



# Building Codes for a Small Planet

by David Eisenberg

Executive Director, Development Center for Appropriate Technology

**W**ith this, my first column for *Building Safety Journal*<sup>™</sup>, I would like to accomplish a few basic things. First, I want to say that it is an honor to have the opportunity to share some ideas, concerns and possibilities for building regulation that I believe are critically important to our future, and express my heartfelt thanks to ICC for providing the opportunity for this exchange to take place. My hope is that this column will help expand the way we all think about the benefits, costs and impacts of buildings and smooth the path toward adopting methods of developing and redeveloping our communities that enhance the prospects of future generations while safeguarding people today.

To give you a little background about myself, as a “recovering contractor,” I’ve been involved with the construction industry for close to half of my 54 years and with building codes and standards for much of the past decade. That involvement has been aided by many people, beginning with the local building officials, plan reviewers and inspectors I met in Southern Arizona as I built various projects over the years. Although there isn’t space to name all of the code officials who have given me critical advice and guidance, a few who stand out include Bill Schlecht, Clint Tawse, Bruce Austin, Stuart Hersh, Becky Baker, Jon Traw, Roy Fewell, Vaughn Wicker, Bob Weber, Anthony Floyd, Dom Sims, Lynn Underwood, Stephen Kanipe and Bob Fowler. I have benefitted enormously from these people and the many others who have helped me along the way.

I would like to inaugurate this new column by recounting an event that marked a turning point in my work related to building codes. In the summer of 1997 Bob Fowler, Founding Chairman of the Board of ICC, invited me to participate in a panel presentation he was organizing for the ICBO Annual Business Meeting in Phoenix that September. The panel was about the importance of ICC and the creation of a consolidated, national set of building codes, including a proposed performance code. Bob asked me to talk about the efforts of the non-profit organization I head, the Development Center

for Appropriate Technology (DCAT), to create a sustainable context for building codes and how that work related to the national consolidation efforts of the model code groups.

Each panelist was to have 20 minutes, and Bob had asked me to go first. As sometimes happens, however, the session before ours ran over the allotted time. Just before they finally finished, Bob looked at his watch and announced that we only had 10 minutes each and that he hoped that was okay. Already a bit nervous about speaking before about a thousand code officials, I momentarily panicked as I mentally tried to narrow down my key points. Fortunately, I gathered my wits and realized I simply didn’t have time to try to transform a 20-minute talk into a 10-minute one and that I’d just have to abandon my prepared speech and wing it.

Bob introduced the panelists, and then me. I launched into my talk and remember thinking at one point that it was going as well as any speech I’d ever given. All too soon, however, I realized that I’d exhausted my 10 minutes and that the conclusion I’d intended to use was based on the 10 minutes of material that I hadn’t had time to address. I found myself standing in front of that huge room with no idea how to close my presentation! After a brief pause, I found myself saying something I’d never thought about until that very moment. Everyone was hearing it for the first time, including me.

“I want to ask you a question,” I began. “What goes through your mind when someone comes into your jurisdiction seeking permission to do something crazy like build a house out of bales of straw? Or maybe they want to build using the soil for adobe or rammed earth, or cob—a material you’ve never even heard of? Or maybe they think they should be able to use bamboo as a structural material. Or perhaps they want to harvest water off the roof and drink it, or put in a greywater system, or use composting toilets. Or maybe they want to be off the electrical grid and have photovoltaic panels up on the roof and batteries. Or maybe they’re worried about electromagnetic fields and don’t want any electrical outlets in their bedrooms.”

“... DO WE HAVE CODES JUST TO MAKE SURE THAT BAD THINGS DON’T HAPPEN, OR TO HELP ENSURE THAT GOOD THINGS DO?”



“What,” I asked, “do you think when people come in asking to be allowed to do these things? My guess is that your first thought is: ‘These people need to be protected from themselves.’ Your next thought is probably: ‘Not in my jurisdiction!’”

