluorescent light bulbs, and eliminating copper-based root-control products. We also developed 'best practices' guidelines for ACE dealers, such as energy-saving tips and recycling cardboard. We try to lead by example and share our experiences," he added, noting that dealers in some states are more tuned in to environmental issues than in others. "Some store owners in Texas, for example, can't understand why we're selling lady bugs and praying mantids.

"A key step was to set up meetings with ACE's buyers to influence the kind of products they make available to us. It's a tug of war to get ecologically better products into the warehouse. Vendor consolidation—working with a single distributor to achieve

economies of scale—makes it difficult for manufacturers of alternative products to get their merchandise onto the shelves. In the garden department, a big chemical company like Ortho will be your key vendor, and looking for other vendors is going against the grain.”

Some changes for the better happen by corporate mergers, notes Hassett, such as the purchase of Safer Products by the Victor Mousetrap Company. Together, they offer a broad-based line of alternative pest control products. One such product is a pesticide-free, mint-based, ant-and-roach-control product developed by Safer, which is claimed to be as effective as Raid.

Beyond assuring shelf space for green products, and placing point-of-purchase signage next to them, Hassett emphasizes the importance of employee training. “To sell less-toxic pest controls effectively, it’s essential to educate your staff. We put together classes in our store, going over the essentials that an employee needs to absorb in order to tell customers what to buy and how to use it.” Then, to help his staff understand why they are stocking the new products, Hassett takes them several blocks away to a nearby creek, pointing to the wildlife—birds, insects, and fish—and emphasizing that what we do in the store will have an impact in our own backyard.

Another ingredient in the success of “going green” is collaborating with local government. One program Hassett helped initiate is the “Our Water Our World” consumer education campaign about less-toxic garden practices. The program includes educational brochures and fact sheets, all printed with public funds, along with staff training and vendor sourcing. “It took us a year to bring it to five stores,” Hassett noted, “then it went into 25 stores the second year. And now, after three years, we have 250 stores participating throughout the Bay Area.” [Sample copies of these consumer educational materials can be requested from the Palo Alto Water Quality Plant, 2501 Embarcadero Road, Palo Alto, CA 94303.]

This successful partnership between small businesses and local government is a hallmark of Hassett’s collaborative approach. “Connecting people together is a real challenge. Government and retailers need to understand each other. Five of us could put together that program because we listened to and respected each other.”

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## A Home Goes Solar

When the rolling blackouts started to hit California last winter, it didn’t take Bay Area residents Jim and Carolyn Burden long to decide they wanted to be part of the solution. Jim reviewed his electric bill to determine how much power his ranch-style house uses, and began calling potential installers. Within a month, he’d ordered two of the Siemens packages from his local hardware store, recruited half a dozen friends to raise the collectors onto his roof, and connected the wires to provide about 3,000 kilowatt-hours of power each year.

Burden's net costs for the system are about \$10,000, after a rebate of approximately \$7,800. The PV system itself—eight 4-array panels and two inverters—cost \$15,775. Other costs included city permits (\$270), lumber for the panel supports (\$110), miscellaneous hardware (\$70), and electrical contractor fees to complete the wiring (\$1200).

To analyze how long it will take for Burden to recoup this \$10,000 investment, he needs to know how much energy his system will generate over a year's time, and how much that number exceeds his typical usage. So far, in its first three months (May–July), the system has generated 234 kW hours in excess of usage, sending his electric meter in reverse for much of each summer day. Overall, at current costs, he figures the payback period might be about 10 years.

Yet watching his meter turn backwards is only part of Burden's pleasure at the new PV system. By generating electricity on his roof, he's helping other Californians keep their lights on, and by creating this power with solar energy rather than fossil fuels, he's helping put the brakes on global climate change by reducing carbon emissions.

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## ***Better Not Bigger*** **Book Review by Mike Abkin**

Farmland and open space disappear. Tract houses, strip malls, and Wal-Marts mushroom. The commutes get longer, the roads get wider, the traffic fills them up. You wonder: "How long can we keep doing this and still have a satisfying place to live?"

