

Deep Energy Savings in the Buildings We All Use

The PPESCO Model

December 2013

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Elizabeth Chant and David Barash
Report Leaders

Beth Sachs
Senior Advisor

Lori Bamberger
Consulting Writer

Frances Huessy
Senior Editor

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Executive Summary

Climate change, human activity, greenhouse gas emissions—scientists tell us these three factors are interdependent. The victims of catastrophic weather events, and the communities in which they live, bear the brunt of this interdependence. These events can be predicted with astonishing precision; guarding against them is less certain.

The common denominator for this interdependence is energy—how it is produced, how its delivery is structured, how it is used, and how it is wasted.

Is it possible to tackle rising levels of greenhouse gas emissions, and particularly carbon dioxide emissions, in a way that also makes populations nationwide more energy secure, that reduces their energy burden, and doesn't sink them into intractable debt?

Yes. This is our environmental imperative.

One important strategy is to reduce greenhouse gas emissions in the building sector—the sector that the United Nations Environment Programme says is responsible for one-third of the world's greenhouse gas emissions. Energy services companies (ESCOs) have pursued this strategy for decades. They use investor capital to pay for up-front costs of massive energy efficiency projects in large buildings; the building owners repay that debt through saved energy costs. But what about the enormous numbers of small to medium-sized buildings? And within that group, what about buildings that serve the public interest—affordable housing, libraries, state and municipal buildings, small health care facilities, and education facilities?

A public-purpose energy services company (PPESCO) offers a solution to the challenge of reaching those buildings. It is an innovative and practical business model made possible by, and explicitly intended to solve, existing market failures. PPESCOs will make possible comprehensive energy improvements in a subset of buildings that are of great value to our communities and society. If buildings have lower operating costs because they are more energy efficient, their owners can re-allocate funds normally spent on paying energy bills to those agencies' missions, whether education, public safety, shelter, or any other critically important elements to a well-functioning society. And because PPESCOs will make it possible for project debt to be paid from energy savings, efficiency projects can be structured so that the building owners are saving actual dollars (making their bottom lines cash flow positive) as soon as the energy improvements are completed.

This report supports the idea that PPESCOs can be established as entrepreneurial organizations—earned-income business structures with a single operational unit, led by one or a few top managers. These organizations will have a mission of helping owners of public-purpose buildings reduce energy consumption, save on energy costs, reduce their vulnerability to energy price volatility, improve the performance of buildings that serve the public, and reduce pressures on often-declining operating budgets. This report also characterizes a PPESCO structure strong enough to support that mission.



This report frames the idea behind a PPESCO, and offers a business model for this entity. To that end, it draws conclusions about:

- The critical balance between mission and economic viability
- The necessity of transparency and a practice of open books
- The aggregation of projects into portfolios to provide benefits for all
- The resiliency of the PPESCO business model
- The necessity for solid technical experience and organizational credibility
- The plan for meeting the market at its doorstep
- The risks of a project's ability to meet its energy savings goals, and the size of those risks
- The effect of taking advantage of all available supplemental resources
- The necessity of smart partnerships with non-traditional capital sources
- The steps for starting a PPESCO
- The ability to use a PPESCO's record of performance—and later, the record of a network of PPESCOs—to attract more traditional capital, which in turn will catalyze more PPESCO activity

The PPESCO holds the promise of new solutions to the environmental imperative. It offers the kind of profitability that doesn't widen the gap between rich and poor, and actually lowers the energy burdens on low-income people. It also creates a new currency of saved greenhouse gas emissions. A PPESCO is a human activity, too. The hope is that it will be a solution that endures and evolves as societal needs change, rooted in wise energy use for all populations and sectors.

PPESCO at a Glance

The PPESCO is for owners of public-purpose buildings in the affordable housing, education, health care, and municipal government markets.

It helps these owners make major energy improvements to their buildings—at very low financial risk, and with no up-front cost.

When energy use is reduced, building owners save money that can then be used to fund more of the owners' public-purpose missions.

The PPESCO customizes the technical assistance and financing for each project, and can achieve energy savings from Day 1.

PPESCO investors who provide capital for these projects receive a reasonable, though not maximum, return on investment.

1. The PPESCO Concept

The role of climate change events on human activity is becoming better known and understood with each catastrophic flood, tsunami, tornado, and hurricane that hits the planet. Climate change injects an element of risk to life in a way that is both largely unpredictable and not easily avoidable. Vulnerable populations—those with marginal shelter, the poor, the disabled—are disproportionately affected by climate change. These effects are economic; the effects also involve basic health and security. These are observations about where we are now. It is not unreasonable to say that the next generation of humans—today’s children—will all be at risk if nothing is done.

It is essential, common knowledge now that the single greatest contributor to climate change is greenhouse gas emissions, the natural by-product of fossil fuel use. We also know from the United Nations Environment Programme and many other sources that one of the most significant sources of greenhouse gas emissions is the building sector.

Thanks to decades of experience, much is known about the effect of America’s buildings on greenhouse gas emissions, what can be done to reduce those emissions, and where the opportunity lies to get that work done while benefiting human society. The number of possible benefits is significant for all buildings that have not yet received energy improvement services. These significant benefits are amplified in the subsector of buildings that serves public purposes: affordable housing, state and municipal buildings, small health care facilities, and education facilities. That is, improving public-purpose buildings in markets that are not yet served by efficiency practices has a high likelihood of cost-effectively lowering those buildings’ operating expenses, increasing the mission impact of these buildings, and improving the lives of low-income people—all while contributing the value of efficiency and renewable energy efforts to the climate change balance sheet.

Making public-purpose buildings in the United States low energy users—and the steps it will take to accomplish this objective—introduces a concept that takes an existing model of energy services in buildings and transforms it into a new, customized model that puts service to the public first. The public-purpose energy services company (PPESCO) is a natural outgrowth of the following considerations:

- Scientists contributing to the Intergovernmental Panel on Climate Change tell us that greenhouse gas emissions can be reduced by 30% through energy efficiency in buildings.
- Comprehensive, “whole-building” energy efficiency, a highly cost-effective approach to reducing greenhouse gas emissions, requires substantial up-front capital.
- Many large buildings can become more energy efficient by using energy services companies (ESCOs), which offer capital from investors to undertake energy improvement projects.



- Energy savings from ESCOs, although significant, are not as large as they could be. Much deeper savings are achievable with today's technologies, but they require a whole-building approach that ESCOs typically do not use.
- The resulting energy efficiency gains—and the corresponding lower energy bills to the building owners—are so great that ESCO investors receive a rate of return commensurate with well-performing investments, generally higher than standard market averages. ESCOs guarantee the energy savings.¹
- Energy improvement projects under \$1 million, usually small to medium-sized buildings, are of little interest to traditional ESCOs. Projects in smaller buildings yield correspondingly lower rates of return.
- Public-serving entities that own and operate small to medium-sized buildings typically have little access to the kind of capital, knowledge, or service providers they need for undertaking an energy improvement project. This access is necessary to help them reduce energy use in their buildings quickly and effectively.
- When energy costs rise, building operations costs rise, too, often putting pressure on budgets.
- These conundrums call for an intelligent and thoughtful solution rooted in successful energy efficiency practice that serves the public sector: Comprehensive energy services, made possible through access to affordable capital—with coordination among owners, builders, and lenders—to turn the value of saved energy costs into more funding for mission-related activity.

A PPESCO offers this solution. It is an innovative and practical way for public-purpose building owners to address the conundrums around access to capital, knowledge of what is needed to make cost-effective energy improvements, and trust in service providers. A PPESCO—and by extension, a system of PPESCOs nationwide—could contribute substantially to reducing greenhouse gas emissions in buildings in the United States.

Even though this term contains the words *public* and *purpose*, the solution it offers is grounded in neither a government mandate nor a public subsidy model. Instead, it is an innovative business model made possible by, and explicitly intended to solve, existing market failures.

PPESCOs will make possible comprehensive energy improvements in the public-purpose building subsector that is of crucial importance to human society. Comprehensive energy improvements lower operating costs in buildings. For the public-purpose building, this means that funds normally spent on paying energy bills can be spent instead on an agency's mission, whether education, public safety, shelter, or other critically important elements to a

How PPESCOs Benefit Their Clients

A PPESCO brings fiscal strength to owners of public-purpose buildings, so that they can:

- reduce their vulnerability to energy price volatility
- reduce pressure on often-declining operating budgets
- put people to work in improving the energy performance of buildings
- make occupants more comfortable with better-functioning buildings
- enable more financial support for the mission, with funds saved from energy budgets that otherwise would be used to heat, cool, light, and operate those buildings
- help develop their capacity to understand and manage energy performance
- put into place a maintenance culture of continuous energy improvement through awareness of new technologies and services

1.

Patient capital

Funding from investors who are willing to provide longer terms and lower rates—largely because the funders’ areas of investment interest are aligned with the organizations in which they invest.

Social-enterprise capital

Funding to organizations that use commercial strategies to maximize improvements in human and environmental well-being, rather than maximizing profits for external shareholders.

well-functioning society. And because PPESCOs make it possible for project debt to be paid from energy savings, projects can be structured so that the building owners are cash flow positive as soon as the energy improvements are completed. Perhaps the most prominent feature of a PPESCO is its ability to align a public good with business opportunity.

PPESCO enterprises can provide comprehensive and integrated energy services, a term that encompasses efficiency of all energy and water use in a building and on-site renewable generation (rooftop solar installations, for example).

For PPESCOs to succeed, they must be able to understand, access, and / or broker capital; be able to deliver solid technical expertise; show themselves to be trusted advisors with only the objective of serving public missions; and have strong relationships with building owners and their networks. PPESCOs are good candidates for tapping into mission-focused, low-cost, long-term capital sources. These sources can be foundations with program-related investments (PRIs), or other similar sources of **patient capital** such as Community Development Financial Institutions (CDFIs), or **social-enterprise capital**. Several factors underlie the feasibility of a PPESCO: (1) the existence of organized implementers with the skills and expertise to capture deep energy savings by pursuing all cost-effective sustainable energy, (2) the availability of patient capital to provide long-term and low-rate financing, and (3) strong networks to provide access to projects and capital.

By serving underserved markets and providing an adequate (but not maximum) return on investment, a PPESCO can offer deep energy savings with ongoing services that not only put money back into the pockets of investors and building owners alike, but also reinvest in public missions. This is a triple benefit to human society: a PPESCO can reduce greenhouse gas (GHG) emissions, reinforce public-purpose missions, and provide investors with a reasonable return on investment.

The need for the PPESCO will not go away until it becomes a reality, takes its place as a well-understood factor in the energy economy, and eventually becomes obsolete because the market will have been transformed. Market transformation, a long-term goal, will occur when multiple PPESCOs have served buildings throughout the United States, with capital coming from standard commercial sources. This process cannot happen overnight. The urgency is real. And the real response that urgency deserves is overdue.



2.1 The Environmental Imperative

Of the many climate goals that have been adopted by states, nations, and international governmental organizations, the most urgent and persistently validated one is relatively straightforward:

We need to reduce greenhouse gas emissions by 80% by the year 2050 to support life on the planet.²

This will be an impossible task if “business as usual” persists. Clearly, there is room for new thinking on how to change the status quo. According to the United Nations Environment Programme (UNEP), buildings produce approximately a third of the world’s GHG emissions.³ Buildings in the United States produce 40% of the US GHG emissions. If nothing is done to lower fossil fuel energy consumption in buildings, GHG emissions will double in 20 years from 2009, according to UNEP.

The 80% goal presumes a carbon emissions level of 450 parts per million (ppm). Climate scientists agree that the highest safe level of carbon dioxide (CO₂) concentrations in the atmosphere—safe for sustaining current life on the planet—is 350 ppm. Earth’s CO₂ concentration is currently at 400 ppm, and growing at 2 ppm per year.⁴

Scientists expect that at 450 ppm, extreme weather events will be the norm. The effects on human society will be substantial. They are well understood, even now: Drinking water will be compromised, mosquitoes and the diseases they can carry will spread into new places, and rising sea levels will displace significant portions of populations in low-lying areas.

The threat to the planet’s climate from increasing GHG emissions—of which CO₂ is the primary gas, next to water vapor—is as high as, if not higher than, any other threat in human history. Increasing emissions destabilize the planet’s climate. Thus, targeting the major sources of these emissions to stall their increase is of crucial importance. The building sector in the United States, with its 40% share of the country’s GHG emissions, is one such major source. That sector’s function in human society makes it of high importance because it serves a primary human need: shelter.

The environmental imperative demands of us a response that adds value to human society in the wake of these inevitable climate disruptions that we know are coming. So a reduction in even a portion of the emissions from buildings in the United States can have a different kind of measurable impact if those reductions bring a much larger benefit to the populations the building sector serves, and if those reductions fundamentally change the definition of business as usual.

This is the thinking behind the PPESCO.

The Environmental Imperative for a PPESCO

- Increasing GHG emissions destabilize the planet's climate.
- Targeting the major sources of these emissions to stall their increase is of crucial importance.
- The building sector in the United States, with its 40% share of the country's GHG emissions, is one such major source.