After the laughter died down, I continued. “I want you to think about what is really happening, because it is extremely important. The vast majority of people who come in wanting to do these things have made a crucial discovery. They have realized that their lifestyle choices have consequences, many—if not most—of which are negative. Not negative for them, but negative for their children and grandchildren . . . and my children . . . and your children. These people are trying to take responsibility for the consequences of their choices.”

“Is there anyone in this room who thinks that is a bad thing?” I asked. “I don’t think so. So what is your job as a building official? Is it to keep those people from pursuing their goal of taking responsibility for what they do? Or is it to help them find a way to do it well and safely?”

Thankfully, I recognized a good ending when it presented itself, expressed my appreciation to the audience for their courtesy, and sat down to loud and prolonged applause.

Thinking about it afterward, I realized that what had made my message so powerful was that I had acknowledged, aligned with and honored what the code officials were most committed to, protecting the public from unsafe buildings, while inviting them to consider a new perspective from which to assess their responsibilities. My message was based on the shared goal of safe buildings coupled with a longer-term, broader—and also shared but rarely articulated—kind of responsibility to the public welfare based on recognizing the real risks from the unintended consequences of mainstream building practices.

What followed was my own realization that those of us trying to find more sustainable and environmentally responsible ways to build actually wanted everything that code officials wanted and more. Clearly, none of us want people building unsafe structures. What we seek is a balance between the short-term risks that occur at the building site and the more widely distributed, longer-term risks that are shifted to the natural systems that support all life on this planet. I saw a vast area of common ground on which to build collaborative relationships and pursue common goals, and this is what DCAT has been working on since then.

I’ve also become much more aware of the degree to which the building regulatory system has focused on preventing building failures and disasters. This is perfectly natural, and certainly a worthy goal in nearly every respect. Yet I have found myself thinking about how this has resulted in a basically reactive, “fear-based” system that can inadvertently limit or prevent many beneficial advancements. So the question is: do we have codes just to make sure that bad things don’t happen, or to help ensure that good things do? From my experience, there’s a significant difference between the outcomes of those two approaches.

All of this has led DCAT to focus on the potential for moving toward a much larger conception of the role of building departments: a shift from being “building police” who make sure that no structure falls below the minimum standards set by the codes to becoming effective resources for the improvement of our neighborhoods and communities.

I know that this raises all kinds of practical issues for building departments across the country that may already be struggling to maintain the staffing, training and other resources they need to do their jobs. I also know that, to some, these ideas may seem far beyond what can be expected of building departments and the people who make them work. Among the many things that I hope to share in future columns are examples of organizations and individuals who have successfully crossed over into that frontier and are helping lead us toward a more deeply satisfying and exciting role as partners finding the path to a truly safe and healthy future.

I hope that this will serve to open an ongoing dialogue about the future of the built environment, building regulation and the roles we can all play in shaping a world that our children will be proud to pass on to their own. Please feel free to contact me with ideas, issues, concerns, or other points of view that you would like to see covered or expressed. ♦

**David Eisenberg**, Executive Director for the non-profit Development Center for Appropriate Technology (DCAT), serves on the City of Tucson/Pima County, Arizona, Joint Building Code Committee. He is also a member of the Board of Directors of the U.S. Green Building Council and leads a national program at DCAT called Building Sustainability into the Codes. Eisenberg can be contacted by phone at (520) 624-6628 or via e-mail at david@dcate.net. For more information about DCAT, visit [www.dcate.net](http://www.dcate.net).

# Building Codes for a Small Planet Hidden in Plain View



by David Eisenberg

Executive Director, Development Center for Appropriate Technology

**T**he massive power outage that struck the U.S. and Canada in August served as a powerful wake-up call. Some 50 million people lost their electric power, and suddenly everyone realized the vulnerability of our crucial power-grid system. “Hidden in plain view” is the expression I like to use to describe things that make us wonder how we didn’t notice obvious potential problems earlier.

