CHAPTER 9
FACILITATING GREEN HOUSING

Retooling HUD
for a Catalytic Federal Government:
A Report to Secretary Shaun Donovan

Penn Institute for Urban Research
University of Pennsylvania

INTRODUCTION

A. The Strategic Opportunity

The green building retrofit market is central to the development of our nation's green economy. The gross economic impact of retrofitting half our nation's housing stock would be $640 billion in expenditures. This could create up to 7 million jobs and generate $9.6 billion in new tax revenues.[68] There would be a 25% reduction in on-going energy costs with a return on investment of 12%.

The U.S. Department of Housing and Urban Development (HUD) has direct influence over 10% of the nation's housing stock and indirectly influences much more of the stock through its interactions with state and local government and financial institutions ranging from banks to Fannie Mae and Freddie Mac.[69] This level of market presence allows it to influence energy efficiency not only in its own housing stock but in the overall market.

B. Assumptions about the Green Housing Market

The Task Force recommendations are based on the following assumptions about the overall green building market:

- A green building strategy has to cover multiple dimensions of building "greening." Primary among these are location efficiency; energy and water efficiency; storm-water management through green infrastructure[70]; health and the indoor environment (including lead-based paint standards).
- Only 1% of new housing is added to the housing stock each year. So the bulk of green building opportunities are in existing buildings.
- Investing in green building improvements can simultaneously achieve multiple benefits:
  - Creation of new jobs
  - Improvement of real estate values
  - Reduction in operating costs
  - Improvement in community health
  - Reduction in greenhouse gas (GHG) emissions and other environmental hazards
  - Preservation of the existing affordable housing stock
  - Alignment of Federal housing, energy, climate, workforce and economic development, urban, and transportation policies

[68] Based on the following assumptions: 1) 128 million existing residential housing units; 2) average cost of a retrofit = $10K; 3) $100K of retrofit work generates 1.11 jobs and $30K in tax revenue, per NAHB methodology. Note that here and throughout the document, the term "jobs" refers to "one year of wages equivalent." Assuming the total activity lasts more than one year, the job impact is proportionately diminished.
[69] HUD has direct involvement in 1.2 million units of public housing through its funding relationship with 3,300 Public Housing Authorities; 2.0 million rental units through Section 8 vouchers; and 1.6 million units in multi-family housing through programs in its Office of Multi-Family Housing. This adds up to a total of 4.8 million units, or 3.8% of the total of 128 million housing units nation-wide. In addition, it enforces a construction code that covers 6.3 million units of manufactured/mobile housing (4.9% of the total U.S. stock). Finally, HUD touches many more housing units through its Community Development Block Grants; HOME investment partnerships; urban revitalization programs; and private lending insurance.
[70] Green infrastructure practices include rain gardens, porous pavements, green roofs, infiltration planters, trees and tree boxes, and rainwater harvesting for non-potable uses such as toilet flushing and landscape irrigation. (http://cfpub.epa.gov/npdes/home.cfm?program_id=298)

- The Obama Administration's building energy efficiency goals cannot be met through government programs alone. This will require the development of a robust and self-reinforcing market for investment in building energy efficiency. Government programs such as those in HUD can play a role in creating this market by demonstrating leadership; creating incentives through policy, credit enhancement, regulation and investing in R&D; and supporting private market innovators.
- Because housing markets, labor markets and climates are regional in nature, effective strategies for large-scale residential retrofits need to be customized at the regional level.

C. Link to Key Obama Administration Goals

The strategies and recommendations outlined in this report can help achieve key Obama administration goals, including:

- Improve existing building energy efficiency by 25% by 2030.
- Improve new building efficiency by 50%.
- Weatherize one million low-income homes each year for the next ten years, achieving 20% to 40% energy savings in each home.
- Provide incentives for property owners to eliminate lead hazards.

D. Positive Impacts

The recommended investments would have the following impacts:

- A total of 3.5 million housing units would be retrofitted (general building system upgrades with energy efficiency and environmental health improvements).
- A direct HUD investment of $25.7 billion would leverage an additional $29.7 billion, for a total investment in the housing retrofit market of $55.4 billion.
- A total of 590,700 direct jobs would be created.
- A total of 1.5 million indirect jobs would be created.
- HUD would save an estimated $206 million per year in direct energy costs.

E. Connection to HUD Mission and Goals

The current HUD mission is to: *"Increase homeownership, support community development, and increase access to affordable housing free from discrimination."* [71] The recommendations in this report directly address two of the three strategic imperatives in this mission:

- Energy efficiency and retrofit improvements in housing reduce energy and maintenance costs, therefore increasing affordability.
- Development of a national building energy efficiency retrofit market would increase household disposable incomes through reduced energy costs, create jobs, and spawn new businesses, therefore contributing significantly to community development.

[71] HUD Strategic Plan, FY 2006-2011. Another task force recommends modifying this mission statement.

EXECUTIVE SUMMARY OF RECOMMENDATIONS

A. Vision

HUD takes the lead in revitalizing the U.S. construction, finance, and real estate sectors through a robust green building retrofit market that contributes hundreds of billions of dollars to the U.S. economy over the next two decades and creates several million new jobs.

B. Strategy Summary

We recommend four broad strategies.

1. Aggressively green the HUD housing portfolio.
2. Make HUD a leader in the development of the national green building retrofitting market.
3. Locate housing to create transit-oriented, walkable and accessible communities.
4. Under White House leadership, organize a cross-departmental national strategy for green building retrofits as an economic sector development strategy.

C. Strategy Detail

The table below summarizes the Task Force recommendations in each of these four areas. It also categorizes the recommendations as follows:

- **Short/long term:** Indicates whether the impact and implementation is generally short term (within two years) or long term.
- **New funding:** Indicates that the recommendation will require new funding in the HUD budget.
- **Existing authority:** Indicates that this action can be undertaken with existing regulatory authority.
- **Demo project:** Indicates recommendations that involve a demonstration project.

