



# **Financing Tools for A Green Building Stock**



**Dutch Green Building Council**



## Introduction

June 5, 2013

This report is the first result of a research program on existing incentives and conditions for the financing of sustainable real estate. This project is part of the program *Energo Fiego*, which has been initiated by the Market Financiers Group of the Dutch Green Building Council (DGBC) and is conducted in partnership with the Holland Financial Centre, Utrecht Sustainability Institute and GRESB. The Dutch Green Building Council (DGBC) acts as secretary of the Group.

The importance of sustainability in the built environment is increasing, and the main Dutch property financing firms recognize this importance. In 2011, the financiers expressed the intention to contribute to the road to a sustainable built environment through a covenant, and the financiers are now members of the Market Financiers Group of the DGBC.

Through this partnership, the financiers explore the opportunities for integration of sustainability requirements into financing of new developments, redevelopments, or refinancing of commercial real estate. Through rigorous research, the aim is to make sustainability an implied condition in financing new construction, redevelopment or refinance real estate.

The member of the Market Financiers Group are:

- **ABN Amro Real Estate**
- **ING Real Estate Finance**
- **FGH Bank**
- **NIBC**
- **Syntus Achmea Real Estate & Finance**

This report has been authored by Piet Eichholtz and Nils Kok of **GRESB & Maastricht University**.





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## Executive Summary

### Motivation

- Energy efficiency in the real estate sector offers the cheapest and most readily available opportunity to reduce carbon emissions;
- Energy-efficient commercial property has higher effective rents and cash flows than conventional property, and has a higher and more stable occupancy rate;
- Commercial property with lower energy efficiency characteristics faces an increased risk of obsolescence, and thus higher depreciation, in many markets;
- Property companies (REITs) with more energy-efficient assets have a higher return on equity, higher operating income, and a lower market beta;
- Mortgages on energy-efficient homes display a significantly lower default risk than conventional mortgages.

### Barriers

- There is still a lack of awareness of energy saving opportunities, and some uncertainty about the *ex-post* performance of building retrofits;
- Asset owners face difficulties in financing the cost of retrofit projects on-balance sheet;
- All over the world, governments, energy service providers and financiers are experimenting with green financing schemes, but these developments are often one-off projects and still in their infancy.

### Solutions

- The Dutch financial industry has a chance to jump-start and take the lead in the development of financial solutions to finance energy efficiency improvements in buildings;
- As a minimum, mortgage underwriting by commercial banks should include energy efficiency parameters, and these should be reflected into pricing (comparable to residential mortgage underwriting);
- Besides that, the specific financing tools that are most attractive for the Netherlands and implementable without significant policy interventions include:
  - On-bill financing by utilities, in conjunction with a third-party capital provider;
  - EUA/PACE financing supported by Dutch local municipalities, but it needs more detailed recommendations on fiscal/legal possibilities;
- Supporting the technical implementation of energy efficiency projects by energy performance contracts reduces the operational risk barriers to financing.
- These solutions could benefit from financing through a revolving fund, providing capital to energy efficiency projects, and creating a diversified pool of loans.



## Motivations for Energy Efficiency in Buildings

Greening the property market reduces energy consumption and may help to mitigate climate change. More importantly, greening the building stock can often be achieved in a NPV-positive manner, as a growing body of research suggests that energy efficiency in buildings has significantly positive effects on the economic performance of these buildings:

**Energy efficient offices** in the United States have higher contract rents than comparable conventional offices, in the order of 2 percent to 5 percent, and have a higher and more stable occupancy rate. Together, these effects translate into a higher effective rent between 6 percent and 7 percent. The transaction prices of green offices are 11 percent to 13 percent higher than the prices of conventional office buildings. Interestingly, these results hold both for net and gross rental contracts, so the infamous split incentive issue seems not as problematic as often described. For the United Kingdom, the green premiums are still higher, and for the Netherlands, the main research results show that rents of more efficient offices are more resilient during the crisis, providing some indication of a “brown discount.”

**Property company (REIT)** performance is positively related to ownership of energy-efficient buildings. Return on assets and return on equity are high for “greener” REITs, and systematic risk, as measured by beta, is much lower, implying less exposure to the business cycle. Alphas are comparable to those of conventional REITs, which probably means that the market has already priced in the sustainability characteristics of the underlying property portfolio.