Fortunately, the ESCO model contains elements that can inspire a stronger and more creative response to the environmental imperative than ESCOs themselves can make. Their business model leaves many buildings unserved and other buildings underserved as deeper energy reduction measures are left undone.

No discussion of reductions in building energy use can be complete without tying it to the current and likely future costs of energy and their effect on the bottom line. If a building contains a large organization with substantial cash on hand, it can afford to undertake comprehensive energy projects, protecting itself from future energy price increases. If, however, the building contains an organization providing a public service—a municipal building such as a library or fire station, for example, a health clinic, a school, or affordable housing—the specter of doing nothing will go hand in glove with rising energy costs and its corollary: additional financial stress on budgets and services. This means that owners and managers of public buildings will need to look at their energy costs and their energy management practices, and assess the extent to which business as usual will serve their needs. At a minimum, they will need to overcome existing barriers to improving energy performance in buildings.

2.2 Barriers to Building Energy Improvements— and What Sets the Public-Purpose Building Apart

The barriers to public-purpose building owners are well known:

- They often lack access to valid and reliable information.
- The project costs are up-front and prohibitive.
- The owners typically lack the organizational capacity and / or capability to tackle energy improvements.
- Split incentives often exist—the phenomenon of neither owner nor occupant having an interest in improving a building, because:
 - Building owners do not reap the benefits of reduced energy costs if occupants pay the utility bills, and
 - Tenant occupants who are uncertain if they will be in the building for the entire payback period tend not to invest in improvements because the occupants are concerned that they won't fully benefit from their investment in such improvements.
- Laws and regulations unique to the funding sources of the public-purpose building can present obstacles to specific energy improvements or to types of financing to make such improvements.

The barriers to making significant energy improvements to buildings in the underserved markets identified in the public-purpose sector involve all of the above. As a result of these barriers, no one to date has taken action in a coordinated, systemic manner to serve these markets. The PPESCO can change much of this by offering a comprehensive solution.



2.2.1 Information

Building owners can find it very difficult to obtain trusted, reliable, and up-to-date information on their own building energy use and on technically feasible and cost-effective improvements—let alone information relating to available incentives and support from local efficiency programs. If tenant-occupants pay their own utility bills, owners might not have access to full building energy use information. Further, business practices within an organization might keep a building operator from knowing much about the building's energy bills. If bills go to the accounting department and are never seen by the staff who manage the building, the prospects for rapid and well-informed change are limited. In addition, it is not uncommon for owners to pay unnecessarily high utility costs because of inaccurate billing practices by the utility, equipment mismanagement in the facility, or the purchase of less-than-optimal equipment.

These problems can be solved if energy information becomes a key feature of building operations. Building improvements are often complex and interdependent, requiring good coordination so that changes to one system in the building do not adversely affect another system. Knowing system interdependencies and their effects on building energy performance is necessary for monitoring the energy use and cost. Many building owners and operators are unlikely to be able to obtain and use such information effectively.

What building owners need is access to energy information in real time, and the ability to compare performance across their portfolios, even when such portfolios cross municipal, state, or utility jurisdictions. Helping owners strategically address their portfolios of buildings in a systematic way relies on accurate and comparable information in as near to real time as possible.

2.2.2 Up-front Project Costs

Up-front costs for energy projects are, more often than not, greater than reserves on hand, except for the largest and most highly profitable organizations. Even if reserves exist in public-purpose organizations, restrictions on the use of capital reserves might be dictated by statute or regulation—and thus make it difficult for those organizations to allocate funds for a project.

So where can a public-purpose building owner go to obtain financing for such projects? The commercial financing sector is typically out of reach for these owners, because they frequently have:

- existing financing that could prohibit or limit their ability to take on additional debt
- project energy savings insufficient to cover the payments on a short-term loan
- low creditworthiness scores for standard commercial financing

In addition, commercial lenders are reluctant to accept the notion that cost savings from energy improvements in a building can be a reliable source of debt repayment.

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Even when commercial financing is available, it generally comes at terms well under 10 years and with higher interest rates. Each of these can result in a project being cash flow negative, or in the elimination of measures with longer payback periods. Deep energy savings produce significant financial benefits, but the energy improvements to achieve those savings require not only substantial amounts of up-front capital, but also long terms at favorable rates.

Public-purpose building owners might have further problems in accessing financing because of legal or regulatory restrictions. These can involve limits on using underlying assets as collateral, or in the case of a municipal or local public school entity, constraints in taking on debt without voter approval.

And finally, in cases in which a public-purpose entity is already in debt, any new debt typically needs to be subordinate to the pre-existing debt. This makes it difficult for a new lender to say “yes” to a loan request from such a public-purpose owner.

2.2.3 Capacity and Capability

It is the rare public-purpose organization that has such large energy bills that it can justify ongoing investment in staff knowledge and training in energy systems. Most organizations lack both the expertise and the staff capacity to monitor energy costs, specify appropriate energy improvements, locate relevant incentives, obtain financing, oversee the installation of energy improvements, and manage systems for peak performance, long after the installation. In addition, most organizations wait until an energy crisis before they think through the level of expertise they might need to improve the energy performance of their buildings—and whether they have that expertise in house. If energy management is a low priority for a building owner because energy costs are relatively low, little change will likely occur.

It is important to note that building owners in regions with rapidly escalating water infrastructure costs have begun to look at reducing costs related to water, wastewater, and storm water runoff. These costs are becoming a significant operating expense for many buildings. The PPESCO addresses these as part of its integrated whole-building approach to providing the best solutions for the client’s circumstances.

2.2.4 Laws and Regulations

Each subsector in the targeted public-purpose market has its own regulations, and those regulations often vary across jurisdictions. The affordable housing sector offers its special complications for owners who might want to improve their buildings:

- Owners of public housing have prohibitions on using their facilities as assets to secure loans.
- Assisted-housing owners frequently have no incentive to reduce energy costs in buildings because their budgets are tied directly to project operating



costs. If the annual operating costs go down (because the owner installs building energy performance measures that lower energy use and costs), so then do the levels of assistance to that housing organization.

- Laws and regulations vary according to the affordable housing funding source, and they vary according to program regulations.

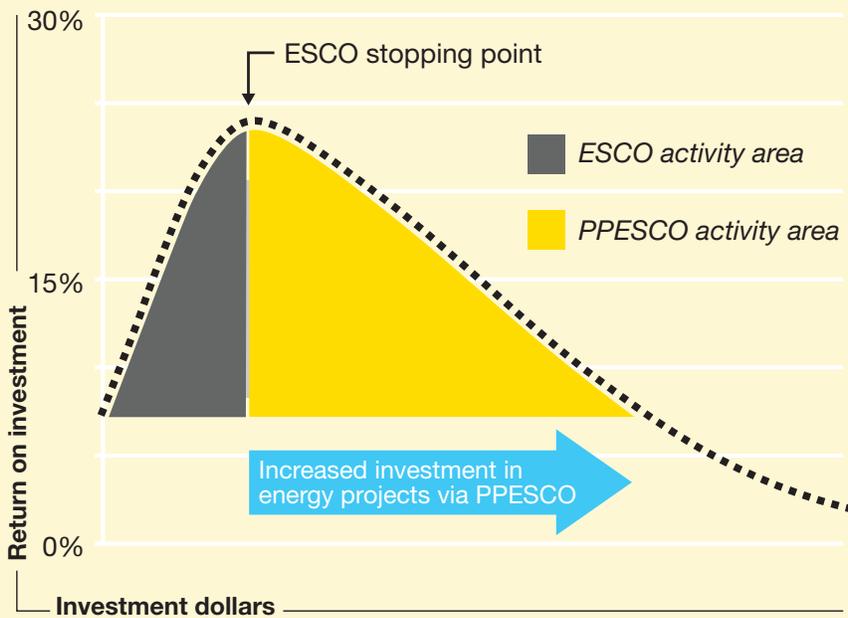
2.3 The ESCO Solution

It is safe to say that the ESCO, a durable market solution, has helped reduce these barriers, at least for the largest institutional customers of electricity and gas utilities. The first ESCOs were created in the 1970s to help these building owners overcome significant barriers, including the need for a hassle-free approach to energy services and no up-front investment. No solution overcomes all barriers for all organizations, but ESCOs have succeeded in coming up with good solutions by integrating four related services: technical assistance, project financing, installation of energy measures, and energy savings guarantees through energy performance contracting. Project financing is paid back through energy savings, and the total project economics typically translate to high rates of return for the investors. However, the capital is made available not by the strength of the project and projected energy savings, but rather by the stability of the client (institutional facilities that have been around for a long time, and are not going anywhere) and the strength of the ESCOs (which will typically have strong balance sheets with which to back their savings

How the Return on Investment Drives the ESCO

ESCOs try to maximize the return on investment (ROI) to their investors, so they install energy improvement measures that lead to the maximum return for investors (see Section 2.4, *Underserved Markets*).

ESCOs frequently will leave undone many building energy improvements, even though they are cost-effective for the owner, because these projects don't meet the ESCO ROI requirements. If an ESCO were to be interested in only the minimum ROI necessary to meet investor obligations and its own reserves for growth and savings guarantees, significant additional cost savings and GHG savings would be possible.



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guarantees). The strength of the ESCOs enables the financing; and banks and other third-party lenders can be comfortable in providing debt financing. There is little, if any, opportunity for the commercial financing sector to build experience in the use of energy savings to repay a building improvement loan. In reality, these investors rely more on the familiarity of the ESCO transaction than they do on valuing the energy savings correctly.

ESCOs serve a large and growing market very well. A recent estimate by the National Association of Energy Services Companies (NAESCO) puts the value of the ESCO market between \$5 and \$7 billion annually, with an annual growth rate of 7%.⁵ The financial scope of the ESCO industry is reflected well in its numbers: Since 1990, the industry has created an estimated 300,000 jobs, provided \$50 billion in energy savings, and \$25 billion in physical infrastructure improvements.⁶ Less easy to ascertain are the number of square feet of space served and the extent of the actual energy consumption reductions. There are good reasons for this: unlike utility data, ESCO data are presented in the context of investment value, rather than in the context of energy consumption, demand, or net societal benefits.

The success of the ESCO model lies in its one-stop services to its clients, making it relatively easy to improve their buildings with minimal risk and no up-front costs. An improved building is also less vulnerable to energy and water price increases likely in future years. The ESCO, with its technical and financing expertise, takes on the responsibility of specifying the energy improvements, contracting for those improvements, securing financing, and monitoring and verifying the completed work. By providing a one-stop solution for building owners, ESCOs help owners manage their energy systems, while owners reap the benefits of reduced risk, reduced energy and operating costs, reduced carbon footprint, and increased operating margins.

Several of the core elements of the success of the ESCO model are the very ones that are at the root of some of the failed market responses—demonstrated in the presence of many unserved buildings and underserved markets—that the PPESCO model is designed to address.

An objective shared by both ESCOs and PPESCOs is to help building owners reduce energy use, right from the start, net of the financing costs to complete the project. See Section 4.6, *Project Financing Structures*.

2.4 Underserved Markets and Less-than-Optimal Improvements

Even with a very strong level of ESCO activity, there are many buildings in dire need of energy improvements, but they do not meet threshold size criteria for ESCOs. In other words, size drives the ESCO decision on project suitability, just as it drives the return on investment to ESCO investors. The buildings that do not meet the size thresholds are the small and medium-sized facilities nationwide.

No one to date has taken action in a coordinated, systemic manner to serve underserved markets



The irony is that ESCOs can achieve significant energy savings in large buildings, but they generally do it without providing truly comprehensive services. They install and control equipment, lighting, and appliances, but they do not typically air-seal and insulate the building. All of these measures are important energy improvements that significantly increase building performance.

The reason is simple: Compared to typical ESCO measures, it is more difficult to estimate costs and savings on building shell measures prior to initiating a project, and difficult to meter and control them after they are installed. The ESCO business model thus overlooks two of the most proven and reliable energy-saving measures in most buildings.

Sometimes these improvements are not a part of the ESCO project because they do not involve products or services from affiliated or preferred suppliers and vendors. Many ESCOs are owned by or affiliated with organizations that sell energy or specific products; thus, improvements are often limited to specific energy sources or products.

PPESCO Market Sectors



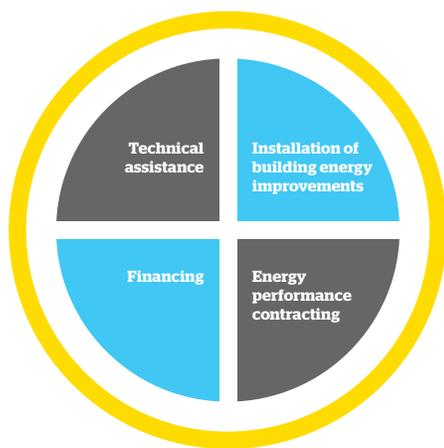
3. The PPESCO Solution

The PPESCO business model takes many of the ESCO approaches, modifies them, and adds elements to address market barriers specific to the needs of public-purpose buildings. The PPESCO is designed to serve the markets that lie below and beyond the ESCOs' scope, whether because of project size, work scope, building type, or market type.

