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Within Our Reach

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Executive Summary

The incoming Obama administration is poised to join with the 111th Congress on an ambitious agenda of reducing energy consumption, curbing greenhouse gas emissions, and creating a viable green jobs sector. To achieve these goals, we cannot afford to ignore housing, in particular the currently existing affordable housing. Our proposal, "Green Affordable Housing: Within Our Reach," shows that:

- Greening our 4.75 million existing units of affordable rental housing offers important fiscal, economic, and environmental gains.
- Without certain policy changes our nation is unlikely to see investment in green improvements by private owners of federally subsidized housing and public housing authorities.
- If properly targeted, green retrofitting can create an expansion of job opportunities and help bring disadvantaged groups into an expanding pathway to opportunity.
- These investments can spur a green renovation industry with best practices and technologies applicable in the non-subsidized market.

In short, affordable housing, consisting of almost 4.75 million apartments (nearly 14 percent of the nation's 35 million rental units), is federally assisted in some way and thus open to clearly targeted green policies. Much of this housing is at least 20 years old, with more than 65 percent of public housing stock built before 1970. Construction of these federally assisted properties predated today's green technologies. A targeted emphasis on energy conservation means they are prime candidates for necessary renovation work that will generate significant energy and CO_2 reductions.

Furthermore, current federal government annual spending on affordable housing energy costs is approximately $5 billion, according to a recent Government Accountability Office report, yet the government can increase energy efficiency by 25 percent to 40 percent through rehabilitation work that is relatively inexpensive—at an estimated cost of just $2,500 to $5,000 per unit. Once upgrades are completed, savings are locked in for the long term. Spending today on a large scale to retrofit millions of units stimulates construction activity, creates jobs, and produces better-quality housing and long-term energy cost reductions.

Policy changes can promote investment in green improvements

While the economic and other benefits of widespread retrofitting are compelling, a welter of existing rules and policies inhibit green retrofitting by private and public owners of affordable housing. Our proposal details areas for policy changes that incentivize and enable the green transformation of affordable housing, including:

- **Decreasing energy costs by increasing cash flow to owners.** Department of Housing and Urban Development programs generally limit distributions of net cash flow from affordable housing operations to an amount that is not more than 10 percent of the private owner's initial equity investment—a percentage fixed decades ago—and are even more restrictive for non-profit organization owners. Generally, there is no exception from profit distribution limitations even when cost savings are generated from a green retrofit. That means owners have no economic incentive to implement energy-saving measures. To create such an incentive, we propose a "green dividend" to provide an annual return on the cost of green improvements funded from reduced energy costs.

- **Drawing capital for renovations from existing reserves.** Energy conservation improvements require up-front capital. Mature HUD-assisted properties have few sources of capital for renovations beyond normal maintenance and capital replacements. We detail the need for clearer guidance to encourage the use of so-called Reserves for Replacement, and also propose allowing the use of existing Residual Receipts trapped in thousands of reserve accounts for green retrofits.

- **Advancing additional private capital for improvements.** More ambitious green retrofits involving significant capital outlays may require policies that attract private capital or additional public appropriations. Existing rules and regulations tend to tightly limit additional affordable housing project debt and discourage lender interest. Such rules and regulations need to be overhauled to stimulate green investment.

- **Installing improvements owned by third parties.** Certain models for funding capital-intensive green improvements, such as rooftop solar equipment, involve an investment by a third party that owns the improvement and locates it on the owner's building by way of a perpetual easement or a lease. Current limits on such arrangements need to be reconsidered and revised to encourage the expansion of energy-savings improvements.

- **Entering energy agreements with third parties.** Privately owned, HUD-subsidized properties suffer from a so-called split-incentives problem—owners who finance energy conservation measures often do not benefit from reduced utility costs. The split incentives problem adds to market barriers to energy performance contracting, in which third parties are engaged to implement energy conservation measures paid for by savings in energy costs. Where utility savings do not accrue to owners under HUD program rules, we need to develop subsidy reforms or new subsidies so that energy conservation benefits flow in part to owners and provide appropriate savings incentives for tenants.

- **Policy changes for Public Housing Authorities.** HUD already encourages the use of energy performance contracting by PHAs, but many barriers exist to its widespread use. HUD should consider how best to remove those barriers and investigate alternatives to energy performance contracting that would provide similar benefits at a greater return to PHAs, their tenants, and HUD.

Greening assisted housing as market stimulus

Knowledge gained from green rehabilitation of the types of older buildings characteristic of the 4.75 million HUD-assisted housing units can create "best practices" for similar unsubsidized buildings. Moreover, HUD affects a sufficiently large number of units to produce demand for workers and products on a scale to stimulate development of a green renovation industry. Early action by HUD on green retrofitting can boost green workforce development and training through recognized federal programs such as YouthBuild and other national service programs, as well as fulfill a longstanding mandate to promote local economic development and improvement and individual self-sufficiency for low- or very-low income residents in connection with projects and activities in their neighborhoods.

Introduction

When gasoline breaks the $4-per-gallon mark, most Americans immediately experience the cost of driving inefficient cars that siphon cash from their wallets every time they fill up. In short order, driving habits change, alternative transportation ridership surges, and fuel-efficient autos fly more quickly off the lots of car dealers across the country.

Such immediate pain to the pocketbook is not felt in our homes and offices even though buildings also are hefty energy guzzlers. Increased energy costs do not as quickly change operating habits where we live and work because buildings consume energy less obtrusively. These costs are often split among several bills—electric, oil, and gas—which arrive monthly, not daily. And utility bills are often paid by the owners of commercial buildings and rental housing rather than by the tenants who control the thermostats. It is as if someone else filled up your gas tank without seeing the costs for a month or more, and never all in one consolidated bill.

There are additional real barriers to reducing energy consumption in existing commercial and rental buildings. Renovations and capital improvements are needed. Someone must determine how a "green retrofit" will be financed and how energy cost savings should be allocated among landlords, tenants, and whoever is funding the effort. For government-subsidized housing, where taxpayers acting through the Department of Housing and Urban Development frequently pay some or all of the utility bills, allocating costs and benefits of retrofitting is even more delicate and complex. While HUD pays energy costs on an annual basis, rewards yielded by changes to the buildings and greater energy efficiency may not be registered immediately and may stretch for years into the future.

Nevertheless, tackling these and other barriers is necessary. There are roughly 4.75 million units of housing for which HUD pays some or all of the energy costs. This represents almost 14 percent of the nation's stock of rental housing. Moreover, HUD-assisted housing units serving low-income families are typically old and aging, as most of these units were built between the late 1960s and the early 1980s with only limited energy efficiency considerations in mind. Consequently, these affordable housing units offer a tremendous opportunity for the incoming Obama administration and the new 111th Congress to speedily establish a stock of affordable green housing. With well-chosen policies, we can lower the energy expenditures in these buildings and at the same time contribute to improving national energy security and reduced greenhouse emissions.