**Home mortgages on energy efficient homes** perform much better than mortgages on conventional homes. They are 32 percent less likely to default and 25 percent less likely to be prepaid. The higher the Energy Star score of the home, the lower the default rate. The exact causes of the superior performance of these mortgages are not clear, but we can think of two channels. The first is the “green equity premium in residential real estate,” which, for a given mortgage size, would decrease the loan-to-value ratio, and would therefore reduce strategic default. The second is that green labels are taken out by higher quality home owners (see Brounen and Kok, 2010), which are probably less likely to default. It is not yet clear whether these results can be extended to commercial mortgages, but the same two mechanisms could apply equally well to that sector.





## Barriers to Energy Efficiency

While the benefits of energy efficiency investments in buildings are tangible and returns often exceed hurdle rates, large-scale “greening” of the building stock has yet to take off. This can partly be explained by lack of awareness of energy saving opportunities, and there is still uncertainty about the *ex-post* performance of building retrofits. However, these barriers are likely to disappear over time, with better information provision, for example through benchmarking programs such as the DGBC’s pilot benchmarking initiative, and evidence on realized savings from energy efficiency projects.

A more important barrier is the lack of financing for retrofit projects. A recent survey by the *Institute for Building Efficiency* shows that, on average, 26% of the respondents do not have the means to invest in energy efficiency. For institutional owners, this percentage is even higher, some 41%.

New financial instruments may resolve this barrier, and in recent years a patchwork of financing programs and solutions has evolved. Energy efficiency financing mimics the fundamental challenges and complexities of traditional real estate lending, and lenders are thus focused on identifying and pricing risks, both operational (performance) risk and credit (borrower) risk. Assessing these risks is costly, especially when there is uncertainty about the underlying asset (the energy efficiency improvement), and involves fixed up-front costs for the financier. For a successful financing model to succeed, capital providers therefore need:

- Security of repayment (for example via priority liens or guarantees);
- Standardization across transactions and projects;
- Deal volume and deal flow (scale)

## Financial Instruments

Financial instruments for financing building energy efficiency projects are manifold, and include equity financing, debt financing, and performance guarantees provided by different sources including banks, the government, and utilities. Importantly, many of the financing tools for energy efficiency investments are currently available to homes only (especially when the government is involved), but most of them could be adjusted easily to commercial real estate. The review below describes the most important financing models, the scalability, sources of funds, and the applicability of financing models to the Dutch commercial property market. We provide links to more in-depth information with the description of each model.

### 1. On-Balance Equity Financing

It may be the least sexy form of financing energy efficiency projects, but it is nonetheless most frequently used: on-balance financing by the asset owner. Many large property companies, private fund managers, and corporate real estate owners have less need for external financing mechanism, and can often raise capital at more attractive rates than they could using external financing. Equity capital providers, which are often institutional investors, increasingly incorporate sustainability criteria as part of the due diligence process when making capital available to property companies and fund managers. Companies like GRESB have been set up to provide systematic and consistent information to inform investors on the “greenness” of their capital allocations.



**Examples:** This financing tool is used for building upgrades by mainstream property owners like Malkin Holdings (in the well-known example of the Empire State Building), many US REITs, mainstream fund managers, and large corporations. In Europe, two prime examples of mainstream property owners that have been very active in this area include Unibail Rodamco in France/Netherlands and Big Yellow in the United Kingdom. Starting in 2006, Unibail Rodamco embarked on a portfolio-wide effort to improve sustainability practices in its retail assets, which has reduced annual electricity consumption by more than 18 percent to date. In 2011 alone, Unibail Rodamco succeeded in a € 2.5 mln reduction in operating costs due to reduced energy use. These efforts were mainly aimed at the “low-hanging fruit” and did not require significant financing. The financing that was needed was taken out of the company’s cash flow. Big Yellow has incorporated sustainability best practices in most of its UK-wide portfolio of self-storage facilities, focusing very strongly on the bottom line, without much of a green ideology. But they get the job done: Big Yellow is consistently rated as one of Europe’s most sustainable property companies (GRESB, 2009, 2011, 2012). Again, this is achieved without much specific financing outside of the annual revenue stream. These examples suggest that, especially in the early stages of a sustainability drive, large savings can be accomplished with relatively little financing, improving the financial position of the property company, and likely reducing its overall risk.

There are also property funds that focus specifically on retrofitting buildings. These “green funds” buy inefficient properties, invest heavily in retrofits and upgrades and aim to capitalize on the improvement through higher leasing rates, better quality tenants, and eventually a higher sales price.

In Europe, **examples** include the Climate Change Property Fund of Climate Change Capital, and the Low Carbon Workplace Fund of Threadneedle and the Carbon Trust, both active in the UK. In the Netherlands, Merin (previously Uni Invest) has a dedicated strategy of improving assets (in strategic locations) to attract and retain tenants. Of course, this is not just based on sustainability factors alone.

