10. Action Plan: 18 Recommendations for Advancing Sustainability in Reconstructed Buildings

We offer the following recommendations in the hope that they will help step up the pace of high-performance building reconstruction in the U.S. and Canada. We consulted many experts for advice, but these recommendations are solely the responsibility of the editors of *Building Design+Construction*. We welcome your comments. Please send them to Robert Cassidy, Editorial Director: rcassidy@sgcmail.com.

FEDERAL EXECUTIVE DEPARTMENTS + AGENCIES

1. The Energy Information Administration should update *and refine* the CBECS data file.

CBECS—the Commercial Buildings Energy Consumption Survey— is a national survey by the Energy Information Administration that collects data on the stock of U.S. commercial buildings, their energy-related building characteristics, and their energy consumption and expenditures. It is the basis on which Energy Star rates buildings, and it hasn't been updated since 2003. That data hole needs to be filled.

After a budget delay in 2011, CBECS will now be conducted beginning with data collection in April 2013, with the first data releases expected in spring 2014. That work needs to be completed as quickly as possible. Following data collection, the documentation and presentation of the data must be improved so that Building Teams can utilize the data in referencing their own work against CBECS metrics.

2. Energy Star should create a new program to encourage energy efficiency in tenant spaces and reconstructed buildings.

The activities of tenants—their use of lighting, heating and cooling, plug load for electronics, etc.—impact at least half of all energy use in a typical office building. Yet there are few incentives for tenants to be more conscientious in their use of energy.

Energy Star should investigate ways to recognize conscientious energy use by tenants.[1] Since 2001, Energy Star has given "Industrial Awards" to manufacturers who excel in energy management. Why not extend this concept to building owners who improve their energy efficiency? Similarly, LEED should consider a system to reward building owners whose renovations result in significant energy reduction, even if they don't achieve LEED certification.

1 See Anthony E. Malkin (President of Malkin Holdings LLC), "Lessons Learned at the Empire State Building: From Innovation, to Implementation, to the Future," in "Lessons Learned: High Performance Buildings," available for purchase at: http://www.earthdayny.org/education/lessons-learned/465-lessons-learned-7.html.

3. Congress needs to straighten out the mess with the PACE program for energy improvements.

PACE (Property Assessed Clean Energy) allows states to grant local governments—cities, counties, special districts—the authority to issue bonds to fund nonpublic energy improvements for homes and commercial buildings. Property owners repay the loans over time (as long as 20 years, in some states), and the obligation to repay the loan stays with the property upon sale. Twenty-seven states have adopted PACE.[2]

On 6 July 2010, the Federal Housing Finance Agency directed Fannie Mae and Freddie Mac to stop underwriting mortgages for properties with PACE assessments. Since then, the validity of existing PACE programs throughout the country has been thrown into doubt, and the order has had a chilling effect on the creation of new PACE programs.

PACE has had a solid record of providing voluntary financing for energy improvements without a burden to taxpayers. Congress needs to step in and clean up the mess FHFA has created. Although as a matter of principle we do not comment on pending legislation, HR 2599 (http://www.opencongress.org/bill/112-h2599/show) makes the case for the rescission of the FHFA order.

2 PACENOW is advocacy blog that covers PACE-related events: http://pacenow.org/blog/.

STATE AND LOCAL GOVERNMENTS

4. States and local jurisdictions should devise ways to provide incentives for improving energy efficiency in buildings, such as reducing vehicle miles traveled (VMT) through reconstruction and retrofitting of existing buildings in urban areas.

As a gross simplification, cities use more energy for buildings than their surrounding suburbs, while suburbs use more energy for transportation than for buildings, according to the Center for Neighborhood Technology. State and local land-use planning should be directed at providing incentives for energy savings to owners of existing buildings in cities to encourage walkable neighborhoods and the use of public transit, thereby reducing vehicle miles traveled.

Further, as "The Greenest Building" notes, policy makers should also consider "the significant role that older buildings play in creating more character-rich and human-scale communities."