Beyond these direct benefits, a large-scale national green retrofitting effort offers multiple benefits to the economy. Knowledge of better green rehabilitation techniques developed for older rental buildings can help create "best practices" for all types of privately-owned buildings. And a widespread approach that takes seriously HUD's long-time mandate to help create job opportunities in lower-income neighborhoods where much of these housing units are located can create meaningful "green jobs" for the many disconnected youth and others needing more pathways to employment and opportunity.

Before detailing housing policies that accelerate realization of all these fiscal, economic, and environmental gains—the primary objective of this paper—it is important first to put relevant energy figures in perspective. Consider a few facts:

- According to the U.S. Green Building Council, buildings account for 70 percent of electricity, 39 percent of energy usage, 39 percent of CO_2 emissions, 40 percent of raw material use, 30 percent of waste output, and 12 percent of water consumption of aggregate U.S. consumption.[1]

- More specifically, "residential buildings in the United States accounted for an estimated 22 percent of the nation's total energy consumption and an estimated 18 percent of the country's total carbon emissions in 2005, a fact that could contribute to long-term global climate change," according to a recent GAO report.[2]

- In 2005, the last year for which complete data are available, total annual U.S. energy spending by homeowners and renters was $201.84 billion. Of this, $171.61 billion was spent by single-family and mobile-home owners and renters, while multifamily home owners and renters spent $30.23 billion.[3]

- Federal government spending on energy costs in affordable housing is large and rising. According to the chair of the Department of Housing and Urban Development's Energy Task Force, Michael Freedburg, HUD spent more than $4 billion in 2007 on energy-related utilities. This spending consisted of direct operating grants to public housing authorities, or PHAs; project- and tenant-based utility allowances under Section 8 of the National Housing Act; and financial assistance to the private owners of multifamily properties, who were reimbursed for $903 million in owner-paid utilities.[4] HUD estimates it is now spending roughly $5 billion annually on energy costs, the GAO reports.[5]

According to a study by Enterprise Community Partners, the rehabilitation of an existing multifamily building that increases energy efficiency by 25 percent to 40 percent costs approximately $2,500 per unit, with the cost of the rehabilitation recouped by the owner from energy savings in 5 years to 10 years. These figures are comparable to those for the rehabilitation of an existing single-family home, which can increase energy efficiency by 25 percent to 50 percent and cost about $3,000, with the cost recouped from energy sav-

ings in 5 years to 10 years.[6] Applied to the HUD expenditures on energy costs noted above, near-term annual savings of $1 billion to $1.5 billion or more could be expected from relatively modest capital outlays.

There are roughly 110 million occupied housing units existing in the United States, 35 million of which are rental units.[7] As noted, almost 4.75 million of these are in some way federally assisted units.[8] Substantial public funds are paying utility costs where potentially large savings are possible. Given that the more than $5 billion spent on energy and utility costs represents nearly 15 percent of the *total* annual HUD budget (and if energy costs rise again, this share is likely to get larger), limiting growth in this line item at a minimum is a worthwhile budgetary goal. The case for public action to assist green retrofits of subsidized housing therefore is compelling.

Not surprisingly, a policy focus on energy efficiency in buildings serving lower-income Americans has long been recognized as offering multiple beneficial outcomes. In 1999, for example, the National Consumer Law Center analyzed benefits to low-income families from energy cost reductions and concluded that "benefits to society, individuals, utilities, and ratepayers from delivery of comprehensive low-income energy efficiency programs, a benefit adder of between 17 percent and more than 300 percent, could reasonably be incorporated to represent the incremental value of a low-income focus beyond the general societal, economic, and environmental benefits of efficiency programs."[9]

What's more, the Harvard University Graduate School of Design's "Public Housing Operating Cost Study" notes that more than 80 percent of the HUD-assisted housing stock is 15 years to 30 years old, and over 65 percent of public housing stock was built before 1970.[10] The application of today's green technologies to this aging, energy-inefficient segment of the housing market would produce significant energy and CO_2 reductions. The non-profit coalition known as Stewards of Affordable Housing for the Future, whose members own or manage some 80,000 units nationally, estimates that 61 percent of housing units that will exist in 2030 have already been built. Green investments to achieve energy efficiency in these buildings today would produce long-term benefits.[11]

HUD and Congress are not unmindful of the need and the potential for green investment. HUD adopted an Energy Action Plan in 2002. Subsequently, Congress passed the Energy Policy Act of 2005 (119 Stat. 650). Under Section 154 of the Act, the HUD secretary is required to "develop and implement an integrated strategy to reduce utility expenses through cost-effective energy conservation and efficiency measures and energy-efficient design and construction of public and assisted housing." HUD is to be commended for having taken this mandate seriously and launching a number of initiatives such as strong promotion of Energy Star rated appliances and creation of a green rehabilitation demonstration project within its Mark-to-Market program.

Yet it is clear that much more remains to be done, and not just by HUD. Owners and managers of federally subsidized housing themselves will need to implement and achieve full energy savings potential—particularly with respect to existing housing as distinct from new construction.[12] In the pages that follow, this report will first define the optimal policy approach to achieving these goals. It will then examine what changes are needed to encourage, or permit, the various stakeholders in HUD-assisted housing programs to implement these policies. Finally, the paper will demonstrate that green retrofitting carried out consistently with these recommendations is fiscally responsible, technologically feasible, environmentally sustainable, and economically progressive.

Defining the Optimum Approach

Federally assisted housing shares a common thread—funding from federal taxpayers distributed through the Department of Housing and Urban Development. But HUD funding flows are burdened by conditions and restrictions under existing authorizations and contractual relationships that generally are incompatible with making significant capital expenditures for green retrofits. Consequently, a purely regulatory approach to greening—one that imposes a federal mandate or condition on all parties receiving such assistance to achieve certain energy efficiencies or lose funding—suffers from many legal as well as practical barriers.

At the same time, a purely voluntary approach assuming well-meaning action by individual owners of HUD-assisted housing units has to date shown only modest results. That may in part be due to the relatively cheap cost of oil and energy over much of the past three decades. Even so, by providing certain incentives to owners and eliminating various existing barriers, the pace of "greening" should accelerate considerably.

This paper will analyze existing HUD-assisted housing as if it is all relatively similar in the characteristics that relate to energy efficiency. Of course, actual variations are numerous. Some apartment complexes are publicly owned, others privately held. Subsidy programs vary widely, sometimes with several different subsidy programs aiding a single building. Regulatory regimes differ greatly. Buildings are of widely varying size, quality, age, materials, and climate zone. A public housing complex built in 1959 has a very different energy usage profile than a Section 8 assisted building from 1975. Such differences will need detailed attention during the implementation of the policies set forth below.