HUD Greening Task Force Recommendations	Characteristics			
	Short/Long Term	New Funding	Existing Authority	Demo Project
Strategy 1 – Aggressively Green the HUD Housing Portfolio				
1.1 Create a Public Housing Retrofit Fund to accelerate the retrofitting of the 1.2 million existing Public Housing Authority units.	Short	X		
1.2 Retrofit 100,000 Project-Based Section 8 units.	Short	X		
1.3 Retrofit 20,000 Section 202 and Section 811 units.	Short	X		
1.4 Green 10,000 units of HOPE VI housing.	Short	X		
1.5 Retrofit 300,000 units of housing through the HOME block grant.	Short	X		
1.6 Green 15,000 units abated annually through healthy homes and lead hazard control grants.	Short	X		
1.7 Create incentives for PHA's to invest in energy efficiency retrofits.	Long		X	
1.8 Create incentives for CDBG funds to incorporate investments in energy efficiency.	Long	X	X	
1.9 Upgrade manufacturing housing codes to incorporate updated energy efficiency standards.	Short		X	
1.10 Require HUD-financed new construction to meet progressive green building standards.	Short		X	
1.11 Increase Total Development Costs for Green Development.	Short		X	
1.12 Invest in building energy information systems.	Short	X		X
1.13 Change the way HUD pays for energy costs.	Short		X	
1.14 Demonstrate leadership in energy demand management.	Long	X		X

HUD Greening Task Force Recommendations	Characteristics			
	Short/Long Term	New Funding	Existing Authority	Demo Project
Strategy 2 – Make HUD a Leader in the Development of the National Building Retrofit Market				
2.1 Create a $5 billion national Building Energy Efficiency Finance (BEEF) Fund to develop the national retrofit market.	Short	X		X
2.2 Create a national technical assistance and capacity building network to support building retrofit strategies.	Short	X		
2.3 Create a HUD Office of Sustainable Development.	Short	X		
2.4 Invest in the R&D strategies of the Partnership for Advanced Technology in Housing (PATH) initiative.	Short	X		
2.5 Invest in the development of a national carbon credit aggregation infrastructure for building efficiency.	Long	X		
2.6 Explore ways to use Fannie Mae and Freddie Mac to advance greening of the national housing stock.	Long		X	
Strategy 3 – Locate Housing to Create Transit-Oriented, Walk-able and Accessible Communities				
3.1 Require HUD-financed building to incorporate incentives for location-efficiency.	Long		X	
3.2 Raise Total Development Cost limits in urban areas to encourage the development of infill housing and transit-oriented development.	Long		X	
3.3 Explore the redefinition of "affordable" housing to incorporate costs of transportation & energy, as well as housing costs.	Long		X	
Strategy 4 – Under White House Leadership, Organize a Cross-Departmental National Strategy For Green Building Retrofits as an Economic Sector Development Strategy				
4.1 Fully fund the Energy Efficiency and Conservation Block Grant program in the Department of Energy.	Short	X (Energy)	X	
4.2 Create an accelerated program to help public and affordable housing residents access green job training.	Short	X (DOL)		X
4.3 Increase funding for residential energy efficiency tax credits.	Short	X (Treasury)		
4.4 Create a national supply chain development strategy to serve the building retrofit market.	Long			

D. Summary of Recommended Investment Amounts

The recommendations that have direct budget implications are summarized below.

Summary of Budget Implications of Recommendations					
Recommendation	**Direct HUD Investment**	**Leveraged Capital**	**Total Capital**	**Cost Per Unit**	**Total Units**
Strategy 1 -- Greening of HUD Portfolio					
Public Housing Retrofit Fund	$13,320,000,000	$1,080,000,000	$14,400,000,000	$30,000	480,000
Project Based Section 8	$4,000,000,000	$0	$4,000,000,000	$40,000	100,000
Section 202 and 811	$800,000,000	$0	$800,000,000	$40,000	20,000
HOPE VI Green Projects	$310,000,000	$0	$310,000,000	$10,000	31,000
HOME Grants	$1,800,000,000	$7,200,000,000	$9,000,000,000	$30,000	300,000
Greening Lead Abatement Units	$150,000,000	$0	$150,000,000	$10,000	15,000
Building Information Systems	$10,000,000	$0	$10,000,000		
Energy Demand Mgt	$50,000,000	$0	$50,000,000		
Strategy 2 -- National Market Development					
Building Energy Efficiency Finance Fund	$5,000,000,000	$20,250,000,000	$25,250,000,000	$10,000	2,525,000
National Capacity Building Network	$10,000,000				
R&D to Support Market Development	$50,000,000	$0	$50,000,000		
Housing Carbon Credit Infrastructure	$50,000,000	$0	$50,000,000		
Total	**$25,550,000,000**	**$28,530,000,000**	**$54,070,000,000**		**3,471,000**

E. Summary of Energy and Job Impacts

The energy savings to HUD and the direct and indirect job impacts of these investments are summarized below.

Investment Area	Direct HUD Investment	Leveraged Capital	Total Capital	Potential HUD Energy Savings	Direct Job Creation	Indirect Job Creation
Public Housing Retrofit Fund	$13,320,000,000	$1,080,000,000	$14,400,000,000	$168,000,000	158,400	403,200
Project Based Section 8	$4,000,000,000	$0	$4,000,000,000	$30,000,000	44,000	112,000
Section 202 and 811	$800,000,000	$0	$800,000,000	$6,000,000	8,800	22,400
HOPE VI Green Projects	$100,000,000	$0	$100,000,000	$2,000,000	1,100	2,800
HOME Grants	$1,800,000,000	$7,200,000,000	$9,000,000,000		99,000	252,000
Green Lead Hazard Control Units	$150,000,000	$0	$150,000,000		1,650	4,200
Building Energy Efficiency Finance Fund	$5,000,000,000	$20,250,000,000	$25,250,000,000		277,750	707,000
Total	$25,170,000,000	$28,530,000,000	$53,700,000,000	$206,000,000	590,700	1,503,600

Assumptions underlying these projections include:

- For every $100,000 of investment, 1.1 direct jobs are created.[72]
- For every $100,000 of investment, 2.8 indirect jobs are created.[73]
- Each green retrofit unit results in an average of 25% of energy savings.[74]

STRATEGY 1 – Aggressively Green the HUD Housing Portfolio

A number of strategies are recommended to aggressively retrofit the existing HUD housing portfolio. These recommendations fall into two basic categories:

- Direct investments in retrofitting of the HUD housing portfolio. These investments combine general retrofits and green retrofits in most cases.
- Regulations, standards, and R&D to incentivize additional greening in the HUD housing portfolio.

The direct investment recommendations are proposed to extend for a three-year time frame (so total costs would be one-third in each year.) The total amount of the proposed direct HUD investments is $20.47 billion. This investment would leverage an additional $9.48 billion in private capital, for a total investment of almost $30 billion.

