# Building Refurbishment Initiatives and Business Models.

## A Global Benchmark

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# Executive summary

Europe set itself an ambitious target: to be the first climate-neutral continent in 2050. As the building sector is one of the largest energy consumers in Europe, a refurbished and improved building stock in the EU will help pave the way for a decarbonised and clean energy system. Buildings account for ca. 40% of the EU's energy consumption, ca. 36% of its $CO_2$ emissions and ca. 55% of its electricity consumption, making emissions and energy savings in this sector vital to meet the European climate and energy targets. The building stock in the EU is relatively old, with more than 40% of it built before 1960 and 90% before 1990. Older buildings typically use more energy than new buildings.

**To realize the climate goals, acceleration of the refurbishment of existing buildings is imperative (up to at least 2-3% per year).** Despite a variety of subsidy schemes to promote energy efficiency on product, technology and building level, the uptake of deep renovation or even shallow renovation is still limited. The rate at which new buildings either replace this old stock, or expand the total stock, is low (about 1% a year).

In this report an overview is provided of different initiatives, business models, experiences and success cases, addressing the refurbishment of existing buildings across the world. **The overview is fact based, and is intended to provide insights on the specific barriers, solutions and results.** Technology benchmarks and details are provided in multiple other publications and is in this overview out of scope.

In the overview, business models are included targeting the **single-family, multi-family and commercial real estate market** segments. A common characteristic of most successful business models is some kind of one-stop-shop approach, to tackle the common barrier of the complexity of a renovation journey combined with an innovative financing arrangement to overcome the barrier of the high up-front cost of renovations. Furthermore, creating customer awareness is signaled as an important success factor to create sufficient market traction. A total of 25 general barriers were identified hampering scaling renovation processes.

**Three main business model innovation types were distinguished: the one-stop-shop approach, innovative financing schemes, and new revenue streams.** One-stop-shop approaches typically reduce the complexity for building owners and occupants, while simultaneously extending the offering from an output to an outcome, being performance guarantees. Innovative financing schemes are effective in removing financial barriers for building owners, by providing access to loans and payment schemes designed for building refurbishments, and investment specific rebates. New revenue streams may overcome market inefficiencies, as by revenue stream creation benefitting key stakeholders (e.g. service providers or building owners).

**Additional incremental innovative solutions in the business model designs observed include the creation of competitor SME collaborative networks and project portfolios.** By enabling competing (SME) suppliers to collaborate in one-stop-shop networks, the customer benefits by: quote standardization, credibility, choice, lowered administrative costs, and visibility of solutions. Identified successful American business cases often apply a portfolio creating approach. By merging projects into (financial) products, default risks of individual projects are hedged, providing lowered cost of capital and insurance, in addition to other economies of scale benefits.

**Two business models stand out in the sense that they are already replicated in several countries: the American PACE model and the Dutch Energiesprong approach:**

PACE (Property Assessed Clean Energy) provides integrated energy renovation services for the residential market, enabling homeowners to receive financing to cover 100% of the upfront costs for a retrofit project. The liability is secured against the property and repaid through an additional property tax, typically over extended timescales (up to 20 years) making repayments more affordable. Importantly, the liability remains with the property if there is a change of ownership.

The Dutch initiative Energiesprong started as a government funded innovation program, strives to achieve net-zero energy renovations of (mainly) terraced houses. It aims to do so by restructuring the value chain, rapid installations, and usage of prefabricated materials. Energiesprong applies energy performance contracts, where most of the cost will be covered by lower future energy bills while performance is guaranteed within the contract. The initiative is designed for supporting deep renovation of houses to net-zero energy consumption level, that offer short installation on-site time, long performance guarantees, and a minimum set of indoor environmental quality parameters. The works typically comprises the use of prefabricated facades, PV panels and a heat pump.

**This report elaborates 14 other cases** in addition to PACE and Energiesprong. These cases vary significantly in the importance and responsibilities of different stakeholders in the value chain. From one-stop-shop solutions that aim to integrate the multiple steps within the value chain within one organization (e.g. Factory Zero), to solutions which bring together competing solution providers, additional supply chain actors, and access to public resources for finance (e.g. RetrofitWorks), a diverse collection of cases is provided which can be compared individually by 4-pagers which include descriptions of realized achievements.