Those are some of the reasons more and more people are saying: "We have to figure out some way to limit growth. We have to learn to live sustainably." But while the terms *sustainability* and *sustainable community* are now in the lexicon of urban and land-use planning, cities and regions are struggling to figure out just what those terms really mean and how to achieve them. Eben Fodor's *Better Not Bigger* is a short, easy-to-read, practical guide for just this purpose.

The author explains what's gone wrong in today's urban settings, explodes some commonly accepted ideas about growth, provides a vision of sustainable communities of the future, and gives straightforward steps communities can take today to move toward that vision.

In the chapter on what Fodor calls "growth myths," he covers twelve beliefs which are generally accepted as fundamental truths and largely go unchallenged, and proceeds to debunk each of them. The myths:

- Growth provides needed tax revenues.
- We have to grow to provide jobs for people in the community.

- We must stimulate and subsidize business growth to have good jobs.
- If we try to limit growth, housing prices will shoot up.
- Environmental protection hurts the economy. We must be willing to sacrifice local environmental quality for jobs and economic prosperity.
- Growth is inevitable. Growth management doesn't work and therefore we have no choice but to continue growing. You can't put a fence around our town.
- If you don't like growth, you're a "NIMBY" or an "ANTI" (against everything).
- Most people don't really support growth management or environmental protection.
- We have to "grow or die." Growth makes the economy strong and creates better-paying jobs.
- Vacant or undeveloped land is just going to waste.
- A person's visual preference is no basis for objecting to development.
- Environmentalists are just another special interest. There is no such thing as the public interest.

In examining the myth, "We have to grow or die," for example, Fodor quotes the ecological economist Herman Daly: "There is evidence that in the United States growth now makes us poorer by increasing costs faster than it increases benefits. In other words, we appear to have grown beyond the optimal scale."

Daly and others, the author notes, have shown that the growing U.S. Gross Domestic Product (GDP) does not reflect the true economic welfare of the public. While GDP has grown steadily, better measures of economic welfare that consider social and ecological costs, such as the Genuine Progress Indicator (GPI), show a declining level of prosperity over the past 20 years.

While acknowledging the political difficulty in limiting growth, Fodor says that Daly has argued convincingly for the need to move towards a stable or "steady-state" economy. While a stable economy can continue to develop in a qualitative sense, quantitative growth in material consumption and waste production cannot continue indefinitely.

Fodor devotes the longest chapter in the book to a discussion of some two dozen practical strategies for slowing growth and preserving undeveloped land. He uses case studies to illustrate how these strategies have been applied in real situations, and includes the legal and other challenges made in attempts to prevent them from being implemented. Among

the practical strategies: development impact fees, standards for growth, growth rate limits, requirements for adequate public facilities, community and environmental impact statements, urban growth boundaries, community land trusts, and transferable development rights.

For example, threshold and performance standards can “protect your community from undesirable impacts of growth....An environmental threshold standard might require that water quality be maintained at or above current levels for all local streams, rivers, lakes, and aquifers. In order to comply, a new industry or development must demonstrate that it will not lower water quality....Performance standards may specify aesthetic criteria, landscaping, affordability, proximity to urban services, amount of open space, and other characteristics of development.”

The final chapter includes “Twelve Steps Towards a Sustainable Community:” Build a positive vision. Think long-range. Recognize physical limits to growth and consumption. Improve citizen involvement. Provide better information. Use full-cost accounting. Use indicators and bench-marks for progress. Provide economic opportunity and equity. Use land wisely. Encourage efficient resource-use. Make neighborhoods walkable. Preserve unique features of local and regional significance.

Fodor observes: “Most of these steps can be accomplished within a year or two. They are possible within our current legal framework and do not require overhauling the political or economic system. What’s more, they make sense for all communities, not only to achieve greater sustainability, but because they simply lead to better communities.”

Adding to the value of *Better Not Bigger* as a guidebook are its two appendices which contain extensive references on urban growth and on organizations concerned with land use, complete with phone/fax numbers and regular mail, e-mail, and web addresses.

In his final paragraph, Fodor sums up the central message of the book: “Further growth is far more likely to be the problem than the solution for today’s communities. Urban growth is not something to be sought after like a prize or a blessing. Instead, it is more like a parasite that saps the strength and will of our communities. It continually erodes economic, environmental, and social conditions, and prevents communities from achieving their aspirations. By taking control of growth in your community, you can shift the focus of its energies from how to accommodate more growth to how to become a better place to live.”