A. Direct Investments in the HUD Housing Portfolio

Recommendation 1.1: Public Housing Retrofit Fund

Short Term, New Funding

The creation of a Public Housing Retrofit (PHR) Fund is recommended to accelerate the retrofitting of the 1.2 million of existing Public Housing Authority (PHA) units.[75] The PHR fund would invest in both general retrofits of units and "green" retrofits of units. The assumptions behind this fund include:

- 40% of the total 1.2 million units = 480,000 units to be retrofitted.
- The average cost to retrofit a public housing unit is $30,000. Approximately $20,000 of this cost is for general retrofitting, and $10,000 is for "green" retrofitting that specifically addresses energy- and water-efficiency and internal environmental quality.
- 100% of the costs for general retrofits would be fully subsidized.
- 75% of the costs for "green" retrofits would be fully subsidized.
- The remaining 25% of the green retrofits would be financed through energy performance contracts with Energy Service Companies (ESCOs)[76] or another leveraged approach. A 10% guarantee fund from HUD would be required to reduce the risk of these deals enough to attract private investors into this market.

[72] National Association of Home Builders

[73] National Association of Home Builders

[74] The amounts shown in the table above assume savings of 25% on HUD energy expenditures for the units retrofitted with these dollars. It assumes an average annual energy bill per unit of $1,200-$1,400. http://www.huduser.org/Publications/pdf/EnergyEfficiency.pdf

[75] The units are financed by HUD, but managed by 3,300 different Public Housing Authorities across the country.

- Promote workforce investment and green job training as an allowable cost under this fund in collaboration with the Department of Energy (Energy) and the Department of Labor (DOL) to establish streamlined training opportunities for community and PHA residents.

It is recommended that this Fund be capitalized at a level of $13,320,000,000. The assumptions that lead to this level of funding are described below.

Retrofit	Funding Level	Description
General Retrofits	$9,600,000,000	100% subsidy for 480,000 units @ $20,000 per unit
Green Retrofits – Subsidized	$3,600,000,000	100% subsidy for green retrofits for 75% of the 480,000 units @ $10,000 per unit
Green Retrofits – ESCO Financing	$ 120,000,000	10% guarantee fund (to leverage a total of $1.2 billion from ESCOs, or other financing mechanism) for green retrofits for 25% of the 480,000 units @ $10,000 per unit
Total HUD Cost	**$13,320,000,000**	
Leveraged Capital	$ 1,080,000,000	
Total Capital	**$14,400,000,000**	

The following recommendations are made for strategies to retrofit HUD assisted housing units, including project-based Section 8, voucher-based Section 8, and Section 202 and 811 supported housing projects.

Recommendation 1.2: Project-based Section 8 retrofits

Short Term, New Funding

Increase Project-Based Section 8 operating expenditures by $4 billion to retrofit 100,000 units. This would be a direct subsidy program (100% HUD funds with no leveraged capital). The cost per unit would average $40,000 per unit, including $10,000 for green retrofit features.

Recommendation 1.3: Section 202 and 811 project retrofits

Short Term, New Funding

Increase operating budgets by $800 million to retrofit 20,000 Section 202 and 811 units. Similar to Project-Based Section 8 programs, this would be a direct subsidy program (100% HUD funds with no leveraged capital). The cost per unit would also average $40,000 per unit, including $10,000 for green retrofit features.

Recommendation 1.4: HOPE VI green housing projects

Short Term, New Funding

It is recommended that an additional $100 million be invested for greening of existing HOPE VI projects that are in process and in need of additional resources to meet Energy Star and green community standards. The estimated cost per unit is $10,000, and this amount of funding would allow the greening of 10,000 units over three years.

Recommendation 1.5: Energy efficient affordable Home Investment Partnerships (HOME) Grants

Short Term, New Funding

It is recommended that $1.8 billion in additional funds for low-income home retrofits through the HOME block grant be provided.[77] HOME provides formula grants to states and localities that communities use – often in partnership with local nonprofit groups – to fund a wide range of activities that build, buy, and/or rehabilitate affordable housing for rent or homeownership or provide direct rental assistance to low-income people. Because HOME investments trigger code requirements, many of these projects may include green and general renovations.

Currently HOME projects leverage $4 for every $1 from HOME. (Historically, HOME has been combined with LIHTC funds which are much less available in current markets.) HOME also requires a 25% match of local dollars which may limit the ability to spend in the short term as city and state budgets are contracting. A $2.1 billion investment could leverage an additional $7.2 billion in private capital for a total capital commitment of $9.0 billion.

---

[76] Energy Service Companies (ESCOs) are engineering firms that perform energy efficiency work and finance the projects using the savings in energy to pay back the capital investment of the project.

[77] This investment would complement an investment through the Department of Energy in the Weatherization Assistance Program. HOME is focused on multi-unit rentals, whereas WAP is primarily focused on single-family homes.

This would be sufficient to retrofit 300,000 units over three years, at an average cost of $30,000 per unit ($20,000 for general retrofit and $10,000 for green retrofit features).

Recommendation 1.6: Green retrofits for lead hazard control homes
Short Term, New Funding
Homes that are already being retrofitted to eliminate lead hazards should also receive green retrofits. A total of $150 million is recommended to do green retrofits for 15,000 lead abatement units over a three year time frame.

B. Regulations, Standards & R&D to Incentivize the Greening of Housing

Recommendation 1.7: Public Housing Authority retrofit incentives
Long Term, Existing Authority
It is recommended that new incentives for Public Housing Agencies to invest in retrofits be created. The following actions should be taken in this area:

- Allow housing authorities to retain 100% of their energy cost savings from green investments for 10 years.
- Restrict this provision to those investments made within the next 2 years to encourage early action. After that point, energy cost savings would still be retained at 100% for a 5 year period, to continue a strong incentive for conservation.
- The maximum term of a contract that a public housing authority may enter into with an energy services company under HUD's energy performance contracting authority was extended to 20 years from 12 years in the 2005 Energy Act. HUD must implement the regulations to enforce this extension.
- These investments would include commitments to purchase Energy Star appliances as well as identified green building and weatherization practices.

Recommendation 1.8: Community Development Block Grant (CDBG) Incentives
Long Term, New Funding, Existing Authority
As CDBG funding is returned to its historical levels, incentives should be provided to local governments to invest in greening their housing stock. As CDBG funding is restored, additional funding should be provided to local partners to invest in energy and water efficiency and green infrastructure strategies that are incorporated into their Consolidated Plans with performance goals.

Recommendation 1.9: Manufactured Housing
Short Term, Existing Authority
The HUD Office of Manufactured Housing should upgrade the manufactured housing construction code in coordination with the Federal Emergency Management Agency (FEMA) to be consistent with the International Energy Conservation Code (IECC) & improved environmental health standards while considering factory design and construction techniques, climate zone and cost-effectiveness. Additionally, the office should develop incentives for manufacturers to incorporate support for workforce training in their programs.