At the general level, however, subsidized housing stock compared to the national housing stock is older, built at a time when there was less attention on energy efficiency. According to the Harvard University Graduate School of Design's "Public Housing Operating Cost Study," more than 80 percent of HUD's assisted housing stock is 15 years to 30 years old.[13] Consequently, the potential savings should be at least as great for the average apartment building. Indeed, according to the chair of the HUD's Energy Task Force, Michael Freedburg:

> *"A study conducted by Lawrence Berkeley National Laboratory of energy retrofits in 25,000 units of multifamily housing showed that energy savings ranged from 10 percent*

to 22 percent of pre-retrofit consumption. The median energy savings was 15 percent. Simple payback on energy conservation measures was six years in gas- or oil-heated buildings. Increasing the energy efficiency of public housing by a similar level would save PHAs as much as $165 million per year. A significant portion of these savings could be achieved through relatively low-cost measures or through sound operating and management practices."[14]

The investments and renovations most likely to be made soonest are those that will cost the least relative to the return from the operating cost savings, and those which least disrupt existing tenants. Green retrofits range from low-tech, minor capital investments such as energy efficient appliances to high-tech, capital-intensive investments such as green construction retrofits of existing insulation, windows, and roofs. At the low-cost end of this spectrum, the Department of Energy and the Environmental Protection Agency developed the Energy Star program to designate appliances and other products as energy efficient and to offer incentives to purchase these products. According to the Department of Energy, Energy Star-qualified homes deliver approximately $200 to $400 in annual savings.[15]

More extensive work, including boiler upgrades, ceiling insulation, caulking, sealing, and storm windows, is estimated by Enterprise Community Partners to cost approximately $2,500 per unit, with the costs paid back in five years to 10 years.[16] Substantial work, including the installation of high-efficiency equipment and systems and the replacement of old windows with double-pane windows and new insulation, is estimated by Enterprise to cost approximately $5,000 per unit, with the costs paid back in eight years to 10 years.[17] Installation of higher cost, longer payback technologies such as photovoltaic cells for alternative electricity generation add further to the per unit cost of a green rehabilitation, but could be worthwhile pursuing given goals of economic stimulus generally and aiding expansion of the solar energy industry in particular.[18]

What Needs to Be Done

This overview of currently available energy efficiency renovations for typical HUD-assisted privately owned multifamily homes suggests a sequence of priorities. If multifamily owners undertook relatively low-cost, high-return strategies, meaningful resource reduction would result in the short term. Longer-term shifts from fossil fuel-based energy sources to solar, wind, and other alternatives are possible but require greater up-front capital investment. A sensible national strategy would encourage all levels of energy efficient renovations and improvements in a manner that allowed each owner of subsidized housing to make property-specific choices rationally.

To do this, however, requires reorienting the economic incentives HUD offers for assisted properties. A web of rules, guidelines, practices, and regulations at the department start from the premise that the owner has received substantial assistance from HUD already

and in return has committed to affordability regulations and to a limited return on investment. This approach was developed to protect taxpayers against undue profits accruing to the owners in the HUD affordable housing system. Avoiding excessive operating cash flow profits and abuse are the underlying guiding principles embodied in these rules.

This longstanding approach becomes problematic when new technologies emerge or fundamental changes in operating cost assumptions shift. The rules neither encourage HUD-assisted property owners to invest in the property nor automatically adapt to a changed set of economic conditions. In order to redirect this dynamic, some fairly significant changes will need to come about. The following sections will highlight some of the most significant barriers for HUD-assisted privately owned housing and for publicly owned housing.

The most beneficial reforms will be aimed at addressing these barriers to stimulate market-oriented activity. Some significant benefits can be obtained just by changes in practice or current guidance, and can be implemented rapidly. Other changes will require revisions to regulations and therefore a longer public process. Still other proposals may require legislative changes. A detailed legal analysis is beyond the scope of this paper but could be achieved through a near-term systematic review.

Policy Changes for HUD-Assisted Privately Owned Housing

Below we identify five areas in which existing rules and policies constrain or inhibit green retrofitting. Careful review of, and revisions to, the rules and policies in each of these categories will be needed to encourage broad participation in the greening of privately owned HUD-assisted housing.

Decreasing energy costs by increasing cash flow to owners

For privately owned HUD-assisted properties, for-profit owners' annual distributions from project net cash flow generally are limited to 10 percent of the owner's equity value established at the beginning of the project (and only 6 percent for elderly projects). This limitation on distributions presents a major obstacle. Owners who might otherwise wish to fund reduced energy consumption work have virtually no economic incentive to do so if they have already reached the maximum limited dividend distribution at the property.

The web of limited dividend provisions prohibits owners from realizing any benefit from decreased energy costs.[19] HUD has partially recognized this in its Mark-to-Market Program Draft Green Initiative.[20] In this voluntary pilot program, HUD provides a way to reduce owner contributions to rehabilitation costs by an increased distribution—called an Incentive Performance Fee—if they commit to specific energy-efficient renovations and operating repairs and maintenance. As noted in the GAO report, however, at present only some 100 Section 8 contract-assisted properties out of 31,000 fall within the scope of this green initiative each year.[21]

The limitation on distribution of profit, which is embedded in regulatory, administrative, and contractual policies and practices, does not generally provide exceptions where cost savings are generated due to a green retrofit. To overcome this obstacle, a "green dividend" should be instituted. The green dividend would be independent of, and in addition to, the standard limited dividend, and could provide for up to a 10 percent annual return on the costs of green improvements to the property—but only to the extent net cash flow improves due to reduced energy costs. Such a program would require HUD to develop a standardized measure of baseline energy usage prior to green renovations and a means of tracking savings.

Boosting returns on investment for owners, however, is only one of the measures necessary to produce energy savings in affordable housing units. HUD has not outlined a way to increase the return to owners from decreased energy costs, but HUD's "Handbook" does address tenant incentives.[22] The handbook describes the conversion of HUD-assisted housing from master-metered (building-wide) to tenant-metered (unit-specific) in order to transfer the incentive to conserve energy directly to the tenant. The handbook also outlines changes to project regulatory agreements and leases as well as rules governing management fees upon conversion.

A fair allocation of savings from such changes among the various parties involved is a critical component of an effective incentive structure. Despite the difficulties in achieving the perfect allocation, any system motivating energy-cost reductions must involve a tenant stake in both the cost of failing to save on energy usage where possible and the economic benefit of such savings.

A large percentage of America's existing assisted rental housing is owned or controlled by non-profit organizations. Historically, HUD has restricted even more tightly the dividend and capital returns to non-profit owners.[23] Additional tailored revisions to these non-profit policies will be required, such as creating a green dividend equal to that available to for-profit owners.