Many states and cities lavish huge tax breaks on corporations to locate in their jurisdictions. A more economical and environmentally beneficial incentive would be to create financing mechanisms for existing businesses to stay in place and improve their energy efficiency. Landing a Fortune 500 corporation may grab headlines for a community in the short term, but achieving long-term energy and environmental improvements could prove to be more beneficial for that jurisdiction.

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5. States and localities that do not have disclosure requirements on energy use in existing buildings should consider requiring such disclosure—and, where feasible, provide incentives for energy improvements.

More and more states and cities are requiring owners of commercial buildings to reveal the energy use of their properties at the time of a sale, lease, or financing. In New York City, the Greener, Greater Buildings Plan requires yearly Energy Star benchmarking and public disclosure for large commercial and multifamily buildings. California requires commercial buildings to disclose their Energy Star ratings to the California Energy Commission at the time of a sale, lease, or financing for the entire building. The state of Washington requires commercial buildings to disclose Energy Star ratings at the time of a sale, lease or financing. The city of Austin, Texas, requires similar disclosure for commercial buildings. (For a helpful listing of all such requirements, see: http://www.buildingrating.org/ammap.)

These disclosure regulations give the buyer or lessee of commercial properties valuable information to weigh in the sale or lease transaction. But they also provide useful information to those seeking to expand the base of knowledge about existing buildings.[3]

3 As Rachel Scheu, LEED AP, of Chicago's Center for Neighborhood Technology, has noted, "Understanding how our building stock uses energy is critical, and local context is important. Building stock characteristics, utility regulatory structures, and energy costs and use vary widely by geography. National datasets (e.g., CBECS) are valuable but too small. Large datasets such as New York's provide tremendous benefits for policymakers and owners to set realistic and measurable energy-reduction goals and channel resources most cost-effectively."

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6. States, counties, and cities should rev up efforts to adopt green building codes that encourage high-performance reconstruction, including water-conservation measures.

It is estimated that there are still 70 million 3.5 gallons/flush toilets in the U.S., not to mention inefficient urinals, showers, and sinks. Two years ago, the International Association of Plumbing and Mechanical Officials issued the IAPMO Green Plumbing and Mechanical Supplement (available for purchase at: http://iapmomembership.org/index.php?option=com_virtuemart&vmcchk=1&Itemid=3), which provides excellent guidance for jurisdictions to adopt water-conservation regulations.

The recently released International Green Construction Code (http://www.iccsafe.org/cs/IGCC/Pages/default.aspx) also offers a path for states and localities to implement energy- and water-saving measures. It is estimated that implementing either of these measures could reduce water use in buildings by 20% compared to current plumbing codes, saving millions of gallons of fresh water at one end and eliminating the need for treating the waste water at the other end.[4]

4 For more on water efficiency, see our 2009 White Paper, "Green Buildings + Water Performance," at: http://www.bdcnetwork.com/2009-white-paper-green-buildings-water-performance.

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7. State historic preservation offices and building code officials need to be more flexible in their interpretation of codes and standards, to enable "outcome-based" energy efficiency and whole-building design in reconstruction projects.

SHPOs are notorious for going by the book, especially regarding historic authenticity and aesthetics, but if more historic buildings are to be preserved, economic, environmental, and technological considerations have to be factored into the equation. SHPOs will have to be more open to compromises that improve energy and water efficiency in historic properties, especially as new, more economical technologies come on line.

Similarly, means have to be found, perhaps through performance- or outcome-based codes, for code officials to have more flexibility in borderline situations, such as scope of work questions. For example, how much renovation work should trigger a code-required energy upgrade? Fifty-one percent of gsf? Seventy-five percent? Or should code officials have greater discretion to determine if the renovation provides sufficient energy upgrading that no further work is required? These are tough calls, but

if we are to create a climate that leads toward "the 99% solution," these may be the kinds of judgments that code officials will have to make in the future.

At the same time, property owners and Building Teams will have to up the ante on their own skills in finding clever ways to introduce advanced technologies into historic projects without incurring the wrath of SHPOs or code enforcers.

