



## Paper 2b: Toward Sustainable Financing and Strong Markets for Green Building:

### US Green Building Finance Review

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The built environment has a profound effect on surrounding ecosystems and on the world's atmosphere. In the United States, the built environment exceeds even the transport sector in the production of the greenhouse gas emissions associated with global warming.<sup>1</sup> As well, 2007 recommendations by the Intergovernmental Panel on Climate Change suggest that the use of green or sustainable building technologies can play a significant and economically beneficial role in reducing climate change emissions.<sup>2</sup> In order to accelerate the adoption of green building technologies, the 2030 Challenge, an aggressive set of targets adopted by the American Institute of Architects and the Royal Architecture Institute of Canada envisions that all new buildings be carbon neutral by 2030.

Because the development and purchase of real estate is highly capital intensive, the engagement of the finance sector is crucial if the 2030 Challenge is to be met. This study surveys the progress of the key actors influencing the financing of US green buildings and proposes a set of recommendations for both private and public sectors to mainstream the delivery of green buildings to the US market. The review is a broad one, encompassing the financing of institutional properties in the government, education and health care sectors; commercial buildings, including multi-family projects; single-family residential buildings and affordable housing.

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<sup>1</sup>US Green Building Council, "Building Design Leaders Collaborating on Carbon Neutral Buildings," 7 May 2007, <<http://www.usgbc.org/News/PressReleaseDetails.aspx?ID=3124>>.

<sup>2</sup> Intergovernmental Panel on Climate Change, *Fourth Assessment Report, Climate Change 2007: Mitigation of Climate Change: Summary for Policy Makers*, May 2007, pp.14, 16, 19-20. <<http://www.ipcc.ch/SPM040507.pdf>>.

The study has been prepared as part of a larger research effort being undertaken by the Commission for Environmental Cooperation, to accelerate the production of green buildings throughout North America, in order to realize the objectives of the 2030 Challenge.

### Institutional Properties

Institutional property owners throughout the United States, including governments, educational institutions, and inpatient health care facilities, all have begun to adopt green building programs, as detailed below.

Governments at the federal, state and local levels have been especially important actors in mainstreaming green building technologies. Government entities have acted as catalysts by mandating green building requirements for their own building programs and by issuing green building regulations that affect private developers and real estate owners. In addition, federal, state and local financial incentives have been important mechanisms for encouraging green development by the private and non-profit sectors; because these incentives are used to finance commercial and residential construction.

Federal Government. The federal government has been a key catalyst in the development of the green building market. The US government owns three billion square feet of real estate in 445,000 buildings, and leases an additional 374 million square feet in 57,000 buildings.<sup>3</sup> The General Services Administration (GSA), the agency that develops and manages most federal property, was an early champion of green building technologies. GSA requires that new construction and major renovations be built to a LEED-certified standard and encourages the use of the Silver LEED standard for federal projects.<sup>4</sup>

The Energy Policy Act of 2005 mandated that US federal buildings, when life-cycle cost effective, be developed to meet energy-efficiency standards at least 30 percent below the applicable International Energy Conservation Code (IECC) or American Society of Heating, Refrigerating and Air-Conditioning Engineers standards, as well as water conservation standards. The Energy Policy Act requires that the federal government apply sustainable design principles to the siting, design and construction of all new and replacement buildings.<sup>5</sup> The Act also requires federal agencies, when cost-effective, to procure equipment—including building appliances—certified under the Energy Star program or the Federal Energy Management Program, to adopt specific energy use reduction goals, and, when practicable, to use advanced meters or metering devices to measure energy use.<sup>6</sup>

In January 2007, the president signed Executive Order 13423, which requires that federal agencies improve energy efficiency and reduce greenhouse gas emissions by three percent annually through the end of 2015, or 30 percent by the end of 2015, relative to each agency's

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<sup>3</sup> Alison Kinn Bennett, Office of the Federal Environmental Executive, US Federal Government Commitment to Green Building: From Policy to Practice, Presentation at the Commission for Environmental Cooperation Mexico City Symposium, 20 February 2007, <[http://www.cec.org/greenbuilding/symposium/pres/GB-Pres-Bennett\\_en.pdf](http://www.cec.org/greenbuilding/symposium/pres/GB-Pres-Bennett_en.pdf)>.

<sup>4</sup> Correspondence with Donald R. Horn, US General Services Administration, 29 March 2007.

<sup>5</sup> Energy Policy Act of 2005, Section 109.

<sup>6</sup> Energy Policy Act of 2005, Sections 104, 102, 103.

2003 baselines. For major renovations, the energy cost budget should be 20 percent below the pre-renovations 2003 baseline. The Order also requires agencies to ensure that all new buildings and major renovations—as well as at least 15 percent of their existing federal capital asset building inventory—incorporate sustainable practices by 2015. These practices include integrated facility planning and design, total building commissioning, the enhancement of indoor environmental quality, the use of environmentally-sensitive materials, a 20 percent reduction of total potable water consumption (relative to the Energy Policy Act of 1992 baseline), and a 50 percent reduction of outdoor potable water consumption.<sup>7</sup>

The federal government also permits agencies to use contracting vehicles known as energy savings performance contracts (ESPCs) to finance and implement efficiency improvements. The contracts give federal agencies the flexibility to contract on a long-term basis with energy services companies (ESCOs) for capital improvements that promote energy efficiency. The contracts establish a long-term flow of low-risk, federal contract payments that developers, building owners and others can borrow against to finance energy-efficient capital improvements and building retrofits. Legislation authorizing ESPCs was enacted in 1992, and the US Department of Energy (DOE) promulgated regulations for their use in 1995.

Super ESPCs—indeefinite delivery, indefefinite quantity (IDIQ) contracts were created in 1998 and reauthorized through 2016 by the Energy Policy Act of 2005. More than 400 ESPC projects have been awarded by nineteen different federal agencies in 46 states. Over \$1.9 billion has been invested in US federal facilities through ESPCs, saving 16 trillion Btu annually, equivalent to the energy used by a city of about 450,000.<sup>8</sup> Super ESPCs are umbrella contracts awarded to a subset of competitively designated ESCOs that have demonstrated their capabilities to provide energy services to federal customers. The super ESPC umbrella contract streamlines the contracting process for federal agencies and permits procurements to be authorized and implemented more rapidly than in the case of a stand-alone ESPC project.

Projects authorized under Super ESPCs include a wide range of building mechanical elements, control systems, lighting, building envelope modifications, distributed power generation and renewable energy systems, water and sewer systems, and a menu of energy saving enhancements, including peak shaving or load shifting, rate adjustments, and process and other improvements. Technology-specific Super ESPCs can be used for alternative energy equipment such as geothermal heat pumps, photovoltaics, biomass and alternative methane fuels and solar thermal systems.

Energy savings performance contracts can be used as collateral for financing building upgrades. One vehicle for borrowing against an Energy Savings Performance Contract is the energy savings trust certificate.<sup>9</sup> This is a medium- or long-term debt vehicle utilized by general

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<sup>7</sup>Executive Order 13423, Office of the President, 24 January 2007, <[http://www.ofee.gov/eo/EO\\_13423.pdf](http://www.ofee.gov/eo/EO_13423.pdf)>.

<sup>8</sup> US Department of Energy, Federal Energy Management Program, Financing Mechanisms, <<http://www1.eere.energy.gov/femp/financing/superespcs.html>>.

<sup>9</sup> The following discussion of Energy Savings Trust Certificates is adapted from Anita Molino and Leanne Tobias, “Energy Savings Trust Certificates: Financing Energy-Efficient Improvements through the Capital Markets,” in *Green Office Buildings: A Practical Guide to Development* (Urban Land Institute, 2005), pp.174-175.

contractors, developers, and non-regulated subsidiaries of utilities that have been designated as ESCOs by federal agencies pursuant to energy savings performance contracts. The debt is backed by the federal contract and debt repayment schedules are linked to the amount and term of the energy savings realized by the capital improvements. The term of a trust certificate for a lighting system, for example, is typically five to seven years, while financings for chillers or HVAC systems would have 15- to 20-year terms. The debt service on the certificates is secured by all payments, revenues and other income realized from the underlying federal contract, as well as by a security interest in the financed improvements, and associated payment and performance bonds.

Trust certificates are typically issued on an unrated basis and are privately placed with qualified institutional buyers. Because they are unrated, trust certificates typically trade at a premium to the issuer's rated corporate bonds of similar maturity. The certificates are popular with institutional investors looking for a safe investment that offers a yield premium over time.

As suggested by the foregoing discussion, the green building policies of the US government are notable for their depth and comprehensiveness, and serve as a policy model for other governmental entities. The following additional changes in US government practice would further enhance federal capabilities to implement green building policies:

- Integrated consideration of federal construction, acquisition and operating budgets. The US Congress authorizes and appropriates funds for federal real estate acquisitions independently from funds for property operations. Similarly, the Administration accounts for its capital investments separately from property operating budgets.<sup>10</sup> This separation prevents the ready linkage of operating savings from green buildings to offset higher initial construction costs. Mechanisms to promote the integrated review of project-specific capital and operating costs would strengthen the ability of federal officials to implement advanced green building technologies.
- Formal federal leasing preferences for green properties. A potent tool to encourage the private sector to develop green space would be the enactment of a formal federal leasing preference for green properties. Although the informal guidance for Executive Order 13423 actively encourages the use of such preferences, the guidance lacks the full force of law.<sup>11</sup> A statutory change or additional executive order formalizing the guidance would mandate the broad federal use of green leasing criteria. As of the first quarter of 2007, several Congressional proposals have been introduced to effect this change.

As well, the federal government exercises a profound influence over the private sector through tax policy and the regulation of financial institutions. These federal powers also can be used to mainstream the use of sustainable and energy-efficient building technologies. Potential policies on these fronts include:

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<sup>10</sup>US General Services Administration, Real Property Activities, Fiscal Year 2008 Budget Discussion, <<http://www.whitehouse.gov/omb/budget/fy2008/pdf/appendix/gsa.pdf>> and interview with Donald R. Horn, US General Services Administration, 26 March 2007.

<sup>11</sup> Interview with Donald R. Horn, US General Services Administration, 26 March 2007.

