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Bundling Solutions for Financing Building Energy Efficiency Retrofit Projects in Residential and Commercial Buildings

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BUNDLING SOLUTIONS FOR FINANCING BUILDING ENERGY EFFICIENCY RETROFIT PROJECTS IN RESIDENTIAL AND COMMERCIAL BUILDINGS

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Introduction

Energy efficiency (**EE**) is sometimes referred to as the "fifth fuel" after coal, oil and gas, nuclear and renewable energy.[1] For more than 40 years, EE has been recognized as an important U.S. energy and public policy goal and an emerging consensus holds that unrealized EE savings constitute a significant source of energy.[2] Indeed, many consider EE to be one of the largest and most cost-effective untapped energy resources in the U.S.[3] Since the 1970's much activity has been undertaken at the federal, state and local levels among government and nongovernmental actors to promote EE standards and practices, however, even today, at a time when energy policy, energy prices and energy security are still on the forefront of public debate, many feel that EE technologies and practices are falling far short of their potential.

Buildings are responsible for approximately 40% of overall national energy consumption and renewed investment in EE projects and measures in that sector, in particular, could potentially save consumers and the U.S. economy billions of dollars, create jobs and significantly reduce the emission of greenhouse gasses. Accordingly, a comprehensive and well crafted economy-wide EE solution should include programs for the upgrading or retrofitting of existing residential and commercial structures.[4] Although there is already investment in these types of projects, significant potential still remains for further investment. The subjects discussed in this paper could serve as a useful starting point for the development of such a program.

A. Overview and Goals

A main goal of this paper is to introduce the idea of "Bundling Solutions" that can help efficiently aggregate different segments of the highly fragmented EE retrofit sector under common

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[1] *See* World Economic Forum in partnership with Cambridge Energy Research Associates, "Energy Vision Update 2010: Towards a More Energy Efficient World", 2010 [hereinafter **WEF (2010B)**] at 8; *and* Daniel Yergin, THE QUEST: ENERGY, SECURITY, AND THE REMAKING OF THE MODERN WORLD, The Penguin Press (2011) [hereinafter **Yergin**] at 614.

[2] *See* Richard Nixon: "Special Message to the Congress on Energy Resources.", (June 4, 1971), made available online by The American Presidency Project *at* http://www.presidency.ucsb.edu/ws/?pid=3038 (last visited March 30, 2012) (in which President Nixon emphasized the importance of energy efficiency as a matter of U.S. policy).

[3] *See* "Policy Implications of Greenhouse Warming: Mitigation, Adaptation, and the Science Base" (1992), Panel on Policy Implications of Greenhouse Warming, National Academy of Sciences, National Academy of Engineering, Institute of Medicine, Published by National Academies Press , [hereinafter **NAS Report**] at 204 and 208. *See also* McKinsey & Company, "Unlocking Energy Efficiency in the U.S. Economy", (July 2009), at iii (noting that "energy efficiency offers a vast, low-cost energy resource for the U.S. economy…); *and* Electric Power Research Institute, "Assessment of Achievable Potential from Energy Efficiency and Demand Response Programs in the U.S.", (January 2009), at x (stating that in 2030 EE programs could help reduce electricity consumption by 398-544 billion kWh).

[4] *See e.g.* NAS Report at 201 (stating that the residential and commercial buildings sector is the "largest end-user of electricity in the United States"); *and* Energy Efficiency Trends in Residential and Commercial Buildings, (August 2010), prepared by McGraw-Hill Construction for the US Department of Energy, Office of Energy Efficiency and Renewable Energy [hereinafter **DOE EE Trends]** at 4 (stating that buildings account for 40% of energy use in the U.S.).

commercial and transactional frameworks. Such Bundling Solutions may help unlock investment and catalyze wider implementation of building EE retrofit (**BEER**) projects in residential and commercial structures in the U.S. or abroad. By incorporating appropriate design characteristics or elements, Bundling Solutions could serve such an unlocking and catalyzing role by:

- developing project structures and contractual frameworks for producing "bankable" projects;
- enabling the origination of clusters of BEER projects of sufficient size to attract private commercial lenders;
- producing economies of scale and reducing the transaction costs involved with developing, financing and implementing BEER projects;
- helping to effectively mitigate project risks; and
- eliminating, mitigating or structuring-around other market and non-market barriers to the deeper penetration of BEER projects in residential and commercial buildings.

This paper presents background information on EE retrofit financing and business models. Attached to this paper are various annexes with additional information, including: Annex 1 (Glossary) providing a short list of relevant terms used in this paper, Annex 2 (Phases and Tasks in BEER Projects) listing typical phases of development and tasks involved with undertaking a BEER project, and Annex 3 (State EE Financial Incentives) providing a high-level summary table of different EE financing incentive programs among the 50 states.

1. Building Energy Efficiency Retrofit Market

A. Market Potential and the "Efficiency Gap"

Many agree that a sizeable efficiency gap has persisted in the U.S. for many years. For purposes of this paper, the concept of an "efficiency gap" refers to the difference between the total number of potential BEER projects that theoretically could be cost-effectively financed and undertaken, versus the subset of such projects that are actually carried out.[5] In this context, BEER projects that are cost-effective are ones in which energy savings and reduced energy costs created by the EE technologies, equipment and practices utilized as part of the BEER project are sufficient to pay for the upfront capital costs of undertaking the project within a time period equal to or less than the useful life of the project or equipment.

The efficiency gap can be at least partly alleviated through market-based transactional structuring and financial innovation designed to address a variety of barriers to EE project

[5] *See* WEF (2010B) at 13.

implementation.[6] This paper is structured on the assumption that among existing residential and commercial buildings in the U.S., even allowing for the slow diffusion of new EE technologies, the implementation of BEER projects consistently falls below the massive unrealized potential for EE savings. This shortfall results, annually, in tens of millions of dollars wasted on needlessly high energy expenditures and the emission of thousands of tons of greenhouse gasses into the atmosphere.

In light of the persistent nature of the efficiency gap, many would agree that the existing array of what an economist might call "policy interventions" and government incentives are not adequately fostering BEER project implementation. One can reasonably expect that when the barriers are mitigated through innovative and deliberate project structuring and design, more investment in BEER projects will be unlocked and the efficiency gap will decrease in size.[7]

B. Adoption Rates and Market Diffusion for Clean Technologies.

In the area of BEER projects, many of the EE technologies, equipment and techniques that can be applied have existed for many years and carry very little technology risk if installed, operated and maintained correctly . (The concept of "technology risk" here means the risk that a new or untested technology will not technologically perform as expected - resulting in lower rates of energy savings.) Even given such low risk, however, the rate of widespread market adoption of new technologies in the energy sector tends to be slower than in other fields because of certain characteristics of the energy sector, which is a policy-influenced, capital intensive industry with long lead times.[8] In the case of BEER Projects, the market is generally considered to be comprised of three main sectors (residential, commercial, and industrial buildings), and also includes municipal/government, university, school and hospital (**MUSH**) buildings. Among these sectors there are multiple sub-segments (e.g. within the residential sector are single family, multi-family, and mobile home structures).