Two things jumped out at me as I watched news reports and read about the blackout. One was the fact that millions of people were able to exit tens of thousands of buildings safely with relatively few problems. How’s that for an affirmation of the effectiveness of modern building codes in dealing with means of egress, including emergency lighting, exit signage, and the design of stairs and exit doors? Undeniably, many lives were saved on that day because of building codes and their enforcement.

However, I couldn’t help but note the incredible number of people forced to spend the night sleeping outside on sidewalks, roofs, in parks—anywhere other than inside all of those powerless buildings. Our expectations of reliable power sources have led us to the construction of buildings that are actually dangerous when disconnected from their external energy sources. Fortunately, this blackout didn’t happen in the dead of winter when being outside could have been as unsafe as staying indoors during the summer.

As a result of the power failure, Cleveland, Ohio, was without water. Virtually the entire affected region was without public transportation and much private transportation was crippled as well. Airports were shut down. Train and subway systems, traffic control systems and gas pumps were all suddenly inoperable.

Tens of millions of people could not work because there was no power to run such basic necessities as lights, elevators, HVAC systems, cash registers, computers and commu-

nication systems. Wastewater treatment plants couldn’t operate, and hospitals switched to emergency power for their most critical needs but were essentially disabled. If the power had remained off for an extended period of time, food and other critical supply systems would have been jeopardized.

## Challenges and Solutions

The challenges to the electric-power grid are just one example of a dangerous pattern that we’re still ignoring. We simply cannot continue to design and attempt to maintain systems that are inherently unstable and insecure while making decisions that undermine the very approaches that could provide much greater safety and healthier communities in the long run.

When considering our energy systems, food supply and the safety of our buildings, we need to ask whether our solutions are robust, resilient and diverse enough to respond adequately to local emergencies while maintaining the integrity of the whole system. Is our infrastructure built to enhance capacity to meet local needs as locally as possible, or is it creating higher-risk dependencies on large, homogenized, centrally controlled systems with long supply and delivery lines?

Our dependence on ever-more complex technology and centralized, distant systems of control amplifies another vexing problem. The collapse of the Northeast energy grid demonstrated the near impossibility of being able to pinpoint the source of a problem in these complex systems and to respond appropriately from a central point of control.

We need to invest in solutions that are diverse, localized, and responsive to changing conditions and sources of supply. We need to work toward developing a power grid that functions as a transfer system for millions of small, distributed sources of energy which feed into and sometimes draw from it, rather than feeding energy from a small number of sources to millions of consumers.

## A Crisis of Will

Zero-energy buildings and distributed-power systems using diverse sources and technologies clearly make sense in terms of the public health, safety and general welfare. So do increasing the use of locally harvested materials, redesigning products and manufacturing systems to eliminate or drastically reduce the production and use of toxic and dangerous substances, neighborhood-scale wastewater treatment systems, urban agriculture, and robust systems of public and alternative transportation.

Are these unattainable or distant goals? They may well be, but not because they're economically unfeasible or beyond the scope of current technology. It is due to a lack of vision and political will that they remain future dreams rather than present-day reality. Just ask yourself: did you hear these sorts of options raised by the "experts" testifying about the power crisis in Washington?

Keep in mind that these aren't just political, economic or environmental issues—they're national security issues. Since September 11, 2001, there has been a lot of talk about how to make buildings and communities safer from the threat of terrorism. If we look hard enough, it seems obvious that the only effective strategy against threats of terrorism to our infrastructure is in redeveloping our ability to meet our needs as locally and in as decentralized a way as possible.

I know that this goes against the contemporary, highly touted trend toward globalization. However, the reality is that regardless of your political or philosophical views on trade, the longer our supply lines and the more dependent we are on resources from places over which we have limited control, the more vulnerable we are to terrorism and other external political and economic circumstances.