- The extension and expansion of federal incentives for the development and retrofitting of green and energy-efficient buildings. The Energy Policy Act of 2005 offers a variety of incentives for real estate, including an energy-efficient commercial building deduction of \$0.60-\$1.80/ft<sup>2</sup> for commercial buildings, residential properties, home manufacturers and installation credits ranging for the installation of qualified fuel cells (30 percent credit), stationery micro turbine plants (10 percent credit) and solar equipment (30 percent).<sup>12</sup> Credits have also been created for residential solar (30 percent) and non-solar home improvements, and the manufacturers of energy-efficient appliances and energy-efficient homes, as detailed later in this study.

Under the Energy Policy Act, these federal incentives have been restricted to property placed in service in 2006 and 2007. In addition, a number of the incentives are comparatively small, rendering their effect on manufacturing and purchasing behavior more tenuous. The extension and expansion of the federal incentives would help to encourage the retrofitting and development of energy-efficient and green properties. In addition, a number of observers have suggested that the federal government enact a central tax credit for green or energy-efficient development and renovation of investment property, analogous to the historic renovation tax credit. The extension of accelerated depreciation to newly-constructed or renovated green or energy-efficient properties would also help to stimulate green building investment.<sup>13</sup>

- The regulation of lending institutions to encourage green and energy efficient lending. The federal and state governments are also key regulators of financial institutions. Requirements that financial institutions disclose the volume of their green or energy-efficient building loans or develop programs to encourage green or energy-efficient real estate lending might be a potent vehicle to stimulate lending for sustainable properties. The use of such approaches to encourage urban lending have been in place at the federal level for some 30 years under the Home Mortgage Disclosure Act and the Community Reinvestment Act. The requirements set forth under these statutes could readily be broadened to support the growth of the green or energy-efficient real estate finance market.

Acting through the Federal Reserve Board, the US government participates in the establishment of international banking guidelines under the Basel Capital Accord process, as do the central banks of other nations. As of early 2007, the Basel process has yet to address the subject of green lending protocols. A first step would be to encourage the Bank for International Settlements, the entity that coordinates the Basel process, to develop research on how green lending principles relate to loan risk. Similar efforts also could be undertaken at the national level in the United States and elsewhere.

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<sup>12</sup> US Department of Energy, <<http://www.energy.gov/taxbreaks.htm>>; material supplied by Michael Zimmer and Jason Hungerford, Thompson Hine, 1 February 2007; Business Tax Incentives, Tax Incentives Assistance Project, <<http://www.energytaxincentives.org/business/>>.

<sup>13</sup> Conversations with Bruce Becker, Becker and Becker, June 16, 2007 and Michael Zimmer, Esq., Thompson Hine, 26 June 2007.

State and Local Governments. Like the federal government, US state and local governments have helped to accelerate the dissemination and use of green building technologies. As of early 2007, 54 state and local governments had adopted green building regulations.<sup>14</sup> Most of these regulations have required that public buildings be constructed according to green standards, frequently to the Leadership in Energy and Environmental Design (LEED) standards of the US Green Building Council. More recently, a number of jurisdictions, including the state of Connecticut; Babylon, New York; Boston; Washington, DC; Montgomery County, Maryland; and Pasadena, California, have begun to impose green building requirements for private construction.

As of early 2007, over 400 local governments throughout the United States had endorsed the Climate Protection Initiative of the US Conference of Mayors, which establishes the objective of meeting or exceeding the greenhouse gas reduction targets of the Kyoto Protocol at the local level. A number of state governments and the National Governors Association have also endorsed greenhouse gas reduction. Because green building programs are central to the goal of reducing global greenhouse gas emissions, state and local governments should be encouraged to enact green building legislation that would commit to green building standards and encourage green leasing preferences. Federal green building construction standards, including Executive Order 13423, represent an excellent template for state and local green building efforts. As well, state and local governments with strong credit ratings could make additional use of energy performance contracting to encourage sustainable development in their jurisdictions.

State and local governments can also help to mainstream green and energy-efficient real estate through their pension investment activities. The US pension real estate sector totals an estimated \$7 trillion. Significant institutional investors in this market include the \$2.7 trillion state and local pension sector and the \$420 billion union pension fund segment.<sup>15</sup> By instructing their real estate advisors to invest a portion of their real estate investment allocations in green and energy-efficient real estate in a manner consistent with the Employee Retirement Income Security Act (ERISA), states and localities can help to mainstream green development and renovation.

As well, state governments could use their regulatory powers over state-chartered banking institutions to encourage green and energy-efficient lending, as suggested for the federal government, above.

Educational Institutions. The more than 100,000 US academic institutions represent an important locus for the continued establishment of green building programs. Elementary and secondary schools represent distinct challenges from those present at the post-secondary level.

The most recent data from the National Center for Education Statistics indicate that there are some 95,726 public elementary and secondary schools in the United States.<sup>16</sup> The dominant US guidelines for green construction serving grades kindergarten through 12 (K-12) are those of the Collaborative for High Performance Schools (CHPS), initially developed in California. CHPS

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<sup>14</sup> Sally Deneen and Brian Howard, "Buildings that Breathe," EMagazine.com, Volume XVIII, No. 1, January-February 2007, <<http://www.emagazine.com>>.

<sup>15</sup> Building Design and Construction, Green Buildings and the Bottom Line, November 2006, p.3.

<sup>16</sup> National Center for Education Statistics, Digest of Education Statistics 2005, Chapter 2, Table 84, 2003 data.

constitutes California's recommended school construction criteria and has been adopted by 21 California counties. Eight additional states (New York, Massachusetts, Washington, Rhode Island, Vermont, New Hampshire, Maine and Connecticut) have adopted elements of CHPS in their school construction guidelines.<sup>17</sup>

CHPS criteria include comfort and safety for students and school staff, indoor environmental quality, energy and water efficiency and efficiency in the selection and use of building materials. CHPS estimates that school districts can save “thirty to forty percent on annual utility costs for new schools and twenty to thirty percent on renovated schools by applying high performance design and sustainability concepts. The potential for savings is greater in new schools because it is possible to ‘design out’ inefficiencies from the outset.”<sup>18</sup>

Despite the potential economies associated with the adoption of CHPS or similar standards for K-12 institutions, school district budgeting processes frequently serve as disincentives to the implementation of green building programs for new construction or renovation. A 2006 review of this sector conducted by TIAX LLC<sup>19</sup> finds that there is a strict division between operating and capital budgets. Capital budgets are fixed periodically by local governments, often on a project-by-project basis intended to maximize square footage built and limit local tax increases and other publicly-imposed fees. Operating budgets are set and managed separately.<sup>20</sup> As a result, operating cost savings frequently are not considered when school districts evaluate project expenditures, and green and energy-cost reduction technologies are given “low priority, especially if they increase first costs.”<sup>21</sup>

Budgeting challenges may be less severe in the United States' 4,140<sup>22</sup> colleges, universities and other post-secondary schools. Although building capital and operating budgets are typically maintained separately, they are more frequently overseen cooperatively,<sup>23</sup> often by a unified facilities staff. Similarly, colleges and universities typically take a long-term view of facilities' development, maintenance and life-cycle costs and expect to own their buildings throughout their life span, which increases interest in the use of green building technologies.<sup>24</sup> Similarly, cutting-edge building design and construction are often considered important in the attraction of high quality students and faculty, and green and energy-efficient features are often considered mission-congruent with the interests of universities and colleges in promoting responsible responses to societal challenges.<sup>25</sup> As this suggests, colleges, universities and other post-secondary educational institutions are potentially fertile ground for green building initiatives.

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<sup>17</sup> Collaborative for High Performance Schools, Membership, Why Should I Join CHPS? See <<http://www.chps.net/membership/whyjoin.htm>>.

<sup>18</sup> Collaborative for High Performance Schools, CHPS Overview, <<http://www.chps.net/overview/index.htm>>.

<sup>19</sup> TIAX LLC, *Products to Enhance Market Penetration of High Performance Buildings*, report prepared for the US Department of Energy, October 2006, pp. 4-14 - 4-15.

<sup>20</sup> *ibid.*

<sup>21</sup> *op. cit.*, pp. 4-14 - 4-15

<sup>22</sup> National Center for Education Statistics, *Digest of Education Statistics 2005*, Chapter 3, Table 213, 2003 data.

<sup>23</sup> TIAX LLC, *Products to Enhance Market Penetration of High Performance Buildings*, report prepared for the US Department of Energy, October 2006, p. 4-15.

<sup>24</sup> *op. cit.*, p. 4-16.

<sup>25</sup> *ibid.*, p. 4-16.

Health Care Institutions. Hospitals and other inpatient medical facilities are intensive users of energy and are also highly regulated. TIAX's 2006 study concludes that inpatient medical facilities typically must comply with minimum lighting, outdoor air exchange, emergency power and other infrastructure requirements needed to ensure patient health.<sup>26</sup> As well, the capital budgets for inpatient medical facilities are utilized for medical equipment as well as for real estate. As a result, capital access for green and energy-efficient improvements may be restricted.<sup>27</sup>

As the foregoing summary suggests, hospitals and inpatient medical facilities may face special challenges in implementing green building programs. At the same time, these facilities would benefit from more extensive use of green building programs in order to manage their energy expenses and to provide the healthiest possible settings for their patients. The drivers of cost control, mission congruence and market differentiation among patients may help to further promote the use of green building technologies in medical settings.

Conclusions. A number of policy recommendations emerge from the foregoing analysis of the use of green building technologies by government, educational and health care organizations:

- Institutions, particularly government entities, are important to the early adoption and initial mainstreaming of green building policies and programs. Actions to encourage the use of green building policies by institutions are therefore an important focus for the future.
- Unified consideration of operating and capital budgets facilitate the use of green building strategies by institutions. Long-term operating cost savings frequently offset additional capital expenditures associated with building green. Integrated consideration of a project's capital and operating costs therefore would be expected to optimize the development of green buildings by institutions.
- In addition to actions affecting their facilities capital and operating budgets, governments and other institutions should consider adopting leasing requirements that provide preferences to green facilities.
- In the United States, federal policies, including Executive Order 13423, provide a useful template for state and local governments interested in developing their own green building policies and programs.
- Adoption of green building policies, programs and leasing requirements could play an important role in advancing state and local interests in reducing greenhouse gas emissions.
- As well, state and local governments might consider increasing their pension investment commitments to green real estate, as detailed in the commercial real estate discussion, below.
- The use of discounted cash flow and other analytic metrics to evaluate holding period or life cycle costs would be helpful to institutions in assessing the costs and benefits of green building technologies.

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<sup>26</sup> *ibid.*, p. 4-16.