Drawing capital for renovations from existing reserves

Energy conservation improvements require up-front capital. In a mature HUD-assisted property, sources of capital for renovations beyond normal maintenance and for capital replacements are limited. Green retrofits of the type contemplated in this paper often involve work that would not be done in the normal course of traditional property maintenance or replacement of worn out structural items such as roofs. A case in point: recently installed insulation still ostensibly within its useful life might be better replaced with currently available materials and techniques to achieve a higher degree of heat loss reduction, but current HUD policies would discourage this. HUD guidance set forth in its handbook states:

> *"The main purpose of having a recommended minimum threshold is to have funds available for an emergency or unforeseen contingency, such as a major roof failure or a water or sewer main break, so that funds could be drawn below the customary threshold. Assuming that a project is in very good physical condition and that no major replacements are needed in the near future (e.g., five years), HUD strongly recommends, but does not mandate, that owners target a minimum amount to be held in the Reserve Fund that would equal or exceed the greater of the following two amounts: The initially established monthly deposit times 144 (12 years); or at least $1,000 per unit."*

The upshot: while HUD does not appear to impose overt statutory or regulatory restrictions on the use of normal project reserves for green retrofits, in practice the department does not yet appear to particularly encourage the use of reserves for these purposes where it might temporarily depress reserves.[24]

Several broad changes in approach are necessary to accelerate green retrofits. First, there should be clearer guidance encouraging use of so called Reserves for Replacement (funds set aside for capital expenditures such as roofs and structural elements) for green retrofits where the projected cost savings would permit replenishment of the Reserves over a reasonable period of time. One model would be to allocate one-third of operating savings toward an excess payment to Reserves, with a five-year to seven-year period for replenishment. HUD might also need to institute a centralized program of back-up capital advances for projects that experience unexpected capital needs during the replenishment period.

A second area for change is in the use of so called Residual Receipts, those funds held in reserve at Section 8 projects where net operating income exceeds the allowable distribution to the owners. Many existing projects have large Residual Receipts accounts that are essentially sequestered until the end of the project-financing period and will continue to exist even if the "green dividend" policy proposed above is implemented. Depending on which particular HUD program subsidized a given apartment complex, such residual funds accrue either to the owners or to HUD.

Residual Receipts are a potentially large source of idle, virtually costless capital for greening privately owned affordable housing. In a nationwide audit of these accounts in 2000, HUD estimated that Residual Receipts for insured multifamily properties exceeded $500 million.[25] Although these figures are out of date and the total pool of Residual Receipts may have changed materially, the 2000 audit suggests that a substantial pool of underutilized capital may exist. Reserves for Replacements and Residual Receipts, however, may be insufficient for a large-scale retrofitting program, which is why HUD may need to seek congressional approval of a low-cost, easy-to-access loan program to fund green retrofits.

Advancing additional private capital for improvements

More ambitious green retrofits involving larger capital outlays (such as for new boilers, photovoltaic cells, and other capital-intensive improvements) may require policies that attract private capital. HUD rules and regulations will need to be revised to encourage the repayment of private financing or owner-loan advances for green capital repairs to be made out of project income as an allowable line item in the rent formula.[26]

Additionally, HUD requires that its loans be senior, or in the first lien position, to all other debts in any privately owned housing project.[27] HUD approval is also required before the conveyance of ownership of any project to which it is a lender or provides mortgage

insurance. HUD therefore approves any encumbrance of the property with new loans, or transfers of interests to investors. In short, any third-party financing or owner-financing would have to be subordinate to the HUD financing and approved by HUD.

HUD's traditionally tight controls on any additional project debt is designed to discourage owners from over-leveraging properties, as well as to prevent owners from evading dividend limitations through increased borrowing. Yet these rules also create barriers to capital-intensive energy renovations and improvements. An effective green retrofitting program requires a systematic overhaul of HUD debt limitations.

Installing improvements owned by third parties

Larger capital outlays for some energy projects, such as photovoltaic installations, should be able to take advantage of the growing market for the tax credit syndication of federal energy credit sources. There is a growing market being created by syndicators—aggregators of capital for projects—appealing to private investors who want to promote such projects and take advantage of the credits available. These credits were recently extended under the Energy Improvement and Extension Act of 2008 enacted on October 3, 2008.[28]

The model that has to date developed in the solar tax credit industry is for new investors to install solar power equipment on the roof of existing buildings, either under a perpetual easement property right or through a potentially time-limited lease. Either way, the solar equipment owner also enters into an energy supply agreement with the apartment building owner.

HUD rules, however, are generally restrictive toward such arrangements. This is because real estate lending rules limit such encumbrances running to third parties out of concern about abusive third-party supply arrangements. HUD as a lender also has a general concern that a project be unencumbered so that in the event the owner goes into default, HUD can foreclose and dispose of the asset easily. Even recognizing these concerns, HUD will need to develop standards that encourage the expansion of such energy-savings improvements to ensure that they are fair and reasonable and can be approved easily and quickly across the country rather than on a slow, case-by-case basis.

Entering energy agreements with third parties

Other than the Green Initiative for a limited set of properties subject to HUD's Mark-to-Market program, there are no HUD energy efficiency programs that incentivize private owners of affordable housing to engage in energy saving measures.[29] Private owners of affordable housing operate approximately 1.5 million units, typically in energy-inefficient buildings that are more than 20 years old.[30]

Because HUD rules limit access to new capital for such buildings, some owners have turned to so-called "energy performance contracting" that HUD is now encouraging, at least in publicly owned affordable housing units. As HUD describes it:

> *Energy Performance Contracting is an innovative financing technique that uses cost savings from reduced energy consumption to repay the cost of installing energy conservation measures. Normally offered by energy service companies, this innovative financing technique allows building users to achieve energy savings without up-front capital expenses. The costs of the energy improvements are borne by the performance contractor and paid back out of the energy savings. Other advantages include the ability to use a single contractor to do necessary energy audits and retrofit and to guarantee the energy savings from a selected series of conservation measures.*[31]

HUD encourages such energy performance contracts in the public housing context, but they are less common in privately owned HUD-assisted housing units. These privately owned properties suffer particularly from the split-incentives problem—owners who finance energy conservation measures often do not benefit from reduced utility costs where such costs are borne by the tenants. This adds to the market barriers to energy performance contracting for privately owned affordable housing.

There is no clear pathway by which project costs can be financed by energy savings. Where utility savings do not accrue to owners in various HUD-assisted housing programs, HUD will need to develop subsidy reforms or new subsidies that would allow energy conservation benefits to flow in part to the owners. In addition, elimination of other regulatory and market barriers inhibiting private owners from entering into energy performance contracts—such as lack of standardized contract forms and terms—would help owners fund and benefit from energy conservation measures.

