Qendresa Rugova
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Financing energy efficiency through publicly listed "YieldCo" vehicles

ABSTRACT

Energy efficiency is considered to be one of the most cost-efficient method of reaching global energy policies and curbing green-house gas emission. Moreover, energy efficiency presents an immense opportunity for investors with global cumulative investment forecasts between 2014 and 2035 reaching a volume of between USD 8 - 13 trillion. However, despite the clear environmental and economic case for energy efficiency, current annual investment volume is still below policy targets mostly due to unique challenges characterizing energy efficiency.

This papers looks into the existing financing methods for energy efficiency with a more specific focus on the energy performance contracting (EPC) with energy service companies (ESCOs) as well as the energy service agreement (ESA) structure and assesses their capability and limitations of achieving deep refurbishments and investment scale. The last section explores secondary markets as a means of delivering energy efficiency investments. In particular, the YieldCo model recently introduced by renewable energy developers is analysed in terms of its benefits and challenges as a financing model and its applicability for deploying energy efficiency investments.

Keywords: Energy efficiency, financing, ESCO, EPC, ESA, secondary markets, institutional investors, YieldCo, pension funds, insurance companies

1. Introduction

Energy efficiency is an integral part of global energy policy as it is widely recognized as an efficient means of reducing greenhouse gas pollution as well as ensuring long term security of energy supply. Investments in energy efficiency measures have a direct effect on reducing energy consumption while also improving industrial competitiveness, driving economic growth.[1] Investments in energy efficiency during the past 25 years have successfully managed to achieve the uncoupling of energy consumption and economic growth with energy consumption per capita in IEA countries dropping to levels of 1980s while income per capita enjoyed a steady growth over the same years. This represents a total saving of USD 5.7 trillion on energy costs in the past 25 years.

Investments in energy efficiency are driven by global energy policies which establish the framework and incentives for achieving the set goals. At the European Union level, member countries have committed to a 20% energy savings target by 2020 as compared to consumption projections for 2020.[2] To achieve these goals, it is estimated that approximately investments of **EUR 84 billion** per annum are required.[3]

Beyond 2020, the EU has greater ambitions of decarbonizing its economy. **The EU Energy Roadmap 2050** explores routes towards decarbonisation of the energy system, with implications of major changes in, but not limited to, carbon prices, technology and networks. This roadmap envisages reduction of greenhouse gas emissions to 80-95% below 1990 levels by 2050.[4] To achieve EU's 2050 decarbonisation target, it is estimated that energy efficiency investment in excess of trillions of euros is to be expected. [5]

According to International Energy Agency's (IEA)'s 2014 Investment Outlook, global annual investments in energy efficiency in 2013 equaled **USD 130 billion**. To put it into perspective, the outlook reminds us that this value represents approximately 15% of global annual investments in oil and gas or about 50% of the value invested in renewable generation in the same year signifying its importance in terms of energy policy as well as investment opportunity.[6]

IEA's investment outlook also estimates future investment trends on energy efficiency. Such forecasts are presented in two scenarios:

The *New Policy Scenario*, which accounts for the current energy policies in place as of 2014 as well as those that have been announced but not yet implemented. According to this scenario, investments in the period of 2014-2034 in energy efficiency amount to **USD 8 trillion**.

The *450 Scenario* estimates the level of energy efficiency investment required to limit future global warming to 2°C above pre-industrial levels. As per the 450 scenario the cumulative amount of investments in energy efficiency by 2035 reaches **USD 13.4 trillion**.

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[1] European Commission, "Energy Efficiency and its contribution to energy security and the 2030 Framework for climate and energy policy" July 2014

[2] EU Energy Efficiency Directive (2012)

[3] Christian Hudson, Anne Schopp, Karsten Neuhoff "Financing of Energy Efficiency: Influences on European Public Banks' Actions and Ways Forward", May 2013

[4] European Commission, Energy Roadmap 2050, 2011

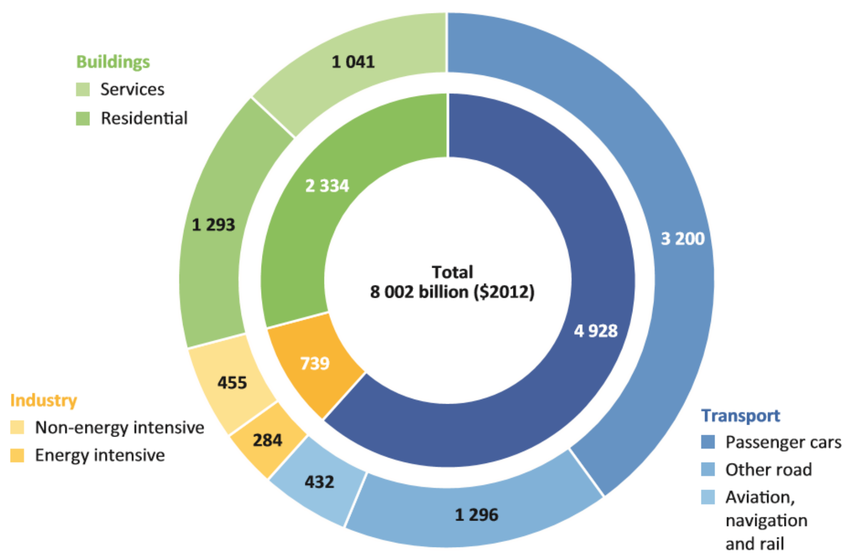
[5] Christian Hudson, Anne Schopp, Karsten Neuhoff "Financing of Energy Efficiency: Influences on European Public Banks' Actions and Ways Forward", May 2013

[6] IEA. (2014). Special Report: World Energy Investment Outlook

It should be acknowledged, however, that the COP21 agreement reach in Paris last December targets limiting global temperature increase well below 2°C and proposes efforts to limit the increase to 1.5 degrees. [7] This would signify an even higher level of investment required for the next two decades.