<sup>27</sup> *op. cit.*, p. 4-17.

- The development and dissemination of additional data on payback metrics for green improvements would assist institutions in determining whether to build green.
- The federal government has been able to successfully utilize energy savings performance contracts as a borrowing mechanism to finance green improvements. State and local governments and other institutions with sufficiently strong credit ratings also may be able to utilize this vehicle.
- Market differentiation and other benefits related to mission may help to encourage institutional users to consider green building programs. In the higher education segment, the use of green building technologies may help institutions attract and retain students and faculty, as well as demonstrate a responsible approach to larger social issues. Hospitals and other inpatient medical facilities may also find the greening of facilities as a means of attracting patients and demonstrating their commitment to providing the best possible health care settings.
- Government regulations and tax incentives play pivotal roles in encouraging investment in green real estate. Regulations help shape market parameters, while tax incentives can reduce the cost of green commercial properties and make green real estate investment more viable. Because buildings represent the single largest source of greenhouse gas emissions, exceeding even the transportation sector, green real estate investment policies should be considered a key element of US energy policy.
- More robust tax incentives for investment in green commercial properties and accelerated depreciation for green property owners are two mechanisms worthy of additional exploration by policy makers. A central tax credit for green and energy-efficient building investment, analogous to the historic preservation tax credit, is one possible mechanism. As well, federal policy makers might consider extending tax incentives for green commercial buildings beyond 2007.
- Federal and state governments are also key regulators of financial institutions. Requirements that financial institutions disclose the volume of their green building loans or act to encourage green or energy-efficient real estate lending could be a potent vehicle to stimulate lending for sustainable properties. The use of such approaches to encourage urban lending have been in place at the federal level for some 30 years under the Home Mortgage Disclosure Act and the Community Reinvestment Act. The requirements set forth under these statutes could readily be broadened to support the growth of the green real estate finance market.
- Acting through the Federal Reserve Board, the US government participates in the establishment of international banking guidelines under the Basel Capital Accord process, as do the central banks of other nations. As of early 2007, the Basel process has yet to address the subject of green lending protocols. A first step would be to encourage the Bank for International Settlements, the entity that coordinates the Basel process, to develop research on how green lending principles relate to loan risk. Similar efforts also could be undertaken at the national level in the United States and elsewhere.

### Commercial Real Estate

Green properties represent a small but fast-growing segment of the \$5.7 trillion<sup>28</sup> US commercial real estate market. According to the most recent available estimates,<sup>29</sup> green properties comprise

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<sup>28</sup> Green Building Finance Consortium, May 2007.

some two percent of US non-residential construction, a sector that generates over \$500 billion in annual economic activity.<sup>30</sup> The asset class is growing rapidly; McGraw-Hill Construction forecasts that the high performance asset class will comprise up to 10 percent of the US real estate market by 2010. US green real estate construction totaled an estimated \$11 billion in 2006, and is expected to grow to \$29 billion to \$57 billion annually over the next several years.<sup>31</sup>

As well, a number of financial institutions, including Citicorp, Bank of America and Wells Fargo have announced significant green lending programs that incorporate commercial real estate components. Increased green loan volumes are beginning to lead to the selective inclusion of green loans in commercial mortgage-backed securities (CMBS) pools. Because the CMBS market, which stood at an estimated \$750 million in June 2007,<sup>32</sup> exerts a considerable influence on US underwriting, lending and borrowing decisions, this development is a welcome one, and a number of observers predict the emergence of green CMBS pools as the market matures.

Pooled real estate funds dedicated to green real estate investment are beginning to come to market, and a number of existing funds, including ProLogis, Liberty Property Trust, the Multi-Employer Property Trust and the Urban Strategies America Fund, are adding green property investments to their existing portfolios.<sup>33</sup> A 2007 study of US real estate investment executives suggests that as many as a third have begun to invest in green or other responsible property investments.<sup>34</sup>

As the foregoing developments suggest, capital is beginning to move into green commercial real estate investment. At the same time, many green developers report that lenders and investors are reluctant to recognize additional investment value in green features with respect to energy cost savings or consumer appeal. Similarly, many commercial real estate lenders and investors feel that they are “flying blind” when asked to assess the value of green commercial real estate projects,<sup>35</sup> noting the lack of lending and investment guidelines dealing specifically with green buildings.

The following concerns represent some of the key investment risks perceived by lenders and investors with respect to investing in green commercial real estate. Mitigation of these perceived risks would accelerate the flow of private capital into green buildings:

Reliability of Green Building Technologies. As of 2007, most real estate lenders, investors and appraisers lack the technical capabilities to evaluate the effectiveness of green building technologies. As a result, finance professionals are uncertain of the reliability of the engineering and energy saving technologies used to build green properties and are frequently concerned that forecast energy savings may not materialize. The outcome is a reluctance to fully recognize the

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<sup>29</sup> Estimate supplied by McGraw-Hill Construction, November 2005 and quoted in CNNMoney.com, “Green Building Goes Big,” June 2006.

<sup>30</sup> Building Design and Construction White Paper 2006, *Green Buildings and the Bottom Line*, November, p. 6.

<sup>31</sup> CNNMoney.com, “Green Building Goes Big,” June 2006.

<sup>32</sup> Commercial Mortgage Alert, June 21, 2007, <<http://www.cmalert.com>>.

<sup>33</sup> Leanne Tobias, “Green Builds a Head of Steam,” IPE Real Estate, March-April 2007.

<sup>34</sup> Gary Pivo, “Responsible Property Investing: A Survey of American Real Estate Executives,” May 2007.

<sup>35</sup> Leanne Tobias, Gary Christensen, David Cohen and Lisa Galley, “Marketing Green Properties to Investors and Lenders,” Sustainable Development Conference, Urban Land Institute, Pittsburgh, PA, 23 April 2007.

energy savings associated with green buildings in investment models, thereby depressing the value creation associated with reduced energy usage.

The addition of in-house or third-party engineering and energy professionals to underwriting and appraisal teams, and the explicit incorporation of energy usage criteria in investment and valuation protocols would overcome the lack of green and energy-specific technical knowledge and standards in the real estate underwriting process. Training of investment, lending and appraisal personnel in green design and construction methods would also be helpful.

Uncertainty about the Costs of Developing of Green Real Estate. The cost premium to deliver sustainable properties to the market has declined considerably in recent years. The informal rule of thumb among US green building experts is that a moderately green project with features equivalent to those required under the basic LEED or Silver LEED guidelines can be delivered to the market for a cost premium in the 1.5–3 percent range, assuming an appropriately experienced design and construction team and the use of an integrated design process that incorporates green features from the outset, a belief that has been validated by initial research.<sup>36</sup>

The increasing affordability of green commercial real estate is not well understood, however, by many real estate professionals. A 2007 study of corporate real estate professionals by Jones Lang LaSalle and CoreNet found that 22 percent believed that a green facility would be over 10 percent more expensive than an equivalent structure, while 30 percent believed that the green building would be 5 to 10 percent more expensive.<sup>37</sup> Additional education of the industry is needed to teach commercial real estate finance professionals about the relatively modest premiums associated with the delivery of many green real estate projects.

Uncertainty about the Economic Benefits of Green Real Estate. The economic benefits of green real estate also need to be better understood. Case study data prepared by developers and researchers suggest that green office, multi-family and mixed-use properties frequently lease faster than their conventional equivalents and attain rents and sale prices at the top tier of the relevant market ranges, with occasional premium pricing reported.<sup>38</sup> The 2007 Jones Lang LaSalle/CoreNet survey found that 77 percent of corporate space users would pay a premium for green space.<sup>39</sup> The sale of credits in the carbon trading markets (see sidebar) may also enhance green building cash flows. It also has been suggested that municipal officials expedite governmental approvals and permitting for green projects, thereby quickening the pace of development and increasing the cost-effectiveness of development.

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<sup>36</sup> See Greg Kats, Leon Alevantes, Adam Berman, Evan Mills, Jeff Perlman, *The Costs and Financial Benefits of Green Buildings: A Report to California's Sustainable Building Task Force*, October 2003. See also Lisa Fay Matthiessen and Peter Morris, *Costing Green: A Comprehensive Cost Database and Budgeting Methodology*, Davis Langdon, September 2004. Findings of both studies are summarized in *Building Design and Construction White Paper 2006, Green Buildings and the Bottom Line*, November, p. 4.

<sup>37</sup> Ben Breslau and Eric H. Fowles, "Sustainable Perspectives and Trends in Corporate Real Estate," Jones Lang, LaSalle and CoreNet Global, 2007.

<sup>38</sup> See, for example, Chris Corps, *Green Value*, Royal Institution of Chartered Surveyors, 2005 and Leanne Tobias, "Financing, Leasing and Investment Considerations," *Green Office Buildings: A Practical Guide to Development*, Urban Land Institute, 2005.

<sup>39</sup> Ben Breslau and Eric H. Fowles, 2007, op. cit.

## Sidebar: CARBON EMISSIONS TRADING: A ROLE FOR GREEN REAL ESTATE?

At the close of 2006, the global carbon emissions trading market (hereinafter, the carbon market) stood at over US\$30 billion. The carbon market is segmented into two areas: (1) the trading of pre-designated allowances, such as those awarded by the European Union, a segment valued at US\$24.6 billion; and (2) the trading of project-based credits, wherein a buyer purchases credits from a project which achieves verifiable reductions of greenhouse gas emissions relative to standard practice, a US\$5.5 billion market.<sup>40</sup>

Carbon trading takes place through a variety of vehicles. Trading mechanisms sponsored by governmental and quasi-governmental entities include the European Union's Emissions Trading Scheme, and the Clean Development Mechanism (CDM) and Joint Implementation (JI) programs organized under the Kyoto Protocol. Voluntary trading mechanisms include Japan's Keidanren Voluntary Action Plan and the US's Chicago Climate Exchange.