Recommendation 1.10: Green standards for new construction
Short Term, Existing Authority
HUD should seek clear authority from Congress to require all new construction to meet progressive green building standards.[78] (Applies to Public and Indian Housing [PIH] programs, Sections 202 and 811 programs, CDBG , HOME, and HOPE VI, among others.)

Recommendation 1.11: Increase total development costs (TDC) for green development
Short Term, Existing Authority
Green investment in new building projects should be encouraged by allowing projects to exceed total development cost limits by up to 7% to cover any "green premium." This green premium will provide an increased capital budget allowance dedicated specifically to green and energy saving investments, for a period of 5 years, because they will

[78] There are a variety of standards that can be used for this purpose, including the LEED Standards; Enterprise Green Community Standards; as well as regional variations such as EarthCraft House in Atlanta; SeaGreen Guidelines Seattle; and the Chicago Green Homes program.

result in on-going operational savings.[79]

Recommendation 1.12: Building energy information systems and benchmarks
Short Term, New Funding, Demo Project
$10 million should be invested in the development of sophisticated systems for measuring, tracking, and benchmarking energy costs in public and affordable housing programs.[80] The data system should be centralized and consider the public housing benchmarking model as an initial step.[81] It should be used to establish performance benchmarks, track progress from retrofits and document savings, and prioritize retrofit investments.

Recommendation 1.13: Changing the way HUD pays for energy
Short Term, Existing Authority
Change the HUD budgeting process so that energy expenditures can easily be identified. Change the way that energy-related expenditures are provided in order to create energy-efficiency incentives for local housing authorities and individual building owners across all HUD programs. Announce a goal to reduce annual energy expenditures and associated greenhouse gas emissions.

Recommendation 1.14: Leadership in energy demand management (links to Recommendation 2.4)
Long Term, New Funding, Demo Project
$50 million should be invested in HUD public housing and assisted portfolios to demonstrate state-of-the-art technology and practices in energy demand management. These demonstration projects could leverage utility resources to build the Smart Grid infrastructure. These strategies should include:

- *Smart Grid Demonstration.* HUD should implement smart grid technology in public housing units to demonstrate advanced strategies for energy efficiency and renewable energy. This involves the use of smart meters to track energy use by time of day, improved digital controls for managing energy demand, better information for customers, and safe, reliable integration of solar panels into the grid.
- *Real Time Pricing.* In regulatory markets where it is authorized, HUD should promote the use of real time pricing in its housing units and offer substantial consumer education to ensure that benefits are realized. This approach allows consumers to save on electricity bills by varying their usage according to real time prices.
- *Advanced Metering Technologies.* These include "next generation" automated meters, advanced software and communications technology, all of which enable customers to control their appliances, from hot water heaters to air conditioners, in response to real-time prices and conditions. In these systems, consumers can "see" their electricity use on in-home devices and over the Internet and can lower thermostats or turn off appliances at home or remotely when electricity rates are high.

STRATEGY 2 – Make HUD a Leader in the Development of the National Building Retrofitting Market

In addition to greening its own housing stock, HUD should take a national leadership role in promoting the "deep greening" of residential housing stocks across the country, and stimulating the development of a robust private national building retrofit market. Six sub-strategies are recommended in this area:

- The creation of a $5 billion national Building Energy Efficiency Finance (BEEF) Fund.
- Creation of a national capacity building network of public agencies, non-profits, suppliers, contractors, workers, unions, and financial institutions to support regional retrofit strategies.
- Creation of a HUD Office of Sustainable Development.
- Investment in R&D to support development of the housing retrofit market.

[79] Recent studies have shown green building projects to cost an average premium of just under 3% of total development costs, with costs ranging from as low as 9% below to 18% above the cost of traditional construction. These investments however can provide near term paybacks for the cost of the initial capital investment and long term cost savings over the life of the project.
[80] According to the GAO study, HUD has partnered with Energy and EPA on the development of a system for public housing units, but they have not applied it to their privately managed assisted housing portfolio. The existing database is apparently the largest database of utility consumption of residential properties in the country, with over 4,700 properties from 160 housing authorities.
[81] The GAO report, GAO-09-46, October 2008 on Green Affordable Housing.

- Development of a national informational and institutional infrastructure to aggregate carbon credits from the building energy efficiency market.
- Use of Fannie Mae and Freddie Mac and any housing bailout or urban economic recovery investments to stimulate the green housing market.

Recommendation 2.1: Building Energy Efficiency Finance Fund

Short Term, New Funding, Demo Project

A $5 billion investment is recommended in a national Building Energy Efficiency Finance Fund to stimulate the development of the building energy efficiency retrofit market in communities across the U.S. Whereas the HUD-specific investments are focused on the retrofitting of subsidized housing units, the BEEF Fund would be focused on the non-subsidized segments of the housing market and units financed with the Low Income Housing Tax Credit (LIHTC). The Fund would engage in a number of activities designed to jump-start the building energy efficiency market nation-wide. These activities would include:

- *Provide planning grants* for regional retrofit market development strategies and institutions. These grants would be used for:
  - Baseline building stock analysis.
  - Baseline analysis of existing programs and resources.
  - Setting and prioritizing retrofit goals by segment and income levels.
  - Designing retrofit financial intermediaries.
- *Provide start up operating grants* for regional retrofit financial intermediaries. This capital would be used for:
  - Organizing the intermediaries, including legal structure and detailed business plan.
  - Initial operating expenses, such as staffing, legal services, marketing and outreach, etc.
  - Paying for energy audits, energy scoring systems, marketing and outreach and other costs of building the market.
- *Subsidize* retrofits for moderate and low income households that are not served under other government programs.
- *Provide risk mitigation capital and products* to leverage private capital into the "demand side" of the residential and commercial/industrial building retrofit market. These products could include loan guarantees, loan loss reserve funds, and government bond underwriting. This capital would be used to help building owners finance energy efficiency retrofits. It could be provided to regional intermediary institutions (including community development financial institutions [CDFIs], community loan funds, local units of government, ESCO financing entities, venture funds, utilities and others) as well as national partners.
- *Business investments.* Providing "supply side" capital to venture funds, loan funds and others to support the development and growth of contracting companies and other service providers to the building retrofit market.

The initial recommended level of funding for these categories is as follows:

Use	% of Fund	$
Planning grants and start-up capital	10%	$500 million[82]
Low income retrofit subsidies	45%	$2.25 billion[83]
Capital leveraging	45%	$2.25 billion[84]
Total	**100%**	**$5 billion**

Additional detail on the proposed design of the BEEF Fund is provided in an attachment to this report.