In sectoral terms as per the *New Policy Scenario*, the **buildings sector** accounts for 29% of investments, the **transport sector** represents the largest share of 62% while only 9% of investments are expected in the **industrial sector**. A similar breakdown is observed in the *450 Scenario*. The breakdown of forecasted investments is presented below.

Figure 1 – Cumulative energy efficiency investments by end users in New Policy Scenario (2014-2035)



Source: IEA, Investment Outlook

This paper focuses on the building and industrial sectors with the building sector considered to have the most benefit in terms of immediate savings. It is also important to note that, as the financing of energy efficiency in the private transport sector is rather straight-forward (financed through cash-flows or secured debt) it is less critical, compared to financing energy efficiency in the buildings sector, to the core topic of discussion of this paper.

2. Challenges to financing energy efficiency investments

Despite the clear economic and environmental reasons for energy efficiency, the ambitious global targets are failing to translate into actual investments to meet the targets. At the EU level, investment targets are still well under the required rate to be able to achieve the set 2020 goals. Investment in buildings, which represent 40% of final energy use in Europe, is estimated to be about 50% under the required rate to achieve

[7] Center for Climate and Energy Solution, Outcomes of the U.N. climate change conference in Paris, December 2015

the goals.[8] The reason for the sluggish progress is mostly due to investment barriers that are unique to energy efficiency. Such barriers result in a weak demand for developing a project pipeline for energy efficiency and consequently weak supply of financing, with the former being the key driver of the process.

Some of the most prevalent challenges/barriers are outlined in the table below:

Investment characteristics	Description	Implication for investors/financiers[9]
(A) Heterogeneous projects	Energy efficiency constitutes a very diverse nature of measures including a wide array of technologies and measures that can be undertaken to enhance energy consumption efficiency. In addition, investments also differ in terms of end users, for example investments in buildings can be in properties that are commercial, public, public rental, private rental, owner occupied - each category with own distinct characteristics.	This makes energy efficiency an extremely heterogeneous sector with varying particularities that in turn affect the investment cycle (assessment, financing and monitoring). In addition, the diverse nature of available measures affects investor's ability to understand investments in terms of technical and operational performance as well as how they compare to other projects. **This creates a challenging environment for standardisation of the investment process – a critical factor for development of secondary markets for energy efficiency**.
(B) Small scale projects	Energy efficiency projects are typically small scale in nature.	Financiers (debt of equity) are accustomed to financing large projects. High transaction costs associated with investments do not always make it worthwhile to focus on individual small scale projects. Aggregation is necessary to reach critical mass for projects to become attractive from a financing point of view.[10] **Aggregation is also an essential component of enabling access to private capital via secondary markets.**

[8] Sweatman, Peter, Climate Strategy Partners "Financing Mechanisms for Europe's Buildings Renovation", January 2012

[9] Financiers implies all parties supplying the capital required for the uptake of the energy efficiency projects through debt, equity, guarantees or a mix thereof. Such parties may be government public funding, development banks, private banks, private capital through own sources, corporations, institutional investors etc.

[10] Christian Hudson, Anne Schopp, Karsten Neuhoff "Financing of Energy Efficiency: Influences on European Public Banks' Actions and Ways Forward", May 2013

(C) Cost saving principle and limited collateral	Energy efficiency projects differ from other energy investments as they are based on the saving principle as opposed to generation of revenues from an underlying asset, for example through sale of power. In addition, energy efficiency investments often lack clear tangible assets which could be used as a collateral.	Financiers are accustomed to traditional asset based financing models and less familiar with projects which do not have a clear cash flow projection from revenues from an underlying asset. **Limited understanding of energy efficiency projects in conjunction with limited collateral value of investments create a high perception of risk among investors, which translates into high financing costs.**[11]
(D) High up-front costs	Energy efficient investments require a significant up-front cost due to high costs associated with efficient equipment or systems as compared to less efficient ones. Moreover, the size of capital outlay is correlated to the scale of efficiency improvements undertaken. Deep refurbishments in buildings or installation of more efficient industrial machinery can represent a substantial upfront investment.[12]	High up-front costs creates weaker demand for energy efficiency investments and often results in **less efficient performance levels as investors opt for investments with lower capital outlays to achieve shorter pay back periods** (See E).
(E) Long pay-back periods	In order for projects to capture the whole economic energy efficiency potential, optimal levels of investments should be sought. The optimal level is considered to be the level of investmetns where the marginal cost of additional investment reaches the marginal benefit of the discounted steam of future energy savings.[13] Such optimal levels of investments however typically leads to high up-front costs with very long pay-back periods. This is particularly the case in comprehensive efficiency projects which aim to achieve a	In practice, however, “lighter” efficiency measures with shorter pay-back periods are preferred by investors/financiers due to liquidity preferences and therefore lower energy efficiency performance levels are achieved i.e. below the theoretical opptimal level. This is a particularly sensitive area for energy efficiency as **it is significantly more difficult to attract long term financing for deep refurbishments due to long pay-back periods**. Financial strucrures that strike a balance between invetors’ ability to hold long term investments while achieving their targeted

[11] Christian Hudson, Anne Schopp, Karsten Neuhoff “Financing of Energy Efficiency: Influences on European Public Banks’ Actions and Ways Forward”, May 2013

[12] Kapur, Hiller, Langdong, Abramson, EDF Environmental Defense Fund, “Show Me the Money, Energy efficiency Financing Barriers and Opportunities”, July 2011