The real estate sector can participate in the carbon markets in two ways. First, real estate companies can buy and sell carbon credits as members of voluntary carbon exchanges. ProLogis, a US-headquartered real estate investment trust with an international industrial portfolio, has become the first real estate member of the Chicago Climate Exchange. Members of the Chicago Climate Exchange agree to voluntarily reduce their greenhouse gas emissions by 6 percent by 2010, relative to a pre-set baseline. Participants can reduce their carbon emissions by internal energy reduction practices, or can buy the required emission reduction credits either from Exchange members whose reductions exceed the required target or from outside offset credit providers vetted by the Exchange.<sup>41</sup>

The real estate sector is also a potential source of credits under project-based trading mechanisms, for projects that meet appropriate greenhouse gas reduction standards. Typically, project-based trading mechanisms require that greenhouse gas reduction projects embody 'additionality'— the production of greenhouse gas reductions in excess of those that would occur under a business as usual scenario. Eligible projects also typically must provide independently verifiable and permanent results and offer controls excluding the sale of a set of credits to more than one buyer at the same time.<sup>42</sup> Offset providers vetted by the Chicago Climate Exchange are sources of project-based credits, as are projects verified under the Kyoto Protocol's CDM and JI programs.

Many carbon market observers anticipate that green real estate is likely to serve as a growing source of salable carbon trading credits. At present, the CDM and JI project-based programs, in which buyers from industrialized nations typically procure credits from green projects in developing nations, are the most robust project-based exchanges. In 2006, the average price for CDM project credits was \$10.90 U.S. per ton of carbon dioxide reduced, while JI project credits sold, on average, for \$8.70 per ton.<sup>43</sup> The growth of voluntary and other carbon markets in North America and elsewhere is expected to generate increasing demand for project-based credits.

The sale of carbon credits may be expected to produce incremental cash flow for green real estate projects. In some cases, the ability to demonstrate demand for carbon credits to be produced by a project may help to secure project financing. Larger green real estate projects or portfolios, which have the

<sup>40</sup> World Bank, *State and Trends of the Carbon Market*, World Bank Institute and International Emissions Trading Association, May 2007, pp. 3, 8.

<sup>41</sup> See "About CCX" and "Offsets" at website of the Chicago Climate Exchange, <http://www.chicagoclimatex.com/>.

<sup>42</sup> World Bank, *State and Trends of the Carbon Market*, World Bank Institute and International Emissions Trading Association, May 2007, p. 37.

<sup>43</sup> World Bank, *State and Trends of the Carbon Market*, World Bank Institute and International Emissions Trading Association, May 2007, p. 21.

potential to produce substantial emissions reductions volumes, are likely to be especially favored as carbon markets mature.

Model regulations of the Regional Greenhouse Gas Initiative (RGGI), a carbon trading system developed by a consortium of state governments in the Northeast and Mid-Atlantic regions of the United States, illustrate the potential influence of emissions trading requirements in shaping the role of green real estate in the carbon markets. RGGI is an emissions cap-and-trade program scheduled to commence in 2009. It will cap power plant emissions from 2009 to 2015 and will require that regulated power plants reduce greenhouse gas emissions from 2015 through 2019. Its intent is to reduce regulated greenhouse gas emissions by 35 percent relative to what would have occurred in the absence of regulation. In addition to trading emissions allowances, participating power plants may purchase project-based offsets from entities outside the electricity sector for at least 3.3 percent of their emissions, with market conditions triggering potential additional offset purchases up to a ceiling of 5 to 10 percent of plant emissions.<sup>44</sup>

RGGI's Model Rule, finalized in early 2007, provides the underpinning for the individual state statutes that will implement the initiative. Under the Model Rule, new buildings qualify as sources of project-based credits only if they replace an existing building on the same site, or if they are "zero net energy buildings," buildings that produce as much renewable energy as they consume from non-renewable sources.<sup>45</sup> Unless the Model Rule is revised on a state-by-state basis, relatively few newly-constructed green real estate projects are likely to qualify as sources of carbon credits under RGGI. On the other hand, RGGI's Model Rule favors renovations of existing buildings as a source of project-based carbon credits

RGGI's Model Rule further requires that eligible projects produce energy savings in excess of those mandated by governmental regulation or judicial order, and excludes projects that receive certain incentive funds for energy-related or greenhouse gas reduction purposes.<sup>46</sup> These Model Rule requirements, if adopted by states participating in RGGI, would appear to limit the eligibility of green buildings that receive public incentives as a source of project-based emissions credits under RGGI. As well, only green buildings producing energy savings in excess of mandated standards would be eligible to sell credits under the Model Rule.

Other emissions trading schemes will of course adopt different requirements with respect to green buildings and other sources of project-based credits. The salient lessons are that carbon trading mechanisms have the potential to help mainstream the construction and renovation of green buildings and that the regulations governing carbon emissions trading will play a role in shaping the green real estate market.

Operating cost savings are of course the most widely-reported presumptive financial benefit of green real estate. Most green properties typically cut energy use by 25 to 40 percent, with accompanying savings in energy costs. A new insurance program offered by Fireman's Fund reduces insurance premiums by five percent for properties certified under the Green Globes and LEED initiatives, offering another arena in which cost reductions can be pursued.<sup>47</sup>

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<sup>44</sup> See Model Rule of the Regional Greenhouse Gas Initiative, final version, 5 January 2007, p. 63 at [http://www.rggi.org/docs/model\\_rule\\_corrected\\_1\\_5\\_07.pdf](http://www.rggi.org/docs/model_rule_corrected_1_5_07.pdf).

<sup>45</sup> *ibid.*

<sup>46</sup> *ibid.*

<sup>47</sup> Building Design and Construction White Paper 2006, *op. cit.*, pp. 13, 15.

Investors, lenders and appraisers, however, are reluctant to rely on case study data as a basis for underwriting decisions. Finance professionals would prefer to see broad quantitative reports that would validate the cost-effectiveness and economic benefits of green real estate. Broad quantitative data would in turn assist in the development of valuation and underwriting information, methods and practices to guide green investment and lending decisions.

Additional financial support for green real estate research and data collection by such organizations as the Green Building Finance Consortium, the Vancouver Valuation Accord and the High Performance Building Data Protocol and Repository would help to generate the broad quantitative information needed to assess the performance of green buildings and construct the appropriate underwriting and valuation protocols and practices to guide the commercial real estate finance industry. Similarly, existing commercial real estate databases should be refined to track the performance of sustainable buildings. CoStar, the leading source of commercial real estate leasing and sales information, has undertaken such an initiative and the Building Owners and Managers Association, which tracks property operations, is reported to be planning a similar effort.

Uncertainty about Green Building Performance Over Time. Lenders are also uncertain whether green buildings will be operated or maintained in such a way as to maintain fuel and water economies and other benefits, such as enhanced indoor air quality, over time. Green loan covenants, tenant leases or memoranda of understanding to be recorded with the property's title have been suggested as possible approaches to ensure that green buildings are operated so as to maintain green performance benefits.<sup>48</sup> These mechanisms should be explored by private industry and real estate trade organizations.

As well, research to test the post-occupancy performance of green commercial buildings with respect to energy performance, water use and indoor air quality, could be used to identify the building features and operating protocols that maintain building performance over time, including the most cost-effective measures available. Such research is needed to develop best practices that finance professionals could require of building operators and borrowers to reduce lending and investment risk associated with building operations. The revision of industry protocols so as to track and disclose of a building's energy and water usage upon leasing and sale would provide an increased incentive for building owners to commit to long-term green operations, thereby reducing another source of investment risk.

Rethinking Loan Security and Cash Flow Issues. Research and education is also needed to encourage real estate investors and lenders to devise innovative loan structures for green and energy-efficient buildings. The Clinton Climate Initiative, for example, is partnering with ABN AMRO, Citigroup, Deutsche Bank, JP Morgan Chase and UBS in a \$5 billion effort to renovate existing buildings in major cities to energy-efficient standards.<sup>49</sup> The program anticipates that

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<sup>48</sup> Conversation with Lisa Galley, senior vice president, HSH-Nordbank, 22 June 2007.

<sup>49</sup> William J. Clinton Foundation, "President Clinton announces landmark program to reduce energy use in buildings worldwide," 16 May 2007, <<http://www.clintonfoundation.org/051607-nr-cf-pr-cci-president-clinton-announces-landmark-program-to-reduce-energy-use-in-buildings-worldwide.htm>>.

borrowers, including cities and building owners, will pay back the loans plus interest with the energy savings generated by the reduced energy costs created by the building retrofits. The potential lesson for lenders and investors is to structure financing that links the provision of capital for green improvements to the cash flows represented by energy savings.

Additional attention is also needed to ensure that green real estate loans are backed by collateral satisfactory to lenders. These typically include a lien on the underlying real estate, as well as a lien on the mechanical elements and fixtures financed by the loan. As well, lenders might also consider liens on energy services contracts associated with the financing, as occurs in the financing of solar equipment. And as detailed more fully below, programs should be undertaken to educate borrowers and lenders in the integration of diverse capital sources to finance energy-efficient and sustainable real estate.

It has also been suggested that lenders increase loan-to-value ratios or reduce interest rates on green properties thought to reduce the lender's risk parameters. New Resource Bank, a San Francisco-based, state-chartered commercial bank initiated such a program in 2007. The bank offers slightly higher loan-to-value ratios for green properties and states that it will reduce interest rates by 1/8 percentage point for certain "green leadership" properties.<sup>50</sup> Research on the comparative performance of loans backed by green and conventional properties is needed to determine if such incentives are economically sound.

Integration of Diverse Financing Sources. An additional key issue for green commercial real estate, particularly for non-institutional owners of existing property, is that green retrofits may be expensive and the owner may have limited capital to commit to green property upgrades. As detailed below, incentives offered by utility companies and state, local and federal governments may be required to supplement private capital in order to make green improvements a reality.

The sources of financing to assist with energy-efficient equipment and upgrades are varied and complex. The Database of State Incentives for Renewables and Efficiency <[www.dsireusa.org](http://www.dsireusa.org)> lists 1,324 cost reduction programs available through US utility companies and federal, state and local governments to make green improvements more affordable, and similar databases are maintained by the US Department of Energy, the Alliance to Save Energy, and state energy departments.<sup>51</sup> Private sources of capital are also diverse, encompassing vehicles offered by the real estate lending industry and the energy equipment finance industry.

Too frequently, however, real estate owners and real estate and energy equipment finance professionals are unaware of the array of financing options that may help them to bring a project to completion, especially for an owner with limited capital. Education of finance professionals

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<sup>50</sup> "New Bank Aims to Make It Easier to Build Green," Greener Buildings, GreenBiz.com, February 1, 2007, <[http://www.greenbiz.com/sites/greenerbuildings/news\\_detail.cfm?NewsID=34525](http://www.greenbiz.com/sites/greenerbuildings/news_detail.cfm?NewsID=34525)>.