This is not a call to cut ourselves off from the rest of the world and become fixated on self-sufficiency. It is, instead, a call to consider whether the systems we develop, including those which impact how our buildings are designed and constructed, add to our security or to our vulnerability. As we begin to explore this shift in thinking we see that when we employ local resources to meet local needs, we also increase the resiliency and dependability of these systems. As a significant side-benefit, we also increase the health and vitality of our local communities.

## A Fresh Perspective

When addressing our security needs, we should ask how strong and easily maintainable the systems we choose are. How easy is it to make them fail? If and when they do fail, are they likely to fail catastrophically? What other essential systems or parts of the system will fail as a result? Along these lines, things like passive heating and cooling and natural ventilation strategies, innovative and alternate power systems, water-harvesting and graywater systems, composting toilets, waterless urinals, and the many local alternate materials and methods of construction certainly seem to point the way toward the less risky path for our long-term security.

This sort of perspective also enables us to see the significance of considering the whole lifecycle of materials and building systems. What strategically important resources go into the manufacturing of something and how far is it transported? What kinds of toxic substances are used? How dangerous are the wastes produced and how can those wastes most safely be disposed of? How vulnerable might the manufacturing facilities be to attack or accident, and what consequences might exist if those toxic chemicals were dispersed in the surrounding communities or ecosystems? What happens if the supply of critical resources is interrupted? Such questions enable us to begin to consider alternatives that might reduce these types of risks and examine the barriers to those alternatives.

This is an extremely healthy process because it allows us to focus beyond the usual considerations and re-evaluate our goals, assumptions and decision-making processes. The good news is that, also hidden in plain view, extraordinary benefits extending well beyond protecting ourselves from terrorist attacks would flow from this approach. As we move toward making our buildings, neighborhoods and communities more resource self-sufficient, we simultaneously reduce the environmental impacts of buildings and strengthen our local economies and communities—which are, after all, the ultimate sources of our security. ♦

*David Eisenberg, Executive Director for the non-profit Development Center for Appropriate Technology (DCAT), serves on the City of Tucson/Pima County, Arizona Joint Building Code Committee. He is a member of the Board of Directors of the U.S. Green Building Council and leads a national program through DCAT, "Building Sustainability into the Codes."*

*Eisenberg can be contacted by phone at (520) 624-6628 or via e-mail at david@dcatt.net. For more information about DCAT, visit [www.dcat.net](http://www.dcat.net).*



*Technology can extend our sight into the far reaches of space while reducing our ability to see what is before our very eyes.*

— David W. Orr, *The Nature of Design*

# Building Codes for a Small Planet



## Thinking About Change, Part 1 of 2

by David Eisenberg

Director, Development Center for Appropriate Technology

There can be little doubt about the acceleration of interest over the past few years in green building and more sustainable development. That interest has triggered a range of responses in building departments across the country, from highly proactive, public-private collaboration in some communities to deepening entrenchment in others.

As a non-profit, public interest organization that has focused considerable attention on building code related barriers to green building over the past few years, the Development Center for Appropriate Technology (DCAT) is often asked for its assistance. These requests come from across the spectrum of people, organizations and businesses engaged in building and development, and from both sides of the permit counter. Issues range from resistance to approving a single technology, such as waterless urinals or vegetated roofs, to requests for assistance in identifying and addressing the full spectrum of barriers to green building, such as the City of Chicago is currently doing.

In this and my next “Building Codes for a Small Planet” column, I’ll be sharing a few insights gleaned from our work that might be of use to communities working through challenges like these and offer suggestions for working through this crucial transition in how our communities and buildings are designed, built and managed. I’ll start with the three-phase strategy we developed for DCAT’s “Building Sustainability into the Codes” program.

### Building Awareness

It took DCAT staff some time to realize that building awareness was as critical for us as for those we hoped to educate. The breakthrough moment occurred when we realized the degree to which we shared the mission of the building codes community. Once we saw that we want what code officials wanted, safe buildings, we found ourselves in authentic partnership with the codes community, pursuing mutual goals.

