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ENERGY EFFICIENCY FINANCING - MODELS AND STRATEGIES

Pathways to scaling energy efficiency financing from $20 billion to $150 billion annually

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ABSTRACT

Increasing energy efficiency financing represents one of the largest and most important opportunities for the US to expand economic growth and job creation. Relative to almost all other investments, it cost effectively creates more distributed jobs, reduces energy costs for businesses and households of all income levels, cuts air pollution and enhances domestic security.

The potential for cost-effective energy efficiency (EE) investments in the US is on the order of $150 billion a year[1]. Investment at this level would, within a decade, save American businesses and households $200 billion annually and create more than 1 million new full time jobs[2]. After decades of public and private support, however, current energy efficiency financing is only about $20 billion per year, less than one-fifth its cost effective potential[3]. This investment gap represents an enormous opportunity to strengthen the economy, increase competitiveness of US businesses while creating jobs and strengthening exports. The critical step to close this gap is to make EE financing a mainstream financial asset class with a high degree of standardization, predictability and scale. Leading financial institutions recognize the opportunity to develop financial products in this area and are increasingly committed to expand financing for energy efficiency. To do so, banks are seeking to develop efficiency performance data and build scalable efficiency financing models.

For building owners, energy efficiency offers the opportunity to lower operating costs, increase occupancy, enhance building quality and increase financial returns. Standards such as LEED and Energy Star reflect and foster increasing interest in making buildings greener and more energy efficient. However, the vast majority of EE opportunities remain unfinanced due to split incentives, insufficient credit and limited data, among other reasons.

The Obama Administration, with Congressional authorization, has invested billions of dollars into energy efficiency as part of its stimulus funding. This funding, however, peaks by the end of 2011 and will disappear in 2013. A recent approach to rapidly expanding EE funding, called the PACE program (Property Assessed Clean Energy) prompted over 20 states to pass legislation allowing cities to use liens on home value to enable community-wide EE funding. Objections by the Federal Housing Finance Agency (FHFA) and others have, in the view of most experts, largely closed this PACE option for residential efficiency financing. The large unmet opportunity, the imminent

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[1]*Energy Expenditures by End-Use Sector (2008, U.S. EIA) = Residential: $256.95-bil (100% from buildings), Commercial: $192.25-bil (100% from buildings), Industrial: $272.32-bil (~15% from buildings). Total Building*

Source: U.S. Energy Information Administration, "State Energy Data, 2008," June 2010, http://www.census.gov/compendia/statab/2012/tables/12s0934.pdf.

[2]*7 jobs created per $1-mil invested annually in EE. Source: "The Economic Benefits of Investing in Clean Energy," Robert Pollin, James Heintz, and Heidi Garrett-Peltier, Department of Economics and Political Economy Research Institute (PERI) University of Massachusetts, Amherst (June, 2009).*

[3] *Market is inclusive of EE projects and services that involve a third party and/or a separate financing mechanism (internal fund, third party financing). Inclusive of ~$8 billion annual ESCO market.*

reduction of federal EE funding and the demise of residential PACE make the need to develop scale efficiency financing imperative.

In late 2010, the Energy Foundation engaged Capital E to better understand the existing and potential models/mechanisms to scale EE financing and their potential to dramatically expand and more efficiently deploy private capital in the space. Capital E has been working closely with 30 private, public and NGO partners to identify and co-develop the most promising mechanisms to scale efficiency financing over the next three to five years. As part of the May, 2010 annual ACEEE Energy Efficiency Finance Forum, Capital E ran a highly-structured meeting of 25 leaders from banks, regulatory agencies, project developers and industry organizations to co-design new mechanisms for energy efficiency financing. Findings from this on-going collaborative work have been captured in this report, which is intended to provide a succinct, structured description of existing and emerging models and strategies for energy efficiency financing. The structured format and links to best available documents and studies are intended to facilitate understanding and application of best practices in energy efficiency financing. In addition to narrative explanations, this document contains summary tables of models and strategies.

METHODOLOGY

The first phase of this work was a survey of literature to identify the viable, existing and potential strategies to scale EE financing. This report draws from and seeks to build upon the large body of often excellent, ongoing work and analysis by banks, national laboratories, NGOs such as the American Council for an Energy-Efficient Economy (ACEEE) and the Alliance to Save Energy, Federal/State agencies, think tanks and others. A range of experts have contributed to and have helped shape this document:

Peter Krajsa - AFC First

R. Neal Elliot and Steven Nadel - American Council for an Energy-Efficient Economy (ACEEE)

Bill Garber – Appraisal Institute

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Chris Lord - Consultant

Jake Baker - Deutsche Asset Management

Bob Epstein – E2

John MacLean - Energy Efficiency Finance Corporation

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Dana Bourland – Enterprise Community Partners

Jeff Eckel and John Christmas - Hannon Armstrong

David Carey - Harcourt Brown & Carey

Francis Sullivan – HSBC

Granville Martin – JPMorgan Chase

Kimberlee Cornett - Kresge Foundation

Art Rosenfeld - Lawrence Berkeley National Lab

Malcolm Woolf - Maryland Energy Administration

Bob Hinkle - Metrus Energy

Neal Parikh –Morgan Stanley

Donald Gilligan - NAESCO

Jeff Genzer –NAESCO/NASEO

Brandon Belford - National Economic Council, The White House

Robin Roy and Phil Henderson - NRDC

Jeffrey Pitkin - NYSERDA/NASEO Financing Task Force

Matt Arnold – PricewaterhouseCoopers (PwC)

JP McNeil - Renovate America

Steve Schiller - Schiller Associates

Claire Broido Johnson - Serious Capital

Mike Niver - Solar City

Sean Patrick Neill – Transcend Equity Development Corp.

Ivo Steklac - Tendril Inc.

David Wooley and John Wilson - The Energy Foundation

Jon Anda – UBS

Brenna Walraven - USAA Real Estate Company (Former Chair of BOMA International)

Kevin McCarty – U.S. Conference of Mayors

Gil Sperling, Stockton Williams, Richard L. Kauffman and Chris Lohmann- U.S. Department of Energy

Roger Platt, Jason Hartke and Scott Horst – U.S. Green Building Council

Michael Karlosky and Wayne Seaton – Wells Fargo.

This report provides a structured and succinct summary of energy efficiency financing models and strategies applicable to the Residential (R), Commercial (C), Industrial (I) and the Federal/Municipalities, Universities, Schools and Hospitals - MUSH (F/M) sectors, including links to some of the best current literature on each of the models or strategies described. For the purposes of this analysis, models are defined as arrangements amongst institutions and market players to finance and implement energy efficiency projects. Strategies are defined as tools to scale efficiency financing which bring down capital and/or transaction costs and increase the deployment of funding to efficiency projects. The following models and strategies are reviewed and summarized in this document.

Models

1. Energy Savings Performance Contracting (ESPC)
2. Energy Services Agreements
3. State/Municipal Loan Programs
4. Sustainable Energy Utilities
5. Carbon Market Funding
6. Mortgage-Backed EE Financing
7. Preferential Terms for Green/EE Buildings
8. Utility On-bill Financing
9. Property Assessed Clean Energy (PACE) - Commercial
10. Property Assessed Clean Energy (PACE) – Residential
11. Unsecured Consumer Loans

STRATEGIES

1. Intermediary Aggregated Scale Purchasing
2. Revolving Loan Fund
3. Preferential Loans
4. Risk Reallocation
5. E-Loan
6. Point of Purchase Interest Rate Buy-down
7. Re-Align Incentive Structure

The review describes each model and indicates its limits to scale, sources of funds, program administration structure, repayment vehicle and project risk allocation. The analysis summarizes the level to which a model is currently being deployed, its potential to enable large investments in energy efficiency, as well as market-enabling actions that could facilitate greater investment. Strategies are described, best-case examples provided and applicable models are identified. The order in which the models and strategies are displayed in this report does not reflect potential or preference. Energy Service Performance Contracting is listed first due to its widespread adoption, while subsequent models are clustered to reflect similarity.

Analysis and key stakeholder co-development has informed the identification of new financing mechanisms that could potentially drive additional billions of dollars in energy efficiency financing within a three to five year time frame. Using the results of this report and on-going collaboration, Capital-E is co-developing mechanisms with key private and public stakeholders. These mechanisms include:

- Green Ginnie Mortgage Backed Securities (MBS)
- Making Energy Efficiency a Standardized Asset Class
- CO2 to Energy Efficiency (EE)

See www.cap-e.com for more information.

PART I: ANALYSIS OF ENERGY EFFICIENCY FINANCING MODELS

ENERGY SAVINGS PERFORMANCE CONTRACTING

DESCRIPTION: Energy Savings Performance Contracting (ESPC) is a method for developing and implementing comprehensive energy efficiency projects (which may also include renewable energy, cogeneration, and/or water efficiency measures). An ESPC is typically provided by an Energy Service Company (ESCO). ESCOs have traditionally developed, implemented, and often helped arrange financing for projects. However, the role of ESCOs will change as result of the Dodd-Frank Wall Street Reform and Consumer Protection Act. ESCOs will not be able to administer programs or originate loans unless they are registered Municipal Financial Advisors, which few will be. The administrator/originator role will be taken by third-party companies who will add a full finance consulting service to their loans, or to specialty brokers. After project completion, the ESCO monitors energy savings and maintains upgrades over many years. The savings produced typically exceeds the loan payments over the term of the contract, which is typically 10 to 20 years. During the contract, the customer shares in a portion of the savings. After the contract term, the customer ceases payments and enjoys all of the residual energy savings. In nearly all ESPC projects implemented in public buildings, the ESCO guarantees the savings to the customer. The guarantee creates a financial commitment for the ESCO to ensure the performance of retrofits during the contract term. If retrofits produce less than the guaranteed savings, the ESCO will pay the difference. The value of savings in excess of the guaranteed savings remains with the customer.

ESPC projects typically take several months to develop; these projects involve complex contracts and blend funds from several sources. Funding sources include utility incentives/rebates, public revolving loan funds, state/federal government grants, bonds, tax equity, loans, and leases. ESPC projects usually have relatively long paybacks periods (10+ years). ESPCs are most often used for projects in federal government buildings and in public institutions, such as municipalities, universities, schools and hospitals (collectively known as the MUSH market). Such facilities are either owner-occupied or leased for long terms, do not have a first lien and have a good credit quality.

Since building owners with strong credit or access to low cost debt commonly prefer to self-finance, ESPCs have been slow to catch on in the commercial buildings market. For example, Malkin Properties considered third party financing to renovate the Empire State Building (a renovation that produced a 38% reduction in annual energy costs), but ultimately decided to self-finance to avoid the financing costs. ESPCs are increasingly being applied in commercial buildings for which owners prefer to outsource energy efficiency.

Specialized lending institutions or other third party financiers provide a combination of debt and tax equity financing for ESPC projects that meet a tightly negotiated set of criteria (e.g. length of agreement, measurement and verification methodology, etc.) and other prescribed risk characteristics (e.g. ownership of project assets, shared savings structure, performance guarantees, etc.). Financing is available for large-scale projects executed by credit-worthy ESCOs and investment-grade hosts. The financing is secured by the assets installed, or is recourse to the host. Investors have securitized ESPCs for sale to capital markets but have not done so at scale.