<sup>51</sup> Additional data bases that track incentives energy incentive programs are those maintained by the US Department of Energy, <[http://www.eere.energy.gov/buildings/info/tax\\_credit\\_2006.html](http://www.eere.energy.gov/buildings/info/tax_credit_2006.html)>; the Alliance to Save Energy, <<http://www.ase.org/content/article/detail/2356>> and those of individual state departments of energy.

on the variety of options available would help lenders to package financing for energy upgrades, thereby enhancing consumer choice and mainstreaming the use of green and energy efficient technologies.

Lisa Galley, senior vice president of HSH-Nordbank, suggests that financial institutions consider the development of integrated financial services practices for green and energy-efficient lending. Galley notes that while “one-stop shopping” for multiple debt and equity products is a firmly-embedded business model for the real estate sector, no such integration exists with respect to green and energy-efficient real estate and equipment lending. Galley suggests that the creation of highly versatile hybrid finance companies “with deep specialist knowledge of green buildings, building upgrades, technology and techniques plus a systems knowledge of capital markets trends, capital sources, regulatory [developments] and tax law...would serve to accelerate the greening of properties [by] removing the burden of inefficiency and fragmentation from financing green real estate.”<sup>52</sup>

Pending the creation of such specialized lending units, investors and lenders should be educated as to the array of financing options that may be packaged to permit the financing of green and energy efficient building retrofits and development projects.

Mission Congruent Investment. Green real estate investment appears to be mission congruent for a variety of private sector actors, notably the socially responsible investment (SRI) sector (\$2.3 trillion), the union pension sector (\$420 billion), and the foundation segment. Together, these actors control approximately \$3 trillion in capital. Carbon market investors may also have interest in supplying capital to green real estate projects with significant potential to reduce greenhouse gas emissions (see sidebar).

To date, most potential private sector investors appear to have been hesitant to charge their financial advisors with green real estate investment requirements. While the attainment of social goals cannot supplant fiduciary responsibilities in the allocation of investment capital under the federal Employee Retirement Income Security Act, the available evidence suggests that green commercial real estate investments may well outperform investments in conventional property. The development of prudent green real estate investment objectives would therefore be permissible and desirable adjuncts to the policy and program objectives of SRI, union and foundation investors, as well as investors in carbon market offset alternatives.

Conclusions. A number of conclusions and recommendations flow from the foregoing review of the finance market for US green commercial real estate.

- The development of research programs and databases documenting the financial performance of green properties would assist financial institutions in quantifying the value of such investments and developing appropriate underwriting protocols. As well, existing commercial real estate databases should be expanded to track the performance of green and energy-efficient properties and the comparative performance of loans backed by green and conventional real estate.

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<sup>52</sup>E-mail correspondence with Lisa Galley, senior vice president, HSH Nordbank, 22 June 2007.

- Engineering and energy expertise relevant to the evaluation of green real estate investment opportunities and property performance should be utilized in real estate underwriting and investment procedures.
- Real estate finance professionals, including lenders, investors and operators, would benefit from education and training related to the design, construction and operation of energy-efficient and sustainable properties.
- Post-occupancy research on the operation of green and energy-efficient buildings is needed to identify the building features and operating protocols that maintain building performance over time, including the most cost-effective measures available.
- The revision of real estate industry standards so as to routinely track a building's energy and water usage upon leasing or sale would provide an increased incentive for building owners to commit to green construction and operations.
- The use of loan covenants, tenant lease clauses and memoranda of understanding recorded with the title of a property are possible mechanisms to ensure that green properties are operated so as to maintain green operating economies.
- Innovative loan structures and collateral arrangements that promote the financing of green and energy-efficient properties. The recognition of energy savings as cash flows that can be deployed in the repayment of green or energy-efficient renovations should be explored, as should the use of energy contracts as additional loan collateral.
- Real estate and energy equipment finance professionals should be trained to help customers integrate diverse sources of capital, including government incentives, utility company incentives, and private capital in order to finance green development and renovation programs.
- Potential investors concerned about energy-efficiency and climate change should be encouraged to develop sound green real estate investment programs. Private investors for whom these concerns may be especially important include socially-responsible investors, unions and foundations.

### Market Rate Housing

The \$10 trillion US single-family housing market<sup>53</sup> represents a substantial opportunity for the acceleration of progress toward carbon neutrality. Although financing innovations typically lag the broad dissemination of development technologies, the opposite is true with respect to energy-efficient mortgages for this sector, which first were introduced in the early 1980s.

US standards for home energy-efficiency have been codified in the Mortgage Industry National Home Energy Rating System or HERS. The HERS standards have been developed and maintained by a private, non-profit organization, the Residential Energy Services Network or RESNET.<sup>54</sup> The HERS standards are in use throughout the United States and are implemented

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<sup>53</sup>Note that apartment housing is grouped with commercial real estate, above. Debt outstanding in the single-family market drawn from Bob Blakely and Tom Lund, Fannie Mae, Presentation at Credit Suisse Financial Services Forum, Naples Florida, 8 February 2007, <[http://www.fanniemae.com/ir/pdf/issues/2007/FNM\\_Credit\\_Suisse\\_Feb0807.pdf;jsessionid=CPDHOE2MT1LQBJ2FQSISFGA](http://www.fanniemae.com/ir/pdf/issues/2007/FNM_Credit_Suisse_Feb0807.pdf;jsessionid=CPDHOE2MT1LQBJ2FQSISFGA)>.

<sup>54</sup> Residential Energy Services Network, RESNET's Standards, <<http://www.resnet.us/standards/default.htm>>.

by a national network of RESNET-accredited home energy raters. Similarly, the Energy Star Builder Option Package is in national use for newly-constructed housing.

The major secondary financing entities for single-family housing offer mortgage products that make energy-efficient homes more affordable<sup>55</sup>:

- Fannie Mae. Fannie Mae's valuation guidelines allow lenders to increase home values to reflect the added value of energy-efficiency measures by up to 15 percent for retrofits and five percent for new construction. In addition, monthly energy savings are added to borrower income available for mortgage debt service.
- Freddie Mac. Freddie Mac recognizes energy savings as a compensating factor increasing the income available for the borrower's mortgage payments and permits appraisers to incorporate energy improvements into a home's market value.
- Federal Housing Administration. The Federal Housing Administration (FHA) allows lenders to finance 100 percent of energy improvements up to the greater of \$4,000 or five percent of a home's appraised value, up to a maximum of \$8,000.
- Veteran's Administration. The Veteran's Administration (VA) finances energy improvements in homes purchased by qualified military personnel, reservists and veterans. Financing is available for up to \$3,000 in documented improvements and up to \$6,000 when improvements produce monthly energy savings in excess of mortgage payment increases.

Despite the broad availability of energy-efficient secondary mortgage products, experts estimate that they are used by one percent or fewer of American homeowners.<sup>56</sup> Most residential lenders are unaware of the energy-efficient mortgage product, or lack the technical experience needed to underwrite energy-efficient home loans, according to Joel Wiese, an expert in energy-efficient home lending. Similarly, the secondary market lenders have had little incentive to publicize energy-efficient mortgage products in the face of minimal demand.<sup>57</sup>

RESNET has proposed Congressional adoption of a 50 percent energy usage reduction for US residential housing by 2020 and the enactment of reporting requirements for secondary market lenders showing progress toward this goal. RESNET also recommends that the federally-sponsored secondary market lenders formally define residential mortgage debt service—now defined as principal, interest, taxes and insurance (PITI)—as PITI less the energy savings derived from a certified home energy rating.<sup>58</sup>

Recent tax incentives enacted by the US Congress also represent vehicles to encourage the development and retrofit of US housing to promote energy efficiency. Tax incentives placed in force by the 2005 Energy Policy Act include:

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<sup>55</sup> *ibid.*; telephone interview with Joel Wiese, Energy Efficient Mortgage Product Specialist, Indigo Financial, 7 March 2007.

<sup>56</sup> Telephone interview with Joel Wiese, Energy Efficient Mortgage Product Specialist, Indigo Financial, 7 March 2007. Telephone interview with Steve Baden, Executive Director, RESNET, 8 March 2007.

<sup>57</sup> Telephone interview with Joel Wiese, telephone interview with Steve Baden.

<sup>58</sup> RESNET Policy on Energy Efficient Mortgages, <<http://www.resnet.us/about/policy/eems.pdf>>. Telephone interview with Steve Baden.

- Tax Credits for Home Builders. Pursuant to the 2005 Energy Policy Act, home builders are eligible for a \$2,000 tax credit for each new energy efficient home that achieves 50 percent energy savings for heating and cooling over the 2004 International Energy Conservation Code (IECC) and supplements. At least one-fifth of the energy savings must come from building envelope improvements. The credit also applies to contractors of manufactured homes conforming to Federal Manufactured Home Construction and Safety Standards. Producers of manufactured homes complying with the Energy Star standard of the US Environmental Protection Agency or achieving heating and cooling savings in excess of 30 percent of the 2004 IECC standard and supplements are eligible for a \$1,000 tax credit. The home builder tax credits apply to new homes located in the United States whose construction is substantially completed after August 8, 2005 and that are acquired from the eligible contractor for use as a residence from 1 January 2006, through 31 December 2008.<sup>59</sup>
- Tax Credits for Manufacturers of Energy Efficient Appliances. The 2005 Energy Policy Act established a tax credit for manufacturers of certain clothes washers, dishwashers, and refrigerators produced in 2006 and 2007 that meet or exceed specified energy efficiency ratings. The expectation is that this credit will lower the final retail prices that consumers pay for these appliances.<sup>60</sup>
- Tax Credits for Non-Solar Home Improvements. Under the Energy Policy Act of 2005, homeowners may receive a 10 percent tax credit of up to \$500 for the purchase and installation of energy-efficient home improvements with a life of at least five years. Improvements must exceed the 2000 IECC standard. The tax credit for home improvement purchases is limited to \$500 for the years 2006 and 2007. The \$500 limit represents the total credit that can be claimed for both years combined. A maximum of \$200 of the \$500 total limit can be used for purchasing windows. Eligible purchases include exterior doors and windows, storm windows, skylights, metal roofs, insulation, central air conditioning and heating, geothermal heat pumps, hot water boilers and advanced main air circulating fans.<sup>61</sup>
- Tax Credits for Home Solar Improvements. Taxpayers may claim 30 percent tax credits up to a maximum of \$2,000 for installing home solar panels, and an equivalent credit for home solar water heating equipment. No part of either system may be used to heat a pool or hot tub. Credits for the installation of a home fuel cell power plant may be claimed up to \$500 for each half kilowatt of capacity generated. In general, a qualified fuel cell power plant converts a fuel into electricity using electrochemical means, has an electricity-only generation efficiency of more than 30 percent and generates at least 0.5 kilowatts of electricity. The credits apply for property placed in service in 2006 and 2007.<sup>62</sup>

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<sup>59</sup> Federal Tax Credits for Energy Efficiency: Energy Star, US Department of Energy, <[http://www.energystar.gov/index.cfm?c=products.pr\\_tax\\_credits#s6](http://www.energystar.gov/index.cfm?c=products.pr_tax_credits#s6)>.