Recommendation 2.2: Create a national technical assistance and capacity building network to support building retrofit strategies

Short Term, New Funding

HUD should take the lead in the creation of a national network of lead practitioners and experts to support regional strategies for accelerating the building retrofit market. This strategy could include:

[82] This could, for instance, provide a total of $10 million per region to 50 regions across the country, or an average of $2 million of operating capital per region per year for 5 years.

[83] At $10,000 per energy efficiency retrofit, this could subsidize retrofitting for 225,000 low-income households.

[84] At a leverage ratio of 10:1, this would leverage an additional $22 billion in private capital.

- Creating a peer-learning and collaborative R&D network of the regions and cities that are implementing large-scale retrofit strategies. (These include cities like Chicago, Milwaukee, Cambridge, Portland, Seattle, Bay Area, Philadelphia and San Antonio.) The network would allow cities to learn from each other as well as collaborate on the development of key systems and standards to support market development.
- Create a network of Technical Assistance providers to work with regions implementing large-scale retrofit strategies.
- Increase the capacity of HUD regional offices to support large-scale retrofit strategies, and link to broader national commitments to job creation and national service through a Clean Energy Corps.
- Establish a program to make HUD buildings showcases for advanced green design, building codes, and green job programs for local construction markets.

Recommendation 2.3: Create a HUD Office of Sustainable Development

Short Term, New Funding

The new administration should create, or, if necessary, seek legislation to create an Office of Sustainable Development with the mandate to increase environmental sustainability in HUD-supported housing and community development projects and the larger real estate industry; consolidate HUD's environmental activities, including: enhance environmental review, promote healthy homes and lead hazard control, increase energy efficiency, remediate brownfields, promote green stormwater infrastructure and water efficiency; expand interagency collaboration to create greener communities by working with similar offices in other agencies (Energy, Transportation, Environment, Labor and Treasury); and ensure that sustainable homes, green infrastructure and communities are a priority in federal policy addressing energy, infrastructure, transportation and climate change. The Office should take the leadership role in advancing a national strategy to develop the private building retrofit market. It should also assist the Secretary to set performance standards linked to budget planning and performance review for all areas of HUD, including the Annual Performance Review and Management Plans, to ensure that environmental performance is internalized as standard operating procedure across the agency.

Recommendation 2.4: Invest in R&D to support market development (links to Recommendation 1.14)

Short Term, New Funding

Provide $50 million to the Office of Policy Development and Research and its PATH (Partnership for Advanced Technology in Housing) initiative to support the development and implementation of the recommendations in the PATH Roadmap for Energy Efficiency in Existing Homes (Green-PATH Initiative). PATH's R&D activities can be demonstrated in recommendation 1.14.

Recommendation 2.5: Carbon credit aggregation infrastructure

Long Term, New Funding

Valuable revenues can potentially be aggregated from carbon credits on housing stock supported in one way or another by HUD.[85] However, carbon credit aggregation requires a set of systems and capacities that HUD currently lacks, including: accurate validation and measurement technology; compliance with offset protocols; third-party verification; resolution of legal issues on credit ownership; capacity for aggregation; and capacity for international credit trading. $50 million should be invested in the development of a national infrastructure for building energy efficiency carbon credit capturing and aggregation. The dimensions of this initiative should include:

- Development of common standards for carbon credit measurement and verification.
- Design of information tools and systems for tracking carbon reductions from building retrofits.
- Business design for regional carbon credit aggregators and planning grants for their design and start-up.
- Building of a national network of carbon aggregation players for the built environment.

Recommendation 2.6: Use Fannie Mae and Freddie Mac to green the nation's housing stock

Long Term, Existing Authority

HUD should explore the ways in which green building standards could be leveraged to create incentives or boost the market to invest in energy efficiency. Examples include promoting Energy Efficient Mortgages and Location Efficient Mortgages®, also known as EEMs and LEMs, and the disclosure of energy costs and energy efficiency improvements during real estate transactions. All Fannie Mae / Freddie Mac financed projects should be required to purchase only

[85] For the City of Chicago Climate Action Plan, the total potential carbon credits from 12 years of residential and commercial/industrial energy efficiency retrofitting were estimated to exceed $190 million in Chicago alone based on current carbon prices of $8 - $14 a ton.

ENERGY STAR appliances (for new construction or replacement) and meet certain green operations and maintenance standards for energy savings and improved resident health.[86]

STRATEGY 3 – Locate Housing to Create Transit-Oriented, Walkable, Accessible Communities

HUD should take national leadership to assure that housing, transportation, and land-use goals are considered jointly and advanced to result in communities that are transit-oriented, walkable and accessible in order to reduce Vehicle Miles Traveled (VMT). Low-, moderate-, and middle-income families spend between 54 and 64% of their income on their combined housing, energy and transportation costs, often spending more on transportation than housing. Locating affordable housing within walking distance to affordable transit is essential so that lower-income families are able to save for their future or invest in education. Transit accessible affordable housing also provides families with greater employment and educational opportunities. The strategies below are some initial steps that can be taken and should be considered as part of a more comprehensive set of strategies to reduce combined housing and transportation costs.

Recommendation 3.1: Reward Location Efficiency
Long Term, Existing Authority
Require that building financed or insured by HUD be transit accessible or have a location efficient priority to the funding so that it contributes to reduced Vehicle Miles Traveled and reduced vehicle ownership.[87] Prioritize infill and provide resources for brownfield remediation by setting up a point system for new construction projects. Work with DOT/FTA to anticipate transit availability in developing affordable housing and in support of long term planning.

The scoring system could be based on a) likely reduction of VMT and vehicle ownership below area median, so that locations were reducing climate impacts and b) likely reduction of transportation costs, so that costs for the project's residents are reduced. (For example, any project within ½ mile of a rail/light rail/street car transit stop, or ¼ mile of a bus stop or public school/grocery store, will get more points.) New construction funding (from FHA and HUD) could only apply to projects that scored above a certain threshold. Over time, this score could be adjusted if there were more applicants than funding. Thus we would know that future projects would move development patterns and resident transit affordability in the right direction.

Recommendation 3.2: Raise total development cost (TDC) limits to promote more location efficiency
Long Term, Existing Authority
Currently, HUD TDC limits favor sprawl and limit more expensive urban development. For example, the base construction cost is multiplied by 1.6 for elevator buildings and 1.75 for non elevator buildings. TDC limits should be raised in urban areas to reflect local market costs so as to encourage infill, TOD and brownfield development. (This applies to PIH programs, Sections 202 and 811 programs, CDBG, HOME, and HOPE VI, among others.)