The PPESCO is the broadest and most feasible solution for improving energy performance in underserved public-purpose building markets. Several other narrower applications of the traditional ESCO model have been discussed at national forums, as a way to bring the ESCO model's value into market sectors not currently served. One concept is the micro-ESCO, which, as its name suggests, would serve only small projects. Mission-driven ESCOs could support a particular mission, such as the preservation of affordable housing. Special-purpose ESCOs could be driven by any one of several purposes, regardless of whether the purpose involves an organizational or market mission. Under this model, the mission or special purpose of the organization would drive the core business; projects completed by a special-purpose ESCO for carbon reduction, for example, might look quite different from those completed by one dedicated to reducing energy costs in assisted multifamily housing.

The PPESCO combines the mission-driven and special-purpose ESCO concepts, and is designed to serve smaller projects with total costs of between \$100,000 and \$800,000 in the targeted public-purpose sectors described earlier. What sets the PPESCO apart is that by reducing energy costs in these buildings, significant and real benefits not only will automatically accrue to the environment, but also will help these organizations reduce their operating costs, leaving them with more resources for serving their public purposes.

PPESCO's Integrated Services Model



3.1 PPESCO and the Principle of Integrated Services

The PPESCO offers public-purpose organizations a package of four integrated services that will improve a building's energy performance:

- **Technical assistance.** Project evaluation; building improvement evaluation, measurement, and verification; assessment of alternatives; estimates of costs and savings; design services; and assistance with relevant value engineering.
- **Installation of building energy improvement measures.** Construction, project management, and building commissioning.
- **Financing.** Access to sufficient (and sufficiently patient) capital to allow organizations to undertake building energy performance projects that result in deep energy savings.
- **Energy performance contracting.** This agreement between a PPESCO and the client covers: operational and financial aspects of the project during and after construction, mutual responsibilities during the contract period (note that the contract period equals the length of the



financing term), and terms and conditions of the PPESCO-provided energy savings guarantee. The guarantee offers surety for both the owner and the capital source that projected reductions in energy use will occur, as defined under the energy performance contract (EPC).

A PPESCO has core principles that form the basis of its work with clients:

- Deep, cost-effective energy improvements that comprehensively address the whole building
- Cash-flow-positive results for the client
- Access to and / or coordination with long-term capital that allows projects to achieve deeper energy savings
- Transparent pricing on all products and services
- Bias-free recommendations on energy sources and technologies
- Contracting for cost-effective installations that might not lend themselves to standard building control, including **building shell** measures.
- Ability to coordinate PPESCO services so that the services can be integrated into a larger rehabilitation or new construction project
- Continued engagement with building owners and managers, after the installation project is complete, both to sustain energy savings and to find additional savings as new, appropriate technologies and services come onto the market
- Ongoing work with building staff to make them knowledgeable about energy use and performance, so that the building owner can rely on them to manage energy systems

Building shell

The exterior surfaces of a building. Technically, the shell (or envelope) is the parts of the building that separate the conditioned spaces from unconditioned spaces.

3.2 PPESCO Market Potential

The PPESCO market is large and diverse, and encompasses, at a minimum:

- **Affordable housing.** Public housing and publicly assisted multifamily housing
- **Education facilities.** Buildings that serve K–12 (for example, public, independent, and charter schools) and other smaller education facilities
- **Health care facilities.** Walk-in clinics, community health centers, rehabilitation centers, primary care clinics, and long-term care facilities
- **Municipal and community buildings.** Town halls, libraries, recreation centers, faith-based facilities, fire stations, wastewater treatment plants

These are not the only sectors in which a PPESCO could offer services to an underserved market, but they are the sectors that hold the greatest promise for a successful launch of the concept. Throughout its development, the PPESCO

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is designed to adjust the targets on both clients and services, depending on market and business conditions.

Table 1 presents an overview of the relevant market subsectors for each of the targeted market sectors identified from the research for this report. The information has been cast from an external perspective, to be useful in creating a high-level strategy for a portfolio of PPESCO projects.

The “Recommendations” column in *Table 1* contains the conclusions drawn from the market research for each sector, more fully detailed in this report’s corollary business operations plan.⁷ These can reasonably be assumed to support PPESCO start-up and long-term sustainability.

This report respects the rules of any sound start-up business planning, acknowledging that the market characteristics and assumptions presented here must be tested and validated at organization, market, client, and project levels. After initial rounds of client development, these assumptions and recommendations (both sector and portfolio) must be revisited and adjusted accordingly.

On a smaller scale

Typical size of an ESCO project:
\$1 million +

Expected size of a PPESCO project:
\$100,000 to \$800,000

Table 1. Recommendations for PPESCO choices, by market sector

Market Sector	Recommendations
Multifamily Affordable Housing	Address underserved public housing authority (PHA) market by targeting buildings or aggregations of buildings with fewer than 500 units
	Seek partnerships with housing finance agencies to obtain projects in the privately owned, subsidized market
Education	Offer services to schools, including small, rural, and charter schools
	Examine charter schools that are at the point of conversion from public asset to charter entity
Health Care	Focus on outpatient facilities – small / rural and federally qualified hospitals and outpatient facilities
Municipal	Target rural and small municipalities



4. The PPESCO Business Model

The PPESCO model offers clients integrated energy services comprising: pre-project assessments of energy use and demand in buildings, project financing, overseeing installation of optimal energy improvements, and post-project involvement with building performance for the duration of the energy performance contract. These services are backed by an energy savings performance guarantee, which involves **measurement and verification** of the installed efficiency measures, and ongoing building performance improvement services.

The PPESCO model pursues the most cost-effective, deep energy improvements in unserved public-purpose buildings, and brings long-term capital to finance them. The model features:

- unbiased solutions related to efficiency measures, renewables, and fuel choices;
- cost-effective energy performance improvements that lend themselves to close measurement (via metering and building controls), and well-tested air-sealing and insulation improvements to the building shell;
- training of site operators and occupants in energy performance management;
- long-term relationships with clients to enable monitoring after the initial energy improvement project is complete.

This section describes those services and explores the “typical” PPESCO project, the energy savings performance guarantee, the grouping of projects into portfolios, the financing needs of the portfolios, and the need for credit enhancement to improve a client’s creditworthiness, if needed, to lenders.

4.1 Integrated Energy Services

The core of the PPESCO business model is a package of integrated energy services that help public-purpose building owners overcome barriers to making building energy improvements. *Table 2* presents these services and the energy performance contract mechanism, and the ways in which they help to overcome barriers.

4.2 Operating Revenue

A PPESCO generates revenue from clients through:

- a one-time payment when the financing package closes, for the bundle of PPESCO technical, financing, and construction services, provided as part of improvement project.
- annual payments for ongoing services over the life of the performance contract (measurement and verification, occupant engagement, and transfer of technology skills and knowledge).

Measurement and verification

The process for quantifying energy savings delivered by a building energy improvement. M&V confirms how much energy an improvement has saved, rather than demonstrating the total cost saved. M&V can confirm energy savings at the measure level or at the project level, depending on improvements done and data available.

4.

Table 2. How each PPESCO service overcomes market barriers

Type	Summary of Service	How the Service Addresses Market Barriers
<p>Technical Assistance</p>	<ul style="list-style-type: none"> • Evaluate building energy needs • Make recommendations for design and installation of energy improvements • Provide: <ul style="list-style-type: none"> - Cost and savings projections - Project management - Building energy audits - Estimates of post-project costs and savings - Engineering oversight • Knowledge of available incentives from utilities, public benefit programs, and federal, state, and local governments 	<ul style="list-style-type: none"> • Increase owners' understanding of building energy and how PPESCO will: <ul style="list-style-type: none"> - Provide appropriate and timely energy services / energy management - Conduct building energy audits - Help owners prioritize equipment replacements - Unlock energy savings in their buildings - Provide access to financing to pay for improvements for cash-flow-positive results • Increase investor confidence in the success of PPESCO projects
<p>Installation</p>	<ul style="list-style-type: none"> • Design • Material and equipment sourcing • Permitting • Construction / installation oversight and coordination • Commissioning to ensure design and performance standards are met 	<ul style="list-style-type: none"> • Takes the energy improvement project burden off shoulders of owner who: <ul style="list-style-type: none"> - Has limited in-house capacity and capabilities to oversee installation - Wants to avoid the hassle of managing installation or serving as the general contractor • PPESCO management: <ul style="list-style-type: none"> - Oversees project, reducing risk of not obtaining guaranteed energy savings - Satisfies owners and lenders of project success via high-quality installation - Offers high likelihood of meeting building energy audit estimates - Provides whole-building approach so that all possible improvement opportunities are identified and considered



Type	Summary of Service	How the Service Addresses Market Barriers
Financing	<ul style="list-style-type: none"> • Matchmaking between PPESCO borrowers and low-cost, long-term sources of capital • Services: <ul style="list-style-type: none"> - Form a pool of capital from investors interested in providing loans to PPESCO borrowers - Create subsidiaries with portfolios to attract lenders - Assemble credit enhancement 	<ul style="list-style-type: none"> • Building owners have access to long-term, low-cost, unsecured capital • Clients matched with lender funds that support client sector and / or activity • A broader finance market for building owners is likely to lead to more participation, scalability • Subsidiaries mitigate risk associated with energy savings guarantees and mitigate lender risk
Energy Performance Contracting	<ul style="list-style-type: none"> • Contract contains specification of energy improvements, and guarantees of the building's energy performance and savings • PPESCO provides ongoing measurement, verification, and continuous commissioning 	<ul style="list-style-type: none"> • Helps public-purpose building owners overcome skepticism about whether energy savings and their corresponding financial savings will materialize • Energy savings guarantee mitigates the risk of poor energy performance, of lower-than-expected return on investment to lenders, and of poorly estimated or verified energy savings claims to the funders or other interested parties. Risk mitigation is expected to catalyze both supply and demand • The accompanying long-term measurement and verification and continuous commissioning provide expertise and capacity to building owners • EPC guarantees should reduce the need for traditional forms of credit enhancements over time, once data prove the PPESCO model and verify the energy savings estimates • Measurement and verification reduces the risk of having to pay out on the performance guarantee (see Section 4.8, <i>Energy Performance Contract and Saving Guarantee</i>, and Section 5.5, <i>Energy Performance Contracts</i>)

4.

The costs of these services are marked up in two ways, sustaining the PPESCO as a viable commercial enterprise by allowing for adequate reserves and growth capital, while maximizing the use of funds for direct project work. Mark-ups provide PPESCOs with operating overhead coverage and reserves for future growth. Their modest levels, compared to the overhead at standard commercial enterprises, enables as much of the financing as possible to be directed to project work. Accordingly, PPESCO supports these goals by applying these charges to its work:

- A contribution to its overhead, applied to labor only. This can be expected to be between 12% and 17%. Most PPESCOs are likely to require modest (but sufficient) overhead spending to cover work not directly related to a project.
- An operations mark-up, typically around 10%, on total project costs, exclusive of equipment and materials.

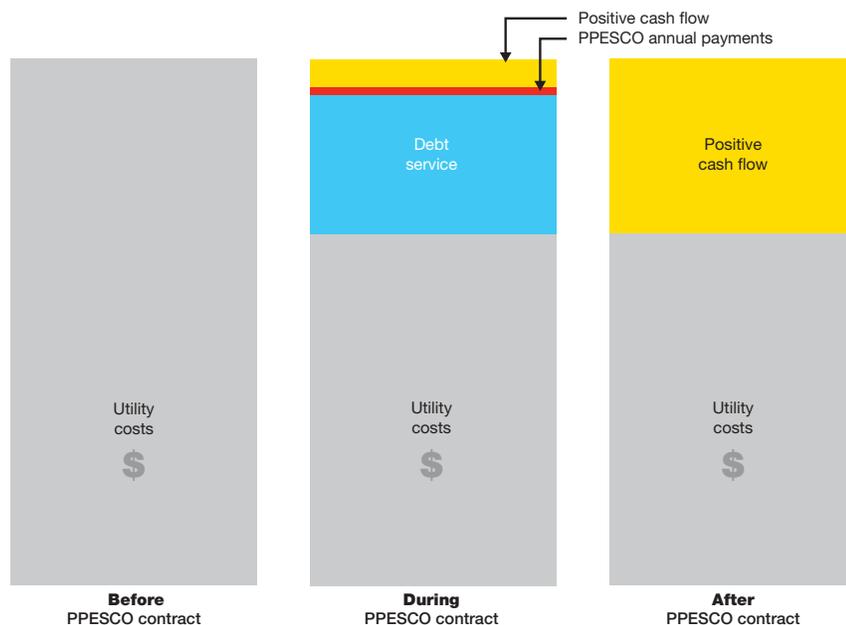
A step-by-step explanation of the design, market considerations, and internal operations of the PPESCO business model—with its calculations—can be found at the PPESCO how-to portal (www.ppescowhowto.org).