EXAMPLES: *ESCOs* - Johnson Controls, Honeywell Building Services, Ameresco

Financiers- Hannon Armstrong, Bostonia Group

Level of Funding	100%
Timing of Funding	Upfront
Type of Funding	Private Debt and Equity, Utility Incentives
Repayment Vehicle	Billing per ESPC
Sectors	Largely serves Federal and MUSH (F/M) markets with limited activity in the Commercial and Industrial markets.
Current Funding/Rate of Growth	Currently $6-$7-bil industry (LBNL). Projected to grow to $20-$23-bil by 2020 according to The Cleantech Group.
Institutional Players	Energy Services Companies, Lending Institutions, Specialized Investors, Utilities, Governments, MUSH and Commercial Property Owners

ADVANTAGES: Reduces project risk for customers. Enables financing of comprehensive retrofits. ESCOs have a 30-year track record of project execution leading to the development of standard contracts and processes. ESPCs can easily be combined with other incentive programs to enhance the project returns. ESPCs rely on rigorous monitoring/verification and detailed data collection. Most ESCOs base measurement and verification requirements on the IPMVP (International Measurement and Verification Protocol). The IPMVP provides an industry-developed, consensus standard of 4 different M&V approaches, which provides a common basis for negotiating, specifying and guaranteeing energy and water efficiency savings. The IPMVP is mandated for all federal energy ESPC programs and is widely used internationally. *Disclosure: Greg Kats Co-founded the IPMVP with Art Rosenfeld, and served as its founding Chair.*

DISADVANTAGES/BARRIERS TO SCALE: The process of reaching agreement on an ESPC requires substantial negotiation and documentation. There are substantial transaction costs associated with establishing baseline energy use and validating energy savings. Projects must be approved and developed on a case-by-case basis requiring credit analysis on each borrower's ability to pay. It is difficult to finance smaller projects (<$500k) because ESCOs aren't interested and the investment does not justify underwriting costs to lenders.

MARKET ENABLING MEASURES: Government or private parties can provide full or partial loan guarantees on owner default, reducing risk of financing commercial energy savings performance contracts.

SOURCES AND LINKS*: DOE Energy Efficiency and Renewable Energy Solution Center: Energy Services Performance Contracts:* http://www1.eere.energy.gov/wip/solutioncenter/financialproducts/ESPC.html

Energy Efficiency Paying The Way: New Financing Strategies Remove First-Cost Hurdles: CalCEF Innovations - Bob Hinkle and David Kenny – February, 2010 - http://www.fypower.org/pdf/CALCEF-WP-EE-2010.pdf

International Measurement and Verification Protocol:
http://www.evo-world.org/index.php?option=com_content&task=view&id=272&Itemid=60&lang=en

Energy Efficiency and the Finance Sector: A Survey on Lending Activities and Policy Issues. UNEP Finance Initiative's Climate Change Working Group, January 2009:
http://ccsl.iccip.net/energy_efficiency.pdf

ENERGY SERVICES AGREEMENTS

DESCRIPTION: Energy Services Agreements (ESA) build on the historical use of PPAs in power plant project finance and, more recently, in renewable energy project finance. Third party entities negotiate ESAs, arrange/provide capital, develop projects and manage installed equipment for large industrial and commercial projects. An SPE is typically established for each single large energy efficiency deal. The SPE is capitalized by third party investors and finances the costs of the efficiency improvement. The host signs an ESA with a project developer and agrees to pay either a fixed or floating rate for the energy savings received. A floating rate is equal to a percentage (e.g. 80%) of their actual utility rate. A fixed payment is based on a cost per avoided energy basis (e.g. dollars per kWh avoided or dollars per therm of natural gas avoided). The host agrees to make payments for contractual terms of their agreement (e.g. 5-15 years). During this period, the SPE retains ownership of the installed equipment and returns cash flows to investors. The fund owns all environmental attributes (e.g. CO2), government grants/rebates, and tax incentives. This structure enables energy efficiency to be treated as a service and an off-balance sheet transaction. Investors commonly obtain multiple tax incentives including typical losses during the first year, accelerated depreciation, and any federal, state or utility incentives. New Federal Accounting Standards Board (FASB) pronouncements on service contract accounting may limit or modify this structure by placing the risk on the obligor's balance sheet. Since many projects yield equity rate of returns, the opportunity exists for private equity to provide up front financing if there were sufficient ability to aggregate contracts, monitoring and services.

The MESA structure is an ESA model that has gained recent traction. An SPE is established for a large commercial building owner to make monthly payments equal to the agreed historical energy expense. Energy savings are utilized by the project developer to pay utility bills and provide investors with a return on their investment. Private equity investors are actively financing projects through this structure.

EXAMPLES: Energy Harvest, Metrus Energy, Clean Feet, Transcend Equity Development Corp, Green City Finance.

Level of Funding	100%
Timing of Funding	Upfront
Type of Funding	Private Debt and Equity
Repayment	PPA payments or Service Charge
Sectors	Residential, Industrial and Commercial
Current Funding/Rate of Growth	Growing but still at a small scale
Institutional Players	Commercial and Multi-Family Property Owners, Specialized Investors, Project Developers, Utilities

ADVANTAGES: Transactions are currently off-balance sheet to the host. Credit exposure can be limited by a loss reserve and/or by retaining title to the physical assets throughout the contract

period. Since an SPE is used, risk is limited to the amount of investment for each individual deal. Building owners can make necessary capital improvements at no up-front cost.

DISADVANTAGES/BARRIERS TO SCALE: Since many large deals require the establishment of a SPE, there are higher transaction costs. Many commercial and industrial building owners prefer to self-finance efficiency projects. Additional costs are incurred to monitor and calculate energy savings achieved by comparing actual energy consumption of the retrofit to a calculated and agreed-upon benchmark, which potentially requires an independent auditor to verify the energy savings achieved. The model is typically not appropriate for small investments such as at the residential level. New FASB pronouncements on service contract accounting could severely limit this models' scale potential. Not currently at scale sufficient for large institutional investors.

MARKET ENABLING MEASURES: Public entities enable the use of PPAs to finance EE. Increase the installment of smart-grid or other software that automatically captures reduction in energy consumption due to EE investment. Arrange private equity funds that invest in project pools financed through standardized ESA structures. Create sufficient aggregation and scale to support a securitized debt market

SOURCES AND LINKS: *Department of Energy: Energy Efficiency and Renewable Energy Financing Guide:* http://www1.eere.energy.gov/wip/solutioncenter/financialproducts/PPA.html

Energy Harvest Capital Management, LLC: Confidential Business Plan PowerPoint Deck

Solar Power Purchase Agreements: http://www.epa.gov/greenpower/buygp/solarpower.htm

Metrus Website: http://metrusenergy.com/

Transcend Equity Website: http://www.transcended.com/mesa_solution.asp

Energy Efficiency Paying The Way: New Financing Strategies Remove First-Cost Hurdles: CalCEF Innovations - Bob Hinkle and David Kenny – February, 2010 - http://www.fypower.org/pdf/CALCEF-WP-EE-2010.pdf

STATE/MUNICIPAL LOAN PROGRAMS

DESCRIPTION: The American Recovery and Reinvestment Act (ARRA) allocated $11.6-bil in FY 2010 to state and local governments to finance energy efficiency programs. While programs take many forms, states (often directed through their energy offices) typically allocate an initial funding pool from the general fund, federal grant allocations or ratepayer funds. County/city governments, utilities, local non-profits and/or Community Development Financial Institutions (CDFIs) typically handle loan origination and program administration. Programs like Portland's Clean Energy Works Program (CEWP) make loans to homeowners to cover up-front project costs (minus available state incentives); homeowners pay the loan back via an additional charge on their utility bills. Pennsylvania's Keystone HELP program offers secured loans for basic retrofit improvements (windows, HVAC, etc.) at 5-7% interest over 3, 5 or 10-year terms. Lower rates (e.g. 3%) are offered for improvements that meet prescribed standards (e.g. Building Performance Institute). Whole home improvements meeting minimum energy reduction requirements (e.g. 20%) also receive lower interest rates. The most successful programs create green job through workforce development programs for needed contracting work.

EXAMPLES: Portland Clean Energy Works Program (CEWP), Pennsylvania Keystone HELP, Maryland Clean Energy Center Home Owner Loan Program, Texas LoanSTAR (loans to Save Taxes And Resources) Program.

Level of Funding	Up to 100%
Timing of Funding	Program dependent
Type of Funding	Loans, rebates and tax benefits financed through federal grants, rate-payer funds, bond issues, state general funds, utility cost recovery or systems benefits charges.
Repayment Vehicle	Differs by program
Sectors	Commercial, Residential, Industrial
Current Funding/Rate of Growth	ARRA directed $3.1-bil into state energy programs, with funding dropping sharply in 2012.
Institutional Players	Utilities, State/Municipal Governments, State Energy Organizations, Community Development Financial Intuitions, Third Party Administrators, Economic Development Organizations/Departments, Departments Of Labor, Housing Development Authorities.

ADVANTAGES: State programs facilitate collaboration across numerous governmental departments, agencies, economic development organizations, private contractors and third party program administrators. Model concentrates energy efficiency information and program offerings into a trusted, single source. Successful efforts consolidate disparate energy efficiency funding programs. There is substantial administrative and technical support available through the DOE and EPA. Certain program types (CEWP, Keystone HELP) enable access secondary sources of capital.

DISADVANTAGES/BARRIERS TO SCALE: Funding is limited to the amount granted, creating temporary programming. High level of coordination is required amongst departments and

organizations. Statewide efforts may create redundancies with third party administrated or municipal efforts. Benchmarking and tracking energy usage on a state scale depends on the quality of metering infrastructure. The majority of states have statutes proscribing local government entities from lending public dollars for private purposes (The New Rules Project, 2009). The growth of CEWP, and its replication to other regions, will depend on the ability to access secondary sources of capital (e.g. bank debt, state municipal bond issuances, and foundation investments) that value the risk-return profile of home energy performance improvement projects.

MARKET ENABLING MEASURES: Create a standardized program so that loans originated through multiple state programs can be consolidated and sold to the secondary market (e.g. Warehouse for Energy Efficiency Loans (WHEEL program) - developed by the Energy Programs Consortium and the Pennsylvania Department of Treasury. Consider use of a credit facility or loan loss reserve.

SOURCES AND LINKS: *Compendium of Best Practices: Sharing Local and State Successes in Energy Efficiency and Renewable Energy from the United States*: Renewable Energy and Energy Efficiency Partnership (REEEP), Alliance to Save Energy, American Council on Renewable Energy (ACORE) – 4/2010 – Pg. 43 http://www.reeep.org/16672/compendium-of-u-s-best-practices.htm

States Stepping Forward: Best Practices for State-Led Energy Efficiency Programs: American Council for an Energy-Efficient Economy – Michael Sciortino - September, 2010 – http://www.aceee.org/research-report/e106

The Growing Landscape of State Energy Efficiency Programs: A New Taxonomy: American Council for an Energy-Efficient Economy - Michael Sciortino and Maggie Eldridge – 2010 - http://www.aceee.org/proceedings-paper/ss10/panel08/paper28

Energy Efficiency Paying The Way: New Financing Strategies Remove First-Cost Hurdles: CalCEF Innovations - Bob Hinkle and David Kenny – February, 2010 - http://www.fypower.org/pdf/CALCEF-WP-EE-2010.pdf

Keystone HELP® ENERGY EFFICIENCY Loan Program Guidelines: Pennsylvania Dept. of Environmental Protection, Treasury, Housing Finance Agency - November, 2010

American Recovery and Reinvestment Act Website: DOE EERE: U.S. Department of Energy - http://www1.eere.energy.gov/recovery/

SUSTAINABLE ENERGY UTILITIES

DESCRIPTION: A Sustainable Energy Utility (SEU) administers financing programs, offers technical assistance, and provides financial incentives to building owners to implement efficiency measures and support renewable energy installations. For example, the Delaware SEU was created in 2007 by legislation enabling a $30-mil bond authority. The SEU pre-screened financeable energy efficiency and renewable energy projects and established measurement and verification standards. Set up costs were funded in part by an increase in the charge for energy efficiency and renewables paid by Delaware utility customers. Among other programs serving the MUSH market, the SEU covers the incremental costs between conventional and high-efficiency technologies. ESCOs work with MUSH building owners to commit to giving the SEU 33% of projected savings created by the installed measures for 3 to 5 years. After the contracted period, the owner retains 100% of the savings. This structure has financed $27-mil in energy savings for building owners. The SEU offers incentives to developers of renewable energy equal to the difference between the cost of an equivalent conventional energy supply and the renewable energy installed. In exchange, developers provide the SEU with 25% of the Renewable Energy Credit (REC) proceeds generated by the project. The Delaware SEU has helped finance 10 MW of solar through this structure. The State of Delaware has created 1,000 jobs through this program.