<sup>60</sup> Miscellaneous Tax Credits, 2005 Energy Policy Act, <<http://www.otpc.com/SaveEnergyMoney/EPACTMiscEnergyTaxCredits.asp>>.

<sup>61</sup> Energy Tax Credits, <<http://taxes.about.com/od/deductionscredits/qt/energytaxcredit.htm>>.

<sup>62</sup> Solar Panels and Fuel Cell Power Plants (aka Residential Energy Efficient Property Credit), <<http://taxes.about.com/od/deductionscredits/qt/energytaxcredit.htm>>.

The tax credits established under the Energy Policy Act of 2005 for homeowners, homebuilders, and appliance manufacturers represent an initial step in motivating suppliers and consumers to embrace energy efficiency. The program is of comparatively short duration, however, and warrants extension beyond 2007 in order to affect home construction, improvement and appliance purchasing patterns. As of 2007, the US Congress is evaluating a new package of energy efficiency tax incentives that would presumably extend some of the 2005 credits.

In addition, the energy-efficiency standards to which the tax credits are linked should be reviewed periodically to ensure that they relate meaningfully to the most recently implemented technical standards and available manufacturing capabilities. Ideally, federal tax incentive programs would be sufficiently robust to effectively advance energy efficiency and green home production to a meaningful degree on an ongoing basis, while providing meaningful financial incentives to consumers and producers.

As detailed above, state or local tax incentives for energy efficiency have also been adopted in a majority of US states. As suggested with respect to federal tax incentives, state and local programs warrant periodic review to ensure that eligibility criteria are linked to the most recently implemented technical standards and manufacturing capabilities.

Broader consumer interest in energy-efficient home construction or rehabilitation is likely to be fueled by growing awareness and the wider availability of tax incentives for green appliances and construction. Rising consumer interest may also be expected to encourage the development of additional lending programs geared to green or energy-efficient construction or home rehabilitation. An early initiative of this type has been launched in the Chicago area through ShoreBank's Homeowners' Energy Conservation Program. The lending program, undertaken in partnership with the Northern Illinois Energy Project and the Illinois Clean Energy Community Foundation, offers homeowners a free energy consultation in connection with their loans. A free Energy Star refrigerator is provided to consumers who include more than \$2,000 in energy saving improvements in their rehabilitation borrowing. Capital for the deposits against which loans are made are raised from ShoreBank's 'Green Neighbor' certificates of deposit, which earn market rates of interest.<sup>63</sup>

Larger institutions are also beginning to announce green mortgage finance projects. Citigroup has included green home lending under a \$50 billion green lending initiative announced in May 2007. As a \$20 billion, 10-year program unveiled in March 2007, Bank of America announced a green mortgage program, under which homebuyers will receive a reduced interest rate or \$1,000 back for each home purchase mortgage meeting Energy Star specifications.<sup>64</sup> JP Morgan/Chase also has announced plans for an energy-efficient mortgage program.<sup>65</sup> These developments suggest that consumer choices are expanding for energy-efficient green mortgage products.

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<sup>63</sup> Joel Freehling, "ShoreBank: Building a Market for Energy Efficient Homes," *Green Money Journal*, Winter 2005, Volume XIV, Issue 2, Number 57.

<sup>64</sup> Citigroup, "Citi Targets \$50 Billion Over 10 Years to Address Global Climate Change," 8 May 2007, <<http://www.citigroup.com/citigroup/press/2007/070508a.htm>>; "Bank of America Announces \$20 Billion Environmental Initiative," Bank of America, Press Release, dated 6 March 2007, <[http://newsroom.bankofamerica.com/index.php?s=press\\_releases&item=7697](http://newsroom.bankofamerica.com/index.php?s=press_releases&item=7697)>.

<sup>65</sup> Bhavna Prasad, vice president, Environmental Affairs, JP Morgan/Chase, presentation delivered at meeting sponsored by the Harvard Center for Health and the Global Environment, Washington, DC, 4 April 2007.

Conclusions. The foregoing review of US single-family financing options for green homes suggests a number of conclusions and policy recommendations:

- Energy-efficient mortgage products for single-family homes predated the widespread development of green building standards and technologies and significant consumer demand for energy-efficient home improvements. To date, market penetration of these financing products has stood at one percent or fewer of American households. As this suggests, green real estate financing vehicles are typically effective only after the development of relevant standards and technologies and in the presence of consumer demand.
- Market priming through the dissemination of green construction standards for one- to four-family homes and consumer and lender education on the benefits of sustainable homes will likely help to accelerate the use of green mortgage products.
- Mortgage lenders should also be educated in green residential construction standards and technologies, as well as on the sources of relevant design, construction and equipment installation expertise.
- As recommended in the section on commercial lending, above, residential lenders should be trained to help consumers integrate the diverse sources of financing, including public and utility company incentives, needed to finance green residential renovation and new construction projects.
- An initial wave of primary lenders is beginning to enter the home mortgage market with green products. Additional primary lenders are likely to enter if these product introductions are successful.
- Energy-efficient home mortgages in the US market typically have been offered through federally-sponsored secondary market lenders, including Fannie Mae, Freddie Mac, the Veterans Administration and the Federal Housing Administration. Congressional adoption of a 50 percent energy usage reduction for US residential housing by 2020 and the enactment of reporting requirements for secondary market lenders showing progress toward this goal would help to spur the use of relevant mortgage products.
- The redefinition of residential mortgage debt service by government-sponsored mortgage lenders as principal, interest, taxes and insurance *less the energy savings associated with approved green or energy efficiency technologies* would help to shape market demand for energy-efficient home loans.
- Federal, state and local tax incentives for green and energy-efficient home improvements help to make these improvements affordable and accelerate the growth of market demand. These programs should be of sufficient duration to affect consumer behavior and warrant periodic review to ensure that eligibility criteria are linked to the most recently implemented technical standards and manufacturing capabilities.

### Affordable Residential Housing

Although US homeownership rates grew to 69 percent of households by 2005, housing affordability has become an increasing challenge due to post-2003 mortgage interest rate increases, significant appreciation in home prices, the growth of low-wage and part-time employment, and continuing restrictions on the affordable housing supply due to local zoning

regulations.<sup>66</sup> According to Harvard University's Joint Center for Housing Studies, the percentage of American households experiencing moderate to severe housing cost burdens (defined as households spending in excess of 30 percent of their incomes for housing) increased from 29.4 percent in 2001 to 31.8 percent in 2004.<sup>67</sup> The housing cost burden has been most pronounced among poorer families: 49 percent of poor working families with children experienced severe housing cost burdens in 2004, defined as a housing expenditure in excess of 50 percent of income, and fully 75 percent had either moderate or severe burdens.<sup>68</sup>

Recent increases in residential energy expenses have placed additional cost burdens on US families, especially on lower-income households. According to 2003 figures, the most recent data available as of early 2007, 2.5 million US households in the bottom income quartile spent over 30 percent of their budgets on home energy costs, and an additional 1.4 million households spent 20 to 30 percent of their incomes for home energy.<sup>69</sup> The affordability challenges posed by rising residential energy expenses have no doubt grown more severe, as the 2003 data preceded 2005–2006 run-ups in oil costs.

As the foregoing data suggests, housing and home energy affordability are growing challenges in the United States. The mainstreaming of green housing is an effective mechanism to address these challenges because of the ongoing operating cost savings associated with green buildings and because green housing is frequently more durable and easier to maintain than conventional housing.<sup>70</sup>

Long-term financing mechanisms and other subsidies have a meaningful role to play in greening affordable housing because green features can be financed over a period of up to 30 years, depending on the loan term. The challenge in financing green affordable housing, however, is three-fold:

- As is the case with conventional housing and commercial properties, lenders and appraisers frequently lack the data necessary to quantify the financial benefits of green housing in their underwriting.
- Because it is unusual for affordable housing to achieve price increases upon resale, green improvements are difficult to underwrite.<sup>71</sup>
- The housing subsidy system in the United States is highly fragmented. Financing for an affordable housing project typically is dependent on multiple sources of capital, and capital sources may have varied underwriting requirements. Thus, the addition of features

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<sup>66</sup> Joint Center for Housing Studies, Harvard University, *The State of the Nation's Housing 2006*, pp. 3, 25, <[http://www.jchs.harvard.edu/publications/markets/son2006/son2006\\_bw.pdf](http://www.jchs.harvard.edu/publications/markets/son2006/son2006_bw.pdf)>.

<sup>67</sup> *op. cit.*, Table A-6, p. 36

<sup>68</sup> *op. cit.*, p. 3.

<sup>69</sup> *op. cit.*, p. 8 and Table A-6, p. 36.

<sup>70</sup> Jessica Boehland, "Greening Affordable Housing," *Environmental Building News*, Volume 14, Number 3, March 2005.

<sup>71</sup> William Bradshaw, Edward F. Connelly, Madeline Fraser Cook, James Goldstein and Justin Paley, New Ecology, Inc., and Tellus Institute, *The Costs and Benefits of Green Affordable Housing*, excerpted in Institute for Professional and Executive Development, *Green Homes and Sustainable Communities: the Future of Affordable Housing and Community Development, Conference Proceedings*, San Francisco, July 13-14, 2006.

considered non-standard and which add up-front cost, including energy-efficient or green features, may be particularly problematic.<sup>72</sup>

At present, US affordable housing subsidies are financed primarily through four vehicles: (1) Housing Choice vouchers (typically referred to as Section 8 vouchers) issued by the US Department of Housing and Urban Development (HUD); (2) HUD assisted and discretionary funding programs; (3) public housing and (4) the federal low-income housing tax credit (LIHTC) program. These programs and the key green initiatives affecting them are discussed below.