### **Read more:**

[Rodamco’s sustainability performance](#)

[The Climate Change Property Fund](#)

[The Low Carbon Workplace Fund](#)

[GRESB Report \(2012\)](#)

## **2. Mortgage-Based Energy Efficiency Financing**

An “energy efficiency mortgage” provides additional borrowing capacity and/or better terms to borrowers that purchase an energy-efficient building, or that invest in energy efficiency improvements. Adapting loan mortgage terms enables efficient access to low-cost capital and can allow for lower monthly payments on energy efficiency measures. The savings typically exceed the additional monthly payments associated with the capital required for energy efficiency improvements, and this enhanced ability to pay may warrant preferential interest rates. The



government may step in to incentivize the mortgage providers to provide preferential rates, or to “buy down” interest rates.

**Examples:** In Germany, Bayerische Landesbank has incorporated the sustainability of (commercial) properties into its mortgage acceptance terms. Bayerische supports its real estate clients in three ways when it comes to sustainability. First, the bank offers support in the certification process of buildings through its subsidiary Bayern Facility Management. Second, Bayerische has created a service called LBIImmoWert that helps to establish the value and risk effects of the sustainability (or lack thereof) of their clients’ properties, and provides advice concerning building improvements that improve value and reduce risk in this regard. Third, clients that fulfil the bank’s sustainability criteria get more favourable financing terms. In the United States, Wells Fargo includes an environmental assessment in their loan due diligence process, a “resource appraisal.”

“Green Refinance Plus” is a US facility to extend a multi-family mortgage under Fannie Mae guarantee, if the additional money is invested in energy efficiency measures in existing buildings. Fannie Mae sets the criteria for these investments to qualify for the facility, principally based on green building certification. The instrument is targeted at landlords active in affordable housing, but could in principle be extended to commercial real estate owners, which would take away the default risk for a commercial mortgage lender. A Dutch equivalent would be a WSW-guaranteed extension of a second mortgage that is used for energy efficiency measures by a social housing institution or another rental housing provider. Here also, this could in principle be extended to commercial real estate owners. (If broadening WSW’s mandate turns out to be difficult, another guarantee possibility could be the Dutch provinces, who have recently sold their stakes in the large utilities, and who may want to invest that money partly into related infrastructure.)

Some national and local governments provide significant incentives for building retrofits and more efficient new construction. The size of these incentives varies across time and space, but a specific example for the Netherlands is the “Groenregeling.” Under this recently revised mandate, retrofit and new development projects can apply for a declaration (the “Groenverklaring”) that shows the construction project will lead to a (more) sustainable outcome. Projects that obtain the declaration are eligible for financing at a 100bp lower interest rate (“Green financing”) from almost all of the Dutch banks. In addition, up to 15 percent of the upfront investment is eligible for tax credits.

**Home mortgages and MBS packaging** of mortgages on energy efficient buildings. The default and prepayment rates of mortgages on Energy Star homes in the US are lower than default and prepayment on less efficient dwellings, so these mortgages could potentially be issued at lower interest rates, reflecting lower risk premiums. Mortgage performance for homes with a Dutch EPC label is not yet known, but the label is comparable to Energy Star, and could possibly serve as a sorting criterion for home mortgages. These could then be bundled in high-quality mortgage pools that could issue so-called “green bonds.”

**Examples:** In the Netherlands, Triodos has incorporated sustainability aspects in its home mortgage underwriting process, and partly bases its mortgage interest rates on these criteria. The mortgage rate falls 0.1 percent for every increase in the energy efficiency label, so a refurbishment that brings the home from a G- to an A-label reduces the mortgage interest rate by 0.6 percent. More generally, Dutch homes with an A++ label are allowed to have €8,000 more financing as compared to regular homes. This rule applies as of January 2013.

**Read more:**



[Bayerische Landesbank's sustainability approach](#)

[Wells Fargo Resource Appraisal](#)

[Green Refinance Plus](#)

[Triodos' sustainable home mortgage](#)

[Groenregeling \(Netherlands\)](#)

### 3. Utility On-Bill Financing

Utilities can play an important role in energy efficiency financing by providing the upfront cost of an energy efficiency upgrade. The customer then repays the principal and interest through a charge on the monthly utility bill. On-bill repayment overcomes some important hurdles (such as transaction costs, insufficient scale, and financing restrictions) by using the existing billing relationship between utilities and their customers. It also builds upon the information that utilities have about energy usage and payment history of the borrowers, thereby providing important information on potential credit risk. In case of a leased building, on-bill financing can also resolve the “split incentive” problem, as the utility bill can be charged directly to the tenant (who profits from the retrofit).