Under the guidance of Citigroup, the Delaware SEU pooled distributed EERE projects and leveraged the State of Delaware's AAA credit rating to issue the first energy efficiency tax-exempt bond in the U.S. ($72-mil in proceeds). This transaction solved the credit problem often faced by large financial institutions looking to invest in EE. Since Delaware accepted the credit risk for the projects, investors were able to assess the risk of the bond based on a known, rated entity as opposed to based on multiple ESCOs/hosts with different credit ratings. This structure enables efficient pricing of the bond and fits the profile of an investment for which municipal financing groups are already comfortable.

In 2008, the District of Columbia passed a bill to create a Sustainable Energy Trust Fund to be managed by a Sustainable Energy Utility. A non-bypassable monthly surcharge assessed to electric and natural gas ratepayers amounting to roughly $20-mil per year will fund new financing programs. The DC SEU has been tasked with developing financing programs to overcome barriers to EERE investment for all building types for all demographic segments in the District. The DC SEU is currently reviewing 10 to 15 financing programs to be considered for implementation starting in 2012.

EXAMPLES: Delaware Sustainable Energy Utility, District of Columbia Sustainable Energy Utility

Level of Funding	100%
Timing of Funding	Up front
Type of Funding	Covers up front cost
Repayment Vehicle	Shared savings agreement
Sectors	Commercial and Residential

Current Funding/Rate of Growth	$100 mil+ invested to date with more funding expected as existing programs expand and new programs are formed
Institutional Players	State Government, Contractors, Non-Profits, Banks, Bond Investors

ADVANTAGES: Large job creator. Leverages public funding to access capital markets. Overcomes credit disaggregation challenge often faced by investors. Consolidates technical assistance, program information and program administration into a single entity. Enables building owners to receive energy efficiency improvements at no up-front cost.

DISADVANTAGES/BARRIERS TO SCALE: Few SEUs have been established since the Delaware SEU was created in 2007. Requires state-level authorization of bonding authority to create statewide entity.

MARKET ENABLING MEASURES: Promote deployment of standardized SEUs across multiple states or municipalities. Work with existing SEUs and municipal finance groups within banks to coordinate energy efficiency tax-exempt bond issuances.

SOURCES AND LINKS: *Sustainable Energy Utility - A Delaware First*: http://www.seu-de.org/docs/SEU_Final_Report.pdf

Energy Conservation Initiative: Bond issue supports energy conservation, job creation – University of Delaware: http://www.udel.edu/udaily/2012/aug/SEU-081911.html

U.S. Department of Energy Program Information: Sustainable Energy Utility: http://www.ymp.gov/savings/sustainable-energy-utility

CARBON MARKET FUNDING

DESCRIPTION: Building energy efficiency is the single largest, low-cost opportunity for CO2 reductions. For CO2 value to drive increased EE (Energy Efficiency) investments, building owners should receive or be able to monetize the value of the associated CO2 reductions when they make EE investments. A mechanism that would enable third-party intermediaries to efficiently document, aggregate, and obtain CO2 reduction value on behalf of business, industry, real estate and municipal clients would allow building owners, companies, etc. investing in electrical or natural gas efficiency to receive the value of the associated CO2 reductions at the point of investment. This would offset a significant portion of the capital cost of EE investments and increase the depth and volume of energy efficiency investments. This model would ultimately create a market transformation where energy efficiency investments are implemented exclusive of carbon pricing.

The proliferation of energy management and demand response firms such as EnerNOC, Tendril and Efficiency 2.0 are representative of a new and fast growing pathway to motivate and guide energy efficiency. Careful analysis of DR is required to determine if it actually reduces carbon emissions. In some places (e.g., PJM) DR that involves load shifting actually increases carbon emissions because it shifts loads from gas peaking units to coal baseload units. These firms have the capacity to serve as efficient, low cost aggregators to deliver, measure and ensure EE savings – and therefore provide a pathway to allow distributed EE investors, including companies and real estate owners to directly to earn the value of CO_2 reductions that result from their CO2 investments. The suggested model involves recognizing and leveraging EE aggregation and motivation entities by qualifying them to act as intermediaries to aggregate the value of the CO2 on behalf of their clients.

CO2 markets, including California and the Regional Greenhouse Gas Initiative (RGGI), have set-aside accounts that indirectly recognize and financially reward the emissions reductions benefits associated with specific EERE investments. Starting in 2013, the California Air Resources Board (CARB) will auction a portion of emissions allowances to the electricity sector. It is foreseen that the proceeds from the auctions will be used for a number of programs, including the financing of energy efficiency retrofit rebates and incentives. This solution, however, is limited to only specific EE measures and does not allow for more holistic efficiency retrofits.

Enabling companies and building owners to earn the value of CO2 reductions effectively moves the CO2 value under a cap and trade program from a point of low impact to a point of high impact. The anticipated price of CO2 in California (floor price $10/ton of CO2, expected to eventually exceed $30/ton) means that the value of CO2 reduction, if sold forward for 5 or 10 years, can cover a significant portion (e.g. 30-50%) of the cost of EE upgrades, resulting in more and deeper retrofits.

EXAMPLES: N/A – not currently in practice

Level of Funding	In the range of 15% to 75% of the project cost (based on CO2 price of $10 to $50/ton, respectively)
Timing of Funding	Upfront
Type of Funding	Revenue
Repayment Vehicle	None

Sectors	Commercial, Industrial and Residential
Current Funding/Growth	N/A

ADVANTAGES: Offsets a significant portion of the capital cost of EE investments, increasing depth and volume of energy efficiency investments, enabling the market for CO2 to function more efficiently and cost effectively. It would also accelerate the adoption of smart grid technology and solutions. It would strengthen US competitiveness, and security, accelerating job growth.

DISADVANTAGES: Utilities may object to this model. It requires coordination amongst market regulators, utilities and independent groups. If set up incorrectly, it could create substantial transactions costs. Model limited to locations with an active and robust carbon markets (e.g. California).

MARKET ENABLING MEASURES: Continue to work with a broad coalition of California organizations, businesses, real estate groups, national labs, and state entities to co-design and implement a pilot. Then, bring pilot to scale.

SOURCES AND LINKS: *Capital E Website*: http://www.cap-e.com/Capital-E/CO2_to_Energy_Efficiency.html

Greening our Built world Sections 1.3 and 4.3: http://www.cap-e.com/Capital-E/Resources_%26_Publications.html

MORTGAGE-BACKED EE FINANCING

DESCRIPTION: Mortgage-backed EE financing such as an Energy Efficient Mortgage (EEM) provides additional borrowing capacity and/or better terms to borrowers buying a new energy efficient home or investing in energy improvements in their existing home.

In the case of an EEM, the financing is rolled into the home mortgage. The mortgage in effect is extended to provide a single low cost source of capital to finance cost-effective, energy saving measures as part of a refinanced or new mortgage. The cost of energy improvements and an estimate of energy savings must be determined by a Home Energy Rating System (HERS) or an energy consultant, and, under the current Federal Housing Administration (FHA) EEM product, cannot exceed 5% of the home value. Mortgages provide for repayment periods that are typically between 10 and 30 years, thus amortizing the costs of the energy efficiency improvement over the typical mortgage term. An EEM can be obtained when purchasing a home or refinancing an existing mortgage. Additional borrowing capacity is provided to the borrower under an EEM based on the assumption that the energy savings exceeds the amortized cost of the energy efficiency improvements, resulting in an NOI positive investment that improves the borrower's ability to pay, hence lowering default risk. This reduced risk can potentially justify a lower interest rate, which in turn further reduces the default risk. Energy Star Mortgage programs in Maine, New York, and Colorado inject capital into mortgage products to "buy down" the interest rate charged to borrowers as an incentive to finance energy improvements.

PowerSaver is a new pilot loan program from the Federal Housing Administration (FHA). FHA PowerSaver has begun providing federal loan insurance and other incentives to FHA Title I Property Improvement Program lenders to deliver home improvement loans. Funds are available to directly lower interest rates and lower servicing costs for loan originators. In eligible markets, homeowners can borrow up to $25,000 in first or secondary lien loans for 15-20 year terms. Initial interest rates have been between 3 and 9%. By leveraging existing state and local programs, these rates could be further reduced. FHA mortgage insurance will cover up to 90% of the loan amount in the event of default through streamlined claims procedures. Private lenders will retain the remaining risk on each loan. PowerSaver borrowers must have good credit, manageable debt and at least some equity in their home. While FHA has engaged in initial conversations with Ginnie Mae and other entities on secondary market options, challenges remain in creating liquidity for PowerSaver investors.

EXAMPLES: Colorado Energy Star Mortgage, U.S. Department of Housing and Urban Development Energy Efficient Mortgage Program, HUD PowerSaver Pilot, Community Preservation Corporation Green Financing Initiative, New Resource Bank.

Level of Funding	100%
Timing of Funding	Upfront
Type of Funding	Loan
Repayment Vehicle	Mortgage

Sectors	Residential and Commercial
Institutional Players	Lending Institutions, Mortgage Companies, Homeowners

ADVANTAGES**:** Long mortgage terms enable efficient access to low cost capital and can allow for lower monthly payments on energy efficiency measures. The cost of energy efficiency measures can be combined with existing home refinancing or home purchase, reducing transaction costs otherwise associated with pursuing a separate loan for efficiency improvements. Interest on loans is tax deductible to the borrower in the majority of cases. Energy efficiency measures typically enhance a borrower's ability to pay since the monthly energy bill reductions typically exceed the additional monthly payments associated with the energy efficiency improvements. Enhanced ability to pay may warrant preferential interest rates. The New Resource Bank, for example, provides preferential terms for green/energy efficient commercial loans for this reason.

DISADVANTAGES/BARRIERS TO SCALE: Homebuyers are often overwhelmed with other issues and unable to think about energy improvements at time-of-sale or refinancing. Many lenders are not knowledgeable about and/or are unconvinced of the NOI-positive impact of efficiency measures and are therefore reluctant to offer EEMs or to provide preferential terms for EEMs. High transaction costs can make smaller projects unfeasible. EEMs are currently limited to residential properties of 1 to 4 units.

MARKET ENABLING MEASURES**:** Municipalities can provide capital to buy-down interest rates or reduce end-user transaction costs. The Federal home lending institutions can offer loan loss reserves for EEMs. Obtaining more data on the risk profile of investments in energy efficiency and the improved effects of EEM on the borrower's ability to pay will enable more mortgage-backed EE financing. Aggregate demand for such products to attract more banks to offer preferential terms. Mortgage lenders could offer a property-secured, EE loan as part of refinanced mortgages for gross-leased and owner occupied commercial properties within pension fund and REIT portfolios. These refinanced mortgages could be securitized into a green mortgage backed security.