Policy Changes for Public Housing Authorities

Public housing authorities operate under a different set of funding rules and regulations than privately owned assisted housing. Consequently, accelerating the pace of effective energy efficiency changes among public housing authorities requires distinct attention. Some PHAs have already initiated meaningful energy efficiency approaches. According to Enterprise Community Partners:

> *The Boston Housing Authority is among the leading PHAs in using energy performance contracting, particularly to deal with an inefficient energy infrastructure, resulting in $40 million in annual utility expenses. The BHA has completed two energy performance contracts resulting in $17 million in privately financed upgrades in nine developments serving 2,700 residents. The agency is negotiating a third contract to finance $45 million to $50 million of improvements at 14 sites.*[32]

The BHA, along with more than 100 other housing authorities, has turned to energy service companies, or ESCOs, for such energy performance contracts. An ESCO is defined as "a business that develops, installs, and arranges financing for projects designed to improve the energy efficiency and maintenance costs for facilities over a seven- to 20-year time period."[33] ESCOs essentially provide a package of services—identification, design, installation, and monitoring of energy savings measures—in return for a fee.

In general, an ESCO arranges or provides financing for the renovations and improvements necessary to produce energy savings through a loan to the apartment complex owner. The project's cost savings are used to cover the entire cost of the project, including debt service,[34] and any surplus savings are allocated between the contracting entity and the ESCO according to the terms of the energy performance contract. In addition, ESCOs take on the risk that their services will generate the required energy savings by providing a savings guarantee. In this manner, building owners such as PHAs pay only what they save, reducing risk and eliminating any up-front investments.

The use of energy performance contracts with ESCOs can in theory provide significant benefits for PHAs and the ultimate payer, HUD and the federal taxpayer. Because ESCOs are responsible for the project financing and guarantee savings, PHAs have little risk and no up-front costs, and no debt is added to the PHAs' balance sheets. Furthermore, ESCOs can employ their superior expertise to design and implement

conservation measures much more successfully and quickly than PHAs typically could and have the technical know-how to fulfill ongoing monitoring requirements with ease, minimizing the burden on the PHA.[35]

HUD's incentive programs for non-federally funded PHA energy conservation measures, such as the so-called frozen-base incentive and the add-on subsidy incentive,[36] eliminate or mitigate the negative effect of reduced utility consumption on PHAs' operating subsidies and allow PHAs to retain cost savings in excess of debt service. PHAs can direct such excess cost savings and ordinary capital funding toward other eligible expenses, further improving the quality of the housing they provide. Finally, the energy conservation measures undertaken by ESCOs can have a useful life that exceeds the period of debt repayment. Once the debt is repaid, HUD and the taxpayer reap the benefits in the form of decreased operating subsidies to PHAs.[37]

There are, however, some significant drawbacks to the widespread adoption of the ESCO approach. A significant portion of the project's savings goes to the ESCO. If savings are less than projected or the method of splitting excess savings is unduly unfavorable to the owner, then the owner may accrue little or none of the savings during the life of the contract.[38] In addition, energy performance contracts are extremely complex and difficult to negotiate, and PHAs may lack the staff time and wherewithal to vet ESCOs' proposals to ensure the contracts provide the necessary protection from risk, adequate measurement and verification procedures, and an equitable split of savings. These factors may decrease a PHA's incentive to hire an ESCO.

Conversely, it is worth investigating whether the widespread use of ESCOs is merely a symptom of other deficiencies in the current system of funding PHA energy retrofits. PHAs have very limited ability to incur debt, and consequently limited experience with it as well. Because many ESCOs are potentially receiving quite favorable returns on their investments, the current system should be examined closely to see if such savings could instead be retained by the PHAs, their tenants, and HUD if a viable alternative were facilitated.

At a minimum, HUD should work with PHAs, ESCOs, and other interested private- and public-sector groups to develop model contract provisions for some of the thorniest and most important elements of energy performance contracting—including savings guarantees, measurement and verification procedures, and allocation of excess savings—to ensure PHAs get the best deals they can while still providing ESCOs with appropriate market incentives. HUD should also provide more educational opportunities for PHA staff members about best practices in energy performance contracting to make sure PHAs are well equipped to enter into and monitor energy performance contracts.

Another significant barrier to PHAs' use of energy performance contracts is that ESCOs and lenders will not commit to a project unless it has the potential to generate large savings. For instance, the EPA and DOE's Energy Star website indicates that energy performance

contracts "are generally arranged for facilities with annual energy costs above $150,000. ESCOs often show little interest in projects costing less than $1 million."[39] This is a significant issue for most PHAs, which have too few units to interest ESCOs and lenders.[40]

While energy performance contracts aggregated among a group of small PHAs, currently encouraged by HUD,[41] may be a potential way to attract ESCOs, they pose troubling collective action and negotiation problems given the complexity and duration of the contracts. It might be more effective for HUD to make a concerted effort to promote the use of the add-on subsidy by small PHAs to finance the kinds of low-hanging-fruit projects—such as weatherization—that are almost certain to provide significant energy gains and are relatively simple for PHAs to implement themselves. In fact, rather than expecting small PHAs to band together and negotiate the contracts themselves, HUD also might consider providing a voluntary program for small PHAs whereby a HUD contracting agent would enter into regional energy performance contracts for the PHAs to minimize negotiating and collective action issues and aggregate potential cost savings to attract the interest of ESCOs.

The Roles of the Various Stakeholders

One of the central distinctions between publicly assisted housing and rental housing generally in the market is that HUD-assisted housing by definition serves a social purpose: providing shelter for residents who cannot afford what the market produces. Consequently, the tenant's payment of rent and operating costs such as utilities is limited to a standard considered affordable. Federal programs generally set the limit of the tenant's rent payment at 30 percent of the tenant's income. While as a general rule this 30-percent cap is intended to include utility costs, a range of rules in specific program areas makes this calculation complicated, shifting utility costs between owner and tenant depending on the program.

As the Center of Budget and Policy Priorities noted in its study of utility costs in public housing developments:

> *"Housing agencies pay most of the cost of utilities in public housing. In some cases, agencies pay utility bills directly. In other cases, tenants pay their own utility bills but are allowed to deduct most of their utility costs from their rent. Under either approach, agencies are able to charge tenants for 'excess' utility costs.*
>
> - *An agency that pays the utility bills itself can impose surcharges for certain types of appliances that use large amounts of energy, including some necessary items such as air conditioners in hot climates.*
>
> - *An agency whose tenants pay the utility bills can cap the amount of utility costs that tenants may deduct from their rent payments; the amount is capped at the level of an agency-set 'utility allowance.' The tenant must bear any costs above the cap."*[42]

The "utility allowance" approach is used in some HUD subsidy programs to shift some of the burden of higher energy costs—and wasteful energy usage—to the tenant, but HUD policies on utility allowances need to do more to encourage energy conservation measures. In the Low-Income Housing Tax Credit, or LIHTC, program, which is administered through the Internal Revenue Service and state housing allocating agencies rather than through HUD, the methodology of calculating the utility allowance had long been based on average usage rather than building-specific data—a practice that had been criticized as creating a disincentive to owners making their buildings more energy efficient. In August 2008, however, the IRS issued a regulatory change that allows owners greater flexibility in calculating the utility cost allowance to better match the allowance to a building's actual

operating costs, arguably providing an incentive to improve building energy efficiency."[43] This change allows the use of an online model that HUD is promoting to calculate utility allowances.[44] Alternatively, a utility allowance estimate provided by state housing finance agencies can be used.