4.2.1 At the Project Level

The operating model makes assumptions about types and levels of skills, staffing, equipment, and materials needed for energy improvements in different buildings, providing the basis for project economics, which then roll up into project portfolios. The operating model further assumes that multiple portfolios are managed by the PPESCO (see Section 4.5, *Portfolios*).

General PPESCO management costs and other costs that are not direct project costs are allocated as an addition to direct project costs. This combination of overhead and direct project costs determines total project costs, provides the basis

How a PPESCO Builds a Client's Positive Cash Flow



for assessing project viability using benchmarked experience, drives project economics, and makes it possible to assign a project to a relevant portfolio.

The total project costs are financed with debt, which will be serviced by the client who will be saving money from lower energy bills and will thus be in a position to pay down the debt. For both the PPESCO and the client to be successful, these savings, expected to average 30% or more, must be sufficient to (1) cover the debt service for the financing; (2) cover annual fees to PPESCO for ongoing services, expected to average approximately 3% of initial project cost; and (3) provide positive cash flow for the client, expected to be approximately 5% to 10% of total energy costs prior to improvements. To accomplish this, most candidate PPESCO buildings cannot have had any recent major energy improvements unless the client is able to allocate the savings from those improvements to the new project.

PPESCO energy performance contracts, described in detail in Section 5.5, *Energy Performance Contracts*, are structured to define the work to be done, identify the costs, and articulate roles and responsibilities of each party. They also establish the conditions and the levels of guarantee of projected energy savings. The building owner assumes the normal risks of energy price escalation, weather fluctuations (whether seasonal or the result of severe weather events), occupancy or use changes, and other factors that the PPESCO cannot control. The PPESCO assumes the performance risk of the installed improvements. The EPC contains an annual service agreement that enables the PPESCO to provide that guarantee. The owner pays annual service fees through energy savings, with the assurance that building systems are well monitored. The monitoring ensures that corrections are made expeditiously to maintain energy savings. Ongoing regular **commissioning** and energy-saving work will be carried out with building staff and tenants.

The PPESCO provides transparency on its pricing, sharing that information with its clients. With overhead kept low to allow only the mark-ups needed to cover operations, growth, and reserves, there is no need to make these rates and data obscure for the client. Disclosing justifiable rates helps to position the PPESCO as an independent, trusted resource, while offering the client a long-term building energy solution that fits its needs.

An important attribute of the PPESCO is that it is technology neutral, putting the client's building energy performance needs at the core of project decision-making. This approach further advances the role of a PPESCO as a trusted partner in energy improvement decisions. By forgoing a mark-up on equipment and materials, the PPESCO removes the potential for bias (real or perceived) in selecting a certain system or type of equipment. As a technology-neutral entity, the PPESCO can serve clients better with brands and equipment that are best suited for specific site conditions.

www.ppescowho.org

Provides a how-to guide for individuals and organizations considering establishing a PPESCO

Commissioning

The process of verifying that building improvement installations perform as designed.

4.

4.2.2 Other Sources of Project Revenue

In some projects and in the portfolios in which they reside, there might be opportunities for creating additional earned revenue streams via credits from power purchase agreements (PPAs) and / or credits from renewable energy certificates (RECs). A PPA is a contract between two parties: one who generates energy (the seller) and one who wants to purchase energy (the buyer). There are many forms of PPAs, and they vary according to the needs of buyer, seller, and financing counterparties. RECs essentially provide the ownership rights to the environmental, social, and other non-power qualities of renewable electricity generation.

4.3 Characteristics of PPESCO Projects

To be successful, the PPESCOs will need to select projects:

- that have utility (energy and water) costs of at least \$50,000 per year. This amount is large enough to allow for contracting and financing of energy improvements with an energy performance contract.
- that have had no prior recent or major energy-saving or water-saving work completed. This ensures that improvements that have shorter payback periods are still available and can be combined with longer-term payback measures to make a comprehensive, deep retrofit package possible.
- that have the potential for deep energy and water cost savings averaging at least 30% across all projects.
- with owners who allow collaborative design and contracting for standards of comfort and energy use acceptable to both the client and the PPESCO. These standards establish realistic and well-informed parameters in the EPC.
- with owners who are able and willing to take on debt financing and enter into a long-term EPC.
- with creditworthy owners, even if not by traditional standards. Although the basic creditworthiness needs to be adequate, EPCs provide critical, additional surety that in the event energy savings do not meet expectations, an alternate source of funding for loan repayments will be available.
- with owners who have a goal of reducing energy costs and want to work with PPESCO to monitor, control, and constantly improve systems and reduce costs.

4.4 Financing Needs

The total cost of the energy improvements for typical PPESCO projects will range from \$100,000 to \$800,000. As noted in Section 4.2, *Operating Revenue*,



the PPESCO will obtain both one-time and recurring revenue from its services: (1) the one-time project fees paid at the closing of financing on the project, and (2) annual fees to support all post-installation services. Project financing requires long-term debt, ideally at 15-year terms (a minimum of 10 years) to allow for deep energy retrofit with positive cash flow. The long financing term makes it possible to install the full complement of energy improvements that yield deep savings. However, due to the scarcity of this length of financing for this type of project, the PPESCO will need to be flexible and creative in its financing approaches.

To allow for the installation of deep energy improvements with longer payback horizons, the PPESCO will need strong relationships with its project financing partners. The PPESCO and its financing partners should develop financing packages with:

- **Long terms.** Mission-driven and philanthropic capital sources that make substantial program-related investments (PRIs) might allow for terms of between 10 and 15 years. Financing terms directly affect the PPESCO's ability to meet the needs for deep savings and positive cash flow. At current low rates, the length of the term matters more than the interest rate, although both are important.
- **Low cost.** The PPESCO's own mission is such that it can uniquely attract capital investors who are seeking investments in carbon emission reductions, energy efficiency, renewable energy, and underserved markets and communities. These available funds frequently offer favorable rates, and can be from PRIs or other mission-aligned, special-interest funds from private social-enterprise sources. The interest rates are significantly below market rates, typically ranging from 1% to 5%.
- **Incentives from other sources.** As a component of its financing function at the project level (capital formation, access to funds, and coordination of services), the PPESCO will identify all available utility or public benefit program incentives and applicable energy tax credits that could offset some project costs. The capitalization of portfolios, which contain multiple projects, will also contain all applicable financial incentives for the portfolio and the capital source. For example, available investment tax or renewable energy credits serve a very useful purpose in reducing up-front costs of a project or in providing additional streams of project revenue that can be used for debt service. These instruments are available only for investors in certain tax circumstances and conditions, and thus are not applicable for every project.
- **Risk mitigation / savings guarantee / credit enhancement.** The long-term PPESCO strategy is to make financing more readily available, thereby catalyzing the creation of multiple PPESCOs. This strategy also should enable scaling up to capture more of the significant energy savings in tens of thousands of public-purpose buildings nationwide.

4.

Access to traditional capital markets at low cost and for long terms is important for PPESCO clients.

However, in the early days of PPESCOs, there will be no track record, and capital providers will require more than simply the guarantee on energy performance. They will want to mitigate the risk of borrower default and the risk of being part of a new marketplace. A credit enhancement can be used to satisfy these needs. Typically, credit enhancement will be structured as a loan loss reserve or letter of credit, which will address concerns about a PPESCO's ability to pay a claim in the future.

As envisioned, early PPESCO structures will involve one or more parent / founding partner organization(s) (see Section 5.1, *Connection to a Parent Organization*). It is possible that the PPESCO parent / founding partner organization could serve this credit-enhancing role at the outset. However, to serve many projects, multiple capital sources will be needed to provide sufficient credit enhancements, even if the default rate is proven to be low (see Section 4.7.2, *Credit Enhancement Sources*).

4.5 Portfolios

The portfolio concept is essential to the PPESCO business model. It mitigates the naturally occurring risk associated with the PPESCO's choice of unserved, smaller projects with longer payback characteristics. One significant feature of a PPESCO project that mitigates this risk is the higher likelihood of operational stability at public-purpose buildings, which tend to have long-term ownership or control that translates to lower risk of default.

Attention to portfolio composition makes marketing, partner development, and financing easier. Diversifying the portfolio reduces risks associated with:

- **Uniformity.** Whether in relation to geography or sector, portfolio diversification helps lessen the impact, should a particular region or market segment experience an economic downturn.
- **Economics.** The PPESCO will seek to mix small projects with large ones to create a risk-balanced profitable portfolio. Combining multiple investment types within a portfolio is a standard risk mitigation investment strategy in other markets, and there is no reason that this approach will not work with a PPESCO. Further, this approach enables the launch of smaller projects (a significant segment of the underserved market) with thinner client economics when those projects are mixed with the strength of larger, more economically resilient projects.

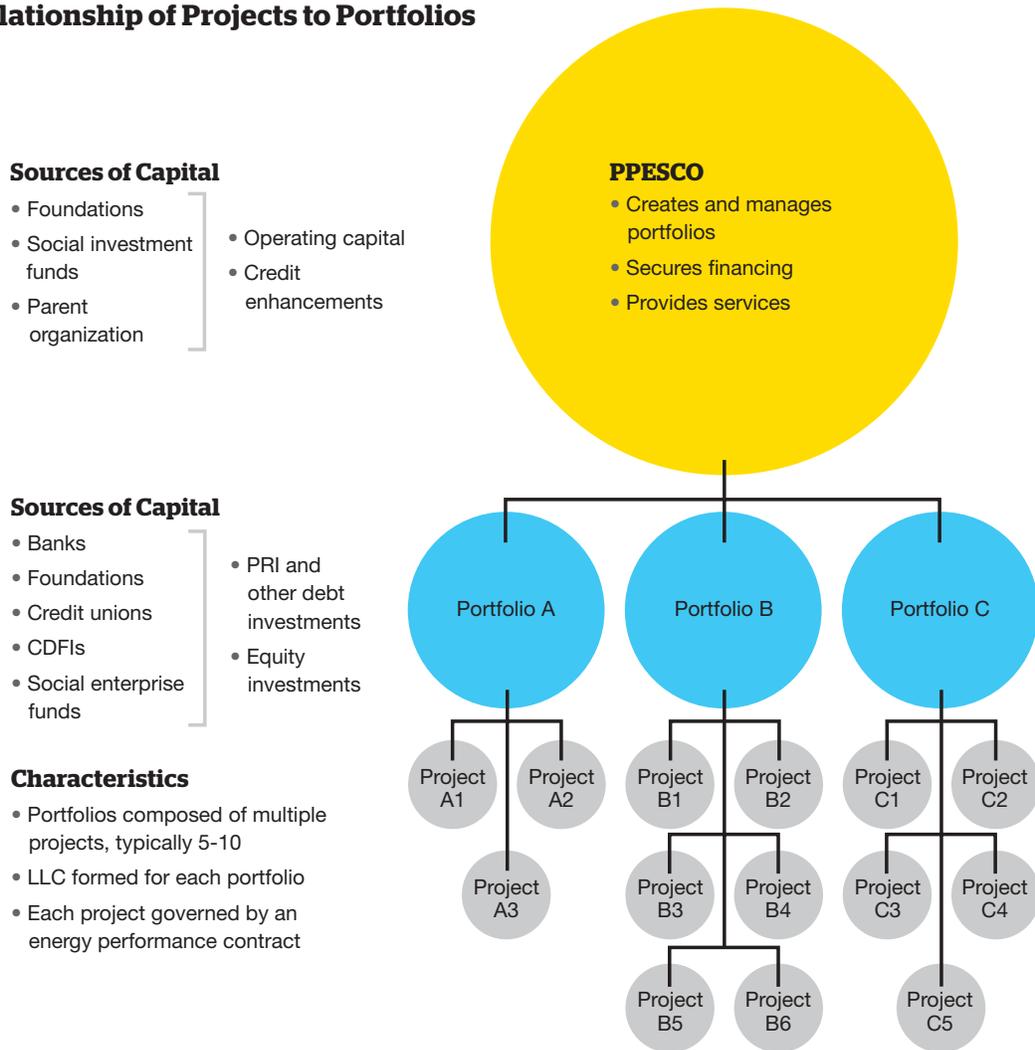
Some likely capital providers for PPESCOs have unique sector, geography, or other defining attributes and therefore need to be matched with a portfolio that represents those target elements. Some lenders specialize in health facilities; some foundations exclusively support affordable housing; some Community Development Financial Institutions (CDFIs) target investments to affordable



housing or charter schools; others might have broad carbon reduction interests that extend across all sectors and types.

The PPESCO can attract capital providers by segmenting client projects into like-minded, equivalent-risk-profiled asset portfolios. This portfolio segmentation offers a relatively easily pooled investment vehicle for different types of investors. The PPESCO may create separate corporate structures for particular portfolios, mitigating risk to the capital providers and to the PPESCO itself. Separate subsidiaries offer a rigor and discipline that help match contract and financing terms, expectations for return on investment, and risk mitigation strategies, such as the presence of credit enhancement assigned to a portfolio.