Capital E is working with Forsyth Street Advisors, U.S. Department of Housing and Urban Development (HUD) and the U.S. Department of Energy to develop a new EEM product called a Green Ginnie Mortgage Backed Security (MBS). Ginnie Mae (Ginnie) is a government corporation within the U.S. HUD. Ginnie guarantees the principal and interest payments on mortgage-backed securities collateralized by cash flows from single and multifamily mortgages insured by the Federal Housing Administration (FHA) and other federal agencies. Approved private lenders issue securities for which Ginnie Mae provides guarantees that are explicitly backed by the U.S. Government. This reduces required yields and reduces the interest rate that lenders charge for underlying mortgages. The Green Ginnie MBS involves structuring and creating a market for FHA and Ginnie Mae insured MBS comprised entirely of certified green single family or multi-family mortgages. This new mechanism involves incorporating a Green Mortgage Aggregator and targeted investors into the existing FHA/Ginnie Mae insurance programs. A Green Ginnie MBS would create a tangible financial incentive for the acquisition, construction, and/or retrofit of green/energy efficient homes, apartments, and other FHA-insured properties.

SOURCES AND LINKS: *DOE Energy Efficiency and Renewable Energy Solution Center: Energy Efficient Mortgages:*
http://www1.eere.energy.gov/wip/solutioncenter/financialproducts/energyefficientmortgages.html

U.S. Department of Housing and Urban Development:
http://www.hud.gov/offices/hsg/sfh/eem/eemhome.cfm

The New Resource Bank: https://www.newresourcebank.com/

Institute for Market Transformation: http://www.imt.org/residential-finance.html

Community Preservation Corporation Green Financing Initiative: http://www.communityp.com/green-financing-initiative

*Value Beyond Cost Savings: How to Underwrite Sustainable Properties - Scott R. Muldavin:*http://www.greenbuildingfc.com/Documents/Value%20Beyond%20Cost%20Savings--Final.pdf

PREFERENTIAL TERMS FOR GREEN/EE BUILDINGS

DESCRIPTION: A growing body of research and data show that green/energy efficient buildings have lower operating costs, yield higher operating income, possess lower risk of default and have higher asset values than conventional, non-green buildings. A study by the Australian Property Institute, Property Funds Association, Jones Lang LaSalle and CB Richard Ellis on 366 office buildings in Sydney and Canberra Australia, found that buildings with the highest (5 star) NABERS energy rating, were valued 9% higher than comparable, non-NABERS rated buildings. As a result of their integrated design process, green/EE buildings typically have less risk of building system failures, which reduces the risk of uninsured events or work shut downs due to system failures. Additionally, green buildings have broadly documented health and productivity benefits with associated reduced employee sick days and enhanced worker productivity. These benefits broadly improve tenant's operating margins and appear to create a valuable brand for property owners that can drive occupancy and rents.

In spite of this body of information, mortgage lenders and insurance providers largely do not recognize the lower risk/higher return attributes of investments in green/EE buildings. Convincing these parties that green buildings warrant preferential terms involves developing and delivering robust data on the performance of green properties/mortgages as compared to non-green properties/mortgages. Sufficient data would presumably serve as rationale for offering lower cost financing/insurance premiums. Preferential terms would in turn drive expanded EE and green building investment. Being a first mover in this area could be attractive to institutional investors to receive positive PR benefits and gain access to a high-quality demographic with substantial opportunities for add on services and brand loyalty.

EXAMPLES: Fireman's Fund Green Building Insurance Product, New Resource Bank. *Disclosure: Greg Kats is a co- founder of the New Resource Bank.*

Level of Funding	100%
Timing of Funding	Upfront
Type of Funding	Preferential Loan or Insurance Terms
Repayment Vehicle	Mortgage or Insurance Policy
Sectors	Residential, Commercial and Industrial
Current Funding/Rate of Growth	Very few financial institutions currently offering preferential terms
Institutional Players	Lending Institutions, Mortgage Companies, Insurance Companies, Building Owners

ADVANTAGES: Utilizes existing and efficient market channels to deploy capital to energy efficient building owners. Does not involve public institutions. Involves no new program structure or bureaucracy.

DISADVANTAGES/BARRIERS TO SCALE: Few banks currently recognize or are developing data to quantify the risk reduction characteristics of green/energy efficient buildings.

MARKET ENABLING MEASURES: Capital E has published one of the most rigorous studies on the costs and benefits of green buildings to date "Greening Our Built World: Costs and Benefits" (170 buildings). The study and book demonstrate that the average additional cost of green buildings is $4 to $5 per square foot and that the NPV from energy savings over 20 years alone is almost 3x greater than the cost premium. With industry partners, Capital E is greatly expanding this database and making it publicly accessible/searchable. The Green Building Database project provides a standard template for building owners to enter data on the performance of green buildings and non-green baselines. Users will be able to analyze data to quantify the costs and benefits (comparing green to non-green buildings). The intent is to collect data on >1,000 international green buildings within 2 years and >2,000 buildings within 3 years. The database will serve as a tool for investors and building owners to better understand the risks and returns of energy efficiency/green building projects and serve as rationale for preferential terms. More information is available at cap-e.com.

SOURCES AND LINKS: *Fireman's Fund Green Insurance Products*:
http://greenriskadvisor.ffido.com/microsite/

The New Resource Bank: https://www.newresourcebank.com/

*Greening our Built world Sections 1.3 and 4.3:*http://www.cap-e.com/Capital-E/Resources_%26_Publications.html

Community Preservation Corporation Green Financing Initiative: http://www.communityp.com/green-financing-initiative

"*Building Better Returns: A Study of the Financial Performance of Green Office Buildings in Australia,"* The Australian Property Institute and Property Funds Association, 2011:
http://www.nsw.api.org.au/c/apinsw?a=sendfile&ft=n&fid=1315792182&sid=

Green Building Database Summary: http://www.cap-e.com/Capital-E/Green_Building_Data.html

UTILITY ON-BILL FINANCING

DESCRIPTION: Under Utility On-Bill Financing, the utility or a third party financier covers the upfront cost of an energy efficiency upgrade and the customer repays the investment through a charge on their monthly utility bill. On-bill repayment overcomes program set-up barriers by leveraging the existing billing relationship that utilities have with customers and builds on the access utilities have to information about energy usage and payment history. Most utility-administered on-bill financing programs, offer low or no interest loans and short repayment periods (e.g. at most 36 months). There are two different types of on bill financing: *loans tied to the customer* - if the customer moves, the balance must be paid; and *loans (tariffs) tied to meter*–if the customer moves, the next building occupant has an obligation to pay.

From 2000 to 2007, United Illuminating offered loans to small commercial and industrial customers to finance projects that offered a minimum of 20-30% savings and 2 to 5 year paybacks. The utility offered zero-interest loans to cover 60-70% of project cost and provided rebates for the remaining 30-40%. The program drew on funding provided by the Connecticut Energy Efficiency Fund, which raised money via a monthly surcharge on the electric bills of Connecticut ratepayers. The default rate on these loans were less than 1%.

From 2002 to 2004, Public Service Company of New Hampshire and New Hampshire Electric Cooperative offered a Pay-As-You-Save (PAYS) Program pilot. The utility covered the upfront cost of installing and purchasing lighting, heating, cooling and other energy efficient equipment. A PAYS Delivery Charge (PDC) was calculated and added to the utility bill of participating customers. The PDC was tied to the meter and was equal to 2/3 of estimated savings projected from the installed measures. The charge remained on the customer's bill until the PDC is fully repaid.

Since 1989, National Grid has offered on-bill financing to small business customers in Massachusetts and Rhode Island. The program targets lighting, water heating, and refrigeration systems. National Grid covers 70% of project cost. The customer finances the remaining 30% with an interest free loan paid back on their utility bill. The loan remains interest free for up to 24 months and customers are given a 15% discount if they pay the loan off in the first month.

EXAMPLES: Sempra Utilities, United Illuminating, Manitoba Hydro (Loans); Midwest Energy How$mart (tariff), PAYS Programs, National Grid, NStar

Level of Funding	Varies by program
Timing of Funding	Upfront
Type of Funding	Loan, Tariff
Repayment Vehicle	Utility Bill
Sectors	Residential, Industrial and Commercial
Current Funding/Rate of Growth	Repayment terms and loan size vary based on customer type
Institutional Players	Utilities, Lending Institutions, Homeowners, Commercial Property Owners

ADVANTAGES: Energy savings gained from efficiency improvements and the monthly payment amount are displayed on the same bill, making it easy for customers to compare savings to loan payments. The threat of disconnecting utility service in the case of default can provide security for lenders but is politically contentious and generally not carved out. Allowing customers to make EE loan payments on their utility bill reduces customer engagement barriers and promotes program participation. Numerous utility-administered on bill financing programs offer 0% interest financing, expanding the range of feasible efficiency projects. Some utility programs offer increased incentives to participants who implement multiple EE measures, incentivizing deeper savings. Utilities have established customer relationships enabling them to administer programs at a lower administrative cost relative to standalone efforts run by municipalities or third parties.

DISADVANTAGES/BARRIERS TO SCALE: Capital providers are sometimes leery of structures in which the utility collects the funds and distributes collections to the lenders because (1) the collection practices of utilities may differ markedly from those of lenders, and (2) in the case of partial bill payment by a customer, utilities might pay themselves before paying the lender. It is difficult and expensive for utilities to change their billing system, creating barriers to adoption. Many utilities are reluctant to serve the role of loan originator and collector. Utilities and their regulators are reluctant to take on any risks associated with making loans to customers using their own capital or ratepayer funds. Utilities are concerned about the potential of servicing customer complaints about failed EE equipment. While a tariff is transferable across changes in property ownership, it is more complicated to secure the legislation necessary to set it up. Nonetheless, successful programs are typically oversubscribed due to program inefficiency and lack of funding access.

MARKET ENABLING MEASURES: Fund programs with public capital. Provide credit enhancements (e.g. loan guarantees, loan loss reserves, etc.) to reduce risks to financier and attract private capital. PUC's can mandate that utilities allocate a portion of utility capital funds for efficiency investments and/or establish dedicated public purpose surcharges to finance efficiency loans.

SOURCES AND LINKS: *DOE Energy Efficiency and Renewable Energy Solution Center: On-Bill Repayment Programs:*http://www1.eere.energy.gov/wip/solutioncenter/financialproducts/OnbillRepayment.html

Mayor's Training Program Case Study: Case study prepared by Michael A. Hyams, Columbia University - April 2009:http://energy.sipa.columbia.edu/researchprograms/urbanenergy/documents/On%20bill%20Financing%20FINAL.pdf

Energy Efficiency Paying The Way: New Financing Strategies Remove First-Cost Hurdles: CalCEF Innovations - Bob Hinkle and David Kenny – February, 2010:http://www.fypower.org/pdf/CALCEF-WP-EE-2010.pdf

Process Evaluation of the Pilot "Pay As You Save" (PAYS) Energy Efficiency Program, GDS Associates, 2003: http://www.paysamerica.org/PAYSProgramEvaluationReportFINAL12-15-03_GDS.pdf

PROPERTY ASSESSED CLEAN ENERGY (PACE) – COMMERCIAL

DESCRIPTION: The Commercial PACE programs allow local governments, when authorized by state law, to fund energy improvements on multi-family (>4 units), commercial and industrial properties with long-term loans. Required state legislation extends the land-secured financing model to energy efficiency and renewable energy projects, allowing municipalities to make loans to property owners for retrofit projects. The loan is secured by a lien on the owners' property and is paid back via a charge on the property tax bill. Municipal loan pools are funded by issuing bonds and/or with state/federal grant funding. The mortgage holder's consent is required before Commercial PACE applications are approved and assessments are placed. Based on credit and project specification guidelines provided by the DOE, reduced monthly energy bills should more than offset the additional charge on the monthly property tax bill (e.g. monthly energy savings > monthly loan payment).