***Better Not Bigger: How to Take Control of Urban Growth and Improve Your Community*** by Eben Fodor. New Society Publishers, Gabriola Island, B.C., Canada, 1999. \$15.95

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## Blips on the Timeline

*The term “blip” is often used to describe a point of light on a radar screen. Gathered by Sandra Mardigian and Research Director Jackie Mathes, here are some recent blips which indicate positive changes toward a global community.*

### Nuclear Phase-out

The German government has decided to phase out nuclear power. (Currently, 19 nuclear plants produce a third of the country’s electricity.) Public fears around shipment of nuclear waste and memories of Chernobyl have brought about this significant change in energy policy. The government has taken steps to ensure that Germany’s greenhouse gas emissions decline, even as nuclear power is taken away from the energy grid. It wants renewable energy to account for ten percent of the country’s energy supply by 2010 and fifty percent by 2050. And it has established an “eco-tax” meant to encourage conservation by making fossil fuels more expensive.

### Air Conditioner Standards

Goodman Manufacturing Company, which owns Amana and other brands, is the second largest air conditioner manufacturer in the U.S. When the Administration prepared to roll back a recent thirty percent improvement in the efficiency standard for central air conditioners, Goodman president David Parks testified before the U.S. Senate that we “desperately need a national energy policy that promotes energy efficiency, conservation, and new supply technologies.” He urged Congress to continue to focus attention on improving appliance efficiency standards for air conditioning and heating products. Parks and the employees at Goodman want greater efficiency standards for air conditioners, a product which emits 3500 pounds of CO<sub>2</sub> and 31 pounds of SO<sub>2</sub> each year in the average American household. They are going ahead with production of appliances that meet the 30 percent improvement standard.

### Canada Pesticide Ban

In a landmark decision, Canada’s Supreme Court ruled that municipalities have the right to ban pesticide use on public and private property. The court stated that the Montreal suburb of Hudson, Quebec, had been within its rights when it outlawed the use of pesticides on lawns in 1991. While upholding the right of municipalities to protect the health of their residents against environmental threats, the decision does not refer exclusively to pesticides, and this opens up the possibility for communities to implement bylaws prohibiting or restricting other potentially dangerous activities or substances. The

judgement quoted the “precautionary principle,” a concept in international law arguing that it is better to be safe than sorry.

## Slow Food

The Slow Food Movement, which strives to save foods that are produced locally and organically, has taken root in the U.S., with some 4000 members participating in 50 chapters across the country. The movement seeks to put people in touch with food and the farmers who produce it. Some 60,000 people in 35 countries now view themselves as part of the Slow Food Movement, which began in Italy in response to the opening of a McDonald’s restaurant. Jordan Vannini, a member in Los Angeles, said, “I’m excited about the idea that there is a counterforce out there to a society that has become dependent on mass fast food production.”

### SUGGESTIONS INVITED

We are always on the lookout for interesting subjects for Blips on the Timeline. Readers are invited to send articles or clippings indicating positive change to Jackie Mathes at the Foundation. If we use your suggestion, we’ll automatically extend your subscription for a year.

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## A New Video: *Exploring A New Cosmology*

Miriam Therese MacGillis has travelled the world, leading groups and giving talks in order to explore and share her perspectives on the writings of author Thomas Berry and cosmologist Brian Swimme. A Dominican Sister, Miriam is cofounder of Genesis Farm, an Earth Literacy Center in New Jersey, which offers programs exploring the sacred Universe as a new transforming context for our lives and culture.

These two videotapes, containing four lectures, were videotaped by the Foundation in a natural setting at Tunitas Creek Farm in Pescadero, California.

To begin, Miriam equates the present moment in time as similar to when Galileo asserted that Earth revolves around the Sun. He introduced a cosmological correction, but was judged as questioning the fundamental basis of Western culture. A similar challenge is before us today when the technologies of our time have extended our senses and revealed to us a Universe far more vast and complex than anyone could previously imagine.