While the adoption of EE technologies and practices in MUSH, industrial and larger commercial buildings may be maturing more rapidly than in other building sectors, the adoption of these technologies and practices in the residential and commercial sectors is far slower and these sectors constitute a primary source of the efficiency gap. In other words, the development process for BEER project technologies can be viewed as being inhibited at the point where more widespread project implementation begins to scale-up and become more widely adopted within

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[6] *See* Eric Hirst and Marilyn Brown, "Closing the efficiency gap: barriers to the efficient use of energy", Resources, Conservation and Recycling, Vol 3, p. 267 (1990) [hereinafter **Hirst & Brown**] at 268 (noting that although estimates of the specific size of the gap vary, there is general agreement that the gap is large).

[7] *See e.g.* Hirst & Brown at 267 (noting that barriers act to inhibit the adoption of EE practices and measures); Adam Jaffe and Robert Stavins, "The energy-efficiency gap: What does it mean?" Energy Policy, Vol. 22, p 804 (1994) [hereinafter **Jaffe & Stavins**] at 804-805 (stating that market barriers act as factors that can account for the efficiency gap).

[8] *See* Yergin at 559-560 (discussing various factors at play in the energy sector which contribute to relatively slow adoption of new technologies). *See also* Bernice Lee, Ilian Iliev and Felix Preston, "Who Owns Our Low Carbon Future? Intellectual Property and Energy Technologies", a Chatham House Report (2009) at vii and 57 (noting that the diffusion of new technologies in the energy sector often takes decades to reach the "mass market").

residential and small to medium sized commercial buildings. An opportunity may thus exist for using project financing structures and market-innovation as a way of overcoming this slowed progression and helping to alleviate this development lag for BEER Project technologies in residential and commercial buildings.

C. Barriers to EE Projects.

There are many barriers that inhibit EE project penetration from achieving its full potential.[9] The most commonly cited barriers to EE projects include:

- *Financial barriers*. A number of financial barriers exist such as the high upfront capital costs of implementing a BEER project and the inability of borrowers to obtain financing.
- *Technical barriers*. A number of technical barriers exist, such as the technological diversity or fragmentation of different EE technologies, the difficulty in accurately measuring and verifying energy savings produced by a project; and the risk of project underperformance due to poor technical design or improper equipment installation.
- *High transaction costs*. There are a number of different types of transaction costs involved with undertaking BEER projects, and relative to the size of the projects, often these costs deter parties from pursuing the projects.
- *Behavioral barriers*. Recent literature has explored different psychological or behavioral barriers that may help explain why a higher numbers of BEER projects have not been undertaken.
- *Structural, organizational and governance barriers*. Various issues related to institutional and governance issues, such as legal matters and complexity, coordination among project participants, project administration and management, split incentives and others.

Bundling may provide a possible means of overcoming many of these barriers.

2. Introduction to Bundling

A. Bundling as a Guiding Principle

This paper explores the concept of aggregation or bundling as a guiding principle that may be useful for overcoming barriers in the BEER project area. In this context, the concept of bundling means the process of taking separate BEER project elements (e.g. discrete project development

[9] *See* "Energy Efficiency Governance Handbook", International Energy Agency, 2nd edition, (2010) at 11; *and* Energy Sector Management Assistance Program, "An Analytical Compendium of Institutional Frameworks for Energy Efficiency Implementation", Formal Report 331/08, (October 2008), Dilip R. Limaye, Grayson C. Heffner, and Ashok Sarkar [hereinafter **Limaye et al**] at 4.

tasks, financing, other services, or physical assets such as EE equipment, parts and components) and/or separate BEER Projects, and collecting, binding together or otherwise aggregating them within or under a common organizational structure, business model and/or contractual framework.

It is expected that through systematic analysis and thoughtful transactional structuring, bundling can be used to combine different elements of EE project design, financing and implementation into practical "Bundling Solutions". As contemplated in this paper, a BEER project aggregation or bundling solution (**Bundling Solution**) means an innovate market-based business model, market delivery approach, project financing structure, or other commercial solution that can help efficiently aggregate different segments the EE retrofit sector under a common commercial and transactional framework and which will help unlock investment and catalyze wider implementation of BEER projects in residential and commercial buildings. Bundling Solutions could conceivably provide holistic "one stop shop" transactional and organizational structures capable of unlocking greater EE in the BEER sector.[10]

As used in a normal commercial context the term "bundling" often refers to the combining of goods or services and is most generally apparent where a seller or marketer bundles various goods, services, or some combination of both goods and services into a single package that can then be sold to an intermediary or end consumer. Commonly cited reasons for engaging in such bundling include: achieving greater efficiency, lowering transaction costs, lowering production costs and otherwise achieving greater economies of scale, and achieving complementarities among the elements in the bundle.

In the BEER project context, the elements that can be bundled can include goods and technology, services, financing, financial incentives, or any number of other elements that go into the different phases of implementing a BEER project. In addition to the reasons listed above that apply in a normal commercial context, other reasons why bundling can be especially useful in the EE context in particular relate to the underlying fragmented nature of EE projects and incentives among other characteristics of the EE sector generally. By using bundling, EE program designers help enable enabling greater access to financing, risk mitigation, and administrative efficiency, among other benefits.

B. Bundling Solutions in Practice

There are potentially millions of BEER projects that can be undertaken in existing residential and commercial buildings in the U.S. and numerous different federal, state and local incentive programs that can be utilized.

Some aggregation or "bundling" of EE projects naturally occurs where multiple potential EE project activities can all be undertaken within a single building, or a single apartment unit within a building. Other natural bundles occur in multi-unit apartment or office buildings. At a different

[10] *See* U.S. Environmental Protection Agency, Energy Star program, "Financing Guidebook for Energy Efficiency Program Sponsors" (December 2007) [hereinafter **EPA Guidebook**] at 9 (noting that sophisticated state or regional EE programs can provide "one-stop shopping" for homeowners) .

level however, bundling does not occur automatically and can only be the product of deliberate project design and transaction structuring, such as where multiple buildings across multiple sites are upgraded as part of the same financing and commercial transaction.