[13] Christian Hudson, Anne Schopp, Karsten Neuhoff “Financing of Energy Efficiency: Influences on European Public Banks’ Actions and Ways Forward”, May 2013

	significant percentage of energy savings (economic potential) such as deep refurbishments.	returns and optimal energy performance levels is a very important aspect and should be explored further.
(F) Technical assessments & protocol	Due to the cost savings nature (as opposed to cash-flow generation), each efficiency project needs to establish *base-line measurements* on consumption based on which future savings are calculated.[14] As such, measurement, reporting & verification (MRV) and quality assurance processes are required continually throughout the investment period to establish the savings acquired and essentially associated investment returns.	From a financing perspective, this aspect adds ambiguity to the investment process. Similar to the heterogeneity aspect, **investors are typically not familiar with such (MRV) processes and have to rely heavily on external consultants**. Standardization of such processes would significantly reduce this risk and make financiers more comfortable with the process.
(G) Split incentives	A situation typically in commercial real estate properties between the landlord and tenant, where neither the owner nor the tenant are incentivized to undertake energy efficiency measures.	The **landlord is not incentivized to fund any efficiency measures as the benefits of lower energy bills are passed on the tenant** who is liable for paying the bills. In the same manner, **the tenant is also not incentivized to fund the upgrade as the long term benefit (the actual investments) stays with the owner**.[15]
(H) Special expertise (know-how)	As a result of the peculiarities listed above, energy efficiency project requires extensive expertise in technical, regulatory, procurement and financing aspect. Such expertise is required during the development stage as well as during the operational period.	Project developers often lack the required in-house expertise to develop projects and may forego such projects by focusing their efforts in other more familiar ventures. This creates a weak demand for energy efficiency and in turn weak supply of financial products for energy efficiency.[16] Likewise, financiers do not possess the required know-how to structure financing for energy efficiency projects. Combination of all the factors translates into **high transaction cost in terms of specialized expertise required as well as high financing costs as a result of perceived risk with energy efficiency investments**.

[14] International Energy Agency, World Energy Investment Outlook, 2014.
[15] Energy Efficiency Financial Institutions Group (EEFIG), Energy Efficiency – the first fuel for the EU Economy - How to drive new finance for energy efficiency investments, February 2015
[16] Christian Hudson, Anne Schopp, Karsten Neuhoff "Financing of Energy Efficiency: Influences on European Public Banks' Actions and Ways Forward", May 2013

		Public funds in form of grants are often sought to offset some of the transaction costs.

In order to deliver on the global targets discussed above, it is of paramount importance that the highlighted (in bold) barriers and challenges are addressed and discussed jointly by all stakeholders invovled. A study commissioned by the European Commission the United Nations Environment Programme Finance Initiative ("UNEP FI") published in February 2015 aims to overcome challenges inherent to obtaining long-term financing for energy efficiency.[17] The study identifies important cross-cutting drivers that must be in place to create the necessary conditions for energy efficiency investments by way of removing some the identified barriers and addressing the existing challenges. Some of the identified drivers with regards to improving energy efficiency in the buildings sector are:

- Strong, stable and well-enforced regulatory framework
- Common regulation and certification processes for buildings/energy management systems for the industry and SMEs
- Creation of open source databases on the building stocks/ corporate energy efficiency benchmarking databases
- Standardization of and adoption of best practice for: legal contracts, underwriting processes, procurement procedures, adjudication, measurement, verification, reporting, energy performance (contracts and certificates) and insurance
- Project rating system, enabling a transparent assessment of the technical and financial risks of buildings renovation projects and their contracting structure
- Use of public funds to address specific market failures and share risks with the private sector. In addition, public funds should be used for project development assistance to help bridge the gap in terms of expertise requirements during the development stage.

Establishment of such drivers would facilitate investors' understanding of the energy efficiency investments, improving investor confidence and lowering perceived risks, all which in turn would allow greater aggregation potential, lower transaction costs and so forth.

3. Existing financing models – Focus on ESCO and ESA structures

There are various instruments available for financing energy efficiency such as dedicated credit lines (soft loans), leasing and the traditional Energy Performance Contract (EPC) model, subordinated and senior debt, energy efficiency funds.[18] Driven and championed by policy makers and development banks, such structures have been instrumental in demonstrating the benefits of energy efficiency measures from both policy-making and economic perspectives. Some of the financing models are more straight-forward and have a longer track record such as dedicated credit lines and other various enhancements offered such, as risk-sharing mechanisms to mitigate some of the inherent risks outlined above.

[17] Energy Efficiency Financial Institutions Group (EEFIG), Energy Efficiency – the first fuel for the EU Economy - How to drive new finance for energy efficiency investments, February 2015

[18] Energy Efficiency Financial Institutions Group (EEFIG), Driving New Finance for Energy Efficiency Investments Summary for Institutional Investors of the work of the Energy Efficiency Financial Institutions Group (EEFIG), May 2015

However, many of such financing instruments are not always successful in creating the necessary demand to deploy investments at the required scale and, therefore, contributing to the optimal level of energy savings. To address such aspects, further innovative structures have emerged, albeit at a much limited scale, such as on-bill financing, Energy Service Agreements (ESA), investment funds, green bonds, and asset based securitization. For the purpose of this paper, the ESCO financing with EPCs and Energy Service Agreements (ESAs) is further explored. When applicable, references are made to other instruments as well.

ESCO Financing Model with EPCs

This model allows Energy Saving Companies (ESCOs) to undertake the implementation of energy efficiency measures on behalf of the end user through an Energy Performance Contract (EPC), which often provides a guaranteed level of energy savings to the beneficiary and furthermore allows for a sharing of future energy savings between both parties.

ESCOs may or may not provide for the financing of the up-front costs. The EEFIG study on financing of energy efficiency makes a distinction between two types of EPC contracts with ESCOs, the "financing Energy Performance Contracts" and "operational Energy Performance Contracts".[19] The key difference between the two lies in the arrangement of financing.