A consortium assembled by the Carbon War Room, a market-based environmental non-profit, is actively demonstrating an innovative, regional approach to Commercial PACE financing. In this model, a project developer (e.g. Ygrene Energy Fund) obtains the exclusive rights to market PACE financing to building owners within a municipal jurisdiction. A credit-worthy contractor (e.g. Lockheed Martin) implements efficiency measures. The contractor guarantees energy savings and works with a third party (e.g. Energi Insurance Services) to underwrite an insurance policy to back their guarantee (e.g. Hanover Re). A capital provider (e.g. Barclays Capital) offers low-interest (e.g. 7%), short-term loans to finance projects. Loans are bundled into long-term bonds and sold to institutional investors (e.g. pension funds). This model is currently being tested in Sacramento, CA and Miami, FL and is expected to finance up to $650-mil in efficiency projects over the next few years.

EXAMPLES: Palm Desert Energy Independence Program - Palm Desert, CA; Sonoma County Energy Independence Program (SCEIP) - Sonoma County, CA; Green Finance SF - San Francisco, CA; Boulder County Climate Smart Loan Program, Boulder, CO; Miami, FL and Sacramento, CA pilot programs

Level of Funding	Maximum loan per project is program dependent. Minimum loan amounts at least $2,500.
Timing of Funding	Upfront
Type of Funding	Loans pools financed by a pooled municipal bond, stand-alone municipal bond or privately funded owner arranged bond.
Repayment Vehicle	Property tax bill
Sectors	Multi-Family Residential (>4 units), Commercial and Industrial
Current Funding/Rate of Growth	As of March 2011,$9.7M had been approved for Commercial PACE funding (Clinton Climate Initiative). Growth potential unclear.
Institutional Players	Energy contractors, ESCOs (projects >100k sf), multi-family/commercial property owners, municipal tax assessor's office, municipal program administrators, community development financial institutions, insurance providers, project

	developers, banks and institutional investors.

ADVANTAGES: Loan security through a tax lien enables beneficial terms (6-8% interest, long repayment periods – average 10-20 yrs.), and facilitates cash flow positive projects (i.e. monthly energy savings > monthly loan payments). Some institutional investors are interested in funding this model if there is sufficient scale (e.g. >$100-mil). Debt obligation transfers with ownership, which enables investments in longer payback measures and lifted debt payment requirements at sale or refinance. Provides employment boost for participating municipalities. Streamlines application process, which lowers relative transaction costs. Facilitates community-wide investments in energy efficiency. Enables certain property owners to deduct payments from income tax liability. Taps into large sources of capital such as municipal bonds. FHFA grievances do not impact Commercial PACE, since mortgage consent is a prerequisite to funding.

DISADVANTAGES/BARRIERS TO SCALE: A major limiting factor in scaling this model is that the Mortgage holder's consent is required before PACE applications are approved and assessments are placed. The program is available only to property owners. Portable items (e.g. screw-in light bulbs, movable refrigerators, etc.) are not eligible for PACE financing. There are significant legal and administrative expenses to municipalities to start programs, which typically take 6-12 months. Not appropriate for investments below $2,500 due to minimum fixed origination and administrative costs. May not be appropriate for small towns and cities since scale is required to amortize set up costs.

MARKET ENABLING MEASURES: For the state governments that have yet to enable PACE programs, pass changes in land secured financing laws. At least one bank with a large portfolio of commercial loans has reached out to building owners to solicit interest in Commercial PACE loans. This experience has demonstrated that Class A building owners would rather self-finance projects than take out PACE loans. Successful execution of this approach within a defined set of buildings could overcome challenges of securing the consent of first mortgage holders.

SOURCES AND LINKS: *Clean Energy Finance Guide for Residential and Commercial Building Improvements, Third Edition, Ch-13 Commercial Property-Assessed Clean Energy (PACE) Financing* – Department of Energy - Finance Technical Assistance Team: http://www1.eere.energy.gov/wip/solutioncenter/financialproducts/default.html

Commercial Property Assessed Clean Energy (PACE) Primer – Department of Energy Office of Energy Efficiency and Renewable Energy: http://www1.eere.energy.gov/wip/pdfs/commercial_pace_primer.pdf

"Tax Plan to Turn Old Buildings 'Green' Finds Favor", Justin Gillis, New York Times, September 19, 2011: http://www.nytimes.com/2011/09/20/business/energy-environment/tax-plan-to-turn-old-buildings-green-finds-favor.html?ref=justingillis

PROPERTY ASSESSED CLEAN ENERGY (PACE) – RESIDENTIAL

DESCRIPTION: Residential PACE programs allow local governments, when authorized by state law, to fund energy improvements on low-density residential properties (up to 4 units) with long-term loans. Required state legislation extends the land secured financing model to energy efficiency and renewable energy projects, allowing municipalities to make loans to residential property owners for retrofit projects. The loan is typically secured by a lien on the owners' property and is paid back via a charge on the property tax bill. Municipal loan pools are funded by issuing bonds and/or by state or federal grant funding (i.e. ARRA). This loan is given a first lien position and takes precedence over the mortgage in the event of default. Recent grievances filed by Fannie Mae and Freddie Mac on the first lien position of PACE loans among other concerns by FHFA and others have effectively stopped Residential PACE programs. Many experts consider the program indefinitely terminated. Based on credit and project specification guidelines provided by the DOE, the reduced monthly energy bills should more than offset the additional charge on the monthly property tax bill.

EXAMPLES: Sonoma, CA; Babylon, NY; Orange County, CA

Level of Funding	Maximum loan per project is program dependent. Efficiency projects typically range from $10k - $20k without solar systems, $20k - $45k with solar systems.
Timing of Funding	Upfront
Type of Funding	Consumer loan pools financed by federal grant awards, municipal bond proceeds or appropriations
Repayment Vehicle	Property tax bill
Sectors	Single family residential, small multi-family (up to 4 units) and small commercial
Current Funding/Rate of Growth	Residential PACE is frozen indefinitely. Since 2008, approximately $60-mil in PACE Financing has been originated in cities across the U.S.
Institutional Players	Energy Contractors, Homeowners, Residential Property Owners, Municipal Tax Assessor's Office, Municipal Program Administrators, Community Development Financial Institutions

ADVANTAGES: The tax lien adds security to PACE loans and enables more attractive financing terms (6-8% interest, long repayment periods – average 15-20 yrs.). Better terms enable cash flow positive projects (i.e. monthly energy savings > monthly loan payments), and reduces the borrower's risk of default. The debt obligation transfers with ownership, enabling investments in longer payback measures. Municipalities can streamline application process and facilitate community-wide investments in energy efficiency. Some property owners are allowed to deduct payments from their income tax liability.

DISADVANTAGES/BARRIERS TO SCALE: Available only to property owners. Portable items (e.g., screw-in light bulbs, standard refrigerators, etc.) are not eligible for financing. There are relatively high legal and administrative expenses to start programs, which typically take 6-12 months. Not

appropriate for small improvement projects due to significant fixed origination and administrative costs.

FHFA, Freddie Mac and Fannie Mae filed objections to PACE, taking issue with the senior position of PACE loans. This has frozen the vast majority of residential PACE programs nationally. The prevailing view is that these objections have killed Residential PACE.

MARKET ENABLING MEASURES: Demonstrate to home loan banks that energy reductions created by PACE-funded retrofits are NOI positive (loan repayment < energy savings) and therefore enhance a borrower's ability to pay. Pursue federal legislative or executive action to resolve the FHFA opposition.

SOURCES AND LINKS: *DOE Guidelines for Pilot PACE Financing Programs* – May 7, 2010: http://www1.eere.energy.gov/wip/pdfs/arra_guidelines_for_pilot_pace_programs.pdf

Local Governments and Federal Agencies Clash Over Property Assessed Clean Energy Programs – Cynthia Boland, Esq., Distributed Energy Financial Group LLC., September, 2010: http://www.defgllc.com/content/Publications/reports.asp

Compendium of Best Practices: Sharing Local and State Successes in Energy Efficiency and Renewable Energy from the United States - Renewable Energy and Energy Efficiency Partnership (REEEP), Alliance to Save Energy, American Council on Renewable Energy (ACORE) – April, 2010 – Pg. 45: http://www.reeep.org/16672/compendium-of-u-s-best-practices.htm

Energy Efficiency Paying The Way: New Financing Strategies Remove First-Cost Hurdles – CalCEF Innovations - Bob Hinkle and David Kenny – February, 2010: http://www.fypower.org/pdf/CALCEF-WP-EE-2010.pdf

Status Update – Pilot PACE Programs – July, 2010: http://www1.eere.energy.gov/wip/pace.html

UNSECURED CONSUMER LOANS

DESCRIPTION: A sizable portion of efficiency upgrades, particularly for less capital-intensive investments, are financed using existing cash reserves, savings from residents, or appropriations from government entities. Residential retrofits are also being funded utilizing unsecured consumer loans. These loans fall into three main categories: credit card financing, contractor liens, and unsecured home improvement loans. A contractor lien involves an installment contract in which payments are due over an extended period of time. Unsecured home improvement loans are of growing interest to federal policy, philanthropy, and commercial entities. The Fannie Mae Energy Loan provides higher interest rates than secured loans, but offers terms of up to 10 years. Fannie purchases these loans through specialized energy lenders, such as AFC First. Similar products are also offered through other sources, such as GE Money and Enerbank.

For unsecured efficiency loans to scale, mechanisms must exist to aggregate and sell loans to a secondary markets. One initiative to create this mechanism is the "Warehouse for Energy Efficiency Loans" or "WHEEL" program, under development by the Energy Programs Consortium and Pennsylvania Treasury Department. The mechanism will facilitate the purchase of unsecured energy efficiency retrofit loans, aggregate loans for between six and twelve months and sell the portfolio of loans to capital market investors, possibly in a securitized structure. The goal is to create a national program, where WHEEL is buying loans from all states, packaging and selling them.

EXAMPLES: Fannie Mae Energy Loan, GE Money, Enerbank, Maryland Clean Energy Center (MCEC) MHELP program, Warehouse for Energy Efficiency Loans (WHEEL) mechanism.

Level of Funding	Up to 100%
Timing of Funding	Upfront
Type of Funding	Consumer loans or self-financing
Repayment Vehicle	Credit Card Bill, Contractor Agreement or Loan Payment
Sectors	Residential
Institutional Players	Building Owners, Lenders, Credit Card Companies

ADVANTAGES: Easier access to capital.

DISADVANTAGES/BARRIERS TO SCALE: Higher interest rates. Good credit scores required to borrow. Requires initiative of home/building owner to investigate and select efficiency measures.

SOURCES AND LINKS: *AFC First Energy Loan*:
http://energyloan.net/index.phphttp://energyloan.net/index.php

Maryland Clean Energy Center: http://mcecloans.com

MODELS SUMMARY

The following matrix arrays all models analyzed, providing a summary characterization of each model. Heading categories include: *Building Sector, Source of Program Funds, Program Administrator, Loan Originator, Repayment Vehicle, Project Risk Profile, Level of Establishment* and *Growth Potential* as well as suggested *Market Enabling Actions*. Program Administrator is the coordinating entity. The Loan Originator reviews loan applications and decides which projects get financing. Project Risk Profile explains which entities carry the performance and financial risks as well as the recourse in the transaction. The suggested growth potential of a given model reflects conversations with study Advisors and national energy efficiency experts and indicates the potential to channel additional billions of dollars into energy efficiency within the next 3 to 5 years.