Also under the new IRS regulations, owners and managers have to annually update the basis for calculating the applicable utility allowance, accounting for energy conservation measures, rates and cost changes, and other factors that impact energy consumption. This new approach complements efforts to encourage energy efficiency retrofits of LIHTC properties by more closely matching utility allowance economics with true building operating cost economics. While HUD released in September 2008 a new "Utility Allowance Guidebook for Public Housing Agencies" that has introduced improvements for PHAs,[45] it still could do more in the realm of privately owned HUD-assisted housing to create utility allowance practices that encourage green investment.

Advocates for changes to utility allowance policies acknowledge that more will need to be done beyond updating the methodology of utility allowance calculations to widely implement accurate utility allowance practices. Energy consultancy Heschong Mahone Group has been working with PHAs in California to develop and implement utility allowance schedules under its Energy Efficiency Based Utility Allowances program.[46] The EEBUA program encompasses reduced utility allowances (and therefore higher rents) for new construction projects that are 15 percent above the applicable energy code and rehabilitation projects that produce at least a 20 percent reduction in energy use. The value of the reduction in energy costs is split between owners, in the form of higher rents, and tenants, in the form of reduced utility costs, thereby incentivizing owners to engage in green retrofits without increasing tenants' overall rent burden.

Enterprise Community Partners, in conjunction with Heschong Mahone Group, is working on an expansion of the energy consultancy's work to develop a national EEUBA program. In doing so, they will draw on the expertise of energy consultants and energy raters who will "regionalize" the allowance calculations and ultimately bring continually improving local accuracy to calculations of costs that are necessarily administratively reviewed.

All such approaches create a tension between protecting tenants from energy costs that they may not be able to bear and not holding them financially accountable for energy they may use wastefully. One approach to this potential road block to energy conservation is to view HUD (and ultimately the taxpayers), tenants, and owners (or ESCOs) as joint beneficiaries of the money saved from energy-use reductions. If each has a meaningful stake in achieving energy savings, then it is likely to happen more quickly and become ingrained more permanently than if only some stakeholders benefit. The stake of each, however, is not necessarily the same: the federal government, private investors, and tenants look upon cost savings over different time horizons, and thus hold different views of their contributions to the efforts needed to achieve energy efficiency and the wherewithal required to deploy the necessary capital and make renovations.

At a minimum, as with all energy cost savings calculations, a baseline of pre-retrofit/renovation energy usage needs to be established so as to measure the reductions that result. For various multifamily housing programs, HUD recommends conducting energy audits to identify and monitor energy costs savings. The DOE's Energy Star program also recommends energy audits for single-family housing, which fall mainly outside HUD programs. It would be helpful if HUD or the DOE set some baseline standards with respect to these energy audits.

Capital for retrofit and improvements can come from varying sources. Existing building Reserves for Replacements are the most readily accessible for work at a reasonable cost in proportion to available funds. If meaningful energy costs savings can be achieved using available funds, then the primary calculation is the degree to which resulting increased net operating income from operating cost reductions flows to replenish reserves, benefit the owner, or reduce tenant rents.

One reasonable approach to this situation—where the cost of the work and burden to the owner to perform it are fairly modest—is to give each party a one-third share of the benefit. That is, one-third of the savings flows to the owner in the form of "green dividend" distributions as previously discussed. Another one-third should go first to replenish the reserve for replacements, and then subsequently accrue to the benefit of HUD (and the federal budget) in the form of a downward subsidy adjustment equal to one-third of the savings. The final one-third should flow through to tenants in the form of lower tenant utility payments where applicable or lower rents.

This three-way split, however, may result in HUD, and ultimately the public, reaping too much financial benefit from individual housing but failing to account for the larger public benefit of reduced energy usage. Given the importance to national goals of reducing carbon emissions and reducing dependence on oil imports, it is fair to ask if aiding in achievement of those goals alone is sufficient return for the public. The lower the cash flow return to HUD, the greater the incentive to owners and tenants to speed up the greening of housing, and the easier the access to loan capital. Consequently, it may be preferable for HUD to forego any share of the savings, at least until any financing is fully repaid.

Consider a hypothetical expenditure of $100,000 in renovations and energy improvements (including a fee for the contractor/owner for oversight of the work) that reduces energy usage by $25,000 per year. If the capital is from a HUD loan or owner's capital advanced to the project, then the lender or owner should receive a reasonable rate of return and repayment terms from, say, 50 percent of savings for reduced energy costs until the loan is paid. During the loan repayment period, the other 50 percent of savings ($12,500) would result in $6,250 each to the owner and tenants. The share allocable among tenants would be determined individually, based on energy usage monitoring by submetering or other newer technologies when available. After the loan is fully repaid, when the full $25,000 annual savings is available, some share of the former payments of debt service could be allocated to reduce HUD's outlays for energy, while the owner and tenant shares could increase.

Greening Federal Housing as Market Stimulus

The roughly 4.75 million units of housing for which HUD pays some energy costs represent almost 14 percent of the nation's rental stock. Knowledge gained through green rehabilitation techniques developed for the types of older buildings characteristic of HUD-assisted housing provides an opportunity to create "best practices" for similar unsubsidized buildings. Several organizations, including national organizations such as Enterprise Community Partners and Stewards of Affordable Housing for the Future, or area-specific authorities such as the New York City Department of Housing Preservation & Development, are all engaged in pilot programs to refine data on costs and benefits of green retrofits. If cost-effective renovation techniques and their attendant savings are publicized more widely, then other owners would probably adopt similar strategies to reduce costs and maximize profit from their buildings.

Moreover, HUD affects a sufficiently large number of units to produce demand for workers and products on a scale to stimulate expedited development of a green renovation industry in a variety of markets. Private owners of HUD-assisted housing who are familiar with new energy efficiency opportunities indicate that some products—such as wallboard made of recycled materials and low-VOC (volatile organic compound) paints—are often hard to find. A strong HUD effort in the near term to boost green retrofits of its own affordable housing and those housing units in the private sector to which it offers assistance could generate sufficient production to bring down costs and make such products more widely available.