Housing Choice Vouchers and Other Assisted and Discretionary Programs. HUD provides financial support for 2.3 million affordable housing units through Housing Choice vouchers issued to lower-income households and through subsidies for housing provided to senior citizens, disabled persons and others targeted for federal assistance. Housing Choice vouchers account for 1.4 million of the housing units provided.<sup>73</sup> In addition, HUD provides community development grants to local governments for housing and related projects under the HOME and Community Development Block Grant (CDBG) programs, respectively.<sup>74</sup>

In order to promote energy-efficiency in housing supported by these programs HUD has:

- Provided funding preferences for assisted housing projects that meet Energy Star construction and appliance purchase standards.<sup>75</sup> Utilization of energy-efficiency measures in CDBG and HOME grants, which are not covered by the preference, is being tracked.<sup>76</sup> Bipartisan legislation has since been introduced in the US House of Representatives to require that HUD community development programs, including the CDBG and HOME initiatives, meet sustainability criteria, including energy-efficiency.<sup>77</sup>
- Adopted HUD-wide management performance goals to prioritize the attainment of energy-efficiency in HUD housing and implemented an alliance with the US Department of Energy to promote Energy Star construction and appliance purchase standards.<sup>78</sup>
- Initiated education, outreach and training programs on energy efficient residential maintenance and appliance purchases for residents of HUD projects and for HUD field office and project staff.<sup>79</sup>

The foregoing initiatives underscore the importance of drafting and implementing comprehensive standards, and educating building staff and consumers in order to mainstream green and energy-efficient building and real estate management practices.

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<sup>72</sup> *ibid.*

<sup>73</sup> US Department of Housing and Urban Development, *Promoting Energy Efficiency at HUD in a Time of Change: Report to Congress*, 8 August 2006, pp.8-9.

<sup>74</sup> *op. cit.*, pp.8-9.

<sup>75</sup> *op. cit.*, p. 13.

<sup>76</sup> *op. cit.*, pp.18-19.

<sup>77</sup> High Performance Buildings Act of 2007, as introduced in the US House of Representatives, 1 March 2007.

<sup>78</sup> US Department of Housing and Urban Development, *Promoting Energy Efficiency at HUD in a Time of Change: Report to Congress*, 8 August 2006, pp. 14-16.

<sup>79</sup> *op. cit.*, pp.17-18.

Public Housing. The US public housing stock comprises an estimated 1.2 million units in 13,000 properties, managed by some 3,100 public housing authorities (PHAs).<sup>80</sup> Annual utility costs for public housing, including expenses paid directly by PHAs (\$1.28 billion) and costs paid by tenants (\$411 million), total \$1.69 billion and represent an estimated 22 percent of operating expenses.<sup>81</sup>

Utility cost increases in public housing have grown at rates in well in excess of inflation. Costs rose by 14.9 percent from 2001–2004. Partial data for 2005 indicate that PHA utility costs increased by close to 22 percent over the prior year.<sup>82</sup> As this suggests, cost increases represent a burden both for PHAs and for public housing tenants responsible for the direct payment of utility bills. Some 26 percent of St. Paul, Minnesota PHA evictions are said to be caused by utility cutoffs.<sup>83</sup>

Under the Energy Policy Act of 2005, newly-constructed public housing projects, known as HOPE VI developments, must be built to comply with or exceed the energy standards of the 2003 International Conservation Code.<sup>84</sup> HUD will issue regulations incorporating this requirement during the 2007 federal fiscal year. In addition, HUD offers two primary capital financing programs to enhance energy efficiency in existing public housing:

- Energy Performance Contracting. PHAs may contract for comprehensive energy improvement services under long-term energy improvement contracts, the duration of which can extend to 20 years. Energy cost savings realized under the contracts can be used to repay borrowings for associated capital improvements or to offset additional HUD-designated expenses. Alternatively, the PHA can elect to receive additional HUD operating subsidies to pay debt service for the improvements and keep 75 percent of the savings.<sup>85</sup>
- Capital Fund Financing Program. PHAs rated as standard or high-performing by HUD may borrow for energy improvements and other capital costs against collateral represented by future capital funds expected to be appropriated by the US Congress. Risks to lenders include the possibilities that anticipated appropriations will not materialize or that PHA capital funds will be withheld or recaptured by HUD due to performance lapses.<sup>86</sup>

Energy performance contracting and the Capital Fund Financing Program offer important long-term mechanisms through which PHAs may finance energy-efficiency and green improvements.

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<sup>80</sup> op. cit., p. 7.

<sup>81</sup> ibid.

<sup>82</sup> op. cit., pp. 7-8.

<sup>83</sup> Global Green USA, Public Housing Authority Toolbox, [www.globalgreen.org/pha-energytoolbox/index.htm](http://www.globalgreen.org/pha-energytoolbox/index.htm).

<sup>84</sup> US Department of Housing and Urban Development, *Promoting Energy Efficiency at HUD in a Time of Change: Report to Congress*, p. 23.

<sup>85</sup> First Pic, D&R International, Facilities Strategies Group, Energy Performance Contracting: Field Office Procedures, PowerPoint presentation prepared for the US Department of Housing and Urban Development, and delivered 28 February–1 March 2006. Available through link at <http://www.hud.gov/offices/pih/programs/ph/phecc/funding.cfm>.

<sup>86</sup> ibid.

As of mid-2007, however, only 3.7 percent of PHAs had taken part in these programs.<sup>87</sup> HUD management reforms being implemented in 2007 and thereafter, which link PHA funding to operating performance on a property-specific basis, are expected to increase participation. Participation is also expected to be boosted by fiscal 2007 regulations requiring that appliances purchased for public housing conform to Energy Star and other federal standards.<sup>88</sup>

Additional management enhancements have been suggested to enhance the utilization and effectiveness of PHA energy performance contracting and Capital Fund Financing Program initiatives. Suggested actions include additional education of local officials (whose approvals are sometimes required for PHA programs) and lenders about the efficacy of the programs, development of aggregate regional programs for smaller PHAs, and training for PHA personnel on available financing sources, energy retrofitting and program oversight.<sup>89</sup>

LIHTC. The federal low-income housing tax credit program was established by Section 252 of the Tax Reform Act of 1986 and was codified as Section 42 of the Internal Revenue Code. The program awards each US state per capita tax credit allocating authority for tax credit awards to investors in low-income housing. The dollar value of allocating authority is based on state population, adjusted according to statutory cost-of-living criteria. The per capita allocating authority for each state for 2007 is set at \$1.95.<sup>90</sup>

The LIHTC program provides a federal guaranty for 10 years of tax credits for investments in projects in which 20 percent or more of the units are occupied by households with incomes at or below 50 percent of area median income as established by the US Department of Housing and Urban Development (HUD), or in which 40 percent or more of the units are occupied by households with incomes at or below 60 percent of the area median. Rents and utility expenses borne by low-income occupants of LIHTC properties cannot exceed 30 percent of household income.<sup>91</sup> The LIHTC program has created an estimated 1.4 million rental units from program inception through 2004, the most recent year for which data are available; annual budget authority available under the program is estimated at \$5 billion.<sup>92</sup>

Under the LIHTC regulations, state housing credit agencies, typically referred to as state housing finance agencies (HFAs), must develop qualified allocation plans establishing the selection criteria for designating LIHTC tax credit projects. The granting of preferential green selection criteria under HFA allocation plans for LIHTC credits is therefore a critical mechanism for greening the affordable housing stock.

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<sup>87</sup> US Department of Housing and Urban Development, *Promoting Energy Efficiency at HUD in a Time of Change: Report to Congress*, p. 25.

<sup>88</sup> *op. cit.*, p. 21.

<sup>89</sup> First Pic, D&R International, Facilities Strategies Group, Energy Performance Contracting: Field Office Procedures, PowerPoint presentation prepared for the US Department of Housing and Urban Development, *op. cit.*

<sup>90</sup> Commonwealth of Massachusetts, Department of Housing and Community Development, *Low Income Housing Tax Credit Program: 2007 Qualified Allocation Plan*, p. 5.

<sup>91</sup> William Bradshaw, Edward F. Connelly, Madeline Fraser Cook, James Goldstein and Justin Paley, New Ecology, Inc., and Tellus Institute, *op. cit.*

<sup>92</sup> US Department of Housing and Urban Development, Low Income Housing Tax Credit Database.

<<http://www.huduser.org/datasets/lihtc.html>>.

As of 2006, 46 states had established LIHTC allocation plans that require or promote energy-efficiency standards or other measures consistent with green construction, according to the non-profit National Housing Trust.<sup>93</sup> Forty-three of the 46 states cited addressed energy efficiency concerns in their allocation plans. Other factors identified in the various state plans included comprehensive green construction or sustainability criteria (ten states), water preservation (two states) and health preservation concerns (two states).

Allocation plan criteria that might be adopted to accelerate the greening of LIHTC-supported affordable housing include:

- The inclusion of energy-efficiency or mandatory green design standards in threshold criteria that must be met by all LIHTC applicants.<sup>94</sup> The utilization of Energy Star construction and home appliance standards would be a possible vehicle to achieve this end, as would the requirement that all projects meet the most recent IECC standards.
- Preferential treatment for projects that meet comprehensive green building guidelines, such as state-enacted green construction requirements or guidelines promulgated by Green Communities, LEED, Earthcraft, Green Globes and others.

Non-profit Initiatives. Affordable housing in the United States is often provided under the auspices of non-profit, community development corporations (CDCs), or community-based organizations (CBOs) operating at the local, state, regional and national levels. Non-profit organizations typically serve as developers of affordable housing, secure and coordinate financing from multiple sources, and frequently provide or coordinate supporting social services for project occupants. As they have a perpetual hold on their real estate, they have a vested interest in ensuring that long-term cost saving measures are put into place. Non-profits have a tradition of comfort with both leading-edge community concerns and the use of tax credits, set-asides, and other means of tax-advantaged programming, to create their financial structures. Green initiatives are beginning to be undertaken by non-profits, CDCs and CBOs in executing affordable housing projects. Among the most prominent:

- Green Communities. Enterprise Community Partners and the National Resources Defense Council have partnered in the Green Communities Initiative, which will invest \$550 million over five years to create 8,500 green affordable homes throughout the United States. As of early 2007, some 6,800 units had been placed in pre-development or under construction or completed.<sup>95</sup> Capital for the Green Communities initiative was obtained from grant financing from a network of foundations and corporations. Assisted projects are selected by competitive application and are developed in accordance with Green Communities sustainability criteria. Financial assistance available through the Green Communities initiative

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<sup>93</sup> National Housing Trust, Summary Table of Green State Low Income Housing Tax Credit Allocation Initiatives, July 2006, <[http://www.nhtinc.org/documents/Green\\_Scan\\_July\\_2006.pdf](http://www.nhtinc.org/documents/Green_Scan_July_2006.pdf)>.