Energy Service Performance Contracting is listed first due to its maturity. Subsequent models are clustered to reflect similarity to each other.

MODEL NAME	BUILDING SECTOR				SOURCE OF PROGRAM FUNDS	PROGRAM ADMINISTRATOR	LOAN ORIGINATOR	REPAYMENT VEHICLE	PROJECT RISK PROFILE	MARKET ENABLING ACTION	LEVEL OF ESTABLISHMENT	GROWTH POTENTIAL
	C	I	R	F/M								
Energy Service Performance Contracting (ESPC)	X	X		X	Private Debt and Equity Utility Incentives	Third Party Specialized Broker	Third Party Specialty Investor Special Purpose Entity (SPE)	Service Contract	Performance Risk - ESCO Recourse - Assets Installed, Unsecured Financial Risk - Lender, SPE	PPA Arrangements Loan Guarantees Loan Loss Reserve Standardize M&V	Well established	LARGE
Energy Services Agreements (ESA)	X	X			Private Debt and Equity	Project Developer	Specialty Investors Special Purpose Entity (SPE)	Terms of PPA or Service Agreement	Performance Risk - SPE Recourse - Equipment Installed, Unsecured Financial Risk - SPE, Investors	Enable public entities to use ESAs to finance EE projects.	Few examples	LARGE
State/Municipal Loan Programs	X	X	X		State/City Appropriations Federal Grants State/City Bond Financing Tax Appropriations Revolving Loan Fund	Government Agency Government Funded Entity (GFE)	Government Agency GFE Local Bank	Loan Payments to GFE or Bank Some programs such as cost sharing or grants require no pay back.	Performance Risk - Host Recourse - Unsecured, Equipment Installed Financial Risk - Host, City/State	Rate Buy Down Preferential Terms Federal Loan Guarantees Loan Loss Reserve	Well established	LIMITED
Sustainable Energy Utility	X		X	X	Electric Bill Surcharge Bonding Authority Shared Savings	Sustainable Energy Utility	Sustainable Energy Utility	Shared Savings	Performance Risk - SEU, Building Owner Financial Risk - SEU, State	Establish bonding authority for SEU setup nationally	Few examples	LARGE

MODEL NAME	BUILDING SECTOR				SOURCE OF PROGRAM FUNDS	PROGRAM ADMINISTRATOR	LOAN ORIGINATOR	REPAYMENT VEHICLE	PROJECT RISK PROFILE	MARKET ENABLING ACTION	LEVEL OF ESTABLISHMENT	GROWTH POTENTIAL
	C	I	R	F/M								
Carbon Market Funding	X	X	X		Carbon Markets	Utility ESCO PUC/PSC Competitive Mechanism	N/A	N/A	N/A	Establish in one or a few markets (e.g. California), establish criteria relating to monitoring, performance, bonding and aggregation.	New model	LARGE
Mortgage-Backed EE Financing	X		X		Mortgage Lenders	Mortgage Lenders Federal Housing Administration (FHA) U.S. Department of Housing and Urban Development (HUD)	Mortgage Lenders	Mortgage bill	Performance Risk - Host Recourse - Property Financial Risk - Mortgage Lender, FHA	Develop and pilot Green Ginnie MBS Rate Buy Down Preferential Terms E-Loan Origination Offer commercial EE mortgage	Few examples	LARGE
Preferential Terms for Green/EE Buildings	X	X	X		Insurance Companies Mortgage Lenders	Insurance Companies Mortgage Lenders	Mortgage Lenders	Mortgage Bill Insurance Policy	Performance Risk - Host Recourse - Property Financial Risk - Mortgage Lender or Insurance Company	Develop useful data for institutional investors/ insurance providers to help meet requirements for pursuing preferential terms.	Few examples	LARGE

MODEL NAME	BUILDING SECTOR				SOURCE OF PROGRAM FUNDS	PROGRAM ADMINISTRATOR	LOAN ORIGINATOR	REPAYMENT VEHICLE	PROJECT RISK PROFILE	MARKET ENABLING ACTION	LEVEL OF ESTABLISHMENT	GROWTH POTENTIAL
	C	I	R	F/M								
Utility On-bill Financing	X	X	X		Utility funds Third party financing Bond proceeds	Utility Third party	Utility Third party	Utility bill	Performance Risk - Host Recourse - Utility service Financial Risk - Host and utility, third party financial institution or bond holders	Loan guarantees Loan loss reserves PUC mandate PUC bond issue Establish leveraged fund	Well established	LARGE
Property Assessed Clean Energy (PACE) - Commercial	X	X			State/City Government Money Federal Grants Investors	Government Agency Government Funded Entity (GFE) Third Party	Government Agency GFE Investor	Property Tax Bill	Performance Risk - Host, Contractor, Insurance Provider Recourse - Property Financial Risk - Government Agency, Investor, GFE	State policy to enable PACE programs Secure consent amongst large first lien mortgage holders Work with mortgage holders to offer PACE financing	Few examples	LARGE
Property Assessed Clean Energy (PACE) - Residential	X		X		State/City Government Money Federal Grants Specialty Investors	Government Agency Government Funded Entity (GFE) Third party administrator	Government Agency GFE Investor	Property Tax Bill	Performance Risk - Host Recourse - Property Financial Risk - Government Agency, Investor or GFE	State policy to enable PACE programs Acceptance by FHFA and Home Loan Banks of PACE's First Lien Position	Few examples	LIMITED
Unsecured Consumer Loans			X		Unsecured Loans/Lines of Credit Contractor Liens	Financing coordinated by building owner	Building Owner Lenders Contractors	Credit Card Bill Contractor Agreement Home Improvement Loan Payment	Performance Risk - Building Owner Recourse - none Financial Risk - Building Owner, Lenders	Loan guarantees, Loan loss reserves	Well established	LIMITED

PART II: STRATEGIES

INTERMEDIARY AGGREGATED SCALE PURCHASING

DESCRIPTION: Intermediary Aggregated Scale Purchasing aggregates purchases of efficiency products by providing interest rate deductions, facilitating bulk purchase discounts or mandating more stringent performance requirements across a buying group (e.g. churches, real estate portfolios, etc.). One developing example of aggregated buying is the Clinton Climate Initiative, which takes a holistic approach to deploy climate change solutions, such as building retrofits and outdoor lighting, with a global reach. A second, newer example is the Global Cool Cities Alliance, which seeks to counter the heat island effect in urban areas by promoting use of highly reflective materials/paints on rooftops and other surfaces to reflect sunlight, decrease temperature, and reduce cooling loads. The use of reflective paints/materials decreases energy bills, CO2 emissions, ozone formation, and provides highly cost effective, substantial cost savings. The Evangelical Environmental Network Climate Initiative educates, coordinates and arranges funding for energy efficiency upgrades of houses of worship. All these models work towards scalable solutions that when implemented on a widespread basis could reduce costs and provide higher financial returns.

APPLICABLE MODELS: All

EXAMPLES: Clinton Climate Initiative, Global Cool Cities Alliance, Evangelical Environmental Network, Carbon War Room's Green Capital – Global Challenge Initiative, MintoUrban Communities, Inc. (MUCI) Energy Management Program.

ADVANTAGES: Reduces the cost of financing or purchase of energy efficiency upgrades.

DISADVANTAGES: Difficult to set up and coordinate. Large entities already have strong buying power, making aggregation more valuable to smaller entities.

SOURCES AND LINKS: *Global Cool Cities Alliance, Strategy and Operations Plan*: http://www.whiteroofsalliance.org/

Clinton Climate Initiative:http://www.clintonfoundation.org/what-we-do/clinton-climate-initiative/

*Evangelical Environmental Network:*http://climateprogress.org/2010/09/27/churches-going-green-greg-kats-greening-our-built-world/

MintoUrban Communities: an Energy Efficiency and Environmental Leader: http://oee.nrcan.gc.ca/publications/commercial/m92-263-2003e.cfm?attr=20

REVOLVING LOAN FUND

DESCRIPTION: A revolving loan fund (a revolver) is a facility that lends capital to fund energy efficiency/green building and/or renewable energy improvements; loan repayments recapitalize the funding pool to enable additional lending. Revolvers can be administered by a range of entities, but are most commonly government-sponsored and managed. They commonly offer lower interest rates and/or more flexible terms than are available from capital markets and typically focus on financing efficiency upgrades such as lighting, insulation, and heating and cooling system upgrades. In addition, many universities, including Harvard, have established revolving loan funds to finance energy efficiency retrofits in their campus buildings.

Revolving loan funds can be capitalized through state bond proceeds, treasury investments, or ratepayer funds. While over 30 states have established loan programs for efficiency or renewable energy financing, their ability to attract borrowers has varied widely based upon numerous factors including interest rates, loan terms, credit requirements, and marketing effectiveness. Program administrators typically set the interest rate for these funds either by pegging the rate to state borrowing rates, or by using program funds to buy down the interest rate to lower levels. The majority of loan terms are 10 years or less. Some programs require loans to be secured by additional collateral, while others create loan loss reserve funds to limit losses in case of defaults.

APPLICABLE MODELS: State/Municipal Loan Programs

EXAMPLES: Rhode Island Energy Loan Program, State of Arizona Energy Efficiency Revolving Loans, Maryland Energy Administration Clean Energy Loan Program, Harvard Green Campus Funds, Bank of America, Texas Loan Star Fund.

ADVANTAGES: In the MUSH or commercial markets, revolving loan funds provide a method to use operational budget allocated for energy expenses to fund capital investments in energy efficiency upgrades. For universities or lending institutions, such as Bank of America, revolving loan funds provide larger loans for commercial building retrofits and upgrades. Corporations or other large entities can create a revolving fund to overcome obstacles between operating and capital budgets- this was part of the rationale used by Bank of America and Harvard in developing a revolving loan fund to support upgrades at their own facilities.

DISADVANTAGES: Simple revolving loan funds, funded directly with public funds (such as ARRA funds), do not leverage private capital, and also tend to "revolve" quite slowly (based on the loan term length). This means that public dollars may have a relatively limited impact in the near term compared to the potential to leverage private funds by using the public funds as a credit enhancement. This limitation can be overcome by additional debt to leverage increased investment.

SOURCES AND LINKS: *DOE Solution Center State and Municipal Revolving Loan Funds*: http://www1.eere.energy.gov/wip/solutioncenter/financialproducts/RevolvingLoanFunds.html

Harvard Green Campus Fund: http://green.harvard.edu/loan-fund

*National Renewable Energy Laboratory, Revolving Loan Fund Webinar:*http://www.nrel.gov/applying_technologies/state_local_activities/webinar_20090826.html

PREFERENTIAL LOANS

DESCRIPTION: Preferential loans involve the use of data by lending (or insurance) institutions to evaluate if and how much green/EE buildings merit preferential interest or insurance terms. The thesis is that energy efficient buildings reduce net operating expenses for a home or businesses due to decreased utility bills, thus increasing the disposable income of tenants. Improved building NOI (due to lower utility costs), brand enhancement and/or market preference (e.g. for healthier work buildings), may translate into higher building value and/or lower risk. In case of default, the higher building value would reduce loss risks to lenders. Analysis by CoStar indicates a considerable value creation/differentiation for green and energy efficient buildings that indicate that preferential loan terms and/or insurance rates appear warranted, with similar findings being documented in "Greening Our Built World".

APPLICABLE MODELS: Mortgage-Backed Financing, Preferential Loan and/or Insurance Terms for Green and/or EE buildings.

EXAMPLES: The New Resource Bank.

ADVANTAGES: Helps encourage energy efficiency and greening upgrades through existing, efficient market channels. Firms that are first movers in offering lower rates for green/efficient buildings will gain access to desirable client demographics and increased brand loyalty.