There are a number of factors that enhance our ability to help jurisdictions constructively build awareness of the unintended risks inherent in current practice and, thereby, understand the need for change. One is that we believe the vast majority of code officials take their responsibility for protecting the public seriously, as do we. As such, we operate from the assumption that we’re working with a community of caring people. We also believe that people are capable of change and will rethink their positions when given reason to do so. We do it all the time our-

selves, and this enables us to trust that others can as well. Finally, we believe that just as none of us wants unsafe buildings, none of us wants to be part of a system that jeopardizes the welfare of children and future generations.

With this in mind, we've developed ways to talk about complex and sometimes controversial issues from the standpoint of common ground. When we talk about risk, for example, we point out how efficiently our codes have enabled us to shift risk away from the building site to the planet's life-support systems and from the present to the future. They are nonetheless real risks to real populations of billions of people—some alive now, many more who will be brought into the world over the next few decades.

All politics aside, anyone aware of the technical realities of global energy supply and demand who isn't focused on finding ways of making everything we do as efficient as possible is not meeting what will soon become a new minimum standard of professional care. The energy efficiency (or, ideally, self-sufficiency) of our buildings is nothing short of a local, national and global security issue. These are not trivial concerns: they demand of us a new seriousness and focus, which leads to the next phase.

### **Building the Capacity for Change**

Building the capacity for change requires providing the information, training, political support and other resources needed for changes to actually happen and be sustained over time. Support is available in a variety of forms and is carried out by a wide array of organizations using many different media and methods.

The myriad organizations engaged in promoting green building is encouraging, but there remains the need for a well-organized effort to coordinate and focus the available resources. It is my hope that the U.S. Green Building Council (USGBC) Greening the Codes Committee (on which ICC Deputy Chief Operating Officer Dominic Sims has recently agreed to serve with me as Vice Chair) will begin to address this need, and that the memorandum of agreement being finalized between ICC and the USGBC will further open the door to an official level of collaboration that will greatly speed this phase of the transition.

### **Transferring of Leadership and Responsibility**

The final phase is the transfer of leadership and responsibility for the ongoing work to those responsible for doing the actual work and a strong interest in seeing change successfully implemented. This happens naturally if the first two phases are well executed. When people are aware of the real consequences of what we are designing and building and are shown that they have the ability to change, they will take responsibility for making change happen.

In my next column, I'll talk about re-envisioning the building department as a true community resource and partner for the best building and development practices, not just a governmental body responsible for preventing the worst practices. I will also discuss some strategies for the green building community to better support the increased demands on building departments, and offer a few insights into how best to create a process for identifying and addressing the existing barriers to green building. ♦

*David Eisenberg serves on the City of Tucson/Pima County, Arizona, Joint Building Code Committee and is a member of the Board of Directors of the U.S. Green Building Council, for which he chairs the Greening the Codes Committee. He can be contacted by phone at (520) 624-6628 or via e-mail at strawnet@aol.com. For more information about DCAT, visit [www.dcat.net](http://www.dcat.net).*





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## Thinking about Change, Part 2 of 2

by David Eisenberg, Director, Development Center for Appropriate Technology

In my last column (July/August 2004), I reviewed the basis of the three-phase approach the Development Center for Appropriate Technology (DCAT) has used in our Building Sustainability into the Codes program. It should be noted that it is a nonlinear process: all three phases—developing awareness of the need for change, building capacity for change through education and development of technical resources, and developing leadership for these issues within building departments and the codes community—are being carried out simultaneously.

This column will focus on re-envisioning building departments as not just governmental agencies responsible for preventing the worst practices, but as true community resources for the best design and building practices. I'll include a few examples of where this transition is already taking place and suggest how the green building community can better support building departments. I'll also offer an example of how one city is identifying and beginning to address barriers to green building that exist in its building regulations.

