SECURITIZATION OF ENERGY SAVINGS: ACCESSING SECONDARY CAPITAL TO FINANCE ENERGY EFFICIENCY INVESTMENTS

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Overview

The buildings and building construction sectors are responsible for 36% of final energy consumption and nearly 40% of total direct and indirect CO_2 emissions, globally. It is therefore clear that increases in efficiency and reductions in energy demand in the built environment will play a major role in the transition to a cleaner, more efficient and sustainable world economy. However, in order for energy efficiency (EE) to deliver its estimated 44% share of CO_2 emissions reduction required in the Paris Agreement, "global investment rates need to double from now to 2025, and then double again from 2025 to 2040 (to USD 1.3 trillion)." And yet, global investment in energy efficient buildings dropped by 2% in 2018 despite the implementation of efficiency-focused policies in many countries.

Limited access to low-cost financing and a lack of appropriate financial products are often cited barriers to EE investment with a clear link to the recent deceleration in global investment. Moreover, efficient access to secondary market capital, by means of securitization of energy-related assets, has been proposed as a practical avenue toward achieving energy transition goals. The concept has been developed and discussed for the residential solar PV market, but largely neglected concerning energy savings. Only a few studies have discussed securitization and the role of secondary capital markets in relation to EE investment, and none – to the best of our knowledge – have proposed a valuation model of the securitization process. This article attempts to fill this gap by assessing the valuation of EE asset-backed securities (ABS) as a lower cost financing mechanism and proposes a model that enables the identification of several junctures at which risk and uncertainty influence investment costs. The model considers all cost factors of the entities involved in securitization, such as credit enhancement, servicing agents, and investor returns. The model is then parameterized and a sensitivity analysis is conducted.

Methods

Based on a model proposed by Alafita and Pearce (2014), originally designed to measure the costs of securitization of solar PV purchasing power agreements, this paper employs a traditional cash flow analysis based on energy performance contracting (EPC) agreements of an energy service company (ESCO). The cash flows of the EPCs depend on the energy cost savings achieved in a shared savings business model. The ESCO (originator) can hold these contracts for their duration, ensuring a long-term annual income stream, or it can sell a pool of these contracts to an issuer, via a special purpose vehicle (SPV), which allows it to immediately raise new capital. The resulting ABS forms a tradable, interest-bearing security that is sold to capital market investors, who in turn receive floating rate payments from the cash flows generated. For the valuation of this, we distinguish three stages:

1) The total real value of the pooled EPCs to the originator is modelled, based on the present value of annual cash flows generated by the contracts (i.e. the energy cost savings of the EPC project); here, we consider the volatility of the energy savings (in kWh) and energy price fluctuations. We further model contractual conditions of a shared savings model, including operation and maintenance costs and contract failure (default) rates.
2) The present value of the income stream generated by the ABS is modelled; here, we take into account costs for credit enhancement, servicing fees, and investor returns. This gives the value of the securitization process and intuitively implies that the costs for such a process have been considered. Two forms of credit enhancement are considered: overcollateralization (OC) and tranching.
3) Cost of capital is considered based on internal rate of return (IRR).

Finally, the model is parameterized based on values presented in existing literature and a sensitivity analysis is conducted in order to test empirically the validity of the model. Four points are of particular interest in this investigation, namely 1) the formation of the asset pool; 2) the process of asset evaluation; 3) the purchase of the asset by uncertain investors; and 4) the formation of tranches vs. overcollateralization.

Results

Based on sensitivity analysis, EPC contract conditions have a significant influence on the formation of the asset pool. Here, contract conditions considered were the level of guaranteed energy cost savings and the share of those savings owed to the ESCO, as well as the share of excess cost savings achieved in the EPC project. Moreover, the default rate of the pooled contracts influenced asset pool formation success rate, although literature on EE investment default rates is scant. Higher credit enhancement costs relating to OC, however, lower the amount of capital that can be raised from the pool EPCs. We find further that lower levels of OC improve the price of the security. As expected, when investors require higher rates of return, the amount of capital that can be raised is reduced, but the size of this effect is influenced by credit enhancement levels. Structuring the security in tranches, then, is a possible solution to this effect, reducing the amount of credit enhancement required to maintain the same level of investor return. Overall, the analysis demonstrates that for many reasonable combinations of cost factors, securitization will reduce financing costs for EE projects.