The table below discusses different types of bundling in greater detail.

Different Types of Bundling		
No.	**Type of Bundle**	**Description**
1.	Vertical - "One-Stop-Shop"	The business model (and related entity/entities and legal documentation) is structured in a manner such that the various tasks involved with undertaking a BEER project (*see* Annex 2 (Phases and Tasks in BEER Projects) for a more thorough discussion on such tasks) are generally all administered by or through the same entity, which plays a "one stop shop" type of role (in this paper, this entity is called "**BundleCo.**").
2.	Horizontal - "Multi-Project"	The transaction framework used by BundleCo. contemplates the financing and undertaking of multiple BEER projects which may each be located in the same or different neighborhoods, cities or geographic areas, have the same or different technical characteristics or other similar or unique design or implementation features. The multiple BEER projects will have been designed, developed, financed or undertaken by following the same general project evaluation, investment and administrative process or framework. In other words, although each individual BEER project will have its own unique technical, financing and other characteristics, however, collectively the grouping of BEER projects will all be wrapped or "bundled" within the same overall commercial/financing structure, albeit through separate individual financing transactions.
3.	Financing and Technical Support	BundleCo. provides the building owner with project financing (or helps arrange financing) and provides other technical services and support, such as providing energy audits, project development and design support, screening and vetting of energy services companies (**ESCOs**), assistance with obtaining government subsidies, tax benefits or other types of financial incentives, or other tasks involved with undertaking BEER projects.
4.	Technology or Practice	This type of bundle may involve a single specific type of EE project technology or practice (e.g. the financing and installation of a new high-efficiency hot water boiler in a commercial or residential building) that would be replicated or reproduced in multiple buildings/locations and would be financed under a single framework.
5.	Deep Retrofit	This type of bundle may involve a deep-retrofit of a single building and the "bundle" would be the cumulative combination of all the different elements of the retrofit which would be financed under a single framework. For example, such a single-building bundle could include the development, financing, ownership, installation and operation of a high-efficiency boiler, new HVAC systems, integrated thermostatic climate controls, building envelope improvements (insulation, windows, etc.), and other related capital improvements.

Different Types of Bundling		
No.	**Type of Bundle**	**Description**
6.	Ownership of Assets or Rights	BundleCo or another person or entity may have sole ownership rights to (or security interests in) physical BEER project assets at a single project or across multiple different projects that are all part of the same multi-project bundle, and/or may have contractual rights to revenue streams paying out of a single project or from multiple projects.
7.	Government Incentives	The model may involve the bundling of financial incentives under a single commercial framework. Here, a single person or entity could act as the project coordinator for the diverse collection of different tax, grant, rebate, and other financial incentives that can exist in connection with a given EE project. Because the property owner or project sponsor is generally the party eligible to receive such incentives initially, the commercial framework could possibly contemplate the contractual transfer, to the project coordinator, of revenues (or cost/tax savings) enjoyed by the owner or sponsor.
8.	Secondary Market Securitization	The model may involve, at a higher level (i.e. one or more levels of ownership above individual BEER projects) entities that could attract financing from institutional investors, like commercial banks or funds, by selling bonds or by using other similar financial/legal instruments.

3. Overview of Business and Financing Models

A. Introduction

Financing for BEER projects can come from a number of different sources and in one or multiple forms.[11] The primary sources for BEER project financing include federal, state or local governmental entities or affiliated quasi-independent organizations; individual financial institutions; nonprofit organizations; and the capital markets. The main forms in which financing for BEER projects can be provided include (i) equity financing – usually provided by available cash reserves of the project sponsor itself or by private equity sponsors, (ii) debt financing of a variety of different types, and (iii) grants, rebates or other "free" money.[12]

[11] *See generally* "Enabling Investments in Energy Efficiency: A study of energy efficiency programs that reduce first-cost barriers in the residential sector", Merrian Fuller, for University of California - California Institute for Energy and Environment and Efficiency Vermont (May 21, 2009) at 4 (outlining elements of different debt financing programs); *and* "Energy Efficiency Finance 101: Understanding the Marketplace", Joel Freehling, (August 2011), ACEEE White Paper [hereinafter **Freehling**] (giving an overview of various debt and other financing sources for EE projects).

[12] For purposes of this paper sponsor-equity, grants and rebates are not directly analyzed as they cannot rightly be considered to be viable market-based mechanisms and they do not appear to offer a practical economy wide long-term solution likely to become widely adopted and effective at driving deeper market penetration of BEER projects.

B. Private Equity and Venture Capital

In simplified terms, the business model behind private equity (**PE**) and venture capital (**VC**) firms is one of high-risk and high-reward. These types of financial firms tend to follow investment strategies by which they provide financing (often in the form of ownership or equity interests) to new or underperforming companies and ventures that are relatively high risk investments, and accordingly the VC or PE firms typically have an expectation of higher rates of return on their capital than what would be recovered from less risky endeavors such as investing in investment grade corporate or government bonds.

A variety of private investment funds, VC and PE firms are active in financing EE projects and can serve as a meaningful source of capital, management expertise and market innovation for BEER projects going forward. According to at least one estimate, 2011 marked the highest level ever recorded for VC investment in the "cleantech" sector as a whole.[13] In terms of timing, often VC and PE firms as a group tend to invest in earlier stage technologies and startup companies although they can also be involved in the later stages of technological development (i.e. market penetration and diffusion) as well.[14] Although they have been active in the cleantech and renewable energy fields for some time, VC and PE firms have a growing interest in EE as well and in recent years, VC and PE firms have become increasingly active investors in the EE sector.[15] Although the specific business models and financing methods used by such firms vary from company to company, some (such as Hannon Armstrong Capital, LLC, based in Annapolis, Maryland, and Transcend Equity Development Corp., based in Dallas, Texas), use innovative equity financing structures utilizing energy performance contracts (discussed below) for retaining ESCOs to do the design and construction work.

C. Debt Financing from Commercial Banks

As a group, commercial banks are the largest category of depository institutions in the U.S. (as compared to savings associations and credit unions) and hold the largest percentage of financial assets as compared to all other financial intermediaries, such as mutual funds, pension funds and bank holding companies.[16] In spite of their financial size and the major role they play in providing retail financing services to individuals and businesses, most commercial banks participate in the EE finance arena in only a limited fashion, if at all, and do not actively provide loan products specifically aimed at financing BEER projects in the residential and commercial sectors.[17]

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[13] *See* "Annual Venture Investment Dollars Increase 22% Over Prior Year, According to the Moneytree Report", PricewaterhouseCoopers and National Venture Capital Association, January 20, 2012, at: https://www.pwcmoneytree.com/MTPublic/ns/moneytree/filesource/exhibits/11Q4MTPressrelease.pdf (last visited March 27, 2012).