In Operational EPCs, the user is the borrower and the financing agreement is entered between the user and the lending institution on the basis of the EPC entered between the user and the ESCO, which guarantees a sufficient level of energy savings to service the debt. In this case, ESCO's role is more operational which mitigates technical related risks and by acting as savings guarantor. [20]

In Financing EPCs, ESCOs originate the project, arrange third party financing, implement the efficiency measures and monitor the project. For large projects, such a centralized role is extremely beneficial as the ESCO serves as the main counterparty role for the financiers as well as the beneficiaries. [21] In such cases, ESCOs enter into debt agreements with lending institution, again based upon the EPC signed between the user and ESCO, however debt servicing obligations fall with the ESCO and not the user.[22]

A schematic overview of the two options described is presented below.

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[19] Energy Efficiency Financial Institutions Group (EEFIG), Driving New Finance for Energy Efficiency Investments Summary for Institutional Investors of the work of the Energy Efficiency Financial Institutions Group (EEFIG), May 2015

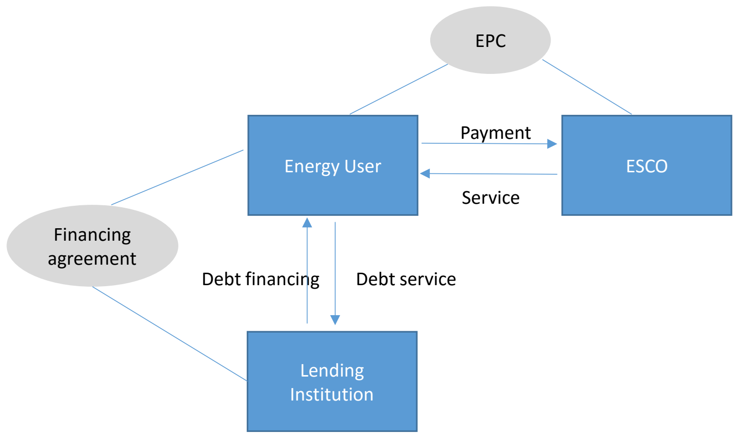
[20] European Commission, Joint Research Centre, Institute for Energy and Transport, "Energy Performance Contracting", 2015

[21] Wilson Sonsini Goodrich & Rosati, Innovations and Opportunities in Energy Efficiency Finance, May 2012

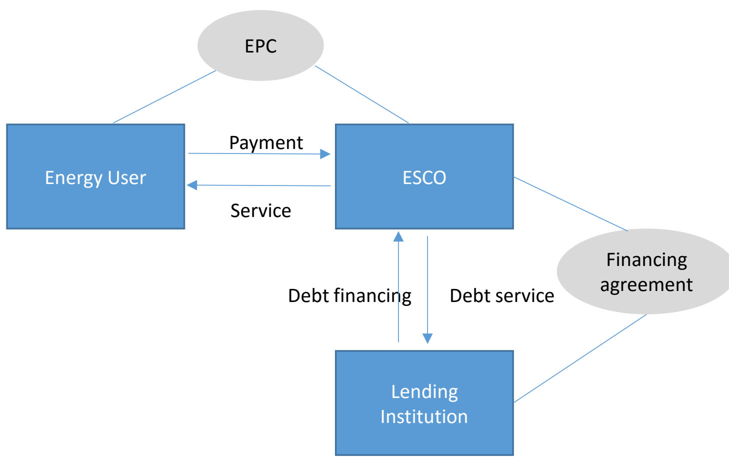
[22] European Commission, Joint Research Centre, Institute for Energy and Transport, "Financing Options", 2015

Figure 2 – Third party financing with ESCO

a) Third party financing with the user as a borrower



b) Third party financing with ESCO as a borrower



Source: European Commission, Joint Research Center

ESA Financing Model

The Energy Service Agreement (ESA) financing model is an emerging structure based on the traditional project finance model for energy projects, whereby a project developer (Sponsor) establishes a Special Purpose Vehicle (SPV) for the purpose of arranging, owning, operating and financing the energy project, in this case energy efficiency projects.

The ESA is an evolution of the EPC seen in ESCO structures, but the revenue aspect mimics the Power Purchasing Agreements (PPA) seen in energy generation projects. In the case of energy efficiency, the SPV and the end user enter into an ESA based on which the end user pays the SPV for the actual energy saved, either as a fixed dollar amount per kWh saved or a floating amount based on a percentage of the utility bill.[23]

An EPC contract is also entered between the SPV and an ESCO, which is in charge of implementing the efficiency measures, their operation and maintenance. In comparison to project finance structures, the ESCO is in a way a counterparty that is in charge of the traditional EPC contract (Engineering, Procurement and Construction) as well as the O&M (Operations & Management).[24] In the case of energy efficiency, both roles are combined and the ESCO also provides a performance guarantee.

Project capital expenditures are funded by Sponsor equity and third party debt. The SPV is the ultimate owner of the energy efficiency equipment and any tax incentives there may be. At the end of the ESA agreement, the end user has the option of purchasing the energy efficiency improvements for the fair market value at the time of the sale.

Counterparty creditworthiness of the end user and the ESCO is a crucial element to secure third party financing and, in some cases, parent guarantees may be needed in innovative financing models to limit financiers' risk exposure.