## References

https://ec.europa.eu/info/news/new-rules-greener-and-smarter-buildings-will-increase-quality-life-all-europeans-2019-apr-15_en

https://www.odyssee-mure.eu/publications/archives/energy-efficiency-trends-policies-buildings.pdf

https://publications.jrc.ec.europa.eu/repository/bitstream/JRC117739/cost_optimal_energy_renovations_online.pdf

https://ec.europa.eu/commission/presscorner/detail/en/QANDA_20_1836

https://ec.europa.eu/energy/sites/ener/files/documents/1.final_report.pdf

# Glossary / acronyms and abbreviations

| | |
|---|---|
| **AUD:** | Australian Dollar. |
| **CAD:** | Canadian Dollar. |
| **Co-ownership Trustee:** | Legal entity representing (building) owners association. |
| **Dwellings:** | Single house or apartment within a multi-family building. |
| **EE:** | Energy Efficiency. |
| **EPC:** | Energy performance Contracting. |
| **ESA:** | Energy Services Agreement. In an ESA, customers pay back the upfront cost through a services agreement through a periodical fee that includes products as well as services. |
| **ESCO:** | Energy Services Company. |
| **IAQ:** | Indoor Air Quality. |
| **IFS:** | Innovative financing schemes. |
| **MESA:** | Managed Energy Services Agreement (MESA). A variation on the ESA with a few important distinctions as the services provider assumes the broader energy management of a customer's facility, including the responsibility for utility bills. |
| **NRS:** | New revenue streams. |
| **OSS:** | One-stop-shop. |
| **PACE:** | Property Assessed Clean Energy. |

# Table of Contents

# 1.

# Introduction

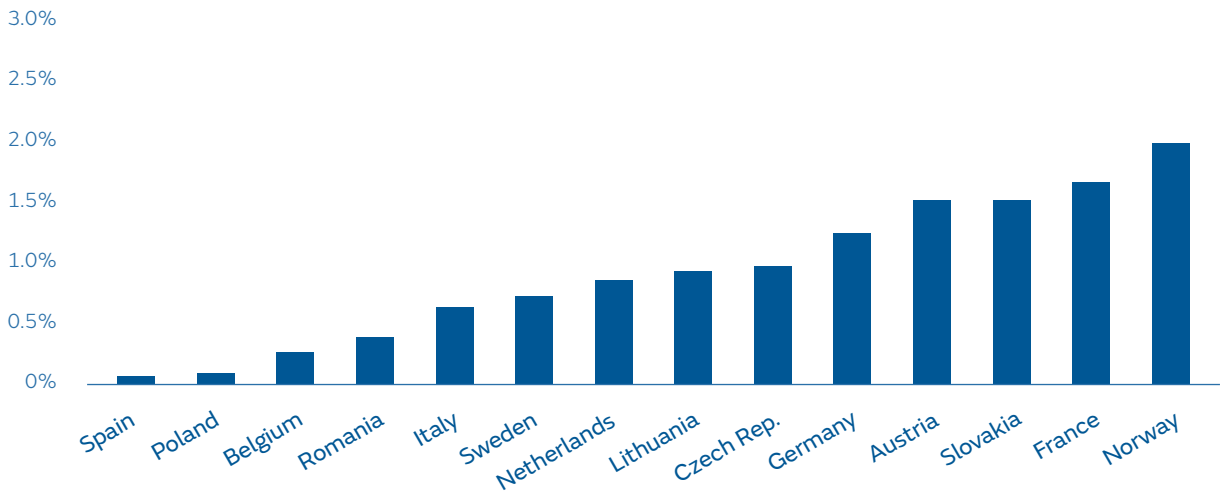
# Introduction

Europe set itself an ambitious target: to be the first climate-neutral continent in 2050. As the building sector is one of the largest energy consumers in Europe, a refurbished and improved building stock in the EU will help pave the way for a decarbonised and clean energy system. Buildings account for ca. 40% of the EU's energy consumption, ca. 36% of its $CO_2$ emissions and ca. 55% of its electricity consumption, making emissions and energy savings in this sector vital to meet the European climate and energy targets. The building stock in the EU is relatively old, with more than 40% of it built before 1960 and 90% before 1990. Older buildings typically use more energy than new buildings. Roughly 75% of today's building stock is energy inefficient.