DISADVANTAGES/BARRIERS: Depends on increasing the quantity/quality of data documenting reduced utility bills, lowered health costs or other benefits and on the credit worthiness/default rate of their occupants. Improved and expanded data could lead to the development of a well-recognized underwriting standard for EE loans, which would facilitate the large-scale proliferation of preferential terms. Even with the availability of additional data supporting the rationale for lower rates to reflect lower risks, lending institutions are typically slow to modify lending practices and would require a large volume market for their preferential loan products.

SOURCES AND LINKS: *Coalition for Green Capital:* http://www.coalitionforgreencapital.com/

Costar Green Study: 2008 http://www.costar.com/uploadedFiles/Partners/CoStar-Green-Study.pdf

Building Rating.org - Institute for Market Transformation and Natural Resource Defense Council: http://www.buildingrating.org/

*Article: Chancellor Aiming to Reveal Structure of Green Investment Bank by Christmas – Guardian - November 4, 2010:*http://www.guardian.co.uk/environment/2010/nov/04/osborne-green-investment-bank-structure

Greening our Built World: Greg Kats, Section 1.10- Property Value Impacts on Green Buildings, p. 76

New Resource Bank:https://www.newresourcebank.com/content/energy-efficiency-home-equity-financing

RISK REALLOCATION

DESCRIPTION: Use of Insurance instruments, such as loan guarantees or loan loss reserves to cost effectively reduce or reallocate risk of energy efficiency financing in order to lower cost and enable scale financing.

A loan loss reserve fund provides partial or full risk coverage for EE loans. This additional security enhances the risk profile of EE projects and motivates financial institutions to offer EE financial products. In the event of a default, the investor is able to recuperate their loss from the reserve fund, broadening access to capital and lowering interest rates. The fund is typically organized by a government agency or government-sponsored agency and can be capitalized with public funds, such as the American Recovery and Reinvestment Act (ARRA) stimulus funds. Loan loss reserve funds take a portfolio approach to credit structuring. The loan loss reserve approximates the anticipated default rate on all the loans in the portfolio, so a reserve fund equal to 2% to 10% of the portfolio can support third party financing that is 10 to 50 times larger than the size of the reserve. A loan guarantee offers insurance against loan default.

APPLICABLE MODELS: State/Municipal Loan Programs, ESPC (credit risk coverage), Mortgage-Backed Financing

EXAMPLES: FHA PowerSaver, Bellingham Whatcom County Washington Loan Loss Reserve

ADVANTAGES: Reduces repayment risks to lenders in the case of default or partial default. Leverages private capital and offers greater opportunity to scale financing. Can result in better terms and lower borrowing rates.

DISADVANTAGES: These are difficult to price, involve significant transaction costs (e.g. evaluating risk and monitoring) and need to be done at scale to be efficient. Incentives must be in place to appropriately distribute risk and to prevent excess losses in the case of default or partial default.

SOURCES AND LINKS: *Structuring Loan Loss Reserve Funds for Clean Energy Finance Programs - John MacLean, Energy Efficiency Financing Corp., January, 2010:*http://www.cap-e.com/Capital-E/Energy_Efficiency_Financing_Resources_files/Loss_Reserve_Funds_MacLean_Presentation_011510.pdf

E-LOAN

DESCRIPTION: Highly-automated origination and a qualification system developed and used to reduce cost and time of processing large volume of efficiency loan origination, monitoring and servicing (e.g. use of e-loan type strategy of electronic automation, screening, sourcing, etc). Turnkey service providers can offer financing and professional services to ensure that municipalities incur no incremental costs or unnecessary program risks. Online portal(s) allows applicants to easily and rapidly submit and, if qualifying, obtain loans for eligible energy efficiency upgrades.

Renovate America is a young San Diego-based firm applying an e-loan approach to originating, qualifying, servicing and monitoring energy efficiency financing and projects. Its sole current product is to serve as a full-service provider to municipalities administering PACE programs. The firm identifies and qualifies projects, offers third party financing, and monitors/administers loans repaid through property tax bills under municipality-sponsored PACE programs. It earns revenue by receiving a fee at the time of origination and by recognizing a gain on sale at the time the EE project is permanently funded. This approach reduces transactions costs and leverages the e-loan software-based, low transaction cost strategy developed by E-Loan for conventional mortgage origination. While the Renovate America model is currently only applied to PACE financing, the strategy of using sophisticated e-loan origination and e-servicing could be utilized in other EE financing models (e.g. third party, utility, or municipal sponsored program). Renovate's reliance on PACE is a risk given uncertainty around the future of Residential PACE even in locations where the program has already been authorized.

APPLICABLE MODELS: Loan-based models

EXAMPLES: Renovate America, Green Door

ADVANTAGES: Reduces loan origination, servicing and administrative costs. Greatly simplifies the process of obtaining a loan. Works well with aggregated buying models for specific energy efficiency technologies.

DISADVANTAGES: More complex or custom retrofits may not be eligible for pre-approval using an e-loan model since further review would be required. Requires significant up-front investment to develop data management, processing and servicing capabilities.

SOURCES AND LINKS: *Renovate America*, http://www.renovateamerica.com/

POINT OF PURCHASE INTEREST RATE BUY-DOWN

DESCRIPTION: Financing by municipal sponsors and utilities used to "buy-down" the interest rates of qualified loans used for purchases of energy efficiency upgrades (Energy Star HVAC, Windows, etc.). The borrower receives a lower interest rate on a loan used to purchase/install equipment, and also obtains technical information and access to pre-qualified contractors. Payment from a municipal sponsor provides an effective, below-market interest rate. The municipality facilitates lending and helps reduce energy consumption, often in accordance with state mandates. If adequate capital is obtained to buy-down rates, the program has large potential for scale. A scale program could secure volume discounts and might demonstrate and leverage lower insurance, health and/or default risks/costs to help justify such a program.

APPLICABLE MODELS: State/Municipal Loan Programs

EXAMPLES: Colorado Governor's Energy Office: ENERGY STAR for New Homes

ADVANTAGES: Offers mechanism for obtaining better terms for borrowers to finance energy efficiency retrofits than would otherwise be available.

DISADVANTAGES: Program scale is limited by funds available to achieve rate buy downs. Even with potential buying power and secondary benefits, this strategy is unlikely to become self – financing.

SOURCES AND LINKS: *Department of Energy Solutions Center*:
http://www1.eere.energy.gov/wip/solutioncenter/financialproducts/ThirdPartyLoans.html

Upgrading America's Homes: Comprehensive Residential Energy Upgrade Financing: Greg Kats and David Carey. http://www.cap-e.com/Capital-E/Resources_%26_Publications.htmlhttp://www.cap-e.com/

RE-ALIGN INCENTIVE STRUCTURE

DESCRIPTION: A split incentive often occurs in many tenant-occupied property. A tenant responsible for paying utility bills is unlikely to invest in capital-intensive efficiency upgrades since they would be improving a building they do not own and may not continue to occupy in the future. Further, under triple net commercial leases, an owner is indifferent to improving the efficiency of an investment property in which they are not responsible for paying the energy bills.

Tenants have no financial incentive to commit to a financing structure that requires them to make payments beyond the end of their lease. This split incentive can be overcome by using a loan or long-term financing vehicle that attaches to the building itself. In this strategy, a new tenant becomes responsible for servicing the EE payments on the space once they begin the lease term.

There is an emerging form of retrofit financing in public housing and federally subsidized, privately owned multifamily residential property used to overcome split incentives that can broadly be described as a "shared savings approach." The property manager calculates a more accurate (i.e. lower) tenant "utility allowance" (the assumed amount in energy bill that is automatically deducted from tenant rent, as required under federal rules) and utilizes the proceeds from higher rents to make energy improvements to the property, sharing some of the savings with the tenant. This mechanism has been used in several properties and could expand rapidly with support from the Department of Housing and Urban Development (HUD) who is actively considering it.

APPLICABLE MODELS: PACE, Utility On-bill Financing, State/Municipal Loan Programs

EXAMPLES: U.S. Department of Housing and Urban Development (HUD), PACE Models, On-Bill Financing Programs (tariffs)

ADVANTAGES: Removes and overcomes split incentive between owners and tenants. Creates methods where owner and tenant can share savings from energy efficiency thus creating financial benefits for each party.

DISADVANTAGES: More complexities and higher transactions costs in setting up a shared savings approach.

SOURCES AND LINKS: *Center for American Progress, Green Housing Report:*
http://www.americanprogress.org/issues/2008/12/green_housing_report.html

STRATEGIES SUMMARY MATRIX

The following matrix summarizes characteristics of the strategies analyzed in this study. Heading categories include: a *Strategy Description, Applicable Building Sectors, Examples, Applicable Models* as well as the *Level of Establishment* and *Growth Potential*. The suggested growth potential of a given strategy reflects conversations with study Advisors and national energy efficiency experts and indicates the potential to channel additional billions of dollars into energy efficiency within the next 3 to 5 years.

STRATEGY NAME	DESCRIPTION	BUILDING SECTOR				EXAMPLES	APPLICABLE MODELS	LEVEL OF ESTABLISHMENT	GROWTH POTENTIAL
		C	I	R	F/M				
Intermediary Aggregated Scale Purchasing	Encouraging aggregated purchases of efficient products by providing interest rate deductions or mandating more stringent performance requirements across a buying group (e.g. churches, real estate portfolio). Aggregated buying can facilitate bulk purchase discounts to decrease project costs.	X	X	X	X	Clinton Global Initiative Evangelical Environmental Network Multi-City/State Carbon War Room's Green Capital - Global Challenge initiative	* All	Well established	**LIMITED**
Revolving Loan Fund	A revolving loan fund (RLF) is an established loan-fund for EERE investments in which loan repayments recapitalize the funding pool.	X	X	X	X	Rhode Island Energy Loan Program Arizona Energy Efficiency Revolving Loans Maryland Energy Administration Clean Energy Loan Program Bank of America Harvard Texas Loan Star	* State/Municipal Loan Programs	Well established	**LIMITED**
Preferential Loans	The use of data to convince insurance & lending institutions that the lower risks &/or higher returns of green buildings merit preferential interest rates & insurance terms. Energy efficient buildings reduce operating expenses for a home or business, increasing NOI hence decreasing risk. Since the occupant of an energy efficient building should have increased capital available (i.e. energy savings > monthly loan payment), they may be more credit worthy & deserve better debt terms.	X	X	X		New Resource Bank Green Banks	* Mortgage-Backed Financing * Preferential Terms for Green/EE Buildings	Few examples	**LARGE**