Recommendation 3.3: Redefine Affordability
Long Term, Existing Authority
For households earning $50,000 or less, transportation now costs more than housing in most metropolitan areas, and this cost is highly dependent on the character of the location of housing.[88] The federal government should act to ensure that housing consumers (renters, homeseekers) and suppliers (investors, builders, regulators and developers) are made aware of the full direct costs of housing. Consider redefining the HUD definition of "affordable" housing to

[86] The Housing and Economic Recovery Act, passed in July and signed in August of 2008, tasks HUD with recommending a strategy for increasing the scale of EEM mortgage lending. HUD is preparing such a report for delivery in the early 111th Congress. In August 2008, the House Financial Services Committee passed HR6078, the GREEN Act, which would require affirmative actions by Fannie Mae and Freddie Mac and possibly by Ginnie Mae and the Federal Home Loan Banks, to take both EEMs and LEMs to scale.
[87] Center for Neighborhood Technology and Center for Transit Oriented Development, "The Affordability Index: A New Tool for Measuring the True Cost of a Housing Choice," Brookings Institution, 2006 at http://www.brookings.edu/reports/2006/01_affordability_index.aspx; geocoded data for 54 metropolitan regions and map server available at http://htaindex.cnt.org.
[88] Barbara J. Lipman and others, "A Heavy Load: The Combined Housing and Transportation Burdens of Working Families," Center for Housing Policy, 2006; and Carrie Makarewicz and others, "Estimating Transportation Costs for Households by Characteristics of the Neighborhood and Household," *Transportation Research Record*, 2008

take into account not only the cost of the housing, but also the cost of transportation and energy associated with that housing, without disadvantaging rural housing.

STRATEGY 4 – Under White House Leadership, Organize a Cross-Department National Strategy for Green Building Retrofits as an Economic Sector Development Strategy

The development of a serious strategy to jump start the national building retrofit market and realize the untapped market opportunity for building efficiency savings will require integration of multiple initiatives across the entire spectrum of the federal government, and will extend far beyond the influence of HUD alone. In particular, it will require coordination from HUD, the Department of Commerce (DOC), the Department of Labor (DOL), the Department of Energy, the Small Business Administration (SBA), the Environmental Protection Agency (EPA), Transportation (DOT), and Treasury to coordinate the combination of housing strategies, economic development and business development support, workforce development and job training, energy standards and grants, environmental programs and tax credits. It is critical that this initiative be looked at from the national market perspective, and not from the perspective of individual federal departments and agencies. And it is also critical that this initiative take a distinctly regional perspective and engage regional political leadership in its design – since it is at the metropolitan and regional level where the "parts" need to be integrated into a "whole" that can have the desired catalytic effect. The following strategies are recommended in this area.

Recommendation 4.1: Energy Efficiency and Conservation Block Grants (EECBG)
Short Term, New Funding, Existing Authority
The authorized but un-funded EECBG should be fully funded at a $10 billion level, and HUD should partner with the Department of Energy on the use of the EECBG to support the development of regional strategies for stimulating the building retrofit market. In particular, HUD and Energy should partner on the provision of sophisticated technical assistance support to regions to make sure their strategies are market-building strategies and not just public programming.[89]

Recommendation 4.2: Green jobs and service for public housing residents
Short Term, Existing Authority, Demo Project
Public and affordable housing residents should be provided with an accelerated program for accessing green job training and should directly benefit from the transforming of the nation's affordable housing stock into a laboratory for green building innovation, distributed energy generation, and energy efficiency. Specifically, the HUD Secretary should engage DOL in the development of Green Jobs training programs that connect affordable housing residents to green career pathways and create a priority for qualified public housing residents to be employed in the retrofitting contracting process. This effort should be linked directly to full funding and implementation of the Green Jobs Act at $500 million, to engage existing workforce development, apprenticeship programs, and community-based service organizations in job training in energy efficiency and clean energy retrofits. In addition, HUD should work actively as a leader in interagency processes (with DOL, Energy, Treasury, and the Corporation for National Service) to establish a national Clean Energy/Green Jobs Corps and supporting funding mechanisms. The goal is to link national service goals and President Obama's commitment to create 5 million new jobs, to the expanding need for energy retrofits in our built infrastructure, and HUD's ability to drive regional market transformation.

Recommendation 4.3: Residential energy efficiency tax credit
Short Term, Existing Authority
Funding for refundable residential energy efficiency tax credits should be increased to $5 billion and the maximum credit for household efficiency upgrades should be increased to $2,000.

[89] Eligible activities of the Energy Efficiency and Climate Protection Strategy are heavily weighted towards energy efficient housing. These activities include: determination of 1990 and present levels of GHG emissions; conducting energy audits and weatherization programs; creation of financial incentive programs for energy efficiency retrofits; development and implementation of building and home energy conservation programs; development and implementation of building codes and inspection services for public, commercial, industrial and residential buildings to promote energy efficiency; development and implementation of transportation fuel conservation programs; development and implementation of alternative fuel technologies and infrastructure that result in significant GHG emission reductions; and development and promotion of land use guidelines that result in energy efficiency and GHG emission reductions.

Recommendation 4.4: Build National Capacity to Serve the Building Retrofit Market

Long Term

In addition to the task of stimulating demand for building retrofits through direct subsidies, finance instruments, and regulatory incentives or requirements, there is also a huge task of building the capacity of the market to effectively respond to this demand. The contractor, supplier and workforce capacities do not currently exist to serve an increase of this market in the $100 billion+ range. HUD's existing grantees will need assistance to expand their current initiatives. Developing this capacity will require investing in supply chain development, which will need to be done across multiple parts of the federal government, and in collaboration with regions. The elements of this will include:

- Career pathways; education and adult workforce development to create an integrated "human talent supply chain" for the building retrofit market.
- National standards on contractor and professional certification. (Many of these are already in place.)
- Business development support for contractor development – both creation of new contractors and expansion of capacity in existing contractors.
- The national supply of energy auditors and certifiers.
- Technical assistance to HUD grantees and regional support networks.