A variation of the ESA structure is the Managed Energy Service Agreement, whereby a project developer owns the energy efficiency equipment and in addition serves as a middle person between the customer and the utility making the project developer the single point of contact making a single payment for all of utility expenses.[25]

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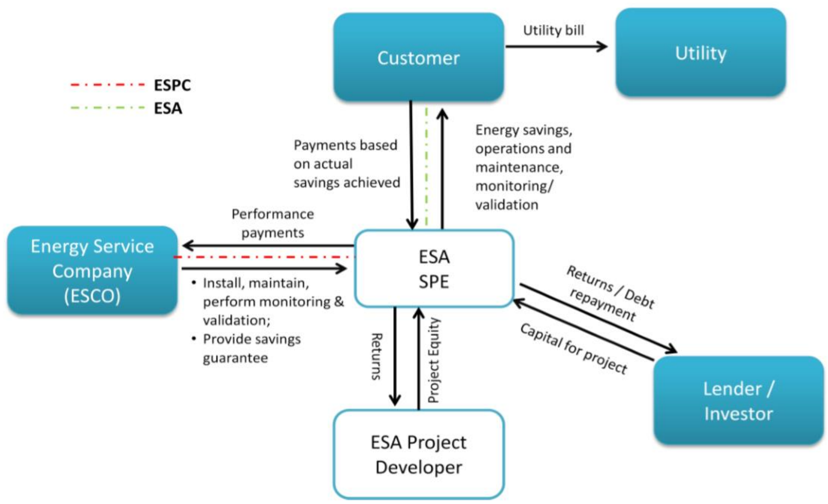
[23] Zimmerman, Greg, Facilitiesnet, "*Financing* Tools Include Energy Performance Contract, Energy Service Agreement", March 2015

[24] Note, in this case the EPC (Engineering, Procurement and Construction) contract is not the same as the EPC mentioned earlier which refers to the Energy Performance Contract.

[25] Wilson Sonsini Goodrich & Rosati, Innovations and Opportunities in Energy Efficiency Finance, May 2012

Figure 3 – ESA Structure



Source: Wilson Sonsini Goodrich & Rosati

Limitations to ESCO/ESA structures

While the financing model via EPCs with ESCOs and ESA offers great advantages for financing energy efficiency at a greater scale, through pooling of projects, the financing models face balance sheet limitations due to debt ratio restrictions imposed by their financiers. In such cases, as their portfolio of projects builds up, so do their liabilities and eventually they are faced with a situation that, in order to uptake more projects, they need to sell operating EPCs to a secondary buyer and thereby free up their balance sheet restrictions imposed on their borrowing capacity.

In addition, ESCOs are faced with another limitation which pertains to their ability to deliver projects that capture optimum levels of energy savings potential. ESCOs, as private service companies, are in the business of developing projects and implementing efficiency measures that commit to delivering on the guaranteed level of savings and often also provide maintenance services. They source the majority of their funding from third party debt (corporate debt), which is typically short-term in nature. In order for ESCOs to maintain their capital structure and service their debt, they are more inclined to opt for investments that capture the "low hanging fruits" of energy efficiency, i.e. measures with the most immediate benefits and in turn with shorter pay-back periods. This however, comes at a cost since, as described in the table above - point (E), the investment does not capture the whole economic potential for energy efficiency.[26] As a result, ESCOs are not always considered to be the most appropriate party with the right motivation in place to implement and hold long term investments in energy efficiency.

[26] Christian Hudson, Anne Schopp, Karsten Neuhoff "Financing of Energy Efficiency: Influences on European Public Banks' Actions and Ways Forward", May 2013

4. Accessing Secondary markets for energy efficiency financing

4.1 Secondary markets[27] as means of accessing private capital for energy efficiency

Having looked at the EPC and ESA models for financing energy efficiency, it is clear that, while most of them manage to address many of the barriers and challenges listed in section 2, some hurdles still remain. It is clear, from the points raised above, that ESCOs and similar structures fall short in their ability to achieve a substantial scale of investments due to balance sheet restrictions, while their investment selection process is also biased towards projects with short pay-back periods at the expense of undertaking deep refurbishments with greater savings potential.

One of the means of providing capital liquidity for ESCOs or other holders of energy efficiency debt is the creation of a secondary market for energy efficiency investments, whereby portfolios of loans or initially issued in a primary market are able to be packaged into a loan portfolio or tradable securities such as bonds or asset-backed securities that are in turn sold in secondary markets. Secondary markets, lower overall transaction costs, promote liquidity by providing financiers an exit strategy and a transparent and reliable market price, thus increasing the number of lenders willing to participate in this market.[28] Such investors may include private capital sources of pension funds, insurance companies, private equity and so forth.

One example of a successful use of secondary transaction model is observed in Bulgaria whereby the Bulgarian Energetics and Energy Savings Fund (EESF) acts as a secondary buyer of future receivables from EPCs from ESCOs. This financing method enables ESCOs to free up their balance sheet to be able to develop and fund a new source of projects. [29] However, it should be noted that this process requires that a buyer be available and ready to purchase such stream of receivables on a continuous basis and, as the portfolio of receivables is not publicly tradable, the secondary buyer should be willing to hold the portfolio till maturity.

The secondary market for energy efficiency loans is at the very early stages of development. Market uptake for energy efficiency projects is constrained by low demand for energy efficiency project pipeline, on one hand, and consequently limited appetite to finance such projects. As such, available sources of private capital (e.g., primary lender capital, utility or other public capital) have been sufficient to meet the current level of deal flow. [30] However, in order to reach the necessary scale and meet the policy targets described earlier, development of secondary markets is imminent, as only through such instruments would sufficient capital be accessed to finance energy efficiency at scale.

The U.S. State and Local Energy Efficiency Network (SEE Action) published a report in which it looks into the means of accessing secondary markets for financing energy efficiency.[31] The report references only

[27] A market where investors purchase securities or assets from other investors, rather than from issuing companies themselves

[28] Hull, Jeanine, Strategic Energy Advisors, "The Role of State, Local, Territorial and Tribal Governments in Energy Efficiency Loan Markets", January 2010

[29] Bullier Adrien, Milin, Christophe, Alternative financing schemes for energy efficiency in buildings, 2013

[30] State and Local Energy Efficiency Action Network, Accessing Secondary Markets as a Capital Source for Energy Efficiency Finance Programs: Program Design Considerations for Policymakers and Administrators, Financing Solutions Working Group, February 2015

[31] State and Local Energy Efficiency Action Network, Accessing Secondary Markets as a Capital Source for Energy Efficiency Finance Programs: Program Design Considerations for Policymakers and Administrators, Financing Solutions Working Group, February 2015

ten secondary market transactions that have been recorded during the past 5 years with a total volume of just over USD 400 million. Most of such transactions have either involved sales to a small group of private investors or have been structured with very strong security or significant credit enhancement.