Renovation of buildings has been singled out in the European Green Deal as a key initiative to drive energy efficiency in the buildings sector to deliver on objectives. Moreover, given the labour-intensive nature of the building sector, the Commission's post-COVID 19 recovery plan identified doubling the rate of renovation as a specific aim for kick-starting the European recovery[1]. To pursue the ambition of energy gains and economic growth, the Commission published on 14 October 2020 a new strategy to boost renovation called "A Renovation Wave for Europe – Greening our buildings, creating jobs, improving lives" (COM(2020)662).

To realize the climate goals, acceleration of the refurbishment of existing buildings is imperative. Despite a variety of subsidy schemes to promote energy efficiency on product, technology and building level, the uptake of deep renovation or even shallow renovation is still limited. The rate at which new buildings either replace this old stock, or expand the total stock, is low (about 1% a year).

## Renovation rates of residential buildings in Europe [ZEBRA2020 tool, ref. 5]




[1] https://ec.europa.eu/energy/topics/energy-efficiency/energy-efficient-buildings/renovation-wave_en

During the last decade, a variety of (public and private) initiatives and new business models were developed and demonstrated to overcome the main barriers that still prevent a massive market uptake of renovation services for existing buildings. Lessons-learnt and success cases are becoming available, but are not yet readily accessible or compiled in a benchmark report.

## Objective

The main objective of this study is to provide an overview of different initiatives, business models, experiences and success cases, addressing the refurbishment of existing buildings. The overview is fact based, is intended to provide insights on the specific barriers, solutions and results. Technology benchmarks and details are provided in multiple other publications and is in this overview out of scope.

In order to provide a global benchmark, the most advanced regions concerning implemented renovation business models and initiatives, and with a more or less similar building stock composition and challenge, are included: Europe, North America and Australia.

## References

https://ec.europa.eu/info/news/new-rules-greener-and-smarter-buildings-will-increase-quality-life-all-europeans-2019-apr-15_en

https://www.odyssee-mure.eu/publications/archives/energy-efficiency-trends-policies-buildings.pdf

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https://ec.europa.eu/energy/sites/ener/files/documents/1.final_report.pdf

# 2.

# Methodology

# Methodology

## 2.1. Introduction

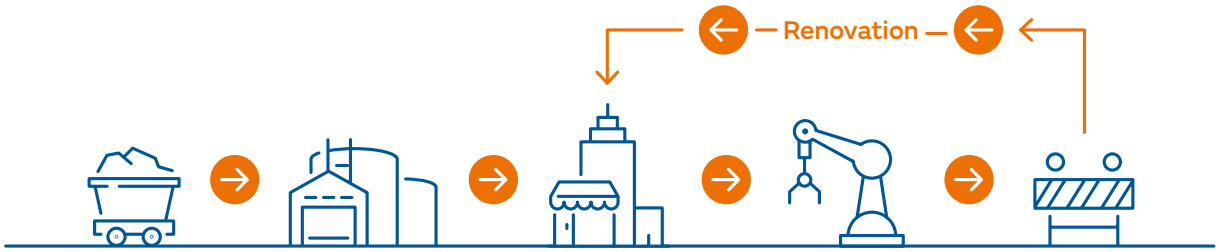
To enable a benchmark of successful renovation business models across different geographies, a generalized framework is needed. Although, the renovation market is influenced by a variety of regulations, incentive schemes and certification schemes, the overall building renovation value chain and the key barriers preventing stakeholders to implement and upscale energy building renovation business models are similar. In paragraph 2.2 and 2.3 the general value chain, actors and the main barriers are indicated. In paragraph 2.4, the business models and initiatives overcoming the key barriers are categorized in classes. This classification, the generalized value chain and the key barriers addressed, are used to describe and benchmark successful energy building renovation business models. Where country specific circumstances are key in enabling a new business model this is highlighted in the case description of that specific business model in chapter 3.

## 2.2. General building renovation value chain

The actors in the different phases of renovation are depicted in figure 2. It is a generalized picture of the construction value chain showing both the actors active in traditional construction and renovation processes as well as new actors. Per phase the active actors are indicated. The traditional actors represent the traditional construction and renovation value chain in which in every phase, a different set of actors is involved. Clearly showing the vast number of actors a single building owner needs to manage to realise an energy efficient renovation of their property in a conventional renovation process.