### A Community Resource for Best Building Practices

In presentations about sustainability and building codes, I typically start with all of the reasons I believe change is necessary. At a certain point, I note that what I've been talking about are the unintended consequences and negative impacts of building and development. I then take a fundamentally different tack. “Do we just have building codes and building departments to make sure that bad things don't happen?” I ask. “Is that the extent of our aspirations? Or are we actually more interested in making sure that the right things happen?”

There is a big difference in outcomes between these two approaches. I believe that we can't really meet our full responsibility for safeguarding public health, safety and general welfare merely by avoiding a particular set of building-related problems or potential threats. I don't intend to diminish in any way the importance of these critical tasks, but until we are aware of and working to balance the risks we create elsewhere in an effort to avoid specific risks in a particular building, we are not serving our communities as well as we could.

I want to go a step beyond the issue of quantifiable risk as the limitation of responsibility for a building department or building official. I think that in beginning to address these larger issues, we create an opportunity for a profound shift extending well beyond what we ordinarily consider important or justifiable. Through this shift, mostly of perception and attitude, we can begin to manage the larger responsibility of enabling healthier, more sustainable communities.

If we think in historic terms of codes essentially being a response to catastrophes, we can understand that no matter how positive the work of preventing disasters is, in the end many will view it as a negative task. This is the “regulatory mind-set” that often makes it seem that the job is just keeping bad things from happening rather than enabling good things to happen.

This brings to mind a few words of wisdom from the late Bob Fowler: “Our job is to solve complicated problems, not complicate solved problems.” The highly esteemed builder, architect and building official addressed this idea a bit more directly in an interview published in the January/February 2000 issue of *Building Standards* magazine (“An Alternative Future for Building Regulation”).

*Eventually, we'll have standards and codes for the environmental performance of buildings, just as we require them to demonstrate a certain level of energy efficiency today. Although it presents many challenges, I believe that this is one of the healthiest things that can happen to the building industry and to those of us responsible for regulating it.*

*I see unlimited opportunities for people who can see past the problems to begin developing solutions, and who understand that we need buildings that give back more than they take; that generate their own power; treat their own wastes, and don't pollute and destroy when they're being built, used or disposed of.*

As building official for the City of Pasadena, California, Bob demonstrated this vision of the building department as a community resource for best practices. In the Paseo Colorado shopping mall redevelopment, for example, his office worked closely with the developer to find creative, performance-based solutions that addressed everyone's interests: a positive partnership that benefitted the entire community enormously.

How different would it be if everyone viewed the work of a building department as enabling best practices? Imagine two fundamentally different builders. One knows the code as a set of minimum standards for recognized designs, and builds to those minimums. The other is always looking to create the most resource- and energy-efficient, least toxic building he or she can. Which one typically has the easiest time getting plans approved? Clearly,

no one intends to reward the lowest-quality building legally possible while penalizing builders who push the upper limits, but this is typically the outcome. That can change!

In a number of jurisdictions around the country, building departments are taking a leadership role by not just allowing but promoting greener building. They have found that doing so is not only better in the short and long terms, but often improves the morale of the building department and, ultimately, the quality of relationships with the public and the design, building and development communities.

### What It Can Look Like

One way this type of transition can occur is through local political leadership. When proactive leaders set sustainability goals for their community and government agencies, a lot can transpire. The City of Seattle, Washington, for example, established itself as a leader in green building by adopting high standards for their own buildings and engaging city staff and the community at large in efforts to improve sustainability in the region. As a result, the Seattle building department now has extensive experience with leading-edge green building practices and can better help all of its clients reach higher goals.

Meanwhile in Scottsdale, Arizona, city leaders made a commitment to a more sustainable future by creating the Scottsdale Green Building Program in 1998. The city eventually integrated the voluntary program into the building department's regular processes. Refer to the article, “Integrating Green Building Practices into the Building Regulatory Process,” by Anthony Floyd and Edward Peaser in the May 2003 issue of *Building Safety Journal* for details about this innovative program.