But the scale of energy efficiency investments through utilities is limited: many utilities are reluctant to take the role of loan originator and collector. There are performance risks involved in the energy efficiency improvements, and credit risks involved in lending funds to customers. Moreover, the balance sheet of utilities does not allow for large-scale funding. This opens an opportunity for external capital providers such as banks, who can buy and pool the loans.

**Examples:** Many utilities in the US provide 0% interest loans to building owners, including Pacific Gas & Electric and Sacramento Municipal Utility District, which are then repaid through the energy bill. In the Netherlands, this does not exist yet, but Nuon cooperates with Santander (and Essent with GreenLoans) to provide 100% funding in conjunction with an insulation project on a house. Interest rates are in the order of 6-10% (which seems high, but given the relatively small loan amounts and short lending period, the absolute amount of interest paid is limited).

#### Read more:

[On-bill financing methods and cases](#)

[Pacific Gas & Electric on-bill financing scheme](#)

[Nuon-Santander insulation financing scheme](#)

[Essent-GreenLoans financing scheme](#)

### 4. EUA/PACE Financing

Property-assessed clean energy (PACE) was created as a financing tool for energy efficiency investments in US owner-occupied homes, but has also (and more successfully) been adopted for use in commercial real estate projects. More recently, the Australian government has developed a similar program: the Environmental Upgrade Agreement (EUA). In the EUA/PACE model, a retrofit





loan is extended to a commercial building owner who receives 100 percent financing, and the loan is secured by a senior lien on the owner's property, paid back via a charge on the property tax bill for up to 20 years. Building owners can transfer repayment obligations to a new owner upon sale.

Typically, the mortgage holder's consent is required before the "assessment" can be placed on the property. The financing for the loan can come from multiple sources: municipal/province/national funds, retrofit funds, or specialized mortgage lenders. In the Netherlands, this tool has not been used yet, but the Dutch property tax system seems well suited for EUA/PACE, so experimentation by Dutch municipalities in conjunction with financiers seems a logical next step.

**Examples:** a recent example of commercial building PACE financing is a \$1.4 million PACE bond issued by the City of San Francisco for the retrofit of the Prologis headquarters in San Francisco. The bond was purchased by Clean Fund, a specialized PACE project financier. In Australia, the National Australia Bank (NAB), Low Carbon Australia and Eureka Funds Management have established "The Australian Environmental Upgrade Fund" (TAEUF) to provide finance for EUA's. Using this structure, the financing (NAB) is separated from the fund management (Eureka).

### Read more:

[PACE background information](#)

[Prologis PACE Bond](#)

[EUA background information](#)

## 5. Energy Savings Performance Contracting

The performance (and thus partially credit) risk of energy efficiency projects is a major concern for all types of green financing. Energy savings performance contracts (often called "EPCs") are therefore often used for developing and implementing comprehensive energy efficiency projects (including renewable energy projects). The service is typically provided by an energy service company (ESCO), which not only develops and implements the plan, but also provides the maintenance during a fixed period after completion. The projected savings are guaranteed by the ESCo, and usually exceed the monthly loan payments.

Funding for EPCs can come from the ESCo, can be sourced from a capital provider, or can be provided by the building owner directly. If ESCos arrange funding from banks and/or institutional investors, the financier enters into a three-way relationship, but has a creditor-borrower relationship with the building owner only. The risk for the bank or the investors is therefore the creditworthiness of the building owner. As the performance risk is minimized under an EPC, banks seem more willing to provide loans to building owners under these contracts. However, the energy savings guarantee comes at a cost, and the returns to the owner are typically insufficient for a commercial real estate investor. The ESCo model has therefore been mostly applied to government-owned, public buildings, such as schools and hospitals.

Importantly, ESCo projects are typically larger in scale, and thus provide less of a solution for the smaller segment of the market. The longevity of the projects (i.e., the payback period) is often a concern to many shorter-term oriented (commercial) property investors.



The ESCo market is still in its infancy in the Netherlands. Recent Dutch **examples** are mostly in public buildings, including the retrofit of nine swimming pools in Rotterdam, and an upgrade of the installations of Meander Medisch Centrum in Baarn, but also an energy and waste reduction project by ESCo Dalkia at Douwe Egberts' coffee plant in Joure.