References

Housing Retrofit Costs

Average General Renovation Cost is $20,000/unit – "Capital Needs of the Public Housing Stock in 1998", Formula Capital Study, Abt Associates http://www.abtassociates.com/reports/ES-20008744720691.pdf

Average Renovation Cost is $30,000/unit (including disaster relief) – Harvard Joint Center for Housing Studies, "Improving America's Housing" http://www.jchs.harvard.edu/publications/remodeling/remod_IAH_99.pdf

Average Energy Retrofit Cost is $10,000/unit -- Privately-Owned Housing Energy Retrofit Costs; 2007 Buildings Energy Data Book http://www.btscoredatabook.net/docs/DataBooks/2007_BEDB.pdf

HUD Subsidized Energy Costs per unit range from $700 to $1400. "Promoting Energy Efficiency at HUD in a Time of Change -- Report to Congress" http://www.huduser.org/Publications/pdf/EnergyEfficiency.pdf

Measuring the Affordability of Housing and Transportation

Scott Bernstein, Carrie Makarewicz, Kevin McCarty; *Driven to Spend*, Center for Neighborhood Technology and Surface Transportation Policy Partnership, 2005, at www.transact.org

Center for Neighborhood Technology and Center for Transit Oriented Development, *The Affordability Index: A New Tool for Measuring the True Cost of a Housing Choice*, Brookings Institution, 2006 at http://www.brookings.edu/reports/2006/01_affordability_index.aspx ; geocoded data for 54 metropolitan regions and map server available at http://htaindex.cnt.org

Barbara J. Lipman *et. al.*, *A Heavy Load: The Combined Housing and Transportation Burdens of Working Families*, Center for Housing Policy, Washington DC 2006 at http://www.nhc.org/pdf/pub_heavy_load_10_06.pdf

General Resources:

Pew Center on Global Climate Change "Towards a Climate Friendly Built Environment," 2005.

Chicago Climate Action Plan, Denver Climate Action Plan, New York Climate Action Plan

US Department of Energy, EIA, Annual Energy Outlook.

The Size of the U.S. Energy Efficiency Market: Generating a More Complete Picture Karen Ehrhardt-Martinez and John A. "Skip" Laitner May 2008 Report Number E083 American Council for an Energy-Efficient Economy

Promoting Energy Efficiency at HUD in a Time of Change, A Report to Congress, HUD's Energy Task Force, August, 2006

Harvard University GSD's *Public Housing Operating Cost Study*

ADDENDUM 9.1

BUILDING ENERGY EFFICIENCY FINANCE FUND

This document provides an additional level of detail on one of the recommendations made by a voluntary team to the U.S. Department of Housing and Urban Development (HUD) transition staff on how to "green" the HUD housing stock, and use HUD to stimulate the development of a robust national green building retrofit market that will result in the energy efficiency retrofitting of a substantial percentage of the nation's building stock.

One of the recommendations of this team was the creation of a $5 billion Building Energy Efficiency Finance (BEEF) Fund. This document provides some additional details on how this fund might operate.

A. Fund Purpose: To stimulate the development of the national building energy efficiency retrofit market.

The Fund would serve as a "national green housing retrofit investment bank" – whose purpose is to catalyze the private market for energy efficiency building retrofits. We believe that this market is ripe for development – and that a well-capitalized national investment fund could significantly accelerate its development.[90] If 50% of the 128 million housing units nationwide were retrofitted at the modest rate of $10,000 per unit, this would be a market worth over $600 billion in revenues. Stimulating a market of this size will require a "market-making" institution that can make several different kinds of smart investments, as well as bring together many of the key players in the market to build the market infrastructure (information products, standards, supply chain, specialized intermediaries, etc.) need to have the market be self-sustaining over time.

B. Fund Activities:

The Fund would engage in a number of activities designed to jump-start the building energy efficiency market nation-wide. These activities would include:

- Provide planning grants for regional retrofit market development strategies and institutions. These grants would be used for:
  - Baseline building stock analysis
  - Baseline analysis of existing programs and resources
  - Setting and prioritizing retrofit goals by segment and income levels
  - Designing retrofit financial intermediaries
- Provide start up operating grants for regional retrofit financial intermediaries. This capital would be used for:
  - Organizing the intermediaries, including legal structure and detailed business plan.
  - Initial operating expenses, such as staffing, legal services, marketing and outreach, etc.
  - Paying for energy audits, energy scoring systems, marketing and outreach, and other costs of building the market
- Provide partial subsidies of retrofits for moderate income households.
- Provide risk mitigation capital and products to leverage private capital into the "demand side" of the residential and commercial/industrial building retrofit market. These products could include loan guarantees, loan loss reserve funds and government bond underwriting. This capital would be used to help building owners finance energy efficiency retrofits. It could be provided to regional intermediary institutions (including CDFIs, community loan funds, local units of government, ESCO financing entities, venture funds, utilities and others), as well as national partners.

[90] A wide number of large urban centers (Chicago, Milwaukee, Portland, Seattle, Philadelphia, San Antonio, and the Bay Area, among others) are in the process of putting together regional strategies and regional institutions to build their local retrofit markets. The Fund could provide crucial support to these kinds of efforts.

- Business investments. Providing "supply side" capital to venture funds, loan funds and others to support the development and growth of contracting companies and other service providers to the building retrofit market.

The initial recommended level of funding for these categories is as follows:

Use	% of Fund	$
Planning grants and start-up capital	10%	$500 million
Moderate income retrofit subsidies	45%	$2.25 billion
Capital leveraging (split 70/30 between demand side and supply side)	45%	$2.25 billion[91]
Total	**100%**	**$5 billion**

C. Funding Process:

The Fund would distribute its capital on a competitive bid basis. Preference would be given to large-scale integrated regional strategies based on a business plan that demonstrates analysis of the existing building stock and retrofit programs as well as the setting of clear goals for deep market penetration rates by segment. Preference would also be given to strategies that demonstrate coordination and collaboration with local/regional green workforce development systems and other potential sources of building retrofit financing, such as weatherization assistance, Community Development Block Grants, public housing retrofit strategies, Energy Efficiency Block Grants, etc.

D. Fund Structure:

There are a number of options for structuring the Fund. These include the following:

- *Government Administered Fund*. Structuring the Fund in a fashion similar to the Community Development Financial Institutions Fund (CDFI Fund) in the Department of Treasury that allocates a combination of capital and New Market Tax Credits to CDFIs and other Community Development Entities.
- *Existing Intermediary*. Providing the capital to an existing housing finance intermediary and using it [b/c both <<capital>> and <<intermediary>> are singular] to make the fund investments.
- *New Federally Owned Investment Bank*. Creating a new federally owned investment corporation ("green infrastructure investment bank") to carry out the tasks of the fund. The corporation would be capitalized with the $5 billion in proposed capital investment. (This would be a structure similar to the Alaska Permanent Fund.)
- *Capitalize a New Private Fund.* An RFP process could be used to capitalize a new "double bottom line" investment fund that is organized by private investment managers and carries out the multiple functions of the fund. The federal government would be the key investor in the fund, but the fund would be expected to also raise private capital.