<sup>94</sup> Stockton Williams, James Tassos, Enterprise Community Partners, Memorandum on Sustainable Development Policies in 2006 State Housing Credit Plans, 21 June 2006, reproduced in Institute for Professional and Executive Development, *Green Homes and Sustainable Communities: the Future of Affordable Housing and Community Development, Conference Proceedings*, San Francisco, 13-14 July 2006.

<sup>95</sup> Sally Deneen and Brian Howard, "Buildings that Breathe," *EMagazine.com*, Volume XVIII, No. 1, January-February 2007, <<http://www.emagazine.com>>.

includes grants for planning, the purchase of green materials, energy systems and appliances; equity from LIHTC investors; and loans for design and other predevelopment expenses, the acquisition of land and buildings, and construction. Green Communities also offers training, information services and technical support to the developers of affordable housing.<sup>96</sup>

- LISC. The Local Initiatives Support Corporation (LISC) offers a comprehensive menu of equity and debt investment, grants and technical support to community-based organizations and to affordable housing and community projects throughout the United States. In order to provide liquidity to the affordable housing market, LISC has created the National Equity Fund, a syndicator of LIHTC credits and the Community Development Trust, a real estate investment trust that provides equity and debt financing to affordable housing projects. LISC has begun to encourage green development by participating CDCs and CBOs through its Green Development Center, which offers technical support on green construction and development approaches. The green technical support supplements LISC's other financial services.<sup>97</sup> LISC is reportedly considering a credit enhancement program for mortgages to green projects by guaranteeing the additional income projected from associated energy savings. The guarantee would allow lenders to make larger loans to green properties.<sup>98</sup>

In order to be successful, non-profit, affordable housing projects must aggregate financing from a variety of sources, including LIHTC equity; government-issued bonds, loans and grants; foundation grants and program-related investments (that is, loans and equity investments that support a foundation's mission); federal, state and local tax incentives; and private debt financing. As this suggests, the financing process is a challenging one. A comprehensive suite of financing and technical support services such as those provided by Green Communities and LISC is critical to increasing green, affordable housing production by community-based, non-profit organizations. Legislation introduced in the US House of Representatives in March 2007 would create a \$10 million HUD program to fund sustainable development and education efforts in low-income communities.<sup>99</sup>

Foundations are also key sources of seed funding for green affordable housing, typically through grant funding. Program-related investment (PRI) support, under which foundations make mission-specific equity and loan investments, represents a new way in which foundations can provide financing. Foundations active in the environmental and real estate development arenas should be encouraged to undertake prudent, mission-related program-related investments to leverage their resources in support of green development initiatives.<sup>100</sup>

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<sup>96</sup> Green Communities, <<http://www.greencommunitiesonline.org/>>.

<sup>97</sup> Local Initiatives Support Corporation, <<http://www.lisc.org>>.

<sup>98</sup> Bendix Anderson, "Lenders Teeter on the Edge of Green," *Green Building*, March 2006.

<sup>99</sup> High Performance Buildings Act of 2007, as introduced in the US House of Representatives, 1 March 2007.

<sup>100</sup> Jon Jensen, The George Gund Foundation, "Ten Things a Foundation Can Do to Advance Green Building in Your Community," May 2006, excerpted in *Green Homes and Sustainable Communities: the Future of Affordable Housing and Community Development, Additional Materials, Conference Proceedings*, op. cit., 2006.

Finally, consumer-marketing programs are beginning to use cause marketing to fuel product sales. These marketing efforts, under which consumer purchases are linked to corporate donations to specific causes, are being used increasingly to finance initiatives related to energy and environmental issues. Bank of America, for example, permits consumers to donate their credit card WorldPoints rewards to organizations that invest in greenhouse gas reductions. Bank of America also has announced that it will make annual donations to Conservation International on behalf of home equity borrowers who use the Bank of America credit card associated with their loan; additional non-profit organizations may be added to the program over time.<sup>101</sup> Similar cause marketing programs can be developed to finance non-profit green development initiatives.

Conclusions. The foregoing review of green financing options in the US affordable housing market suggests the following conclusions and recommendations:

- The US Department of Housing and Urban Development has made considerable progress in granting preferences for federal assistance to affordable projects that meet energy-efficiency criteria, and new public housing construction must comply with the 2003 International Conservation Code. Required periodic review of HUD's energy efficiency standards would help to ensure that HUD guidelines reflect technical advances.
- The enactment of federal legislation requiring that all new projects funded by HUD, including those supported by the Community Development Block Grant and HOME programs, meet sustainability and energy-efficiency criteria, would accelerate the development of green affordable housing.
- Regulations effective in fiscal year 2007 require that US public housing projects purchase energy-efficient appliances and encourage local public housing authorities to utilize energy savings performance contracts and the HUD Capital Fund Financing program to become more energy efficient. To date, only an estimated 3.7 percent of public housing authorities have utilized these programs.
- Additional education and technical assistance on energy efficiency, retrofitting, project management and financial oversight would help to maximize public housing authority usage of financing vehicles for energy efficiency. Additional education of local officials (whose approvals are sometimes required for public housing expenditures) and lenders about the efficacy of the programs would also be helpful, as would the development of aggregate regional programs for smaller housing authorities.
- US affordable housing is also financed through low-income housing tax credits awarded to investors. Recipients of the tax credits are selected at the state level under allocation plans developed by state housing finance agencies. State allocation policies that might be adopted to accelerate the greening of LIHTC-supported affordable housing include the inclusion of energy-efficiency or mandatory green design standards in threshold criteria, or preferential treatment for projects that meet comprehensive green building guidelines, such as state-enacted green construction requirements or guidelines promulgated by Green Communities, LEED, Earthcraft, Green Globes and others.
- Affordable housing in the United States is often provided under the auspices of non-profit or community-based organizations at the local, state, regional and national levels. Additional public funding for sustainable development and consumer education efforts for these organizations would allow them to strengthen their efforts. Legislation

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<sup>101</sup> "Bank of America Announces \$20 Billion Environmental Initiative," Bank of America press release dated 6 March 2007, <[http://newsroom.bankofamerica.com/index.php?s=press\\_releases&item=7697](http://newsroom.bankofamerica.com/index.php?s=press_releases&item=7697)>.

introduced in the US House of Representatives in March 2007 would create a \$10 million HUD program for this purpose.

- Foundations and other charitable enterprises frequently provide grant financing for affordable housing and related community development projects. Foundations active in the environmental and real estate development arenas also should be encouraged to explore prudent, mission-congruent program-related investments, including equity investments and loans, to leverage their resources in support of green development initiatives.
- Cause-related marketing, wherein consumer product purchases are linked to corporate charitable donations to specific causes, is being used increasingly by US companies, and has been used successfully to finance initiatives related to energy and environmental issues. Expansion of these programs and their use to finance non-profit green development initiatives should be explored by community-based organizations.

### Summing Up

The foregoing study has summarized the state of the real estate finance market for green buildings in the United States' governmental, institutionally-owned, private commercial and residential, and affordable housing markets. Financing for green real estate has begun to penetrate all sectors, but more must be done in order to accelerate the production of green buildings and potentially accomplish the objectives of the 2030 Challenge, which envisions that all new buildings be carbon neutral by 2030.

Detailed recommendations have been set forth above for key actors influencing green building finance, but some over-arching themes are worth restating in conclusion:

- The mainstreaming of US green building finance will require the collaboration of private industry, government and non-profit organizations.
- The creation of green design and construction standards has played a key role in the evolution of the green building segment, and the continued refinement and dissemination of such standards underpins the growth of the green building market and associated financing.
- Governmental actors can accelerate the market adoption of sustainable building technologies through the adoption of green requirements for public and private construction and for the leasing of government space.
- Tax incentives and the oversight or regulation of financial institutions are other possible mechanisms to mainstream green building production. These mechanisms are especially important in the early years of market formation. A robust federal tax incentive, analogous to the historic preservation tax credit, has been suggested as a model for a green building tax credit. Accelerated depreciation for green properties represents another possible mechanism to spur the production and retrofitting of green buildings.

- In the United States, the private sector is the key source of financing for market-rate green buildings. The real estate sector is extremely well-capitalized, and green projects are beginning to attract market financing.
- Research and database development on the comparative economic and operating performance of green and conventional buildings and the loans collateralized by such properties is needed to educate lenders and investors, identify best practices, and develop cogent green building underwriting and appraisal standards and practices. The collaboration of private industry, trade groups and governmental organizations would serve to accelerate this process.
- The integration of engineering and energy expertise in the financial underwriting of real estate projects would help lenders, equity investors, and building owners to evaluate the soundness of green building proposals. The training of finance professionals in green building design and construction technologies would also be helpful.
- Well-capitalized institutions and individuals are likely to be able to access financing for green buildings with little or no outside support. Smaller businesses and less affluent households are more likely to require the integration of financing from a variety of sources, including private capital, utility company incentives and government incentives. Lenders should be trained to assist consumers in packaging these multiple financing sources.
- In the affordable housing segment, public agencies should expand recent efforts to enhance financing options for energy-efficient public housing and to green state requirements for the award of low-income housing tax credits. Additional support for non-profit organizations that develop energy-efficient affordable housing should also be considered.
- Organizations involved in real estate finance, whether private, public or institutional, should be encouraged to integrate their capital and operating budgets for real estate projects. Integrated consideration of the long-term financial performance of a real estate asset encourages the use of sustainable technologies.
- Energy savings should be identified by all sectors as a source of cash flow for the repayment of energy-efficient building construction and renovation projects. Lenders should also consider a variety of financing models and collateralization approaches in developing green financing projects.
- Investment organizations for which green real estate is mission-congruent should develop robust programs to encourage investment in this segment. The pension funds of states, localities and unions may have particular interest in the sustainable real estate segment, as might foundations and endowments.

Consideration, refinement and action on the recommendations contained in this study are the first step of putting the US real estate finance industry on the road to meeting the 2030 Challenge.