[14] *See* discussion above regarding "Adoption Rates and Market Diffusion for Clean Technologies".

[15] *See* Bloomberg (2010) at 14, 22 and 27.

[16] *See* Michael Malloy, BANKING LAW AND REGULATION, Second Edition, Aspen Publishers (2012) at 1-13.

[17] *See* Freehling at 3. A preliminary review on or around March 20, 2012 of the websites of at least five state chartered banks in each of New York, California, Texas, Virginia, Florida and Michigan, and of five major national bank-holding

The fact that most commercial banks do not appear to offer specific loan products for financing EE projects is probably a product of banking customer priorities. The lack of consumer demand for BEER project loans may be a main reason why commercial lenders do not typically offer specific loan programs in this area. Even though this group of lenders does not offer a specific loan product tailored for BEER projects, such loans can be made through the existing home equity or home improvement loan programs of the banks – assuming borrowers satisfy the lenders' underwriting and eligibility criteria for such loans.

To the extent commercial banks are involved in directly providing debt financing for BEER projects, they mainly do so by writing loans for large EE projects in the MUSH sector. BEER projects in this sector tend to be significantly bigger, in terms of capital costs and physical infrastructure, than typical residential or commercial retrofits and usually involve borrowers with robust balance sheets and investment grade credit ratings, as determined by major credit rating agencies (e.g. Moody's, Fitch and Standard & Poor's). For a variety of reasons, including the small size of the loans, high transaction costs relative to the size of the projects, and other barriers, providing financing for residential and commercial projects is not part of the standard business model for most commercial banks. In the area of community development, many banks like Bank of America, Wells Fargo, and JPMorgan Chase provide financing directly or indirectly to community development financial institutions (**CDFIs**), some of which have specific EE financing programs. These CDFI programs, however, focus on only one segment of the overall residential and commercial BEER project sector.

D. Debt Financing from Credit Unions

There are approximately 7,500 credit unions in the U.S.[18] As compared to commercial banks, credit unions are typically smaller in size (as measured by total assets) and constitute a much smaller portion of depositary institutions. Credit unions are, however, viewed by some observers as being much more active in BEER financing than commercial banks. Unlike commercial banks, the depositors who have savings, checking and other accounts with credit unions are also the owners or "members". Perhaps partly because of this reason, credit unions are often viewed as tending to be more focused on the local communities in which they are located.

In the area of clean energy and EE lending, credit unions are increasingly focusing more on offering loans for BEER projects in residential and commercial buildings.[19] According to one report,

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companies (Bank of America, Wells Fargo, JP Morgan Chase & Co., Citigroup, and PNC Financial Services) revealed that none offered loan products to individuals focused on EE projects.

[18] Credit Union National Association (stating that the U.S. has 7,535 credit unions); World Council of Credit Unions (reporting that in 2010 the U.S. had 7,491 credit unions).

[19] *See generally* Michael Emancipator, "Tap Into Renewable Energy Loan Market", online article at www.CreditUnions.com, (January 30, 2012) (reporting on credit unions that offer renewable energy and EE loan programs); *and* W. Robert Hall, "Guest Opinion: Green Lending Is Profitable and Smart", Credit Union Times Magazine, (February 15, 2012) [hereinafter **Hall**] (stating that many credit unions "are meeting the needs of their members by providing fairly priced financing for energy-saving improvements and investments" in their homes and businesses). *See also* Filene Research Institute, "Finding Sustainable Profits: Green Lending in Credit Unions" as quoted in Hall

many credit unions currently offer such loans on an unsecured basis, without taking a lien or mortgage, and a growing number are joining the BEER financing market. In addition, several credit unions with programs for EE financing do so in collaboration with state, municipal or utility sponsored programs designed to increase consumer outreach and market access for BEER project implementation.[20]

E. Debt Financing from Federal and State Sources

In general, most debt financing provided by government sources for BEER projects in the residential and commercial sectors is channeled through state or local programs. At the federal level, aside from programs aimed at low income housing, there are no major programs by which the federal government directly finances BEER projects in privately owned residential or commercial buildings, although in some cases such funding is made indirectly through state or local programs.[21] The American Recovery and Reinvestment Act of 2009, for example, contained a number of different energy and EE related provisions which provided new funding for existing federal programs such as the following:

- funding for the Energy Efficiency and Conservation Block Grant program;
- funding for the Weatherization Assistance Program; and
- funding for the Public Housing Capital Fund – Energy Conservation Retrofit Investment Plan, administered by the U.S. Department of Housing and Urban Development.[22]

At the state level, the majority of states are host to some form of EE loan financing program of one type or another and many have created revolving loan funds that provide financing for renewable energy and/or EE projects.[23] Many of such loan funds are financed through income

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(stating that more and more credit unions are providing loans for "green purposes" including renewable energy and EE projects).

[20] Examples include Velocity Credit Union (coordinating with Austin Energy through the utility's Power Saver program); Opportunities Credit Union (coordinating with Efficiency Vermont, a program administered by the Vermont Energy Investment Corporation, to finance farm EE projects), and Pacific Crest Federal Credit Union (coordinating with Clean Energy Works Oregon, Inc. to finance residential EE projects).

[21] *See e.g.* Michael Zimmer and Jennifer Rohleder, "Green Building Financing", Chapter 5 in The Law of Green Buildings, J. Cullen Howe and Michael B. Gerrard Eds. (2011) [hereinafter "**Zimmer & Rohleder**"] at 104-109 (discussing different federal programs for financing green buildings but omitting mention of any significant loan programs).

[22] *See* American Recovery and Reinvestment Act of 2009, Title III (appropriating funds for the Energy Efficiency, Conservation Block Grant and Weatherization Assistance programs) and Title XIII (appropriating funds for the Public Housing Capital Fund); see also GBC Press Release (summarizing green building and energy efficiency provisions in ARRA).

[23] *See* Database of State Incentives for Renewables & Efficiency (DSIRE) at http://www.dsireusa.org [hereinafter **DSIRE**]; *See also* Freehling at 11; *and* "Interactions between Energy Efficiency Programs funded under the Recovery Act and Utility Customer-Funded Energy Efficiency Programs", Charles A. Goldman, Elizabeth Stuart, Ian Hoffman, Merrian C. Fuller and Megan A. Billingsley, Environmental Energy Technologies Division, Ernest Orlando Lawrence Berkley National Laboratory, (March 2011) at 36 (noting that around 35 states have revolving loan funds to finance EE and renewable energy projects).

earned by states or utilities in connection with public benefits charges, or in connection with emissions trading schemes like the Regional Greenhouse Gas Initiative in the Northeast.