Relationship of Projects to Portfolios



This access-to-financing service of the PPESCO will likely require partnerships with one or more financial intermediaries capable of aggregating asset portfolios and / or aggregating capital sources. To the extent that capital sources are

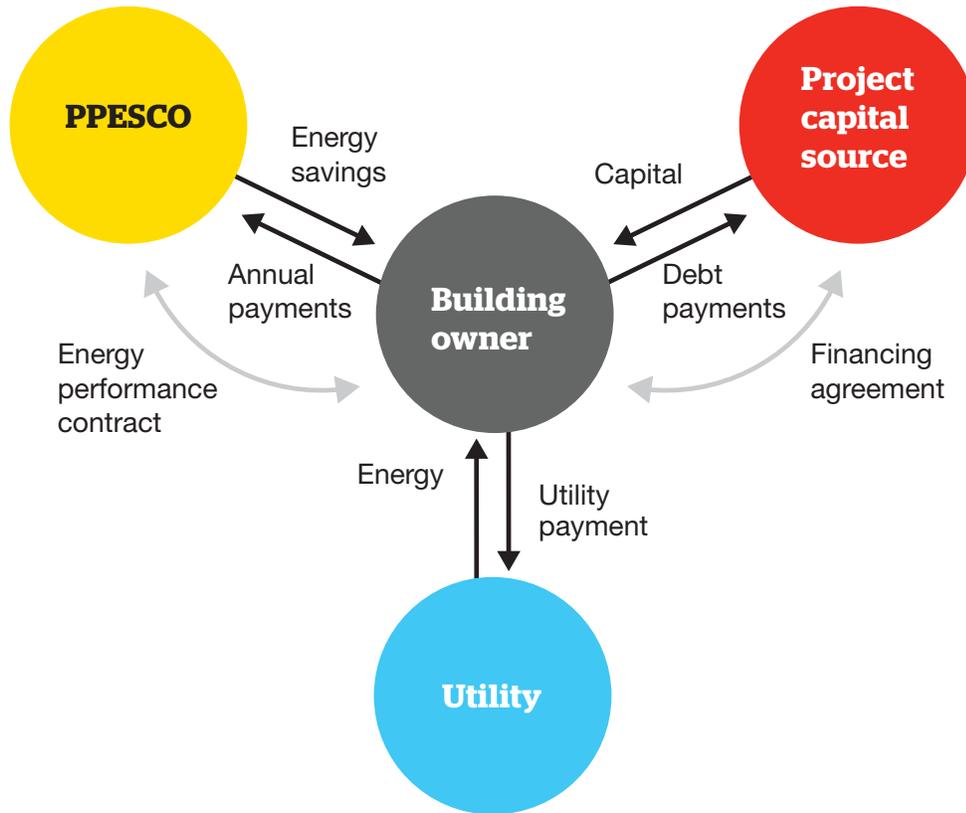
4. aggregated into a fund or funds, a financial partner will underwrite, originate, and service the loans.

4.6 Project Financing Structures

PPESCO project financing will have to meet the balance sheet needs of clients and of the PPESCO itself. Some clients might not be permitted to take on debt, either because their existing capital structures won't permit new or more senior entrants, or because debt adversely affects their own financial positions. In those cases, project financing will need to use alternative mechanisms. The PPESCO's own balance sheet needs will influence project financing, as well. If the PPESCO were to provide financing directly to clients, it would need to recognize these transactions on its own balance sheet. As the amount of both assets (the receivables from its clients) and liabilities (its own repayment obligations) increases, the PPESCO would be precluded from taking on further financial obligations, and thus it would be unable to undertake a larger number of projects.

- **Third-party financing.** In a third-party financing model, the client borrows directly from a third-party lender or a pool made available by the PPESCO through a portfolio. This is the preferred method of PPESCO financing. A full 90% of the ESCO work in the United States is carried out under this model.
- **Direct PPESCO financing.** The PPESCO could provide financing directly to the client, accepting capital investments from others and investing that capital directly into projects. The client then repays the PPESCO, which in turn repays its capital source. This has negative implications for the PPESCO's own balance sheet, and therefore is suggested only when third-party financing will not work. Direct PPESCO financing will need to be modest or the number of projects the PPESCO can undertake will be very limited.





4.7 Sources and Types of Capital

4.7.1 Project Financing Capital and Sources

Although project financing capital sources will evolve over time, the early PPESCO stages are expected to rely on patient, low-cost, mission-driven capital providers—most likely philanthropic sources, some of which have PRI or similar investment funds available. The target range for interest rates, in the current economic environment, is 1% to 5%, with financing periods ranging up to 15 years. As with any debt investment, borrowers of PRI must provide an agreed-upon return, but funds are permitted to be invested in “program-related” areas. Typically PRIs feature below-market interest rates. As the PPESCO proves itself, other complementary sources, such as CDFI funds or investments by financial institutions to satisfy federal Community Reinvestment Act compliance might become available. Finally, after the model has been tested and proven, the PPESCO can attract social-venture debt and equity (for example, niche social-enterprise capital that attaches to carbon reduction goals) or other funds (for example, publicly managed benefits funds with needs for local investing).

Data Collection and Storage

Operating costs must include data collection and storage costs, a feature that is vitally important to proving energy savings and managing client support. These two functions, carried out responsibly and with a high degree of accuracy, will help make the PPESCO market grow. They will also build the long-term record necessary for access to additional capital markets.

Properly organized data storage can be a significant expense, but it is a high-value, up-front cost that needs to be adequately funded as an overhead cost.

4.7.2 Credit Enhancement Sources

The PPESCO performance guarantee mitigates the risk that energy and cost savings will not be as predicted. However, the concern of early lenders about mitigating the risk of borrower default can be effectively addressed with credit enhancement—for example, loan loss reserves and letters of credit. The PPESCO can establish credit enhancements from a blend of these sources to meet the needs of investors providing project financing capital. The need for credit enhancement will very likely be reduced as the experience and the portfolio strength of the PPESCO increase, and the gap between the perceived and observed risk closes. A successful track record will be built on the PPESCO projects' default rates over time, which are likely to be low, given the stability and persistence of public-purpose entities.

4.7.3 PPESCO Start-up Capital

The PPESCO will need access to capital, just as any new business does, when it begins. Likely sources are loans from a parent or partner organization, low-interest PRI loans, and / or philanthropic grants. Finally, debt sources willing to defer principal payments in early years might be of interest to the PPESCO for start-up capitalization. Because these sources will not typically lend to borrowers without a track record, the PPESCO must either come to the business with some experience, or piggyback on the track record of a parent organization or partner (see Section 5.1, *Connection to a Parent Organization*).

4.8 Energy Performance Contract and Savings Guarantee

In the contract with the client, the PPESCO commits to specifying and installing the energy improvements and guaranteeing the energy performance and energy savings. The PPESCO also provides measurement and verification and other services for the duration of the guarantee period, which corresponds with the length of the EPC. The EPC contains an energy-savings guarantee that assures the client that the energy savings will be as predicted, so the client can be more confident of the ability to pay from future savings. Likewise, the guarantee gives capital sources greater confidence in the client's ability to repay the debt from those energy savings. It is important to emphasize that it is the energy savings that are being guaranteed, not the cost savings and not the loan repayment. Both of those are outside the purview of the PPESCO.

Over time, it is expected that the PPESCO performance contract and accompanying guarantee will allow lenders to become comfortable with including the savings as part of their underwriting process. This will occur only after the PPESCO has established a track record, and has accumulated comprehensive, reliable data comparing energy savings projections to actual results. This shift is required to actualize the long-term vision of making standard credit instruments available for PPESCO work and in so doing, catalyzing large-scale PPESCO activity.



The risk that the guarantee could be invoked ensures that the PPESCO stays engaged with the project for the entirety of the loan term. During this engagement, the PPESCO performs routine M&V services as well as post-project monitoring, knowledge-sharing about technology and services, and occupant engagement. Through this work, the PPESCO effectively ensures that energy consumption will be reduced, technology and operations are deployed accurately, **rebound behavior** does not occur, and energy management expertise transitions to the client over time.

Estimating the amount of necessary reserves for the satisfaction of any claims against the PPESCO depends on several factors. An estimation tool is available at www.ppescowho.org. Project modeling indicates that a set-aside of approximately 5% of the project cost is adequate to provide the needed reserves, together with the credit enhancement support.

Rebound behavior

The tendency for owners and occupants who install energy upgrades in a building to offset their savings with additional uses of energy because they believe they are saving energy and can therefore “afford” to use more.

5. PPESCO Operating Structure

The corporate legal structure for a PPESCO must serve: (1) its mission of attaining the deepest possible energy savings in public-purpose buildings, (2) its financial sustainability, (3) the diversity of capital sources, (4) its need for risk mitigation for its own activities and those of its clients, (5) the needs of investors, and (6) the needs of the parent organization. The corporate legal structure must assure the complexity of the PPESCO's activities can be adequately covered, even though it also needs to be a simple and flexible structure.

The PPESCO structure will have to be responsive to the needs of its investors and insulate the organization from risks common to start-ups and to the business enterprise itself.

This section contains discussion of possible legal structures for PPESCOs. Any organization interested in starting a PPESCO should retain its own legal counsel, since this report does not provide legal or other professional advice.

5.1 Connection to a Parent Organization

The PPESCO can be free-standing, or it can be formally or informally connected to another business enterprise, such as a parent organization—an entity to which it has a linked legal relationship. An emerging PPESCO will have to determine whether to establish itself as a new enterprise, such as any one of the types described here, or whether it needs to be a new division within an existing organization. Given the liability associated with many aspects of the PPESCO's services, including the energy savings guarantee, and given the decisions described in the opening paragraph of this section, it might be appropriate to consider establishing a PPESCO separately from its parent.

5.2 Mission

The PPESCO must be structured to allow it to balance mission with profits equally, while maintaining its ability to operate in a way that assures self-sufficiency. As the PPESCO matures and its operations normalize past the start-up stage, portfolio revenue is expected to exceed overhead and growth reserve needs. In this instance, a PPESCO can elect to reduce its mark-up to allow more project capital to go to direct project costs (see Section 4.2, *Operating Revenue*).

Nonprofit and for-profit businesses each can direct excess of revenues over expenses into growth opportunities, including those that might not all generate the same profit level. For-profit businesses generate a financial return to their investors. A PPESCO's objective is to enable as much available financing capital as possible to go to projects—with reasonable, but not maximum, profits as their organizational goal.

This means that certain legal structures are ill-suited to the PPESCO model—specifically, those that are complex and / or whose obligations to investors dictate that the business prioritize profits over mission. For those reasons,



standard corporate entities, Limited Liability Partnerships (LLPs), C Corporations, and S Corporations might not offer an organization an optimal mix of features that a PPESCO needs.

A Limited Liability Company (LLC) is simple and flexible. It can also be easily and singularly overseen by the parent organization. The LLC structure protects its parent by keeping assets, liabilities, and operations all with the LLC. Therefore, it can keep the parent's operating entity separate from the activity of the LLC. All of this creates a separation between the PPESCO and its parent, essentially reducing the risk to the parent from claims against the PPESCO.

Because PRIs and similar foundation investments are a sound and likely source for early project financing, the legal structure for a PPESCO should be compatible with their requirements. Although grant funding from foundations is typically used for nonprofit organizations, there is nothing that structurally precludes foundation PRIs from being made in a for-profit entity like an LLC.

5.2.1 Balancing Profit with Mission

Just as it can be problematic for a standard corporate entity to balance mission with profit, it can be challenging for a nonprofit to balance profit with mission—or to create the optimal balance between the two. Because the PPESCO needs to be commercially viable, a nonprofit structure might not be ideal.

Furthermore, a nonprofit structure could inhibit a PPESCO's ability to use equity investments from social-enterprise or other private-sector sources, be those investments at the project, portfolio, and / or entity level. In certain cases, a for-profit structure can also allow the PPESCO, on behalf of its projects, to take advantage of investment tax credits that would not be available to a nonprofit.

Social enterprises reside at the intersection of the private and public sectors. They typically emphasize a balance of mission and profits for their investments. An ideal structure for a PPESCO would be a for-profit LLC that is created and operated by a nonprofit parent organization.