An efficient secondary market for energy efficiency products is more likely to develop as (1) investors become more familiar with specialized energy efficiency loan products; (2) financial instruments are designed to suit energy efficiency investments; and (3) investment and performance measurement processes are standardised.[32] These points also correspond with the challenges and barriers listed in section 2, and as these targets are achieved the appetite for energy efficiency investment among investors will also increase. Moreover, energy efficiency investments, in particular deep refurbishments with long holding period, would be even better suited to some secondary market investors (e.g., pension funds and insurance companies) as they seek out longer-term assets (to match their long - term liabilities) with steady returns as opposed to riskier high-yielding securities.

4.2 Accessing capital through “YieldCos”: inspiration from the renewable industry

The YieldCo structure is an emerging financing concept introduced by renewable industry developers, solar developers in particular, whereby parent companies create a spun off publicly listed vehicle (YieldCo) with the sole aim of bundling and holding operating projects.

In the development phase, renewable projects face certain development (planning, permitting, engineering, etc.) and construction related risks that are typical to projects of that nature. However, once operational, most of the projects are significantly de-risked and provide stable and predictable long term cash-flows to investors supported by long term PPAs.

YieldCos acquire fully operational projects from their parent companies via so-called “drop-down” transactions, which in turn provide companies with low cost equity funding[33] needed to fund development of new projects[34]. In this sense, parent companies continue to put their efforts on their primary activity of sourcing and developing a project pipeline, which will then be sold to the YieldCos arranged via a right of first offer (ROFO).

YieldCos do not offer exceptionally high returns[35], as compared to other asset classes, however, the essence of this structure is to enable suitable investors to invest in a liquid structure which stable returns supported by long-term cash flows which are contractually arranged through PPAs. As such, unlike growth companies, YieldCos distribute most of the cash flows to its shareholders in the form of dividends (typically 80%)[36], hence the name YieldCo as the essence of the vehicle is to generate yields.

YieldCos are typically attractive for yield-based investors that are keen to invest in renewable energy but are either not be comfortable with the development related risks of parent companies or lack the appropriate channels to invest capital in renewables.[37] These structures have been particularly interesting for Socially

[32] State and Local Energy Efficiency Action Network, Accessing Secondary Markets as a Capital Source for Energy Efficiency Finance Programs: Program Design Considerations for Policymakers and Administrators, Financing Solutions Working Group, February 2015

[33] Forbes, “Understanding Solar YieldCos”, June 2014

[34] Forbes, “Why Have Solar YieldCo Stocks Been Trending Lower?”, September 2015

[35] PV Tech, “Bloomberg: Yieldcos lower the cost of renewables, with ‘substantial growth’ expected”, April 2015

[36] Forbes, “Why Have Solar YieldCo Stocks Been Trending Lower?”, September 2015

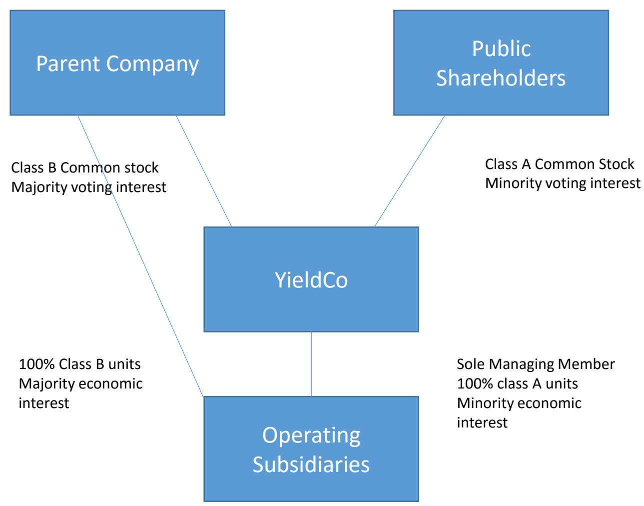
[37] Urdanick, Marley, National Renewable Energy Laboratory, “A Deeper Look into Yieldco Structuring”,

Responsible Investors (SRI) and institutional investors, such as pension funds and insurance companies, especially in the current environment of low-interest rates with low-yielding government bonds. In addition, such investors (asset managers, institutional investors) do not have the operational capability and know-how to place a direct investment into projects.

In a YieldCo structure, the parent company owns a majority share of the YieldCo in the form of Class B Common Stock, while public shareholders are entitled to a minority share of Class A Common Stock. The revenue generated from projects owned and/or operated by "operating subsidiaries" is passed through this structure to deliver returns to shareholders.[38]

An example of the YieldCo structure is presented below.

Figure 4 – YieldCo structure



Source: National Renewable Energy Laboratory

The structure was initially introduced to the market in 2013 pioneered by NRG Yield and, over the course of the subsequent 30 months, fifteen US and European renewable power ownership vehicles raised a total of $12bn and their market values have climbed 84 percent to almost $28 billion[39]. However, since their introduction in 2013 and their impressive growth in market value throughout 2014, in the latter part of 2015 YieldCos have been facing a challenging environment with many stocks losing a significant share of their market value mainly due to the following reasons:

Dividend growth vs. moderate returns with limited growth

YieldCos models are inspired by real estate investment trust (REIT) and master limited partnerships (MLP) models, which are also yield seeking structures with certain inherent tax benefits. Unlike these two models which offer a stable and modest return, YieldCos, particularly, those in the U.S. promise a double digit

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[38] Urdanick, Marley, National Renewable Energy Laboratory, "A Deeper Look into Yieldco Structuring",
[39] McCrone, Liebreich Michael, Bloomberg New Energy Finance, "YielCos – Two Big Questions", July, 2015

dividend growth[40] with investors earning yields with anticipated long-term dividend growth targets between 8 and 15%.[41]