In addition to funding from revolving loan funds, states can also be involved with a variety of different types of EE programs or initiatives, from state-run programs administered by one or more state agencies, such as the Green Jobs - Green New York Program administered by the New York State Energy Research and Development Authority, or state or municipal economic development authorities. Some independent or quasi-independent nonprofit organizations are also sponsored by state governments or funded with state resources. Overall, the availability of federal, state or municipal debt financing for BEER projects varies widely from one location to the next and the combinations of programs and incentives that may be available for a project sponsor in one town, may be dramatically different from those available to another sponsor of a nearly identical project in a different state.

F. Debt Financing from Nonprofits

Subject to certain limitations, tax exempt nonprofit entities can make low interest mission or social-related loans called program related investments (**PRIs**) to finance eligible BEER projects. As long as they are structured correctly, PRIs have the potential to be a versatile and useful method for providing financing for BEER and other EE projects. PRIs are highly versatile in many ways, can be made in a variety of sizes from very small loans of $1,000 or less to several million dollars, can be made in the form of bridge loans, subordinated loans, loan guarantees or a variety of other forms and, as a matter of federal tax law, cannot be extended at interest rates that are competitive with commercial loans.[24] The largest issuers of PRIs are the Ford Foundation, the MacArthur Foundation, and the FB Heron Foundation, all of which have provided funding in the past for EE projects, largely by financing CDFIs which have then used the funds to leverage additional debt from commercial banks.

G. Bond Financing

In many ways the process and structure for issuing private corporate or municipal bonds as a fundraising tool is similar to taking conventional commercial loans and can be an effective method for financing the upfront capital costs of an energy project in general.[25] In the field of EE projects, however, the use of bond financing is not widely used. Issuing long term bonds or promissory notes (basically short-term "IOUs") in a BEER project context is more difficult than obtaining a commercial or other loan and tends to be a highly complex process involving multiple parties and high transaction costs. It is generally viewed as impractical to use bonds or notes to finance individual BEER projects in the residential or commercial sector. That said, bond financing

[24] *See* PRI Makers Network, "Frequently Asked Questions About Program-Related Investments", available at http://www.primakers.net/files/Feb%202011%20PRI%20Primer.pdf (last visited March 30, 2012).

[25] *See* THE LAW AND BUSINESS OF INTERNATIONAL PROJECT FINANCE, 2nd Edition., Scott Hoffman, Kluwer Law International, (2001) at 114 and 117 (discussing how the typical project financing uses commercial term loans and noting that bond financing structure is similar to the commercial loan structure).

can be a powerful tool for capitalizing a financial intermediary or special purpose entity (**SPE**) which can then use those funds to make a series of smaller loans for individual BEER projects. In this context, such an SPE could be a community development fund or other similar entity focused on providing relatively small loans for individual EE projects. Such an SPE can potentially bundle together an existing portfolio of BEER project loans into a marketable security instrument (bonds or notes) and capitalize or recapitalize itself by selling those instruments into the secondary market where such bonds and notes are traded among financial firms. This is the same general approach used in the mortgage industry to increase liquidity and manage risk.[26]

As a method for capitalizing or recapitalizing an EE fund or SPE, issuing bonds in a careful and well structured manner may be an effective tool for financing BEER projects and enhancing access to secondary market sources of funding. There are a variety of different bond financing methods and structures that conceivably can be used for funding SPEs or BEER project programs, including for example:

- private placements to qualified institutional buyers under Rule 144A (a special type of bond-issuance process that avoids the burdensome registration and reporting conditions applicable to securities that are marketed and sold to the general public);
- tax-exempt private activity bonds (a category of bonds that qualify for tax exempt status under federal tax laws);
- issuance of bonds under the CDFI Bond Guarantee Program (a federal program through which the U.S. Treasury Department guarantees the debt issued by qualifying CDFIs); or
- sale of Qualified Energy Conservation Bonds (a type of tax exempt bond that can be issued by local governments to help finance qualifying private EE projects).

H. Sustainable Energy Utilities

A relatively new approach for helping spur greater investment in EE projects is the sustainable energy utility (**SEU**). An SEU is an entity created by a state or local government that provides funding and technical assistance for BEER projects and/or local renewable energy projects.[27] In general, SEUs provide a variety of different services and functions to encourage EE activities, renewable energy and other energy-related projects. Such services and functions can include the following:

- provide or help arrange project financing;
- exploit different funding sources, including tax exempt financing and incentives, federal or state grant money and commercial debt, utility efficiency funds from state public

[26] *See generally* Goldman, Sachs & Co., "A reference guide to mortgages, bank loans and structured credit" (2008) (describing mortgage backed securities). *See also generally* Adam Ashcraft and Til Scheurmann, "Understanding the Securitization of Subprime Mortgage Credit", Federal Reserve Bank of New York, Staff Report No. 318, (March 2008) (providing an overview of the subprime mortgage securitization process).

[27] *See generally* "Energy Efficiency and Conservation: New Legal Tools and Opportunities", Natural Resources & Environment, (Spring, 2011), John C. Dernbach, Robert B. McKinstry, Jr., Darin Lowder [hereinafter **Dernbach et al**] at 6-7 (providing a succinct overview of SEUs); *and* Jason Houck and Wilson Rickerson, "The Sustainable Energy Utility (SEU) Model for Energy Service Delivery", Bulletin of Science Technology & Society (2009), Vol. 29, at 95-107.

benefit charges, dedicated taxes, and funds from the sale of emissions allowances or efficiency credits;

- facilitate public-private partnerships and use different tax incentives (e.g. tax credits and accelerated depreciation) to develop EE projects;
- use financing and organizational methods to aggregate or bundle smaller EE projects under a single portfolio in order to achieve a greater scale that helps facilitate project development and financing; and
- serve as a central hub of technical knowledge and know-how, provide technical assistance and help find and vet ESCOs and potential financiers who can help in project implementation.[28]

There are at least five SEUs in existence around the U.S. which have been created at the state or municipal levels, although this number may be greater depending on what specific criteria are used to distinguish an SEU from other similar entities and programs.[29] Because of their innovative organizational structure and financial and technical flexibility, the use of an SEU as a potential method for overcoming barriers and further unlocking BEER project implementation merits further consideration.