Similarly, on the services side, early action by HUD on green retrofitting would boost workforce development and training. HUD is required by Section 3 of the Housing and Urban Development Act of 1968 to promote local economic development, neighborhood economic improvement, and individual self-sufficiency. The Section 3 program "requires that recipients of certain HUD financial assistance, to the greatest extent possible, provide job training, employment, and contract opportunities for low- or very-low income residents in connection with projects and activities in their neighborhoods."[47]

This federal mandate in a green context could be coupled with other federally assisted programs, such as YouthBuild, which trains disconnected youth in green building techniques, to connect workforce development with new green jobs in a potentially higher-paying sector of the construction industry—realizing the potential of developing a "green collar" workforce alongside a ready marketplace for these necessary skills.[48]

Estimates vary, but it is generally agreed that each $1 million investment in rehabilitation of affordable housing yields between eight on-site jobs to 11 on-site jobs.[49] According to Oregon Housing and Community Services' study of some of its affordable residential development and rehabilitation projects, for each job created on-site another 1.5 jobs on average are created off-site.[50] Using these numbers, a $1 billion investment in the greening of HUD-assisted housing would create an estimated 20,000 green jobs to 27,500 green jobs. Moreover, because rehabilitation of existing occupied housing does not require the clearing of land, zoning appeals, or other such measures, the rehabilitation of HUD-assisted housing produces jobs more quickly than new construction of rental housing.

Conclusion

Some initiatives to reduce energy usage, increase sustainability, and lower CO_2 emissions are dauntingly complex. The greening of America's existing subsidized housing is not one of them. The technology to do so is often simple. The construction and repair methods are well known or easily taught. And the equipment—whether energy-efficient appliances or solar panels, better construction materials, or improved building-wide heating and cooling systems—exists.

Similarly, all the government policy tools are available to create green affordable housing—provided the policymakers themselves take the necessary steps to implement them. Our goal in this paper is to marshal all of these elements into a comprehensive plan, to show that an achievable path exists.

As with many elements of a green agenda, this one set of policies will not, on its own, solve the majority of our energy issues. But if implemented seriously and systemically, the green retrofitting of millions of units of housing affected in one way or another by programs under the aegis of HUD will create major economic savings and avoid an enormous waste of energy—and consequently reduce greenhouse gas emissions and provide demand for good jobs at good wages. Green retrofitting of affordable housing can also establish standards and expand markets in ways that make similar action in the fully private housing market more likely to be more widespread, more quickly. We just need to declare the goal, and set to work.

Endnotes

1 "Green Building Research," available at http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1718.

2 See pp. 1., Government Accountability Office, "Green Affordable Housing" (2008); see also Table CE1-4c, "Total Energy Consumption in U.S. Households by Type of Housing Unit, 2001," in Energy Information Administration, "Residential Energy Consumption Survey" (2001).

3 See Table US5, "Total Expenditures by Fuels Used, 2005," in Energy Information Administration, "Residential Energy Consumption Survey" (2005).

4 Michael Freedburg, Testimony before the House Committee on Financial Services, "H.R. 6078, the Green Resources for Energy Efficient Neighborhoods Act of 2008," June 11, 2008.

5 Government Accountability Office, "Green Affordable Housing," pp. 1.

6 "Bringing Home the Benefits of Energy Efficiency to Low-Income Households," available at http://www.practitionerresources.org/cache/documents/663/66381.pdf. Estimates of per unit cost and efficiency savings for green rehabilitation projects vary. One private industry leader who has undertaken a sampling of green retrofits on more than a dozen older multifamily buildings has indicated that an investment of $2,300 to $3,500 per unit typically yields an efficiency savings of 25 to 30 percent, which can be recouped from lower operating costs in less than 10 years. In practice, efficiency savings will depend on an array of factors, such as the building's condition before rehabilitation and climate zone.

7 See Census information available at http://www.census.gov/Press-Release/www/releases/archives/housing/012760.html and http://www.census.gov/prod/2008pubs/h150-07.pdf.

8 See U.S. Department of Housing and Urban Develpoment, "FY 2008 Performance and Accountability Report," p. 406, available at http://nhl.gov/offices/cfo/reports/hudpar-fy2008.pdf.

9 John Howat and Jerrold Oppenheim, "Analysis of Low-Income Benefits in Determining Cost-effectiveness of Energy Efficiency Programs" (Washington: National Consumer Law Center, 1999). Available at http://www.consumerlaw.org/initiatives/energy_and_utility/non_energy_benefits.shtml.

10 See pp. 77 in Harvard University Graduate School of Design, "Public Housing Operating Cost Study, Final Report" (2003).

11 "Energy Efficiency in Affordable Rental Housing: Getting Serious," *Affordable Housing Finance*, April 2008, pp. 40.

12 Government Accountability Office, "Green Affordable Housing," pp. 1.

13 Freedburg testimony before the House Committee on Financial Services, pp. 3

14 Ibid., pp. 5.

15 "Benefits for Homeowners: Energy Star," available at http://www.energystar.gov/index.cfm?c=new_homes.nh_benefits.

16 "Bringing Home the Benefits of Energy Efficiency to Low-Income Households," available at http://www.practitionerresources.org/cache/documents/663/66381.pdf.

17 Ibid.

18 According to a solar industry leader whom Enterprise Community Partners consulted, the amount of solar photovoltaic (PV) cells that is feasible to install on an apartment building—and therefore the cost of installation, the projected amount of electricity generation, and the anticipated payback period for the cost of the improvements—depends on a number of variables, including the building's location, its available roof space, and whether it is master-metered for energy consumption. The expert estimated that, assuming a master-metered, four-unit building located within the middle latitudes of the United States with available roof space of 450 square feet, a PV installation would cost $9,000 per unit. Such an installation would generate about 1500 kWh per year of electricity, which, assuming an electricity cost of $0.15 per kWh, would cost $225 to purchase on the market. Under these assumptions, the payback period for the PV installation would be 40 years. Another private industry leader estimates that the cost per unit for solar PV is at least $5,500 per unit to cover 100% of the building's common area electricity load. An owner of affordable housing would be unlikely to implement solar PV installation unless deep subsidies were available to offset the cost.

19 24 C.F.R. 880.205 sets forth the limitation on distributions for certain projects: "Project funds may only be distributed to profit-motivated owners at the end of each fiscal year of project operation following the effective date of the Contract after all project expenses have been paid, or funds have been set aside for payment, and all reserve requirements have been met." Such distribution is limited to 6 percent of initial equity (as the amount is provided in the regulatory agreement) for projects with elderly tenants and 10 percent of initial equity (as the amount is provided in the regulatory agreement) for projects with non-elderly tenants pursuant to 24 C.F.R. 880.205. This restriction is also described at the administrative level, including in Handbooks 4350.1 and 4370.2, and at the contractual level, in the project regulatory agreement. Pursuant to Handbook 4370.2 2-8, "On limited dividend (LD) projects, the regulatory agreement provides that surplus cash be used first to pay distributions (up to the amount specified in the project's regulatory agreement), and that any remaining surplus cash be deposited in the Residual Receipts account."