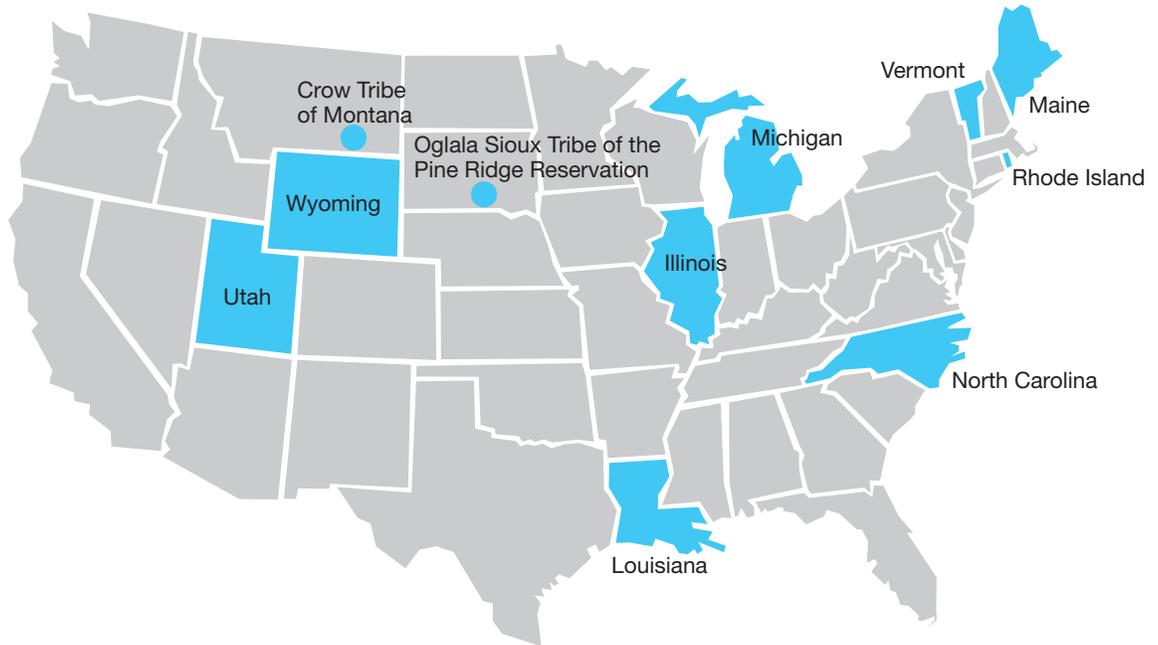
5.2.2 Different Types of Structure

One additional advantage of a for-profit entity is that it can significantly enhance the ability for PPESCO work to transform the market of existing service providers. A for-profit entity that appeals to small-business people and entrepreneurs who seek a profit, albeit a modest one, offers an easily replicable model. This model, once established, makes it possible for other PPESCOs to be created and move through the market quickly.

Nine states nationwide and two federal Native American jurisdictions have created a new structure called the Low-Profit Limited Liability Corporation (L3C). This structure has the explicit purpose of enabling for-profit businesses to equally value mission and profits by removing the need to maximize profits for owners. Although still in its infancy, an L3C can be a good choice for a PPESCO that organizes in one of the nine states in which the L3C legislation has passed.

5.

Jurisdictions with Low-Profit Limited Liability Companies (L3C)



An L3C bridges the gap between nonprofit and for-profit investing by providing a structure that enables investments to be made in socially beneficial, for-profit ventures while simplifying compliance with Internal Revenue Service rules.

However attractive an L3C might appear, it is important to note that it is an essentially untested structure because it is so recent, and because so few entities have been created under it. Therefore, there might be more inherent risk in an L3C structure, compared to an LLC, which has a long and well-tested history.

As was discussed in Section 4, *The PPESCO Business Model*, a PPESCO earns income, rather than relying on philanthropic grant support for its operating funding. The earned-income model must assure a balance of mission and profit, it must operate entrepreneurially to create and capture growth, and it needs to be financially self-sufficient with sound business practices in place. These elements are paramount, and the PPESCO entity's legal structure must enable them. If the PPESCO is created by a parent organization, the nature of that parent organization is a primary factor in determining an appropriate legal structure for the PPESCO. Important considerations are (1) a full understanding of how the parent organization operates; (2) its experience in balancing mission and profit, and (3) its experience in using market models that rely on commercial activity.

Table 3 compares the essential considerations for a PPESCO across three possible legal structures, highlighting the attributes of an LLC / L3C.



Table 3. Three possible legal structures for a PPESCO

	501(c)(3) Tax-exempt Nonprofit	Limited Liability Company (LLC) / (L3C)	Benefit Corporation
Overview	Corporation exempt from taxation, but faces constraints, since all assets must serve the organization's tax-exempt mission	Highly flexible organizational form. L3C is an LLC variation meant to spur investment from both nonprofit and for-profit sectors	Corporation allowing for consideration of social and environmental factors in business judgment of directors
Capitalization	<ul style="list-style-type: none"> • Grants • Charitable donations • PRI • Sponsorships • Private activity bonds 	<ul style="list-style-type: none"> • Member contributions (stock, bonds, loans) • PRI is possible 	<ul style="list-style-type: none"> • Investor contributions • Stocks • Bonds • Loans
Taxation	No federal income taxation unless conducting unrelated business at a significant level	Likely taxed as a check-the-box entity (pass-through taxation of members available) but taxed as a corporation if publicly traded	Likely taxed as a check-the-box entity, but faces double taxation if investors are non-persons
Governance	Board of directors appoints officers to manage affairs	<ul style="list-style-type: none"> • Member-managed or owner-managed • High degree of control available for exempt partners 	Board of Directors appoints officers to manage affairs (must be a dedicated benefit director; reporting is subject to third-party monitoring)
Main Advantages	<ul style="list-style-type: none"> • No taxation • Easily eligible for grant funding and program-related investments 	<ul style="list-style-type: none"> • Highly flexible • Can be organized for a mission-driven purpose • Pass-through taxation • Allows combination of public and private investments 	<ul style="list-style-type: none"> • High transferability of interests • Encourages diverse equity investors
Main Disadvantages	Constraints associated with tax-exempt status (non-distribution constraint, no equity financing, parental control is indirect)	Interests not designed to be publicly traded on a registered security exchange (if publicly traded, faces double taxation)	<ul style="list-style-type: none"> • High transferability of interests means subject to possible hostile takeover • Faces double taxation if investors are non-persons

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5.3 Governance

Start-up PPESCO organizations need to be managed so that their operating and business plans can be carried out. This means adopting a structure that can accommodate strong executive decision-making and fulfill a broad allegiance to public purposes. In this regard, the quality of leadership and staff within the PPESCO become of paramount importance. Also important is the alignment of a PPESCO's values with its parent organization. Assuming the leadership and alignment exist, strategic oversight of the PPESCO entity by its parent increases the likelihood of success.

Other governing structures might be: a stakeholder governance model (with investors, partners, and others), a community board with broad PPESCO interests, or a member-controlled cooperative. All of these options, at least at the outset when the PPESCO will be faced with many standard start-up issues, are likely to be more challenging until the PPESCO entity becomes well established.

5.4 Capitalization

Clearly, the legal structure must enable the PPESCO to raise project capital from all potential sources. Each portfolio of projects will need to be structured independently, with some structured as their own LLCs to accommodate the needs of the capital source. This capitalization structure allows matching of the project and its portfolio through objectives related to mission and investment return. Different capital sources will have preferences between debt and equity, and the PPESCO's legal structure must accommodate both. This is expected to be a factor more at the project and portfolio levels than at the entity level.

Equity investments as a financing source for the PPESCO itself add a significant level of complexity in the initial stage of a PPESCO's existence. However, equity investments are a sound option for attracting certain types of capital for portfolios and individual projects, especially when PPAs, tax credits, and / or RECs are being used (see Section 4.2.2, *Other Sources of Project Revenue*). Project and portfolio financing should be structured such that they can accept both debt and equity investments, since both are likely to be available. Considering equity investment at the entity level of a PPESCO, however, requires the PPESCO to be structured as a for-profit entity and thus might prevent the PPESCO from being able to easily secure early grants from philanthropic sources. The ideal situation, therefore, is to create a flexible structure and to form strategic partnerships. These partnerships can make access possible to additional capital and support.

5.5 Energy Performance Contracts

The EPC between the PPESCO and the client is of critical importance and thus the entire business model depends on a well-constructed and well-executed EPC. It defines the parameters of the performance guarantee; it spells out all



of the risks and to whom they belong; and it describes how savings are to be attributed in measurement and verification. All EPC models contain adjustments to baseline energy performance, with the objective of isolating the primary energy savings from other factors that the energy services provider cannot control.

In the EPC, the PPESCO commits to determining and installing the energy improvements, guarantees the energy performance and energy savings, and agrees to provide M&V and other ongoing services as mutually agreed upon between the client and the PPESCO for the duration of the performance guarantee period. The contract and savings guarantee provide assurance to clients that the energy savings will result, and will make clients and capital sources more confident of the clients' ability to repay debt.

The risk that the guarantee could be invoked motivates the PPESCO and client to stay engaged throughout the contract term. During this period, the PPESCO will perform routine M&V services, conduct ongoing commissioning so that the building(s) perform as predicted, suggest other energy improvements, provide training to the client's operations and maintenance staff, and provide occupant engagement as desired by the client. Energy use behavior is a significant driver of energy savings and performance. Through long-term client and occupant engagement, the PPESCO will effectively ensure that energy consumption will be reduced, that technology and operations are deployed accurately, that rebound behavior does not occur, and that energy management expertise transitions to the client over time.

In the event of under-performance of energy savings, the PPESCO provides payment to the client. The conditions under which this might occur are detailed in the EPC, and explicitly describe the thresholds beyond which energy saving claims occur. Any such payments would need to come from (accrued) cash on hand. Thereafter, in the unlikely event of significant or unremedied under-performance beyond any level specified by the contract, loss reserves would be available to help cover the loss. Loss reserves can be put in place as a component of the credit enhancement, and can be provided from patient capital sources that a PPESCO arranges as part of the financing package. The financial effect of the savings guarantee for the PPESCO is the calculated necessary reserves to cover possible claims, with those reserves estimated at less than 5% of total project cost (see www.ppescohowto.org for calculating models). The reserve is accrued against future liability claims that might occur in the event of under-performance.

The ongoing annual services of a PPESCO on behalf of its client are spelled out in the EPC. The contract obligates the PPESCO to perform the services, and obligates the client to make an annual payment for them. Ongoing M&V ensures that building systems are monitored throughout the contract term, and that corrections are made expeditiously to maintain energy savings. These contracts will stipulate regular commissioning and continued energy-saving work with building staff and tenants.

What's Contained in the Energy Performance Contract

- Project parameters
- Mutually binding obligations
- Influencing variables (both controllable and uncontrollable)
- PPESCO's guarantee of energy savings
- Services schedules with specific measures and costs, both at time of construction and throughout the life of the project
- Conditions under which the building is managed

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Any refusal to maintain all conditions of the contract will void the guarantee. Loan terms between the client and the financial intermediary may stipulate that this would also be considered a default on the loan.

The PPESCO will need a high level of legal expertise to support the execution of EPCs, as well as the multitude of contracts and other agreements it will need with clients, consultants, contractors, suppliers, and lenders. Confidentiality agreements will likely be needed as early as the information-gathering phase, and throughout the term of the contract.

5.6 Business Development, Marketing, and Sales

There will be pressure on the PPESCO to prove itself with its first projects. On the one hand, many of its intended clients don't know yet that this service is possible for them, they might not know they need the services, and they probably don't understand how PPESCO services work.

On the other hand, the proving ground for PPESCO work is relatively well known, because there are many reasonably informed potential clients who would like to make energy improvements to their buildings, but they know they lack the skills and coordinating capacity to make it happen. A well-structured, well-marketed PPESCO can move these clients from "Where would I start?" to "When can we start?"

The PPESCO must quickly and successfully undertake early projects while building a pipeline of future projects. This objective poses some challenges for the early stages of the PPESCO model. The typical sales cycle of 12 to 24 months in the ESCO industry will have to be shorter for a PPESCO. The primary method for sales is to cultivate strategic partnerships and tap into partner networks to secure new projects. Project pipelines can be built via knowledge of construction projects in the planning and development stages to which a PPESCO can be integrated. Networks can also generate good leads that can be converted rapidly to real projects by:

- **Reaching networks of public-purpose building owners already known to a PPESCO or its parent / partner.** The PPESCO must already possess, directly or indirectly through a parent or partner organization, strong relationships among target market clients. The PPESCO will need to work those channels effectively, identify clients ready to engage in a project, and rapidly build pipelines of new projects. In addition to parent / partner connections, this strategy needs skilled business development talent capable of not only understanding and reaching networks, but also closing deals.
- **Targeting locations with newly launched or undersubscribed energy efficiency programs.** Newly launched and undersubscribed incentive programs often look for ways to increase participation. The early PPESCO marketing strategy should identify locations in which



these opportunities exist, and piggyback onto utility marketing and outreach.

- **Targeting building owners who have the greatest needs for energy efficiency upgrades.** The PPESCO should cultivate market channels known to have significant needs for an integrated services offering. This tactic would attempt to expand beyond existing relationships to locate owners who might have high need, but little access to or understanding of energy efficiency.
- **Developing the PPESCO brand and long-term marketing and sales strategies.** The PPESCO will eventually move beyond its existing contacts and networks and expand to new prospects and channels. Promoting a “trusted advisor” role will help a PPESCO meet the needs of those possible new clients. Examples of networks or channels of public-purpose client prospects are associations and targeted investors.