Another success story comes from the City of Aspen and Pitkin County, Colorado, where the building department championed some of the most forward-looking approaches to energy efficiency in the country and introduced efficient building requirements that address environmental and resource concerns. Aspen building official Stephen Kanipe worked with regional and national experts to develop and refine the new requirements and coordinated with elected officials and the local design, construction and development communities to work through issues and gain acceptance of them. Go to [www.aspenpitkin.com/depts/41/bldg\\_efficient.cfm](http://www.aspenpitkin.com/depts/41/bldg_efficient.cfm) for more information about Aspen's Efficient Building Program.

*(continued)*



## Spotlight on Chicago

Among the communities across the U.S. working to address green issues, none is more prominent than the City of Chicago, Illinois. Mayor Richard Daley's commitment to greening Chicago is proving to be durable, and is solidified no small amount by his recruitment of founder and former Executive Director of the Cleveland Green Building Coalition Sadhu Johnston to serve as his Assistant for Green Initiatives.

In December 2003, the city hired DCAT to assist in initiating an effort to assess the Chicago building codes in terms of barriers to green building. We helped conduct a day-long workshop at which approximately 100 area design, building, planning and development professionals joined material and equipment suppliers, local citizens, environmental activists and city officials in identifying issues that impede progress toward the green building and sustainability goals set by the mayor and city council.

We divided the participants into five groups, each responsible for dealing with one of the categories used in the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Green Building Rating System: sustainable sites, water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality. In hindsight, a sixth group tasked with identifying enforcement, process and organizational issues would have been beneficial, but many of these barriers were captured as it was. Identified barriers were then sorted by the following types:

- code barriers (issues with the structure or intent of the codes or provisions themselves),
- needed additions to the codes,
- needed changes to the codes, and
- process barriers (issues that are organizational, code enforcement or interpretation based, or more general in nature).

Sorting the barriers and related issues in this way was important because addressing different types of problems usually requires employing different processes. Items on the lists were then prioritized according to both their relative impacts and importance and whether the changes needed were achievable within a reasonable time frame. The resulting information is now being used to further the process and build momentum for change within the city.

## Supporting the Process of Change

In localities with green building programs or where the local or state government has established a commitment to green building and sustainable development, the potential exists for great collaboration. To be effective, however, everyone involved must not only understand and commit to the goals but also identify and address factors that constrain change. One factor not always recognized by proponents of such change is the limited resources—time, personnel, financial support for training,

etc.—available to most building departments for normal day-to-day operations, much less new areas of expertise and responsibility. Quite simply, the types of changes we're talking about place real demands that staff cannot meet without additional support.

One remedy is to help fund or find funding for a new staff position in the building department requiring expertise in and responsibility for managing or facilitating green projects. There are many ways this can be accomplished, but the key is recognizing that it is unreasonable to expect a building department to have greater flexibility without enhancing its capacity to carry out additional work.

In a future column, I'll discuss the potential for building departments, especially in larger jurisdictions, to develop the in-house expertise necessary to effectively participate in deeply integrated design processes. If building departments have plan review staff qualified to participate in these processes, they can address code-related issues at the most advantageous point in the process, as various strategies and design concepts are proposed and explored, thereby eliminating significant code compliance problems early on. This can save building owners and developers tens of thousands of dollars in time and redesign fees, and building departments the time and effort of rejecting and re-examining plans.

I've only touched on the possibilities for creating a different environment in which the crucial work of the building department can be conducted. As more and more communities confront concerns about their health and future, we'll see more changes in building design and construction. It is exciting to think about the leaders who will emerge and the new ideas and programs that they will help develop to turn these challenges into opportunities. ♦

*David Eisenberg serves on the City of Tucson/Pima County, Arizona, Joint Building Code Committee and is a member of the Board of Directors of the U.S. Green Building Council, for which he chairs the Greening the Codes Committee. He can be contacted by phone at (520) 624-6628 or via e-mail at strawnet@aol.com. For more information about DCAT, visit [www.dcat.net](http://www.dcat.net).*