I. Utility Programs

There are over 3,000 electricity providers and utilities nationally, a large number of which administer EE-related programs promoting the more efficient use of energy among their customers.[30] Many of such EE programs are driven by the requirements of state level EE resource standards which obligate covered utilities to obtain specified quantities of EE savings by certain target dates.[31]

Although the form and substance of these programs can differ greatly, in general many utility-based EE programs offer a range of different financial incentives such as access to equipment-specific rebates and upfront grant or loan financing, as well as technical support. By one calculation, utilities in 48 states offer more than 1,000 rebates, grants and loans for BEER projects (45% of which target the residential market, 29% target the commercial market, and 16% focus on both markets).[32] Although some debt-financing is available under such programs, rebates make up

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[28] Dernbach et al at 7.

[29] These include Efficiency Vermont (Vermont); the Clean Energy Finance & Investment Authority (Connecticut); the Sustainable Energy Utility, Inc. (Delaware); the District of Columbia Sustainable Energy Utility program (Washington DC); and the Cambridge Energy Alliance, Inc. (Cambridge, Mass.).

[30] *See* American Public Power Association, *2010-11 Annual Directory & Statistical Report*, at 22. As used here, the term "electricity utility" is broadly defined to refer to publicly owned utilities, investor owned utilities, cooperatives, federal power agencies and power marketers.

[31] Approximately half of all states in the U.S. have some type of mandatory EE resource standard. *See* "The 2011 State Energy Efficiency Scorecard", Michael Sciortino, Max Neubauer, Shruti Vaidyanathan, Anna Chittum, Sara Hayes, Seth Nowak, and Maggie Molina, (October 2011), American Council for an Energy-Efficient Economy, Report No. E115, at 18; *and* DSIRE.

[32] *See* DOE EE Trends at 37.

the vast majority of utility incentives that are available from utilities for residential and commercial BEER projects. Annex 3 (State EE Financial Incentives) of this paper provides more detailed data on such programs.

In addition to rebate, loan and other similar programs, in many cases utilities allow customers to make use of on-bill repayment options. Under this approach a customer who receives financing from a utility or other third-party for their BEER project can make loan payments in the normal course of paying their energy bill. On-bill repayment thus acts to simplify the payment process for the customer, allowing them to pay their regular energy bill and repay their EE loan at the same time and through the same invoicing and payment-processing system . On-bill financing programs run by electric utilities in New England, California and some Midwestern markets have proven successful for residential and small business projects, although on-bill programs do pose their own challenges and require more of the participating utilities.[33]

For the most part, on-bill financing programs differ from one another and no two are exactly the same. Often they vary in their sources of capital, financing product design, target market, and overall implementation strategy. Additionally, differences in on-bill programs from one locality to another can be driven by the EE financing needs of local borrowers, the availability of local and state financial incentives and differences between utility business models.

In New York, for example, state legislation passed in June of 2011 gave BEER project owners the option of borrowing funds from a special state-sponsored loan fund and repaying that debt through a new program for on-bill payments, as part of their utility bill.[34] Borrowers participating in this program would allow a subordinated mortgage to be placed on their property as security for the loan, and in the event they stopped making their loan payments, their electricity could be shut off by the utility. At the time of its passage, this program was touted as the first statewide program of its kind in the U.S. which allowed residents, nonprofits, and small businesses to use on-bill repayment as a way of paying for EE upgrades.[35]

J. Debt Financing with Energy Efficient Mortgages

Some highly credit worthy borrowers may not be required to provide collateral as security for a BEER project loan, however, often a financial institution (be it a commercial bank or some other type of lender) will require some form of assurance that the debt will be repaid. In such cases, the home or building itself is often the most valuable asset owned by the borrower and the

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[33] "New Business Models for Energy Efficiency", Bob Hinkle and Steve Schiller, CalCef Innovations, (March 2009), [hereinafter **Hinkle & Schiller (2009)**] at 9.

[34] The Power NY Act of 2011 (A. 8510/S. 5844).

[35] *See* Press Release, dated August 4, 2011, "Governor Cuomo Signs Power NY Legislation", available at: https://www.governor.ny.gov/press/08042011NYLegislation (last visited on May 31, 2012). *See also* Michael Gerrard, Frederick Fucci and Nelson Johnson, "New York Law to Help Finance Energy Efficiency Contacts Improvements and Accelerate Energy Generation Facility Construction", Arnold & Porter LLP, Advisory (June 2011), available at: http://www.martindale.com/members/Article_Atachment.aspx?od=113129&id=1311248&filename=asr-1311202.Energy.pdf (last visited May 31, 2012).

lender will require that it receive a security interest in the property in exchange for extending the loan. In such a case the borrower agrees to give the lender a lien over the property until the outstanding principal, interest and fees are repaid.

In essence, a mortgage is a generalized term for a loan, usually from a bank, that is used to pay for the purchase of property, home improvements or for other purposes, and which is secured by a lien on the property itself. The mortgage is the legal document that is used to establish the lender's security interest on the property. An EE mortgage is a generic term referring to a special type of mortgage-backed loan in which the lender's underwriting guidelines and procedures have been modified to expressly contemplate that a portion of the loan funds will be used for home EE improvements in addition to the cost of purchasing or refinancing the home.[36] Qualifying EE mortgages can be underwritten by Fannie Mae, Freddie Mac or insured by the Federal Housing Administration and such underwriting or insurance further helps to provide liquidity to this market.

K. Debt Financing with PACE

Although the details vary from one program to the next, in general property assessed clean energy (**PACE**) financing allows residential and commercial property owners to borrow money through a local municipal program to pay for their BEER projects, and the debt is typically then repaid by the borrower through a special assessment on their property over a period of several years.[37] Once enabled through local laws, PACE financing can generally be used for financing a residential or commercial BEER project, although as discussed at the end of this section, since 2010 residential PACE financing programs have been stalled due to issues raised by the federal government.

PACE financing is a relatively new approach for financing EE projects even if the underlying approach used by municipalities has existed for some time. For years municipal governments have paid for local infrastructure improvements such as new sewer and potable water systems by issuing bonds which are ultimately backed by the local government's ability to impose property levies or tax assessments on the land owners who will benefit from the improvements. The basic idea is that the property owners (as beneficiaries of the new infrastructure) can borrow funds from the PACE program and pay for the property improvements in the course of paying their local property taxes.

More recently municipalities have taken this basic concept and sought to use it to finance clean energy projects. Currently almost 30 states have some form of PACE program in existence.[38] In most cases, the starting point for creating a new PACE program is the enactment of state-level

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[36] *See generally* Zimmer & Rohleder at 105-107 (describing EE mortgages in general and specific federal programs in particular).