STRATEGY NAME	DESCRIPTION	BUILDING SECTOR				EXAMPLES	APPLICABLE MODELS	LEVEL OF ESTABLISHMENT	GROWTH POTENTIAL
		C	I	R	F/M				
Risk Reallocation	Use of insurance mechanisms such as loan guarantees or financial instruments, such as loan loss reserves, to lower overall program & loan costs. A loan loss reserve provides partial risk coverage to motivate investors to offer energy efficiency financing products. In the event of default, a loss reserve serves to limit investor losses. Similarly, a loan guarantee offers insurance against loan default wherein a third party takes responsibility for payment in case the primary borrower defaults.	X	X	X	X	Loan Loss Reserve Loan Guarantees; Evan Mills Research (LBNL) FHA Powersaver Program Bellingham/Whatcom County Washington	* State/Municipal Loan Programs * Mortgage-Backed Financing * ESPC (credit risk coverage)	Well established	**LARGE**
E-Loan	Scale origination used to reduce transaction costs via electronic automation of loan sourcing & servicing. Turnkey service providers offer financing & professional services to reduce municipality costs or program risks. Online portals allow applicants to easily apply for & obtain loans for applications that meet origination criteria.			X		Renovate America Green Door	* Loan-based models	New strategy	**LARGE**
Point of Purchase Interest Rate Buy-Down	Financing by a municipality or utility is used to "buy-down" the interest portion of qualified energy efficiency loans, providing better terms to borrowers as an incentive to buy more energy efficient products (e.g. Energy Star HVAC, windows). The investor receives payment from a municipal sponsor to lower the effective interest rate on energy efficiency loans (e.g. 6.9% as opposed to 11.9%). While the program helps to facilitate lending for energy efficiency projects, it is limited to the size & scope of funding available to buy down rates. Once funding is exhausted, the program must end or new capital secured.	X		X		Colorado Governor's Energy Office: ENERGY STAR for New Homes	* State/Municipal Loan Programs	Well established	**LIMITED**
Re-Align Incentive Structure	Tenants have no financial incentive to commit to a financing structure that requires them to make payments beyond the end of their lease. This split incentive can be overcome by using a loan or long-term financing vehicle that attaches to the building itself. In this strategy, a new tenant becomes responsible for servicing the EE payments on the space once when they begin the lease term.	X		X		U.S. Department of Housing and Urban Development (HUD) PACE Models Shared Savings Approach	* Utility On-bill Financing, * State/Municipal Loan Programs * PACE	Few examples	**LIMITED**

APPENDIX

MODEL SUMMARY II

The following matrix summarizes, in greater detail than Table 1, the models discussed in this study. Heading categories include: a brief *Description, Applicable Building Sectors, Examples, Limits to Scale* as well as the *Level of Establishment* and *Growth Potential*. The suggested growth potential of a given model reflects conversations with study Advisors and national energy efficiency experts and indicates the potential to channel additional billions of dollars into energy efficiency within the next 3 to 5 years. Energy Service Performance Contracting is listed first due to its widespread use, while subsequent models are clustered to reflect similarity.

MODEL NAME	DESCRIPTION	BUILDING SECTOR				EXAMPLES	LIMITS TO SCALE	LEVEL OF ESTABLISHMENT	GROWTH POTENTIAL
		C	I	R	F/M				
Energy Service Performance Contracting (ESPC)	Energy Service Companies (ESCOs) develop, implement & arrange financing for comprehensive energy projects. The ESCO monitors energy savings & often maintains the upgrades over time. The savings produced typically exceeds the loan payments over the term of the contract, which is typically 10 to 20 years. The savings produced by the project are usually sufficient to repay the capital costs with a minority of savings going to the host. Once the contract ends, the owner keeps all energy savings.	X	X		X	ESCOs: Ameresco; Honeywell; Siemens; Johnson Control; FINANCIERS: Hannon Armstrong, Bostonia Group	• Generally not applied to residential or small commercial. • Large transaction costs associated with reaching agreement on ESPCs. • Dodd-Frank bill will limit ESCOs ability to originate loans to finance projects.	Well established	LARGE
Energy Services Agreements (ESA)	Third party entities negotiate ESAs, arrange/provide capital, develop projects and manage installed equipment for large industrial and commercial projects. An SPE is typically established. The SPE is capitalized by third party investors and finances the costs of the efficiency improvements. The host signs an Energy Service Agreement with a project developer and agrees to pay either a fixed or floating rate for the energy savings received. The host agrees to make payments for contractual terms of their agreement (e.g. 5-15 years). During this period, the SPE retains ownership of the installed equipment and returns cash flows to investors. This structure enables energy efficiency to be treated as a service and as an off-balance sheet transaction.	X	X			Energy Harvest Fund; Metrus Energy; Transcend Equity Development Corporation; Clean Feet; Green City Finance	• Small projects have higher transaction costs & are more difficult to implement. • Many commercial and industrial building owners prefer to self-finance EE projects. • Requires complex measurement & verification of energy savings. • New FASB pronouncements on service contract accounting could severely limit scale potential. • Requires very large individual projects or aggregation of many projects to gain interest from institutional investors.	Few examples	LARGE
State/ Municipal Loan Programs	Commonly involve city/state allocating funds from general fund, federal grants or rate payer funds & aligning state energy offices, county/city governments, utilities & non-profits to originate loans & conduct program administration. Portland Clean Energy Works Program (CEWP) makes loans to home owners to cover up-front project costs (minus available state incentives). Homeowners pay the loan back via a supplemental charge on their utility bills. The most successful programs have driven green job creation through workforce development programs for needed contracting work.	X	X	X		Portland Clean Energy Works Program; PA Keystone HELP; CO Governor's Energy Office: ENERGY STAR for New Homes; MD Clean Energy Center Home Owner Loan Program; Texas LoanSTAR Program	• ARRA grants funding most active programs. • State efforts can create redundancies with utility or other Government-funded efforts. • Benchmarking/tracking energy savings on state scale is contingent upon quality metering infrastructure. • Majority of states have statutes limiting local governments from lending public money for private purposes. • Scale of programs depend on access to secondary capital (e.g. bank debt, bond issuances, & foundation investments).	Well established	LIMITED

MODEL NAME	DESCRIPTION	BUILDING SECTOR				EXAMPLES	LIMITS TO SCALE	LEVEL OF ESTABLISHMENT	GROWTH POTENTIAL
		C	I	R	F/M				
Sustainable Energy Utility	A Sustainable Energy Utility (SEU) administers financing programs, offers technical assistance, and provides financial incentives to building owners to implement efficiency measures and support renewable energy installations. The SEU is created by legislation enabling a bonding authority and/or a utility bill surcharge. Among other programs, SEUs cover the incremental costs between conventional and high-efficiency technologies. The SEU offers incentives to developers of renewable energy equal to the difference between the cost of an equivalent conventional energy supply and the renewable energy installed.	X		X	X	Delaware Sustainable Energy Utility; DC Sustainable Energy Utility	• Few SEUs have been established to date. • Requires state-level political initiative to issue bond authority necessary to create entity.	Few examples	LARGE
Carbon Market Funding	Award the value of C02 reductions to firms that lower their emissions through investment in efficiency or renewable energy. By selling their anticipated future emission reductions on the forward market, firms can pay for a significant portion of the up-front capital investment.	X	X	X		N/A – not currently in practice	• A liquid forward market for carbon reductions must exist. • Utilities & NGO's may object. • Requires coordination amongst market regulators, utilities & M&V aggregators. • If set up incorrectly, could create substantial transactions cost. •Limited to areas with active carbon market.	New model	LARGE
Mortgage-Backed EE Financing	Mortgage-backed financing such as Energy Efficient mortgages (EEM) provide additional borrowing capacity or better terms on mortgages to borrowers buying a new home certified as energy efficient or investing in energy improvements in their existing home.	X		X		EE/Green Mortgage; Col. Energy Star Mortgage; New Resource Bank, FHA Powersaver, Community Preservation Corp. Green Financing	• Utilizing existing home equity to backstop efficiency investments occur only during purchase of new home or refinancing. • Lack of secondary market for EE mortgages.	Few examples	LARGE
Preferential Terms for Green/EE Buildings	A growing body of research and data shows that green/energy efficient buildings have lower operating costs, yield higher operating income, possess lower risk of default and have higher asset values than conventional, non-green buildings. Additionally, green buildings have broadly documented health and productivity benefits with associated reduced employee sick days and enhanced worker productivity. These benefits broadly improve tenant's operating margins and appear to create a valuable brand for property owners that can drive occupancy and rents. If institutional investors and insurance funds believe that green buildings merit preferential terms, building owners could access lower cost financing/insurance for their energy efficient buildings.	X	X	X		Fireman's Fund Green Building Insurance Product; New Resource Bank.	• Banks do not currently see this as a great opportunity to mitigate risk, drive NOI, enhance borrower credit, etc.	Few examples	LARGE

MODEL NAME	DESCRIPTION	BUILDING SECTOR				EXAMPLES	LIMITS TO SCALE	LEVEL OF ESTABLISHMENT	GROWTH POTENTIAL
		C	I	R	F/M				
Utility On-bill Financing	Upfront cost of an EE upgrade covered by a utility or other entity (e.g. third party financial institution) & customer repays investment (principal & interest) through a supplemental charge on their monthly utility bill. On-bill repayment allows for a streamlined process leveraging utility's existing customer relationships and access to information about energy usage & payment history. The repayment programs can be either loans-function like personal loans as when customer moves, full balance is paid- or tariffs (attached to meter so when a customer moves, next customer at meter continues to repay).	X	X	X		Sempra Utilities; United Illuminating; Manitoba Hydro; Midwest Energy How$mart; PAYS Programs; National Grid; Nstar	* Risk-averse utilities reluctant to play role of lender or change billing mechanisms. * Traditional utility business model provides disincentive for utilities to encourage energy efficiency. * Market enabling actions largely policy based. * Successful programs are typically oversubscribed due to limited, unleveraged funding. * Utilities do not want to service customer complaints about failed EE equipment.	Well established	LARGE
Property Assessed Clean Energy (PACE) - Commercial	Once authorized by state law, Commercial PACE programs allow local governments to fund EE improvements on multi-family (>4 units), commercial & industrial properties with long-term loans. The loan is secured by a lien on the property & is paid back via a charge on the property tax bill. Municipal loan pools are funded by issuing bonds and/or accepting state/federal grant funding (i.e. ARRA). Based on credit & project specification guidelines provided by DOE, reduced monthly energy bills should more than offset the additional charge on the monthly property tax bill.	X	X			Palm Desert Energy Independence Program; Sonoma County Energy Independence Program (SCEIP); Green Finance SF; Boulder County Climate Smart Loan Program; Boulder, CO; Miami, FL and Sacramento, CA Pilots	* Mortgage holder consent is required on each transaction (major limitation). * Available only to property owners; renters cannot access program directly. * Cannot finance portable items (e.g. screw-in light bulbs, etc.). * Not appropriate for investments below $2,500 due to minimum origination & administrative costs. * May be inappropriate for small towns/cities, scale required to reduce costs.	Few examples	LARGE
Property Assessed Clean Energy (PACE) - Residential	Once authorized by state law, Residential PACE programs allow local governments to fund EE improvements on low-density residential properties (up to 4 units) with long-term loans. Loan pools funded by issuing bonds and/or accepting state or federal grant funding (i.e. ARRA). Loan secured by a lien on the property & is paid back via a supplemental charge on the property tax bill. Based on credit & project specification guidelines provided by the DOE, reduced monthly energy bills should more than offset the additional charge on the monthly property tax bill. Since 2008, establishing legislation passed in more than 20 states.	X		X		Sonoma, CA; Babylon, NY; Orange County, CA	* Available only to property owners; renters cannot access program directly. * Cannot finance portable items (e.g., screw-in light bulbs, etc.). * High legal/administrative startup costs. * Not appropriate for small improvement projects due to minimum origination/ administrative costs. * FHA, Freddie Mac & Fannie Mae filed grievances with PACE, has frozen majority of residential PACE programs nationally.	Few examples	LIMITED
Unsecured Consumer Loans	A sizable portion of efficiency upgrades, particularly for less capital-intense investments, are financed using existing cash reserves, savings from residents, or appropriations from government entities. In the absence of self-financing, residential retrofits are also being funded utilizing unsecured consumer loans. These loans fall into three main categories; credit card financing, contractor liens, and unsecured home improvement loans.	X	X	X		Fannie Mae Energy Loan; GE Money; Enerbank; Maryland Clean Energy Center (MCEC) MHELP program; WHEEL Program	* Higher interest rates, good credit scores required to borrow *Requires initiative of homeowner to investigate and select efficiency measures.	Well established	LIMITED