20 Department of Housing and Urban Development Office of Affordable Housing Preservation, "Mark-to-Market Program Draft Green Guide" (2008).

21 Government Accountability Office, "Green Affordable Housing," pp. 16.

22 See pp. 12-19, Department of Housing and Urban Development, "Handbook 4350.1."

23 See, for example, "Limitation on Distributions," 24 C.F.R. § 881.205, which sprecludes non-profit owners from distributions of project funds and sets forth distributions only to "profit-motivated owners."

24 In fact, HUD Handbook 4350.1, pp. 12-15 recommends that "project owners should utilize project funds to cover energy conservation measures… and whenever possible the replacement of appliances, heating equipment, etc. should be funded out of the Reserve for Replacement fund or Residual Receipts." Pages 12 through 16 of the handbook describe alternative funding sources to achieve energy efficiency in HUD-insured multifamily housing. Such funding sources include conventional financing, rent increases, HUD-insured loans, advances by the owner where repayment is from sources other than surplus cash, residual receipts and reserves for replacements. Reserves specifically identified in the handbook as alternative funding sources are "release from residual receipts account, if applicable" and "advances from the reserve for replacement account." With respect to the reserve for replacement account, the handbook provides that a "HUD-approved plan for repayment of the advance shall be required unless there is adequate justification for a waiver."

Although chapter 12 of the handbook recommends the use of project funds for green retrofits, HUD often requires a minimum threshold remain in the replacement reserves account. Section 4-11 advises: "All owners should strive to reach some minimum threshold for the Reserve Fund for Replacements. The main purpose of having a recommended minimum threshold is to have funds available for an emergency or unforeseen contingency, such as a major roof failure or a water or sewer main break, so that funds could be drawn below the customary threshold. Assuming that a project is in very good physical condition and that no major replacements are needed in the near future (e.g., five years), HUD strongly recommends, but does not mandate, that owners target a minimum amount to be held in the Reserve Fund that would equal or exceed the greater of the following two amounts: A. The initially established monthly deposit times 144 (12 years); or B. At least $1,000 per unit."

25 See Department of Housing and Urban Development, "Nationwide Audit of Use and Disposition of Residual Receipts, Office of Multifamily Housing Program" (2000).

26 See HUD Handbook 4350.1, pp. 12-16. With respect to both conventional, third-party financing and owner loans, pursuant to the handbook "the terms of such a loan must be approved by the Field Office if repayment of the loan is to be made out of project income as an allowable line item in the rent formula, rather than from surplus cash."

27 See section 207(a)(1) 12 U.S.C. 1713(a). See also, e.g., 24 C.F.R. 207.251(c).

28 The Energy Improvement and Extension Act of 2008 was enacted as part of Public Law 110-343.

29 See "Stewards of Affordable Housing for the Future, Energy Initiative: Policy Summaries," available at http://www.sahfnet.org/energyPolicy.html.

30 Ibid.

31 "Energy Performance Contracting," available at http://www.hud.gov/offices/pih/programs/ph/phecc/eperformance.cfm.

32 See note 26.

33 "What is an ESCO?" available at http://www.naesco.org/resources/esco.htm.

34 Ibid. According to the National Association of Energy Service Companies, "The customer's debt payments are tied to the energy savings offered under the project so that the customer pays for the capital improvement with the money that comes out of the difference between pre-installation and post-installation energy use and other costs."

35 "Energy Star: Financing," available at http://www.energystar.gov/index.cfm?c=business.EPA_BUM_CH4_Financing.

36 See pp. 6-8, Department of Housing and Urban Development, "Field Office Review Procedure: Energy Performance Contracting," and "Incentives to Reduce Utility Costs," available at, http://www.hud.gov/offices/pih/programs/ph/phecc/funding.cfm. With the frozen base incentive, HUD will base an apartment complex's utility consumption calculation on the average consumption during the three years before the energy conservation measures are implemented for the life of the energy performance contract. The PHA consequently receives a stream of energy savings it can retain to pay for eligible expenses, including the debt service on the energy conservation measures, so long as the PHA uses at least 75 percent of annual savings to repay the loan. With the add-on subsidy incentive, HUD provides an additional subsidy as an "add-on" to the PHA's total operating subsidy eligibility. This additional subsidy is applied to amortizing payments for the loan obtained to finance energy conservation measures.

37 Mary Barron, "Going Green in Denver," *Journal of Housing and Community Development* (2007).

38 If cost savings are only enough to service the debt incurred to finance the project, the PHA and the ESCO will not receive any economic benefit. When there are savings in excess of debt service, their distribution depends on the method stipulated in the contract. Commonly used methods include guaranteed savings, by which the contracting entity receives a guaranteed amount and the ESCO receives the remainder; shared savings, by which the contracting entity and the ESCO split savings according to a negotiated percentage; and paid-from savings, by which the ESCO's amount is guaranteed and the PHF receives whatever remains. See "Energy Star: Financing," available at http://www.energystar.gov/index.cfm?c=business.EPA_BUM_CH4_Financing.

39 Ibid.

40 Government Accountability Office, "Green Affordable Housing," pp. 17.

41 Ibid.

42 Will Fischer, "Public Housing Squeezed Between higher Utility Costs and Stagnant Funding: Low-Income Families Will Bear Brunt of Shortfalls" (Washington: Center on Budget and Policy Priorities, 2006). Available at http://www.cbpp.org/10-11-06hous.htm#_ftnref7.

43 "NAHB Applauds New IRS Regs on Utility Allowance for Low Income Housing Tax Credit Properties," available at http://www.buildingonline.com/news/viewnews.pl?id=7357&subcategory=139.

44 For details, see "HUD Utility Schedule Model," available at http://www.huduser.org/resources/utilmodel.html.

45 Department of Housing and Urban Development, "Utility Allowance Guidebook" (2008). Available at www.hud.gov/offices/pih/programs/ph/phecc/draftuaguidebook.doc.

46 See "Energy Efficiency-Based Utility Allowance Schedule," available at http://www.h-m-g.com/multifamily/AHEEA/eebua.htm.

47 "Section 3: Economic Opportunities," available at http://www.hud.gov/offices/fheo/section3/section3.cfm.

48 "YouthBuild USA Green Initiative," available at http://www.youthbuild.org/site/c.htlRI3PlKoG/b.1310741/apps/s/content.asp?ct=5239683.

49 Center on Wisconsin Strategy, The Workforce Alliance and The Apollo Alliance, "Greener Pathways: Jobs and Workforce Development in the Clean Energy Economy" (2008).

50 See pp. 25, Oregon Housing and Community Services, "Housing as an Economic Stimulus: The Economic and Community Benefits of Affordable Housing Development" (2005).

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