### Read more:

[Global ESCo overview](#)

[Dutch examples of ESCo funding](#)

### Energy Services Agreements (ESA)

A variation of the Energy Savings Performance Contracting model is offered by “energy services agreements,” which resemble power-purchase agreements that are often used for renewable energy projects. This model is especially suitable for large energy efficiency projects. An external developer of an energy efficiency project creates a stand-alone special purpose vehicle that takes ownership of the project installation and the maintenance services, and in return receives a fixed payment from the building owner (often a fixed percentage of the current utility bill, or a fraction of the projected energy savings). The vehicle is externally financed by a private capital provider, who enters into a contract with the developer. In a variation of this model, the special purpose vehicle takes over the energy bill of the tenant or owner, providing a hedge against rising energy costs.

The ESA structure has the advantage of being recognized as a service, and is thus off-balance sheet for the building owner. It is fully dependent on third-party capital and is as such the purest market-based energy efficiency financing solution. But thus far, this model has not taken off. Complications include the requirement of a special purpose vehicle for each project, and the scale required to make a project financially viable.

**Examples** are limited to a handful of projects by SClenergy (formerly Transcend Equity Development) and Metrus Energy. No examples exist in the Netherlands yet.

### Read more:

[Metrus Energy](#)

## 6. Revolving Retrofit Funds

A revolving retrofit fund is a facility that lends capital to fund energy efficiency improvements, green building acquisitions, or renewable energy projects. Repayments recapitalize the funding pool to enable additional lending/financing. These revolving funds can be administered by private entities or can be government-sponsored and managed. To date, all revolving funds are loan funds, not equity funds, and they do not involve mortgage loans.

**Retrofit loan funds.** The national government, provinces and cities can finance energy efficiency improvements through direct loan programs, or can pool these loans into a revolving fund. These funds can, for example, be capitalized through utility (ratepayer) funds. Interestingly, US examples show that marketing the availability of funds is more important than is often assumed: borrowers are not necessarily attracted by the terms offered through the funds.



**Examples** include the Harvard Green Loan Fund, set up by the Harvard University endowment, and which finances energy efficiency investments made by the various departments of the university. This US\$ 12mln fund is run like a normal business, has so far financed 192 projects for a total of US\$ 15 mln, and has generated an ROI of 29.9 percent on its projects. Another example is the EnergyWorks Loan Fund in Philadelphia, which offers low-interest financing for retrofits of commercial properties.

A European example is the German KfW Energy Efficient Refurbishment program. KfW has made €8.9 billion available (part financed by federal funds) as soft loans with reduced interest, or as grants to promote energy-efficient investments for new and existing buildings. Another European example is the “Green for Growth Fund”, launched by the European Investment Bank (EIB) and KfW in 2009. It provides financing, including loans, equity and technical assistance, for sustainable energy projects in the Western Balkans and Turkey. The EIB has more investment funds available for intermediated lending. More recently, a guarantee scheme was set up by GESB (Global Environmental Social Business) for revolving funds. This initiative is backed by the World Bank, and is mostly active in Central Europe.

**Read more:**

[Harvard Green Loan Fund](#)

[EnergyWorks Loan Fund](#)

[KfW Energy Efficient Refurbishment Program](#)

[EIB Energy Efficiency Financing](#)

[GESB Retrofit Revolving Loan Guarantee Fund](#)



## Appendix: Overview of relevant research

Recent survey by the Institute for Building Efficiency

Bauer, Eichholtz, Kok & Quigley: “How Green is Your Property Portfolio? The Global Real Estate Sustainability Benchmark”, *Rotman International Journal for Pension Management*, 2011.

Brounen & Kok: “On the Economics of Energy Labels in the Housing Market,” *Journal of Environmental Economics and Management*, 2011.

Chegut, Eichholtz & Kok: “Supply, Demand, and the Value of Green Buildings”, *Urban Studies*, forthcoming, 2014.

Eichholtz, Kok & Quigley: “Doing Well by Doing Good; Green Office Buildings”, *American Economic Review*, 2010.

Eichholtz, Kok & Quigley: “The Economics of Green Building”, *Review of Economics and Statistics*, 2013.

Eichholtz, Kok & Yonder: “Portfolio Greenness and the Financial Performance of REITs”, *Journal of International Money and Finance*, 2012.

GRESB: *The Annual GRESB Report*, 2011, 2012.

Quercia, Sahadi & Stellberg: “Home Energy Efficiency and Mortgage Risks”, Working paper, University of North Carolina, Chapel Hill, 2013.