Bloomberg's New Energy Finance (BNEF) points out a differing perception towards YieldCos between the U.S. and Europe. In the U.S., YieldCos are perceived as growth stocks whereby dividends are expected to grow in the future with as projects are added into the vehicle stocks while in Europe, the vehicle is perceived as a structure that simply aggregates low-risk regulated projects offering a stable return, for example a 6% yield observed in the UK.[42]

Furthermore, an interesting assessment is provided by the *Institutional Investor* magazine which looks at YieldCos from an ownership perspective. According to the article, before the major YieldCo stock sell off, about 50% of the vehicles were owned by hedge fund investors who were attracted by the high dividend growth potential. Hedge funds are not considered to be YieldCos natural owners principally because their investment horizons tend to be short term and, as such, are incompatible in terms investment commitment.[43]

In summary, YieldCo are essential structures that pool operational projects which deliver a return based upon low-risk stable and predictable cash-flows. Such operating projects have a limited lifecycle and, in order to maintain their targeted yields, the vehicle needs to add more projects to maintain the yield. The YieldCo can grow in volume, i.e. significantly increase the number of acquired operating assets, however that does not provide for the grounds of a perpetual growth in dividend yields as the yield of the added projects is essential determined by commercial structure of the power projects, which in essence give a return in line with other renewable projects in the market where it operates. As such, a YieldCo does not provide the grounds for offering a growing dividend over the years as it is constrained by the physical and operational properties of the assets it owns.

Possible increase in interest rates

YieldCos provide access to investments in projects with predictable cash flows and stable yields, which are more attractive to institutional investors in an environment of very low interest rates. However, there is a growing concern that should market interest rates increase, YieldCos' attractiveness may be hampered as compared to government yields. Increased interest rates decrease YieldCo share prices and in turn make it more expensive for YieldCos to raise additional equity to finance new acquisitions.

Despite the recent setbacks, the general sentiment in the market is that the YieldCo structure is a sound business model with the Chief Editor of BNEF stating that "YieldCos meet a real need and [are] here to stay."[44] Market participants need to re-assess their understanding of the structure and the underlying assets and make the necessary market corrections to the structure and the fundamental investment strategy.

[40] Konrad Tom, Greentech Media, "How Much Can Clean Energy YieldCo Dividends Grow?", June 2015
[41] Ernst & Young "The YieldCo structure - Unlocking the value in power generation assets", 2015
[42] McCrone, Liebreich Michael, Bloomberg New Energy Finance, "YielCos – Two Big Questions", July, 2015
[43] Clouse, Carol, Institutional Investor Magazine, "YieldCos and Hedge Funds begin conscious uncoupling", October 2015
[44] McCrone, Liebreich Michael, Bloomberg New Energy Finance, "YielCos – Two Big Questions", July, 2015

4.2 Can YieldCo structures be applied to energy efficiency?

Having looked at the existing financing models for energy efficiency, in particular the ESCO and ESA model and the emerging YieldCo structure for financing renewable energy projects, this sections looks into the possibility of using a YieldCo structure as a means of financing energy efficiency investments.

Before moving forward, it is important to note that, while both energy efficiency and renewable energy projects pertain to the overall policy goals of decarbonisation, they differ significantly in terms of their nature. Some of such differences are listed below:

- **Tested technology -** Energy efficiency is based generally on tested commercial technologies that do not require any feed-in tariff support for its commercial viability.

- **Diverse rates of returns -** Energy efficiency projects provide for a range of potential returns depending on the type and depth of investments even within the same market. For example, lighting improvement projects (public or private) can have higher returns and relatively short pay-back period. Deep refurbishments such as complete building envelopes may have above average returns though with a much longer pay-back period. Weather conditions also have a great impact on the type of measure and the extent of savings. This is not the case with renewable energy projects as they are subject to power prices and name place capacity limitations in production terms (e.g. panel production limitations and solar irradiation levels for a particular market). According to the institute for efficient buildings, in three third-party data points for energy efficiency metrics, the range for energy efficiency internal rate of return (IRR) is between 12.77 and 18.8 percent representing a wide range of project types (from lighting retrofits, to whole-building improvements, to employee engagement initiatives). [45]

- **Neutral to generation source:** Efficiency measures reduce power consumption irrespective of the source of generation it comes from therefore it is not affected by regulatory or market sentiments on any particular sector (thermal, nuclear, renewable).

- **Less competition on project acquisition**: As compared to renewable projects, there is significantly less competition in terms of project acquisitions given the low maturity of the market. For renewable energy projects, there is sometimes fierce competition between large utilities with deep pockets to acquire newly developed projects. This often drives up acquisition prices and impacts returns.

- **No systemic risk to certain technologies:** Energy efficiency are diverse in the types of technologies used to achieve the desired results. This makes investments less exposed to systemic risks such as those of technology providers' e.g. solar panel manufacturers, wind turbines etc. Like renewables, energy efficiency technologies are exposed to the risk of moving power prices.

With those considerations in mind, and the YieldCo specificities covered earlier, the following describes the basic elements of how a YieldCo structure could be adopted for energy efficiency. It should be noted that, in such an arrangement, a careful coordination between all the stakeholders should be done to ensure that the long term strategies are met.