8. Cities and counties should look to implement "aggregation initiatives," such as Seattle's 2030 District, for energy and water conservation in existing and renovated buildings.

The Seattle 2030 District (http://www.2030district.org/seattle) is a public-private collaborative working to create a high-performance building district in downtown Seattle, based on the Architecture 2030 Challenge for Planning (http://architecture2030.org/2030_challenge/2030_challenge_planning). The partnership is on its way to enrolling 88 million sf of existing buildings to provide innovative strategies that will assist property owners, managers, and tenants in meeting aggressive energy, water, and carbon reduction goals related to reconstruction and ongoing building operations.

Taking environmental upgrades to the district-wide level, rather than focusing on new, existing, or reconstructed buildings one at a time, is the necessary next step in a more volumetric approach to "the 99% solution." Already, Cleveland has jumped on board and will be launching its own 2030 District this month (http://www.2030district.org/cleveland/). The city of Milwaukee's Milwaukee Energy Efficiency (http://www.smartenergypays.com/), or Me^2, is using $60 million in ARRA funds to link up building owners with energy service contractors and private lenders. Upfront costs of improving energy efficiency will be paid back from savings in energy use.

Denver's Living City Block (http://www.livingcityblock.org) is another district-wide effort to reduce energy use, in this case a block and a half of Denver's historic Lower Downtown district. The goal: cut energy use in "Lo Do" in half by 2013. The Living City Block has spread to the Gowanus neighborhood of Brooklyn, N.Y.

Other cities and counties should be investigating these neighborhood-based models for sustainable building renovation as well.

9. The Appraisal Institute should lead efforts to educate the building valuation community on green commercial buildings, especially for high-performance renovations.

APPRAISERS AND VALUATORS

In our 2011 White Paper, we called for the appraisal community to develop model real estate appraisal standards for net-zero and other low-energy buildings. So, too, should the Appraisal Institute set its sights on developing standards for green renovations.

To its credit, the Appraisal Institute has been presenting education programs on the value of green commercial buildings, and it has begun to consider improved valuations for green-certified single-family homes.[5] But the AI and the appraisal community in general need to give greater attention to the valuation of nonresidential green buildings—in particular, high-performance reconstructed commercial buildings—in order to create incentives for building owners to engage in renovations.

5 Information on these education programs is available at: http://appraisalinstitute.org/education/prof_dev_programs.aspx.

10. Owners of small commercial buildings need to get on the renovation bandwagon.

BUILDING OWNERS AND DEVELOPERS

More than 90% of commercial buildings in the U.S. are under 50,000 sf; 73% are under 10,000 sf. The owners of these buildings are notoriously risk averse, but they are the ones who hold the key to potentially large-scale energy and environmental improvements. BOMA (Building Owners and Managers Association International) is making some progress in this direction through its BOMA Energy Efficiency Program and BOMA 360 Performance Program, but more needs to be done.

It is important for owners of smaller buildings to realize that retrofits don't have to be completed or paid for all at once—that incremental improvements over time can be done in conjunction with major events, such as tenant turnover, code-required upgrades, market repositioning, or necessary improvements to the building envelope (roof or window replacement, overcladding, insulation upgrades, etc.)[6] Making small improvements over time will produce cumulatively greater energy and dollar savings than waiting to undertake the whole job much later.

Other organizations that can play a significant role in reconstructing nonresidential buildings include the Certified Commercial Investment Manager Institute, CoreNet Global, the Council of Education Facility Planners International, the Institute of Real Estate Management, the International Facility Management Association, NAIOP, the Society of Industrial and Office Realtors, and the Urban Land Institute.

6 "Financing Deep Energy Retrofits: Workshop Report," 17 May 2011, Northwest Energy Efficiency Alliance and the Rocky Mountain Institute, at: Whitepaper_Financing_Energy_Retrofits_RMI_05-17-2011.pdf.

11. Owners who engage in reconstruction projects should meter their buildings for both energy use *and* water use.

Reconstruction is a perfect time to meter an existing building. However, while forward-thinking owners may "get" the benefit of metering (and submetering) for energy use, many neglect to think about measuring water use.