In following segments, Miriam discusses how the human community is slowly awakening to the extent of our ecological crisis. As Thomas Berry suggests, we have two choices: continue to believe we are separate from nature, or realize that we are embedded in it. Miriam then explores his challenge to judge “all human institutions, professions, and

activities by the extent to which they inhibit, ignore, or foster a mutually enhancing human-Earth relationship.”

These presentations are a must for anyone interested in furthering his or her understanding of the world we live in, this moment in time, and the implications and opportunities for the human species. The set would also make a unique holiday gift.

**Exploring A New Cosmology:** Set of two tapes: \$30, plus \$4 per set shipping and handling. Order from the Foundation for Global Community by calling toll-free (800) 707-7932 or on our website, [www.globalcommunity.org](http://www.globalcommunity.org)

## ***Profit Beyond Measure*** **Book Review by Joe Kresse**

In *Timeline*, we often address the pre-eminent issue of our time: How can human activities be brought into harmony with the natural processes of the Earth? It is pre-eminent because, with our numbers and our power, humans are significantly altering those natural processes, and for the most part in an unsustainable way.

Business is one activity that obviously needs to be realigned because of its enormous impact on the environment. While a number of authors have addressed this problem from a theoretical viewpoint, few have shown how business can be realigned in a practical way. For example, see *Timeline* reviews of *When Corporations Rule the World*, *The Post-Corporate World*, and *False Dawn*.

But this book, written by a professor of management and a management consultant, is all about two vehicle manufacturers, Toyota and Scania (a Swedish heavy truck maker), who have designed their production processes in a way that mimics natural systems. The book describes how these companies have done this, and what principles of nature they have followed to do so.

Perhaps the most radical idea in the book, at least given current American management methods, is to shift from “management by results” (MBR) to “management by means” (MBM). Essentially, this means no longer managing to a set of predetermined financial results. Heresy!

To make their point, the authors quote the famous management expert, W. Edwards Deming, who said: “If you have a stable system, then there is no use to specify a goal. You will get whatever the system will deliver. A goal beyond the capability of the system will not be reached. Focus on outcome is not an effective way to improve a process or an activity....Management by numerical goal is an attempt to manage without knowledge of what to do, and in fact is usually management by fear.”

Deming believed that the job of a manager is to lead people to understand the system of work in which they are involved, “a system that links each worker’s capacity to serve

with a specific customer's needs. The goal of a business is to nurture continually the creative talents of company members. By focusing on its members' activities, the manager will thereby improve the system's capability to serve the needs of customers."

When companies try to manage to numbers, they create instability by trying to force the system to meet goals beyond its capabilities. The authors point out many companies (Chrysler) and industries (airlines) that have gone through booms and busts attempting to meet numerical targets rather than continually improving their systems. Of course, a key part of MBM is a recognition that natural systems fluctuate—they don't grow or decline linearly, nor do they for the most part remain stable. Therefore, management has to realize that, in an MBM world, profits also will fluctuate according to the general health of the company and the economy. And rather than focusing on cutting costs (usually by laying off experienced staff who will have to be replaced later), managers must continue to work on improving the way the system works, recognizing that over the long run that will lead to maximum profitability and effectiveness in the market. This makes it difficult to adopt MBM in the U.S. because of the almost obsessive focus on improving profits quarterly in a linear fashion. Perhaps that is why the two companies described in this book are not U.S.-based.

There are three principles the authors set forth as basic to natural systems, and which Toyota and Scania embody in their production processes:

*"PRINCIPLE 1: Creative energy continually and spontaneously materializes in self-organizing forms that strive to maintain their unique self-identity."*

Everything has its own identity, including such things as production lines. If the people who work on a production line understand and document how it works, they can see when it is operating well and when it isn't. For example, at Toyota this information enables workers to assess their own ongoing work and easily accommodate change in design and processes.

Operating this way allows a form of standardization which makes it possible to match production rate with customer orders. Toyota can produce each model on a custom basis, as opposed to companies which produce batches of model "A," followed by model "B," etc., even if there are not enough orders for all the items produced, requiring the line to shut down in between the batches to set up for the differences between the models. Toyota has found that by knowing the process intimately, it is more effective to scatter the various models throughout the production day than to batch produce. Since different models take different times at various work stations, scattering balances out these different times without ever having to shut down the line. And at the same time, cars are only being produced to order, thus saving inventory costs.