[37] *See generally* Alliance to Save Energy, "Fact Sheet: Property Assessed Clean Energy Financing" (July 2011); *and* "Property Assessed Clean Energy (PACE) Financing: Update on Commercial Programs", Policy Brief, (March 23, 2011), Renewable Funding, Clinton Climate Initiative – Clinton Foundation, Lawrence Berkeley National Laboratory.

[38] *See* DSIRE (PACE programs) listing PACE programs in 29 separate states.

legislation authorizing municipalities to assess liens on the local properties. After this, or if the municipality is located in a state where such legislation is not necessary, the local municipal government can opt to participate and create enabling laws to implement the program.[39]

Effectively PACE functions as a payment mechanism (like on-bill payments) that helps ensure that the EE project costs are paid off by additional cash flow for the property owner or tenant created by the EE project itself and the resulting lower energy costs. PACE financing also allows for the payment obligation to stay attached to the land itself, even if ownership changes from one owner to another. In case the borrower stops paying, the municipal government as the lender has direct recourse to the property itself.

Regarding residential PACE programs, over the course of several months in 2010, various federal agencies and affiliated entities, (including the Federal Housing Finance Agency (**FHFA**), the Office of the Comptroller of the Currency, and mortgage underwriters Fannie Mae and Freddie Mac), issued statements and other guidance regarding PACE financing for residential borrowers.[40] Collectively, these statements and guidance effectively stopped most residential BEER project loan programs that used a PACE financing model. In general, the U.S. government took the view that such PACE financings constituted secured loans that were senior in priority to the federally-backed mortgages, thus violating standard mortgage provisions which prohibit the subordination of the federal loans. In response, several lawsuits were filed and an official FHFA rulemaking process has been initiated.[41] Until this matter is settled, however, PACE programs generally cannot be used to finance residential BEER projects.

L. Energy Efficiency Performance Contracting

In this paper the terms "EE performance contracting" and "EE performance contracts" are used generically to refer to a specific structure and business model for the development and financing of BEER projects. In general, under this model an ESCO (as the service provider and contractor) enters into an agreement with the building owner or sponsor of the BEER project (as the customer) pursuant to which the ESCO takes on the responsibility for performing most of the work involved with designing and constructing a BEER project. Although the specific services to be performed by the ESCO will vary from contract to contract, such tasks can include all or many of the specific items identified in Annex 2 (Phases and Task) for undertaking a BEER project.

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[39] *See* Dernbach et al, at 7 (regarding Pennsylvania).

[40] *See e.g.* Fannie Mae Lender Letter LL-2010-06, dated May 5, 2010, to all Fannie Mae Single-Family Sellers and Servicers, available at: https://www.efanniemae.com/sf/guides/ssg/annltrs/pdf/2010/ll1006.pdf (last visited May 31, 2012); Federal Housing Finance Agency Statement on Certain Energy Retrofit Loan Programs, dated July 6, 2010, available at: http://www.fhfa.gov/webfiles/15884/PACESTMT7610.pdf (last visited May 31, 2012); and Freddie Mac Industry Letter, dated May 5, 2010, to Freddie Mac Sellers/Servicers, available at: http://www.freddiemac.com/sell/guide/bulletins/pdf/iltr050510.pdf (last visited May 31, 2012).

[41] *See* FHFA, Advance Notice of Proposed Rulemaking, No. 2590–AA53, dated January 26, 2012 in the Federal Register, Volume 77, No. 17 (providing a detailed summary and background on the FHFA's concerns regarding residential PACE and raising a series of questions to be considered in connection with potential federal regulations), available at: http://www.fhfa.gov/webfiles/23073/77_FR_3958.pdf (last visited May 31, 2012).

In EE performance contracts, ESCOs often contractually assume certain project-related risks, including actual EE savings/performance risk. A defining feature of most EE performance contracts is the performance guarantee given by the ESCO, in which it guarantees that, subject to certain conditions, the project will deliver the expected energy savings.

Often the ESCO itself will finance (or arrange financing for) the upfront capital costs of undertaking the project and these costs are typically then repaid by the building owner over time out of the newly available cash flows created by the lower energy costs. In this way, like a bank the ESCO itself may be extending credit to the building owner. In many ways EE performance contracts are very similar to the "Engineering, Procurement and Construction Contract" or "EPC Contract" widely used in large infrastructure and energy projects in that they provide a turnkey solution for obtaining design, procurement and construction services through a single instrument.

The general concept of EE performance contracting has existed since the 1950's, and in the U.S. the "Energy Savings Performance Contract" (**ESPC**) has been used for over twenty years by U.S. government agencies and to a lesser extent by state and local governments and other building owners in the MUSH sector.[42] Since the mid-1980's, when the use of ESPCs by federal agencies was first authorized by Congress, ESPCs and other types of EE performance contracts have continued to evolve and become more widely used beyond the government and MUSH sectors.

The expansion of EE performance contracting into residential and smaller-scale commercial BEER projects is a relatively new occurrence and there are potential issues and risks to be addressed. That said, as a contractual structure and business model, many observers in the EE finance arena note that EE performance contracting holds great potential as a possible tool for further unlocking BEER projects and helping to penetrate the EE market beyond large commercial and MUSH projects.

In recent years various nonprofit organizations and private companies have developed variations on the basic EE performance contracting model. Among others, these include structures in which the ESCO, in addition to providing the same general bundle of services for the owner as under a standard ESPC, may also own the BEER project assets or may act as the energy supplier to the building owner, selling the owner electricity through a type of a power purchase agreement.[43]

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[42] *See generally* "Energy Savings Performance Contracts: A Critical Look", Jeff Belkin and Lydia Jones, Andrews Utilities Industry Litigation Reporter (June 13, 2008); *and* "The Future is Bright for Energy Savings Performance Contracts", Aaron P. Silberman, Construction Briefings, (October 2011), (each providing brief histories of ESPCs in the U.S.). *See also* IEA (2012) at 24-28 (giving an overview of ESPCs and noting that the concept of performance contracting "originated with the Energy Supply Contracting, or Chauffage, model in France in the 1950s…")

[43] *See generally* "The Evolving Picture of Energy Efficiency Retrofitting for New York City Commercial Buildings", Ryan North, Daniella Leifer, Ellen Sinreich, Michael Bobker, Practicing Law Institute, Real Estate Law and Practice Course Handbook Series, at 6-7; Hinkle & Schiller (2009) at 11; *and* Namrita Kapur, Jake Hiller, Robin Langdon, and Alan Abramson, "Show Me the Money: Energy Efficiency Financing Barriers and Opportunities", Environmental Defense Fund, (July 2011) at 13-16 (discussing energy services agreements and managed energy services agreements)

M. Municipal Programs

Municipally sponsored EE financing and development programs come in many forms including, among others, grants, loan programs, revolving loan funds, tax-exempt bonds issued for the benefit of qualifying privately owned projects, and financing under PACE programs. For example, across the U.S. there are approximately 33 separate loan programs administered by local governments in 22 states for financing clean energy (renewable and/or EE) projects in the residential and commercial sectors.[44] Municipalities can also promote private investment in BEER projects by offering various tax and other incentives. Such financing programs are generally administered directly by city agencies or municipal utilities, by independent or quasi-independent nonprofit entities, or by city sponsored economic development organizations.