Advice to owners and Building Teams from Rob Zimmerman, PE, of Kohler Co.: 1) If you are doing energy monitoring, pull the water use in via a smart meter so you know your water use in real time, and make the data available on a dashboard or via the Web—don't rely on utility bills; 2) submeter major water uses like landscape irrigation and cooling towers; 3) benchmark your building's water use against similar types of buildings; 4) replace old fixtures with high-efficiency toilets and urinals, and consider using piston-style flushometer valves for commercial toilets.

INSTITUTIONS OF HIGHER LEARNING

12. Community colleges and technical training institutions should create programs to educate and train skilled professionals for jobs in deep energy (and water) retrofits.

The nation's community colleges, along with private-sector training institutions like DeVry and ITT Educational Services, are uniquely positioned to train a generation of mid-level experts skilled in energy modeling, building commissioning, and energy- and water-conservation practices in existing buildings and retrofits. Such an effort could start with certificate programs and lead to two-year associate's degrees in energy, water, and building materials management for retrofits.[7] Certification programs that go beyond LEED-EB:O+M accreditation could also be developed for architects, engineers, and construction professionals who want to strengthen their expertise in reconstruction work.[8]

7 One model AAS program for energy management and renewable energy is offered by Lane Community College, Eugene, Ore. (http://www.lanecc.edu/science/energyMgmt/).

8 The Northwest Energy Education Institute is one such exemplary program (http://www.nweei.org/)

AEC FIRMS AND BUILDING TEAMS

13. AEC firms should consider expanding their business models to add "service integration" to their portfolios.

Due to the disaggregation of building ownership in the U.S., with half of commercial floor space in buildings under 50,000 sf, there is a need—and a business opportunity—for "service integrators" to help owners overcome their reluctance to renovate their buildings. As the NEEA/RMI report, "Financing Deep Energy Retrofits," suggests, service integrators could provide "the full spectrum of support" to take the hassle out of doing deep retrofits. NEEA/RMI have proposed that service integrators could work through the U.S. Small Business Administration (504 Green Loan and 7a programs), utility companies, and community development banks. There is a huge need for such a "one-stop" service, but making it financially feasible, especially for owners of small properties, will not be easy, which is why some sort of sponsored experimentation is called for.

14. Building Teams must become more cognizant of the long-term economic and environmental impact of building products in renovation projects.

As the NTHP report, "The Greenest Building," notes, Building Teams should pay careful attention to the amount and performance of building materials used in renovation projects, or the environmental and financial benefits of reconstruction may be lost (as in the case of converting a warehouse to multifamily use).

Along similar lines, Building Teams involved in reconstruction must be clever enough to think ahead as to how future technologies might be applied to buildings currently undergoing renovation: for example, reconstructing a roof such that it could accommodate future photovoltaic arrays—cheaper, smaller, more powerful that today's—even if PVs don't make sense for the project right now.

BUILDING PRODUCT MANUFACTURERS

15. Building product manufacturers need to redouble their efforts on durability and end-of-life reuse in their products.

If it is true that the greenest building is the one that lasts the longest, then it follows that the greenest building product is the one that lasts the life of building—and can then be recycled or reused in some beneficial way. This is especially important for systems like roofing, cladding, windows, and other key components of the building envelope, as well as for interior components—flooring, furnishings, wood, ceiling tiles. Even old toilets and urinals have been known to have a second life, crushed into granules and mixed into flooring materials.

Product durability in particular needs to be emphasized, to avoid the kind of disaster that took place with some first-generation low-VOC paints and finishes that washed right off the wall (a problem that the paint industry has since rectified).

16. Public- and private-sector stakeholders need to find ways to work together on the next stage of technology innovation for sustainable reconstruction.