Conclusions

With this paper, we show that a simple securitization model can lower the cost of financing EE projects, contributing to national and global energy transition targets. It clearly leads to a "triple win" situation, in which the energy consumer (client), investors, as well as national authorities can gain from such a financial product. The positive effect for clients (i.e. energy cost savings), by shifting most of the risk to a third party, only marginally increases the payback period before the monetary value of the energy savings can be consumed. For the investors, the originator has immediate access to new capital and third-party investors have access to sustainable and green financial products. Moreover, with tranching and the possibility of forming a bottom tranche that is secured by an insurer, bank or government improves the remaining portfolio rating, such that financing costs can be significantly reduced. The only shortcoming of the model lies in the current situation of low interest rates, which may reduce the overall positive effects.

The results of the analysis also provide potential targets for future policies to facilitate the development of market for securitized EE assets. These may include policies to improve standardization of EE investment projects; develop specialized credit enhancement services (such as insurance policies); encourage or discourage geographical diversification of pooled projects (e.g. community projects vs. singular projects over a wide geographical area); and address liquidity issues. Future research should focus on expanding this model to other EPC business models and investigations in to sectoral applicability (e.g. residential, commercial, or public buildings).

References

Alafita, T., & Pearce, J. M. (2014). Securitization of residential solar photovoltaic assets: Costs, risks and uncertainty. *Energy Policy*, *67*, 488–498.

Bertoldi, P., & Boza-Kiss, B. (2017). Analysis of barriers and drivers for the development of the ESCO markets in Europe. *Energy Policy*, *107*(Supplement C), 345–355.

Deng, Q., Zhang, L., Cui, Q., & Jiang, X. (2014). A simulation-based decision model for designing contract period in building energy performance contracting. *Building and Environment*, *71*, 71–80.

Hill, D. R. (2019). Energy Efficiency Financing: A review of risks and uncertainties. Presented at the 42nd IAEE International Conference (May 29-June 1), Montréal, Canada: International Association of Energy Economics.

Jobst, A. A. (2008, September). What Is Securitization? *Finance and Development - A Quarterly Magazine of the IMF*, *45*(3).

Kromer, S. (2007). Efficiency Valuation: How to "Plan, Play and Settle" Energy Efficiency Projects. *Strategic Planning for Energy and the Environment*, *27*(1), 69–78.

Lee, P., Lam, P. T. I., & Lee, W. L. (2015). Risks in Energy Performance Contracting (EPC) projects. *Energy and Buildings*, *92*, 116–127.

Lowder, T., & Mendelsohn, M. (2013). *Potential of Securitization in Solar PV Finance*. National Renewable Energy Laboratory (NREL), Golden, CO.

Peretz, N. (2009). Growing the Energy Efficiency Market through Third-Party Financing. *Energy Law Journal*, *30*, 377–404.

Sandor, R. L., Clark, N. J., Kanakasabai, M., & Marques, R. L. (2014). Environmental Markets: A New Asset Class. *Research Foundation Books*, *2014*(1), 1–159.

SEE Action (2015). *Accessing Secondary Markets as a Capital Source for Energy Efficiency Finance Programs: Program Design Considerations for Policymakers and Administrators*. Washington, DC: State and Local Energy Efficiency Action Network.

Shang, T., Zhang, K., Liu, P., & Chen, Z. (2017). A review of energy performance contracting business models: Status and recommendation. *Sustainable Cities and Society*, *34*, 203–210.

Sweatman, P. (2019, January 17). Energy Efficiency targets: Time to ramp up investment in buildings, industry and vehicles. *Energy Post*.