*"PRINCIPLE 2: Interdependent natural systems interact with each other through a web of relationships that connects everything in the universe."*

In nature, species are forced to be in relationship to what is around them. That's why they don't continually self-organize to grow, take over, and destroy each other. This is certainly a lesson most corporations need to learn, as they tend to focus on their own growth without regard to the consequences to the larger systems of which they are a part.

The continuous flow approach that companies like Toyota use is a good example of this principle. Continuous flow makes visible the relationship between each employee's activities and the satisfaction of customer wants, facilitates the feedback necessary to keep the system running smoothly, and provides more readily the resources being consumed to fill each customer's order. Thus it provides, without any added cost, information that otherwise must be processed outside of the work stream, at great cost and delay.

*“PRINCIPLE 3: Diversity results from the continual interaction of unique identities always relating to one another.*

Nature shows how to make a wide diversity of organisms using a minimum of interrelated parts. As an example, the authors point out that just five chemical elements combine to form the four structures that constitute the DNA of all nature's diverse life forms. And diversity is what customers demand these days. By using nature's modular approach to its vehicles, Scania is able to offer a wide variety of models with about half the number of parts as comparable manufacturers, thus increasing efficiency, reliability, and ease of repair, while lowering costs. The cabs, engines, transmissions, and chassis are all interchangeable. In addition, many of the parts for the different engines, transmissions, etc., are common. For instance, in engines of different sizes, the pistons, valves, etc., are the same; there are simply more or fewer cylinders.

In the concluding chapter, the authors emphasize that companies which manage by results (MBR) “drive people to reach planned financial results by aiming for a target, without regard for the wasteful means used to hit the target.” They are able to reach targets for short periods—even several years during expansion phases of the business cycle. Invariably, however, their performance lags behind MBM (management by means) companies, and they survive for significantly shorter periods. MBR, mass production, and other practices feature growth but ignore relationships. They ignore, in other words, the fundamental principle in nature—interdependence—that exists expressly to check growth and thus to avoid destruction of the entire system.

The authors believe MBM can play a key role in reaching a future in which business activities are life-enhancing instead of life-threatening: “Managing by means may to some extent curtail this destruction....That may be reason enough for most companies to take it seriously. However, there is a far more important reason to promote MBM practices. These practices force humans in their daily lives to honor nature's principles of interdependence and diversity as well as the principle of self-articulation....The fact is, human creativity is both a grave danger and a great blessing. Balancing that twin potential

for danger and fulfillment in every moment, in every act, is the essence of the human condition.

“Today’s global economic activity, because it equates fulfillment too much with quantitative growth rather than qualitative enrichment, prompts humans to encroach too far, too fast on the habitats of other species. MBM practices may do more than any single thing in the next generation to reverse the deteriorating human and environmental conditions that accompany unchecked human expansion. Limiting and reducing that damage, while working relentlessly to raise living standards of the poorest third of humanity, is arguably the most pressing problem of our time. MBM calls for new thinking that may enable business organizations to lead the way toward solving that problem in the next century.”

Whether Management by Means can bring forth the new thinking outlined in this book, and whether it will become widely adopted, remains to be seen. However the two companies cited are certainly excellent models, and the fact that a business book contains this wisdom bodes well.

*Profit Beyond Measure* by H Thomas Johnson and Anders Bröms. The Free Press (Simon & Schuster), New York, 2000. \$30.00

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## On Awakening

Out of the darkness, gently into the light.

Gratitude. Gratitude for the gift of another day.  
A conscious breath, the breath of life. And again,  
gratitude for air to breathe and lungs to fill.

This day. This time. This space.  
What *must* I do? What do I *need* to do?  
What do I *want* to do? Choice. Decisions.  
Gratitude for the values and knowledge  
with which to make decisions.

Remembering. I have chosen to live my life  
in a certain way, to walk the path of light.

Appreciation. For those who have gone before  
and for those beloveds who are companions  
on this journey.

Bless this day.

Get up!

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Palo Alto, California

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