5.7 Risks to the PPESCO

The PPESCO will assume risks that will need to be considered early on and over time. As the PPESCO enterprise gains experience and a reputation, many of these risks will be reduced or eliminated. The PPESCO is vulnerable to risks associated with individual projects, as well as those associated with the operation of the business itself.

The risks to PPESCO projects—in the context of both clients and building occupants—are described in *Table 4*. Several of these risks are beyond the control of the PPESCO, the clients, and / or the occupants.

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Table 4. PPESCO project risks and mitigation strategies

Risk to PPESCO Project	Impact	Probability	Mitigation Strategies
Client's key financiers, funders, regulators, etc., do not approve contracts	High	Medium	<ul style="list-style-type: none"> • Help client understand, early, necessary approvals • Keep key people informed, as appropriate, on contract approval steps • Advocate changes to laws, regulations impeding EPCs
Positive cash flow deal cannot be devised	High	Low	<ul style="list-style-type: none"> • Create and adhere to screening criteria for clients, with clear go / no-go rules • Give the client a well-supported assessment of cash flow, early in the screening process
Client defaults on loan because of under-performance of energy savings	High	Low	<ul style="list-style-type: none"> • Create and maintain an adequate loan loss reserve • Structure PPESCO and portfolios as LLCs • Communicate frequently with the client to avoid default surprises, and to reduce the possibility of a default
Tenant behavior reduces client savings	Medium	High	<ul style="list-style-type: none"> • Make sure long-term contract specifies requirement and schedule for providing information to tenants about optimizing building energy performance • Use measures that reduce the need for tenant to adjust controls • Include clear "standards of comfort" in EPC • Help influence tenant behavior, using effective feedback
Planned energy improvements in the building are significantly modified during installation	Medium	Medium	<ul style="list-style-type: none"> • Specify performance standards for installations • Require written PPESCO approval for modifications • Provide good construction management oversight • Keep client informed and involved throughout project
Construction costs are higher than estimated	Medium	Medium	<ul style="list-style-type: none"> • Provide strong general contractor oversight for projects • Use trusted contractors when putting work out to bid • Improve training of building engineers to estimate construction costs accurately
Systems are not operating correctly according to optimal settings	Medium	Medium	<ul style="list-style-type: none"> • Train operations and maintenance staff in optimizing practices as part of PPESCO annual services • Prove value of monitoring and system correction with specific early examples to clients • Install remote monitoring and warning systems • Provide periodic system updates and refresher courses



Risk to PPESCO Project	Impact	Probability	Mitigation Strategies
Client is not creditworthy when evaluated against standard financing criteria	Medium	Low	<ul style="list-style-type: none"> • Determine creditworthiness during project screening • Include guaranteed energy savings as a factor in determining creditworthiness • Use credit enhancements as needed
Client does not fully understand contract terms	Low	Medium	<ul style="list-style-type: none"> • Identify client personnel who must understand key terms and conditions (operational, legal, financial) • Enable peer-to-peer information flow from other clients • Use transparent methodology • Review contract terms and conditions with the client, prior to closing the deal
Occupancy rates or changes in use impact client savings	Low	Medium	<ul style="list-style-type: none"> • Determine likely savings, using historical occupancy rates and disclose them in project documents • Require periodic reporting on building occupancy and use • Structure savings guarantee with stipulations for savings adjustments if occupancy rates or building use changes
Weather impacts negatively affect savings from installed measures	Low	Medium	<ul style="list-style-type: none"> • Write into contracts provisions for savings adjustments for weather-related effects • Design projects to contain a mix of measures, including those that are impervious to weather-related effects • Create a portfolio with a geographical mix to balance weather impacts (hot climate and cold climate mix)
Changing energy prices significantly reduce savings from installed measures	Low	Low	<ul style="list-style-type: none"> • Write into contracts provisions for making savings adjustments for energy price changes

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Table 5. PPESCO entity risks and mitigation strategies

Risk to PPESCO Entity	Impact	Probability	Mitigation Strategies
Practices change in energy contracting and financing	High	High	<ul style="list-style-type: none"> • Build PPESCO on trust and performance, not lowest financing rates • Integrate new models into PPESCO as necessary
Operating costs for non-project-related activity (overhead) are not covered by mark-up	High	Low	<ul style="list-style-type: none"> • Design structures for cost controls, monitor costs monthly • Allocate all possible costs and funds to projects • Maintain thin overhead structure
Inability to obtain sufficient capital for projects	High	Low	<ul style="list-style-type: none"> • Integrate capital sourcing with project sourcing • Obtain commitments for capital well before it is needed • Build long-term relationships with mission-aligned capital sources
Changes in state or federal policy restrict use of energy performance contracts	High	Low	<ul style="list-style-type: none"> • Stay up to date on regulation in markets of interest • Require review of regulatory conditions and trends for new markets • Seek strategic relationship with industry, trade groups active in energy policy, regulations
Project timelines too long	Medium	High	<ul style="list-style-type: none"> • Create normative project schedules and budgets • Require reporting on deviations from norm, with remediation plans • All contracts must contain penalties for delays
Interest rates increase	Medium	High	<ul style="list-style-type: none"> • Secure best possible rate at deal close, though not at the expense of the term (higher importance to cash flow)
Low close rate on projects	Medium	Medium	<ul style="list-style-type: none"> • Create data system and reporting functions on close rates • Determine normative data for each market sector, and reasons for variances, remediate where possible • Eliminate unqualified project candidates early and at lowest cost



Risk to PPESCO Entity	Impact	Probability	Mitigation Strategies
Financial partners take over control of PPESCO	Medium	Low	<ul style="list-style-type: none"> • Put legal structure in place to protect mission • Solicit funding partners with similar missions • Include contract terms to keep executive control within PPESCO (e.g., investments remain as loans, not equity) • Design LLC governance structure to maintain control
Loss of parent organization's commitment to PPESCO	Medium	Low	<ul style="list-style-type: none"> • Establish and maintain strong leadership • Maintain interaction between PPESCO, parent organization
Project pipeline builds too quickly	Medium	Low	<ul style="list-style-type: none"> • Balance pipeline development with organizational growth goals • Design intake systems to triage projects quickly • Articulate decision criteria and schedule for projects under consideration • Manage prospective client recruitment and existing client expectations
High payouts on savings claims	Medium	Low	<ul style="list-style-type: none"> • Guide technical staff in understanding standards for estimating savings conservatively • Make clear to clients that monitoring and corrections are frequent in first 2 years after construction / installation • Monitor whole-building energy use at least monthly in first year, even if energy use is not from a metered source
Inability to obtain capital for loan loss reserve / credit enhancement	Medium	Low	<ul style="list-style-type: none"> • Build relationships with mission-aligned capital sources • Promote record of accuracy in predicting energy savings • Allocate more revenue to build own-source reserves
Project pipeline builds too slowly	Low	High	<ul style="list-style-type: none"> • Deploy trusted-partner networks to identify new projects • Use early success to obtain more projects, taking advantage of professional groups in markets of interest • Increase growth activities

6. The Life of a PPESCO Project

6.1 Project Flow

A substantial amount of PPESCO work occurs at the prospecting stage. Networks are effective channels for finding target sectors and promising projects. The steps after initial project identification follow a prescribed path.

Eliminating unqualified project candidates early is, understandably, critically important. This screening needs to be conducted in a relatively inexpensive manner that limits unrecoverable expenses to the PPESCO. Accordingly, the preliminary examination should be completed quickly. It requires a review of data and an interview with the owner. When a site visit is warranted, a walk-through conducted by an experienced PPESCO staff person will suffice, and often can be done in a few hours; in many cases, initial screening will not require a site visit.

The major activities fall into sequential phases, the details of which can be found at www.ppescowhowto.org. The website also contains many of the steps, supporting documentation, and calculation models for launching and operating a PPESCO.

Project Phases

- Screening for suitability
- Building assessment and recommendation of measures
- Project financing
- Performance contract and savings guarantee
- Installation of energy improvements
- Post-retrofit services

6.2 Building Assessment and Recommendation of Measures

After a candidate project passes screening and its client expresses interest in taking the next step with the PPESCO, it becomes a “qualified lead,” and organizational resources including account management and engineering are assigned. At this point, the PPESCO has completed the first “go / no-go” determination and has decided to go forward because the client meets the initial criteria.

Project information is then gathered for the next level of analysis: a detailed description of the building, its energy use, history of energy audits and improvements, ownership structure, and an evaluation of the owner’s commitment. If a walk-through of the building was not conducted in the screening phase, it will be done at this phase.



Assuming that the project shows promise, a detailed energy audit of the building is the next step. PPESCO engineering staff will conduct a walk-through of the building to examine its energy and water systems to make a preliminary list of savings recommendations, and to identify non-energy issues that might be relevant for the project. PPESCO staff will also gather other information about the client's capital plan and budgeting for the next 5 to 10 years, its approval process for capital improvements, and the client's creditworthiness.

At this point, the PPESCO can proceed with the comprehensive energy analysis. It is not sufficient to rely on a previous energy audit conducted by some other party, since this analysis is the basis for project evaluation and the guarantee of energy savings that the PPESCO provides. This analysis provides specific and up-to-date data on the building's uses, energy, water, and other relevant building needs, along with estimated savings and costs. The analysis reviews historic energy consumption, isolates external factors, and identifies technical adaptations or alterations that would be recommended for reducing energy consumption.

Financing sources will likely require the results from this type of analysis as a condition for providing financing to the building owner or PPESCO. The data collected in this process are used to determine the optimal package of cost-effective measures for achieving the deepest savings for the project, as well as many of the conditions that will be necessary for the EPC. Sharing this information transparently creates mutual expectations between the client and the PPESCO, and sets the tone for the long-term relationship that will continue throughout the life of the project.

As an additional service to the client, the PPESCO can offer recommendations for related non-energy improvements that might not have correlated savings but have important value to the client, given its public purpose. Such improvements could be those that affect indoor air quality or overall building durability.

6.3 Project Financing

The PPESCO must develop capital sources well in advance of beginning projects and entering into mutually binding contract obligations. Full financing details and contracts will need to be worked out following the comprehensive analysis. Financing is discussed in Section 4, *The PPESCO Business Model*.

6.4 Performance Contract and Savings Guarantee

Once the financing is secured and the PPESCO and client have agreed on a scope of work, completing the EPC is the next step. Then construction can begin. The performance contract is discussed in Section 5.5, *Energy Performance Contracts*.

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6.5 Installation of Energy Improvements

The PPESCO will manage the installation of energy improvement measures. In cases where the project is not part of a larger construction project, the PPESCO will fulfill the general contractor role, overseeing the installation of energy, water, and renewable energy improvements, any related health and safety measures, and any other scoped services. In cases in which the energy work is a component of a larger project, such as a comprehensive rehabilitation effort, the PPESCO will provide performance standards. These would be included in the construction contracts with the General Contractor and the PPESCO will oversee, coordinate, and manage the energy work to ensure that the project is carried out as designed.

It is critical that the building's energy performance be optimized at the point of construction completion, and building commissioning provides the mechanism for this. Building performance standards will have been created as part of project scoping and design, and commissioning will ensure that all project specifications are met. This requires a high level of coordination among the PPESCO, the owner, and the contractors and suppliers.

6.6 Post-Installation Services

Long after the installations are complete, the building will need monitoring to ensure projected savings are achieved. Even if energy systems are optimized when the improvements are installed, their performance can rapidly decline unless there are regular systems of monitoring, adjusting, and correcting. This is known as continuous commissioning. To avoid compromising the savings guarantee in the EPC, the PPESCO will thoroughly monitor and continuously commission the facility throughout the term of the performance contract.

Ongoing M&V is essential to assuring that the energy performance meets or exceeds the PPESCO's projections. This is a long-term strategy for maximizing energy efficiency. It will also address management practices, transfer knowledge and technology, and increase the building staff's capability in optimizing building energy performance.



PPESCO Conclusions

Good business models can inspire great ideas. In the decades since the ESCO model entered the energy marketplace, many of the largest energy users have been able to lower their costs because of it. Although the model works for them, it has left a large part of the building sector underserved.⁸ As energy costs continue to rise, the needs of that wider range of clients have become more pronounced. Serving this wider market is both an opportunity and an imperative.

The existing energy services industry cannot easily apply its model to this wider range of clients, particularly not to those they consider hard to reach and outside their business model. With a new model in place, however, redesigned to be attractive to the underserved markets, while providing benefits to society at large, the next generation of services to fill those needs is now ready to enter the marketplace.

The idea of using future energy savings to finance energy improvements—and putting that idea to work in the underserved building market—have been percolating for many years. The PPESCO takes this idea further by specifying that the highest and best use of this proven concept is to apply it in sectors that explicitly exist to serve public interests.

It does so by prioritizing energy savings and public benefit over financial return, installing measures that achieve more savings than an average energy improvement project, and finding and using non-traditional capital to finance projects. The PPESCO emphasizes the best client solutions, regardless of technology or energy source. It operates in a fully transparent way to engage the client as an active stakeholder in selecting the best choices for the client organization, the purpose of the building, and the building itself.