The roles and the process is described below:

[45] Institute for Building Efficiency, "Allocating Capital for Energy Efficiency in Corporate Budgets", November, 2011

ESCO/Project Developer:

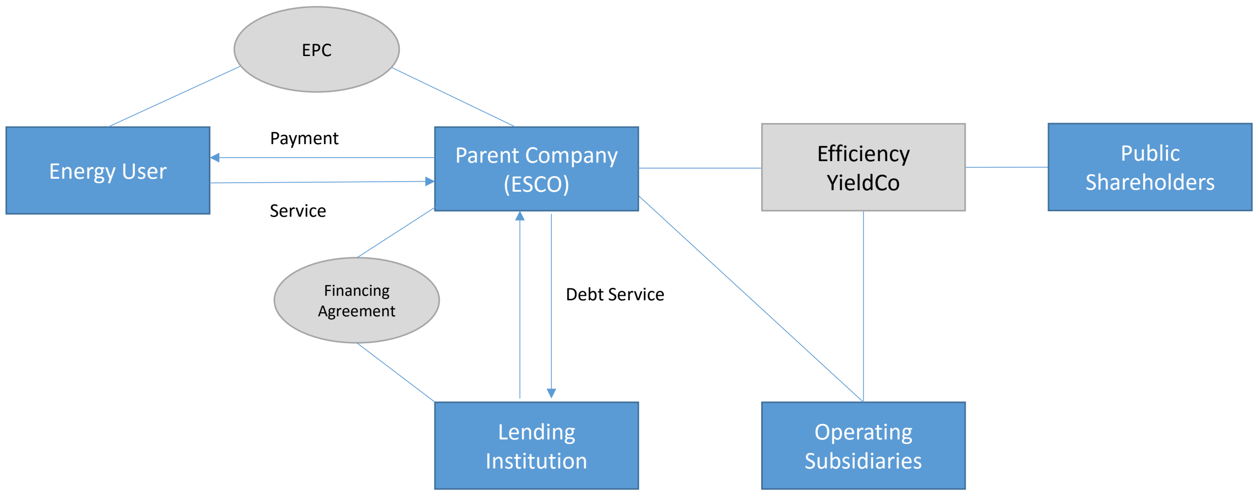
- Originate projects through their own channels. Origination to be done with YieldCo investment criteria in mind
- Undertake the technical and financial assessments to select the suitable investment projects
- Enter into EPC or ESA agreement with end users as applicable with performance guarantees
- Arrange third party financing (again with the YieldCo vehicle in mind as a secondary buyer)
- Implement energy efficiency measures
- Build a significant pipeline reach a critical mass (EUR 100 million) with the aim of transferring such assets to the designated YieldCo.
- Monitor performance for a set time frame to de-risk the projects by ensuring that performance criteria are met and establishing an operational track record for the future YieldCo investors.
- Hold investments until a track record is established

YieldCo:

- YieldCo may be established as an extension of ESCO/Project Developer or by an independent third party
- YieldCo to establish investment criteria in terms of energy savings seeking optimal energy savings levels
- Transaction costs related to the establishment of the YieldCo for the purpose of holding energy efficiency investments may be done using public funds (European Structural Funds, Horizon 2020 etc.)
- Arrange third-party re-refinancing to seek longer maturities optimizing the capital structure in line with the characteristics of the investment assets
- ESCO/Project Developer or an independent party will hold the majority of the shares in the vehicle
- Raise public funds through an IPO. Targeted investor would be institutional investors (pension funds, insurance companies, assets management companies) seeking low-risk long term assets with stable returns to match their long term liabilities. Note: the model advocated should be the European YieldCo model and not the Dividend Growth model.
- Seek improvement efficiencies in terms of Operation and Maintenance costs from ESCOs or other applicable parties
- Acquire new projects to maintain the required yields.

In schematic representation, the structure would look as follows:

Figure 4 – YieldCo structure for energy efficiency structures



The overall aim of the structure would be to enable an optimal level of energy savings for targeted projects and avoid the short term "low handing fruit" approach. This would be possible when ESCOs have a lined up long term secondary buyer willing to take the long term financing and holding risks. In addition, such structures would aims to establish a tested vehicle that able to acquire a large volume of such projects, enabling an investment of energy efficiency at scale.

5. Conclusions

Energy efficiency is an integral part of global energy policy as it is widely recognized as an efficient means of reducing greenhouse gas pollution as well as ensuring long term security of energy supply. Investments in energy efficiency are driven by global energy policies which establish the framework and incentives for achieving the set goals. According to International Energy Agency's (IEA)'s 2014 Investment Outlook, global annual investments in energy efficiency in 2013 equaled USD 130 billion while investments foreseen in the period of 2014-2034 in energy efficiency range from USD 8 – 13 trillion (depending on the scenario).

However, despite the clear environmental and economic case for energy efficiency, current annual investment volume is still below policy targets mostly due to unique challenges characterizing energy efficiency. Investment in buildings, which represent 40% of final energy use in Europe, is estimated to be about 50% under the required rate to achieve the goals. The reason for the sluggish progress is mostly due to investment barriers that result in a weak demand for developing a project pipeline for energy efficiency and consequently weak supply of financing.

To address some of these challenges, various financing instruments for financing energy efficiency have been introduced, such as dedicated credit lines (soft loans), leasing and the traditional Energy Performance Contract (EPC) model, subordinated and senior debt, energy efficiency funds. Such structures have been instrumental in demonstrating the benefits of EE measures from both policy-making and economic perspectives. However, many of them are not always successful in creating the necessary demand to deploy investments at the required scale and the optimal level of energy savings.

Looking at EPC and Energy Service Agreements (ESA) in particular reveals that such structures fall short in their ability to achieve a substantial scale of investments due balance sheet restrictions while their investment selection process is also biased towards projects with short pay-back periods at the expense of undertaking deep refurbishments with greater savings potential.

The YieldCo financing model introduced by the renewable energy industry's may bring some of added benefits through the creation of a designated vehicle to hold de-risked operating energy efficiency projects that would be attractive to institutional investors in particular who seek low-risk investment projects.

The overall aim of the structure would be to enable an optimal level of energy savings for targeted projects and avoid the short term "low handing fruit" approach. This would be possible when ESCOs have a lined up long term secondary buyer willing to take the long term financing and holding risks. In addition, such structures would aims to establish a tested vehicle that able to acquire a large volume of such projects, enabling an investment of energy efficiency at scale.

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