Our instinct is that the Fund would best be structured as a free-standing investment entity outside of the federal government. While there are multiple pathways to launching such an entity, the most efficient market strategy would probably be to use an RFP process to capitalize a new investment fund organized by private investment managers with experience in national real estate markets.[92]

Whatever structure is chosen for the fund, it would have to be capable of carrying out the multiple functions of the Fund, including:

- Allocating planning grants.
- Allocating regional intermediary start up grants.
- Allocating capital to regions for subsidizing low income retrofits.
- Making investments in national and regional retrofit financing intermediaries designed to leverage private capital.

[91] At a leverage ratio of 10:1, this would leverage an additional $22 billion in private capital.
[92] There are many examples of such "multiple-bottom line" investment funds. See "The Double Bottom Line Handbook", available at www.sdsgroup.com, which documents over $10 billion of investment in such funds.

- Bond underwriting for local and state government building retrofit bonds.
- Capital for development and growth of contractors serving the retrofit market.

This would likely require an umbrella structure housing several different kinds of functions and/or funds. Given that the purpose of the fund is to help develop the national energy efficiency retrofit market, not just subsidize transactions, one could imagine the Fund having a number of different sub-units:

- Regional strategy unit (allocating planning grants and regional intermediary start-up grants, as well as general Technical Assistance to the field).
- Industry outreach (working with the building and contracting sector to develop standards, information resources and other tools to advance the sector).
- Subsidized retrofit grants (making grants to regions to subsidize housing retrofits for low and moderate income housing that does not qualify for other subsidies).
- Private capital fund (to leverage private investment into the green retrofit market).
- Business development fund (to invest in financial institutions, funds and other capital providers serving contractors and other building retrofit service providers).

The Fund would need to work in close collaboration with other players in this sector and, to this end, would likely be engaged in significant outreach and networking.

E. Leveraging Private Capital:

The Fund would leverage private capital in three different ways:

- The moderate income subsidies would be restricted to, on average, one-third of the total cost of a retrofit. In this case, the fund would be leveraging private building owner capital on a 2:1 ratio ($1 of fund subsidy would be matched by $2 of private building owner investment). In other words, the $2.25 billion in partial subsidies would be matched by $4.5 billion in private capital, for a total investment of $6.75 billion.
- The "demand side" capital would be used as risk mitigation to attract private capital investment in retrofit transactions that have attractive energy savings ROIs (both residential and commercial/industrial). The leverage ratio in the retrofit market will depend on a combination of: 1) the degree to which the market returns to "normal" levels of liquidity (this is assumed for purposes of this fund); and 2) the risk perception of this market by private investors. For purposes of this fund, we assume that the risk levels will be somewhat higher than traditional economic development finance tools, so we assume a risk level of 10%, for a leveraging ratio of 10:1. Assuming 70% of the $2.25 billion risk mitigation capital is committed to demand-side leverage, this would mean a total of $1.575 billion, leveraged at a rate of 10:1, resulting in a total investment of $15.75 billion.
- The "supply-side" capital would be invested in loan funds, venture funds and other sources of capital to support companies providing products, services and technology to the high-performance building market. Thirty percent of the $2.25 in leverage capital ($675 million) would go to this purpose.

Here are some of the kinds of transactions the fund could engage in to leverage private capital into this market.

- The Fund invests in a regional building retrofit financing intermediary, providing capital for loan guarantees on both residential retrofits as well as commercial/industrial Energy Service Company (ESCO) transactions.
- The Fund capitalizes a loan loss reserve fund for the financing facility for a national home retrofit company, such as Home Depot or Sears.
- The Fund capitalizes a loan loss reserve fund in partnership with a national community development bank.
- The Fund underwrites a bond for a state program for a loan loss reserve fund for ESCO transactions with state and municipal buildings.
- The fund invests in a series of venture funds specializing in the retrofit contractor market and/or product and technology innovations for the retrofit market.

F. Fund Payout Scenarios:

After establishment, the rate of actual capital payout from the fund will be determined by a number of factors:

- Readiness of regions to implement large scale retrofit strategies.
- Rate at which intermediary start up occurs.
- Rate at which private capital partners are brought on board and develop deal flow.
- Ability to stimulate home owner demand for green retrofits.
- Capacity of programs to deliver subsidized retrofits.
- Degree to which supply chain constraints slow down implementation.

One possible scenario for payout over 10 years is provided below.

Building Energy Efficiency Finance Fund Payout Scenarios											
(in millions of $)											
Fund Use	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**	**Total**
Regional Planning Grants	$5	$15	$15	$15							$50
Start Up Capital Grants	$10	$30	$80	$100	$120	$60	$50				$450
Low Income Subsidies	$280	$350	$700	$700	$210						$2,240
Private Leverage	$50	$100	$400	$400	$300	$200	$200	$200	$200	$200	$2,250
Total Pay Out	**$345**	**$495**	**$1,195**	**$1,215**	**$630**	**$260**	**$250**	**$200**	**$200**	**$200**	**$4,990**
Subsidized Units Per Year	80,000	100,000	200,000	200,000	60,000						640,000
Total Leveraged Funding	$500	$1,000	$4,000	$4,000	$3,000	$2,000	$2,000	$2,000	$2,000	$2,000	$22,500
Units Per Year Financed With Leveraged Capital	50,000	100,000	400,000	400,000	300,000	200,000	200,000	200,000	200,000	200,000	2,250,000
Total Capital	$795	$1,395	$4,795	$4,815	$3,330	$2,060	$2,050	$2,000	$2,000	$2,000	$25,240
Total Units	130,000	200,000	600,000	600,000	360,000	200,000	200,000	200,000	200,000	200,000	2,890,000

The assumptions that this payout is based on include the following:

- Planning grants average $300K per region, and a total of 160 grants are given out over four years (some regions might receive more than one grant). (If the top 125 metro regions in the country received at least one grant, that would encompass a total population of over 200 million people.)
- Start up capital grants average $10 million per region over 5 years, for $2 million per year per region. In this scenario, a total of 45 regions end up qualifying for 5 years worth of grants ($10 million per region).
- Low income subsidies are released over 4 years, and the average cost of a unit is $10,000 per year, with $3,500 per unit subsidized.
- Private leverage capital is released over the full 10 years of the fund, with the largest amount in years 3 and 4. Leverage is on a 10:1 basis.