The PPESCO seeks a balance of mission and profit. The PPESCO mission is critical to enabling significant greenhouse gas emission reductions in important, underserved sectors. Providing services to public-purpose clients also creates significant positive cash flow for public-serving institutions.

Long-term financial sustainability is essential to successfully operating a PPESCO. Even though it has evolved from the ESCO model, the PPESCO is less a modification of an ESCO, and more an innovative twist on the savings-as-debt-service concept.

This model could bring significant benefits to organizations that are not able to access the expertise and financing they need to make their buildings more efficient. Potential PPESCO clients also would see lower operating costs and would reduce their environmental impacts by completing customized, comprehensive energy improvement projects in their buildings.

The work in this report has three important results: (1) the relevant conditions for the financial market and the legal and business considerations for successfully

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launching the PPESCO model are now recognized; (2) the market opportunity for a PPESCO is well understood; and (3) the extent to which a PPESCO—and a network of PPESCOs nationwide—can have an effect on lowering GHG emissions can now be envisaged.

The following conclusions create a path for launching a PPESCO, assess the steps for expanding the impact by creating more PPESCOs, and describe the process for rapidly scaling the work to obtain deep energy savings in public-purpose buildings nationwide.

Why Does It Matter?

1. PPESCO markets are waiting to be addressed.
2. A mission balanced with a profit motive meets everyone's goals.
3. Transparency creates trust.
4. Project portfolios maximize benefits.
5. The PPESCO business model is viable.
6. Deep experience is necessary and available.
7. The market requires flexibility.
8. The risks of under-performance are manageable.
9. Valuable additional resources exist.
10. Non-traditional capital sources are critical.
11. The parent can get a PPESCO started.
12. Performing well will attract traditional capital.
13. The environmental imperative is compelling.



7.1 PPESCO Markets Are Waiting to be Addressed

The PPESCO is intended to provide services to the not-yet-served projects in which the energy investment cost is below \$1 million and the buildings themselves house entities with a public purpose.

There are four primary public-service sectors that appear to hold the most promise for PPESCOs: multifamily affordable housing, education, health care, and municipalities and other community facilities. They can be health clinics, public and charter K–12 schools, community centers, affordable housing, and municipal facilities such as libraries, police departments, city offices, and wastewater treatment facilities. Although such organizations typically have little interest in energy per se, they can free up funds, via saved energy, to support their mission work. These organizations generally do not have in-house capability and capacity to effectively harvest deep energy savings. The PPESCO can play that role for them, bringing its high level of technical skills and expertise to customized, comprehensive solutions that work for their buildings.

7.2 A Mission Balanced with a Profit Motive Meets Everyone's Goals

Fulfilling the PPESCO mission must be on a par with, and not secondary to, the motive to be profitable. The PPESCO must generate sufficient net income to sustain and expand the business, and to build needed reserves. An objective of achieving a healthy return, rather than a maximum return, allows for the greatest amount of total funding to be used to invest in the widest and deepest range of energy improvement measures. This objective best suits the PPESCO's deep energy savings goals, the client's public benefit goals, and mission-related investor goals.

7.3 Transparency Creates Trust

The PPESCO's interest should align with those of its clients, so that the PPESCO is a trusted partner ready to serve the client. In the PPESCO business model, the assumptions are that the PPESCO will:

- Be transparent in all respects (this is especially important as it relates to project and service pricing)
- Have no financial interest in any specific technology, vendor, or brand
- Have no financial interest in any specific energy source
- Source financing that is both long term and mission aligned

This behavior makes a very strong statement to clients that the PPESCO is willing to obtain the most cost-effective and well-informed results for the client.

7.4 Project Portfolios Maximize Benefits

The ability to aggregate multiple projects into well-defined portfolios benefits clients, investors, and the PPESCO. Each portfolio will contain projects with similar attributes. Portfolios spread risk. If projects under-perform or are marginally profitable, the negative effect of a single project will be offset by higher-performing and more profitable projects for the investor. Capital sources can be matched with portfolios that best represent their respective missions and their financial return requirements. Transaction activities that are common to individual projects at the portfolio level can be spread across multiple projects, sometimes resulting in economies of scale.

7.5 The PPESCO Business Model Is Viable

The analysis in this report shows the PPESCO business model to be viable and sustainable at the project level, the portfolio level, and the organization level.

There is a need to serve smaller projects; the PPESCO is expected to serve projects that range in total cost of energy improvements from \$100,000 to \$800,000. The portfolio approach and good early selection are imperative to viability of the model.

Given the objectives of deep energy savings and GHG emissions reductions, the average minimum energy savings goal of 30% means that projects without significant prior energy work offer the greatest potential. Addressing mechanical and electrical systems, building shell systems, and on-site renewable energy installations offers the opportunity to go significantly beyond that 30% figure. Renewable installations might also provide an additional revenue stream for investors and produce carbon reduction benefits.

Positive cash flow from the outset of the project is of high value to the client. It is the PPESCO's objective that energy savings, after debt service and fees, provide a net positive cash flow of 5% to 10%. This serves as a motivator for the client, and is a source of additional funds for supporting the work of their missions.

Long-term financing is required to obtain deep energy savings. The objective is that the PPESCO will find financing with a term of 15 years. And although 15 years is the target, the PPESCO will need to be sufficiently flexible and creative to be able to use 10- or 12-year debt terms if those are the only ones available.

7.6 Deep Experience Is Necessary and Available

A PPESCO needs a strong track record, which, of course, does not exist at start-up. Therefore, the PPESCO needs a parent or partner organization that does have these attributes to launch it, with a staff and trusted contractors who bring deep experience in accurately predicting and measuring energy savings from installed improvements in buildings. Because financing for a



project is typically based on savings, the savings estimates need to be as accurate as possible.

The PPESCO needs deep roots in the communities in which it plans to work. It also needs collaborative relationships with partners and networks that can bring projects (and in some cases capital) to the PPESCO. Potential clients of the PPESCO need and value these relationships and possible sources of capital. These roots, partners, and market or sector networks will provide the access to decision makers to help move projects forward. Growing through networks is a core strategy of the PPESCO business model.

These requirements lead to the conclusion that in most cases, a PPESCO will be launched as a subsidiary of an existing organization that has experience and credibility in specific markets. A PPESCO might also be launched as a joint venture, bringing together the talent and market connections of more than one organization.

7.7 The Market Requires Flexibility

The PPESCO's package of integrated services provides the flexibility to serve clients with a wide range of needs. The approach is not "one size fits all," but rather "accommodate the needs of different conditions." The approach serves an objective of arriving at a customized solution for a given situation and client. For example, the most cost-effective time to optimize building energy performance is when the structure is being built or undergoing major rehabilitation. Although there are challenges to creating a performance contract without a clear, historical baseline of energy use, and therefore no easy path for establishing a savings guarantee, it is not an impossible task. PPESCOs must be open to working on such projects, rather than closing off these unconventional opportunities.

7.8 The Risks of Under-Performance Are Manageable

All start-up enterprises have risks, but because the concepts upon which the PPESCO is built have been in use by many organizations for decades, the risks are relatively well understood. They can also be calculated and planned for. The risk of not meeting energy savings goals is the most often-cited risk. However, industry professionals with many years of experience and knowledge from tens of thousands of projects characterize this risk as minimal and manageable.

The risk is not binary: It is not that the savings will result or they won't, but that the installations might under-perform. These are usually easily observable and can be readily fixed. The PPESCO's technical expertise and its monitoring after the installation lower the risk for under-performance. Essentially, under-performance is the degree to which realized savings vary on the low side from prediction.

30%

The average minimum amount of energy savings expected from a PPESCO project

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7.9 Valuable Additional Resources Exist

The PPESCO needs to take full advantage of all available resources—incentives, credits, and / or grants. These can bring down initial capital costs, reducing the amount to be financed, and improving the cash flow.

A PPESCO can provide the types of projects that utility and other programs want to see with accurately predicted savings, project management and commissioning, verification, and rapid intervention should energy savings fall short of predictions. Taken together, these supplemental resources can reinforce the creation of solid savings that persist over the long term.

Under certain circumstances, access to tax credits can play an important role both for attracting capital sources and for improving the economics of a given project. Similarly, adjunct revenue streams—power purchase agreements tied to on-site renewable installations, for example—add to the attraction of a given project and / or portfolio.

7.10 Non-traditional Capital Sources Are Critical

Until financing is more readily available through standard commercial mechanisms (which will happen when energy savings are seen as a source of sound and financially secure debt repayment), non-traditional capital sources need to be identified, nurtured, and deployed. The long-term goal is to create access to standard commercial sources for long-term financing. This is many years off, but it is what the PPESCO vision leads to.

A primary source at the start is the philanthropic community. Mission-aligned investments that qualify as PRIs are one such source, and can lead to a wider range of social-enterprise capital.

7.11 The Parent Can Get a PPESCO Started

The likely source for start-up support is grant funding and / or support from a parent organization. Initial seed funding provided by the parent organization launching the PPESCO is highly attractive for other funders, because it demonstrates financial and organizational commitment, and improves the chances of attracting grant support.

7.12 Performing Well Will Attract Traditional Capital

There are multiple reasons that patient, non-traditional financing is needed to achieve the long-term goal of wide capital access through traditional commercial lending channels. The case will need to be made that energy savings are a logical, safe, and predictable source of repayment.



A strong body of experience is necessary to make this case. The existence of multiple, successful PPESCOs, with their accumulated experience and data, will inspire confidence in the lending community. When this happens, access to traditional commercial financing is more likely to occur. This in turn will enable expansion of the PPESCO model, significantly accelerating the opportunities to reduce energy use in public buildings across the United States.

7.13 The Environmental Imperative Is Compelling

Carbon emissions have passed the 400 parts-per-million threshold, a line that many climate scientists and policy makers deem dangerously close to the “point of no return” for environmental stability on the planet. This environmental imperative demands “will do” solutions, rather than “can’t do” responses.

The PPESCO model is imbued with “will do” optimism. Although barriers exist, proven solutions are at hand. The PPESCO uses these solutions, together with capital and the willpower to methodically knock down these barriers, for the benefit of human society. This is a solvable problem and PPESCO is a market-based innovation.

To accomplish what must be done, every tool is needed, be it existing or newly conceived, to reduce our impact on climate. Climate disruption hits hardest the most vulnerable people in human society. The PPESCO provides an effective tool for addressing the sectors that have both the highest need to become more energy efficient and some of the most serious barriers to doing that. This concept can be successfully replicated throughout the country. The hope is that many qualified and interested organizations will create PPESCOs.

An individual PPESCO can scale to hundreds of buildings and millions of square feet; well-coordinated and effectively collaborating PPESCOs can scale to reduce energy costs and carbon emissions in tens of thousands of buildings.

This can be done. It can be done relatively quickly. And it requires sustained and coordinated interest, and patient capital to make it happen. The outcome will be transformative.

Endnotes

- 1 Even though the energy savings guarantee exists in the ESCO model, an ESCO does not guarantee energy cost savings—largely because prices are outside the control of the ESCO; it is energy savings that are controlled and guaranteed by the ESCO.
- 2 This measure has become so fixed in the climate change vernacular that it is frequently quoted without attribution. A valuable summary of this conclusion can be found in Hassol, Susan Joy (2007), *Emissions Reductions Needed to Stabilize Climate, Questions and Answers*; The Presidential Climate Action Project, p. 4. Her statement describes the conditions: “In order to stabilize CO₂ concentrations at about 450 ppm by 2050, global emissions would have to decline by about 60% by 2050. Industrialized countries greenhouse gas emissions would have to decline by about 80% by 2050.”
- 3 United Nations Environment Programme, *Buildings and Climate Change—Summary for Decision-Makers*. New York: UNEP Sustainable Buildings and Climate Initiative, 2009, p. 5. <http://www.unep.org/sbci/pdfs/SBCI-BCCSummary.pdf>.
- 4 For an excellent overview of the sustainability of Earth’s climate at various levels of CO₂ ppm, as alluded to in this paragraph, see 350 Science at <http://350.org/about/science>.
- 5 <http://www.naesco.org/resources/industry/documents/ESCO%20study.pdf>. See page vii.
- 6 Meghan Cieslak, 2012. *Energy Efficiency Is a Proven Economic Winner*. Washington: National Association of Energy Services Companies, October 18. <http://www.naesco.org/news/press/pressreleases.aspx?PressType=NAESCO>.
- 7 www.ppescowhowto.org.
- 8 As mentioned in Section 2.4, *Underserved Markets and Less-than-Optimal Improvements*, the economics of the ESCO business model are backed by standard commercial financing, requiring them to focus on the most profitable client bases and to use practices designed to maximize financial returns. ESCOs are doing exactly what they were designed to do, and quite effectively, in a market that is calculated to be between \$5 billion and \$7 billion a year and growing at 7% a year. <http://www.naesco.org/resources/industry/documents/ESCO%20study.pdf>. See page vii.



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Tel: (802) 658-6060
Toll-free: (800) 639-6069

VEIC Headquarters:
128 Lakeside Avenue, Suite 401
Burlington, VT USA 05401