Part 4. Conclusion

Buildings are responsible for approximately 40% of overall energy consumption in the U.S. For over twenty years an emerging consensus has held that unrealized EE savings in general constitute a significant source of energy. Indeed many consider EE to be one of the largest and most cost-effective untapped energy resources in the country. At a time when energy policy, energy independence, energy prices and energy security are all prominent public policy issues, many are concerned that the upgrading of residential and commercial buildings with EE technologies and practices may be falling far short of the potential.

Innovative market-based transactional "Bundling Solutions" could potentially help efficiently aggregate different segments of the highly fragmented EE retrofit sector under common commercial and transactional frameworks. Such Bundling Solutions may thus help overcome barriers, unlock investment and catalyze wider implementation of EE retrofit projects in residential and commercial buildings in the U.S. A solid appreciation and understanding of existing commercial approaches may be necessary, however, before such innovation can be attempted.

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About the Author
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[44] *See* DSIRE.

Annex 1
To CCCL Working Paper

GLOSSARY

BEER project	A building energy efficiency retrofit project
BundleCo.	A hypothetical SPE, or program within an existing organization, the specific structure and business model of which is the focus of this project, which could conceivably play a "one stop shop" role in the design, financing, coordination and implementation of BEER projects as contemplated in a specific Bundling Solution developed in connection with this project.
Bundling Solution	An innovate market-based business model, developed in connection with this project, that can help efficiently aggregate different segments the EE retrofit sector under a common commercial and transactional framework and which will help unlock investment and catalyze wider implementation of BEER projects in residential and commercial buildings.
CCCL	Center for Climate Change Law, Columbia Law School
CDFI	Community development financial institution
EE	Energy efficiency
ESCO	Energy services company
ESPC	Energy Savings Performance Contract
MUSH	Municipal, university, school and hospital buildings
PACE	Property assessed clean energy
PE	Private equity
PRI	Program related investment
R&D	Research and development
SEU	Sustainable energy utility
SPE	Special purpose entity
VC	Venture capital

Annex 2
To CCCL Working Paper

PHASES AND TASKS IN BEER PROJECTS

Introduction.

The following is a list of phases of development and major tasks that can be involved with undertaking a BEER project. This list is generic in nature and the particular phases and tasks that are involved with undertaking a specific BEER project may not include each of the following items or may include different ones altogether. For example, while larger projects (requiring higher levels of capital investment and greater complexity and risk) would generally be expected to include many or all of the following phases and tasks, a less costly and less complex project may not expressly involve each phase and/or task but rather may implicitly incorporate various elements of these tasks as part of the normal project development process.

NO.	PHASE OR TASK
	Phase One - Project Identification
1.	Consumer education, outreach and marketing
2.	Project identification and screening
	Phase Two - Design and Planning
3.	Energy audit
4.	Feasibility study / financial modeling
5.	Project structuring and design
6.	Overall project management, administration and coordination
7.	Obtain consent from existing secured lenders / mortgage holders
	Phase Three - Contracting and Project Management
8.	Contractor, subcontractor and ESCO screening, prequalification, etc.
9.	Retaining and coordinating with project manager or general contractor
10.	Retaining and/or coordinating with subcontractors
11.	Retain ESCOs
12.	Retaining and coordinating with professional service providers (legal counsel, accountants, etc.)
13.	Update or obtain new insurance policies to cover project equipment and other assets
	Phase Four - Financing
14.	Structure and arrange financing package
15.	Collateral/security package structuring, perfection and administration
16.	Debt service reserve or other account monitoring and administration

NO.	PHASE OR TASK
17.	Back-office BundleCo. (or lender) capitalization
	Phase Five - Procurement and Construction
18.	Schedule construction period
19.	Procure or order long-lead/ major equipment
20.	Procure other supplies
21.	Obtain permits and other approvals
22.	Undertake installation, construction and other related building retrofitting or upgrading work
23.	Test and commission building's upgraded equipment and systems
	Phase Six - Operation, Maintenance, Monitoring and Debt repayment
24.	Operate project (i.e. consume energy in normal course of building occupancy)
25.	Maintain project equipment
26.	Monitor, record and verify energy data and savings
27.	Pay back project debt out of additional cash available due to energy savings

STATE EE FINANCIAL INCENTIVES

State	No. of Rebate Programs	No. of Grant Programs	No. of Loan Programs	No. of Bond Programs
Alabama	8		8	
Alaska	3		5	
Arizona	19		2	
Arkansas	13		7	
California	79	4	11	
Colorado	41		3	
Connecticut	11		6	
Delaware	1		1	
Florida	32	2	5	
Georgia	21		8	
Hawaii	3		1	
Idaho	22		5	
Illinois	30	4	2	1
Indiana	44		1	
Iowa	32	1	3	
Kansas	5		2	
Kentucky	22	1	4	
Louisiana	6		2	
Maine	2		3	
Maryland	18		8	
Massachusetts	31	2	6	
Michigan	24		3	
Minnesota	89	4	12	
Mississippi	12		3	
Missouri	38		5	
Montana	12	1	1	
Nebraska	9		1	
Nevada	10		2	
New Hampshire	17	3	8	
New Jersey	11	4	4	
New Mexico	10			1
New York	43	3	3	
North Carolina	28		10	
North Dakota	6	1	3	
Ohio	25		5	
Oklahoma	13		7	
Oregon	48	1	14	
Pennsylvania	14	5	6	
Rhode Island	5			
South Carolina	19		5	
South Dakota	12		3	
Tennessee	14	1	5	
Texas	54	1	5	
Utah	9		2	
Vermont	14		3	
Virginia	12		3	
Washington	72	3	8	
West Virginia	3			
Wisconsin	24	2	9	
Wyoming	15	1	2	
District of Columbia			1	
Totals	**1106**	**47**	**230**	**2**

Source: Database of State Incentives for Renewables and Efficiency (DSIRE), as of March 25, 2012