PRIVATE INDUSTRY, UNIVERSITIES, AND FEDERAL LABS

Technological innovation in building products and systems will require the synergies that might best be created through the collaboration of private industry, universities, and federal labs. The EnOcean Alliance (http://www.enocean-alliance.org/home/), which develops and promotes self-powered wireless monitoring and control systems for sustainable buildings by formalizing the interoperable wireless standard, is one such industry-based consortium.

A more wide-ranging collaboration is the Greater Philadelphia Innovation Cluster (gpichub.org/), a regional innovation center at the Philadelphia Navy Yard. One of three such federally funded clusters, it is unique in its focus on full-spectrum retrofits (50% or more energy reduction) of average-sized commercial, institutional, and multifamily residential buildings. The consortium consists of Pennsylvania State University, Philadelphia Industrial Development Corp., Ben Franklin Technology Partners of Southeastern Pennsylvania, Delaware Valley Industrial Resource Center, and Wharton Small Business Development Center, with additional membership from such high-tech companies as Bayer MaterialScience, IBM Research, Lutron Electronics, PPG Industries, and United Technologies.

Research-based universities and technology-enabled companies in other parts of the country need to establish similar innovation clusters to attack specific target technologies that would benefit the renovation and reconstruction of existing buildings.

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17. LEED-EB:O+M should recognize buildings that make significant improvements in reducing energy use, outside of Energy Star qualification.

U.S. GREEN BUILDING COUNCIL

Under current LEED-EB:O+M requirements, owners of the worst energy guzzlers who make substantial investments to reduce energy use in their buildings but who don't reach Energy Star top 25% level get left out of LEED-EB. This creates an obvious disincentive for owners of energy-hog buildings to participate in LEED-EB. The USGBC should appoint a committee to investigate a new form of recognition for these properties, which in some cases could be realizing greater energy-conservation gains than many certified LEED-EB:O+M properties.

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18. The U.S. Green Building Council should delete a proposed credit to LEED 2012 related to avoidance of chemicals of concern.

LEED 2012, which is expected to be released in November, includes a Materials & Resources credit for "avoidance of chemicals of concern." Among the substances to be avoided is PVC/vinyl.

This latest attempt to get PVC blackballed by LEED should sound familiar to those who have followed the controversy in our White Papers over the past decade. (Note: The Vinyl Institute and Sika Sarnafil, a maker of PVC-based roofing products, are sponsors of this White Paper, but the views expressed here are entirely those of the editors.) Ten years ago, the USGBC asked its five-member Technical and Scientific Advisory Committee, chaired by Scot Horst (now Senior Vice President of LEED at the USGBC), to investigate.

The TSAC spent four years reviewing hundreds of scientific documents and studies related to PVC. Based on the TSAC report, the LEED Steering Committee concluded "that the evidence available at present is not conclusive, but it is suggestive that a credit specifically targeting PVC is not warranted." In essence, the USGBC's own blue-ribbon committee concluded that there was insufficient scientific evidence to prevent vinyl from being used in LEED-rated buildings.

The new MR credit came about as the result of a "pilot credit" experiment in which, after two years, only two projects gained credit for avoiding "chemicals of concern." Two data points do not a scientific conclusion make. Moreover, the list of chemicals to be avoided is based primarily on data from a private ecolabel that does not have an open, ANSI-type process. The proposed credit also makes reference to California Proposition 65, which calls for *labeling* of certain chemicals used in all sorts of products but *does not ban* them.

The MR Credit for Avoidance of Chemicals of Concern is another example of the USGBC overstepping its bounds, as it has in creating a de facto wood standard in LEED. The LEED credit development process is not fully open and transparent, unlike that of ANSI and other recognized standards-setting organizations. The USGBC argues that the use of LEED is voluntary, yet its website keeps a tally of all the government entities (442 localities, 34 states, 14 federal agencies) that treat LEED like a de facto standard—without a fully open, ANSI-based standards development process.

The USGBC should not be in the business of creating so-called "red lists." USGBC staff and members are not professional chemists, biologists, epidemiologists, or toxicologists, and they are not qualified to determine the health risks, if any, of specific building products. That's the job of Congressionally authorized federal agencies with the appropriate expertise and capability. +