The **traditional actors** represent the traditional construction and renovation value chain in which in every phase, a different set of actors is involved

## Construction value chain including actors participating per phase




| | Raw Materials | Product Manufacturer | Design & Engineering | Construction | Operation & Maintenance |
|---|---|---|---|---|---|
| Traditional Actors | Mining | Manufacturer | Building owner | Contractor | Maintenance comp. |
| | | | Architect | Architect | Building occupant |
| | | | Engineer | Engineer | Building owner |
| | | | Project financer | | Facility manager |
| Additional New Actors | | Manufacturer coming from other sectors | Energy experts | Aggregators | Aggregators |
| | | | IEQ experts | | Utility companies |

Note: the legislator was not included as an actor in the general value chain. However, the role of the legislator should not be underestimated as the one able to set minimum requirements for the complete national building stock (new buildings but potentially also existing buildings), creating general awareness and incentive schemes.

The 'additional new actors' mentioned in the lower block, are the ones that come into play in several innovative business models overcoming the important barriers preventing faster upscaling of renovation. Often they are replacing groups of traditional actors.

Business model innovations often redesign the responsibilities and interactions between actors. These innovations always consists of an initiator, supplier(s) and a beneficiary, and possibly a newly created actor. In this report, the value chain visual aims to demonstrate the roles of the active actors of business model cases in chapter 3.

## 2.3. General barriers

In an extensive number of literature sources barriers have been reviewed that delay or even prevent real estate owners to take a seemingly rational decision to improve the quality and energy performance of their buildings in a renovation process.

In tables the main barriers faced by property owners at decision making level are summarized and the barriers are listed that prevent actors in the value chain taking part in an energy renovation process to implement with ease successful business models.

### Barriers at decision taking level

| Technical | Knowledge-Informative | Market Inefficiencies | Financial |
|---|---|---|---|
| - uncertainty of performance and performance gap | - difficulties in proving non-energy benefits of renovation, i.e. comfort, health, property value | - split incentives (property owner pays for EE improvements, tenants accrue the benefits through reduced energy bill) and conflicts of interest | - high upfront costs for improvements |
| - lack of technological, product and system developments | - low awareness among property owners and disconnect between a genuine concern about climate change and the energy efficiency of their property | - duration, hassle and complexity (i.e. supply chain, installation, finances) of EE renovation projects | - lack of access to capital |
| | - lack of reliable information (what/who to trust) | | - uncaptured value: energy improvements do not translate into increase rental rates or property valuations |
| | - lack of good quality information and support on how to meet EE goals, product choices and suppliers to embark on a renovation journey | | - limited impact Energy Performance certication on property value |
| | | | - low confidence in energy bill savings: a barrier for property owners seeking full repayment via energy savings |
| | | | - planning horizons: short-term public grant programs are difficult to reconcile with longer-term improvement plans |
| | | | - availability and accessibility: low penetration and availability of attractive financial offers for efficiency measures |

Typical barriers halting refurbishments at the decision taking level can be distinguished by the categories Technical, Knowledge-Informative, Market Inefficiencies and Financial. The successes of particular business models, described in chapter 3, can be explained by how effective these are in removing the most significant barriers for their respective target group.

## Barriers that actors in the value chain face during renovation process

| Knowledge-Informative | EE renovation market structure | Regulatory |
|---|---|---|
| - lack of skilled personel and training | - fragmented value chain: difficulties coordination and communication between numerous involved actors | - lack of continuity in regulations |
| - low quality auditing | - insufficient resources and competences to tender for public procurement schemes | - limited consistent grant schemes and governmental programs |
| | - reluctant leaseholders in flats and terraces are not always willing to permit or contribute to changes, which can limit economies of scale | |
| | - **gaining permission:** getting collective agreement amongst groups of appartment owners | |
| | - **supply chain constraints:** renovation on the scale needed, at an acceptable cost, cannot be routinely relied upon | |
| | - **bureaucracy:** financing models for EE renovation projects have long lead-times for approval | |

The primary barriers obstructing refurbishments during the renovation process are grouped in barriers of a Knowledge-Informative nature, barriers as a result of how the energy efficient renovation market is structured, and barriers that are due to a locally governing Regulatory framework.

In traditional business models, building owners are facing most of the barriers mentioned and are effectively discouraged to renovate their property. Even if there is a feasible business case behind or they are intrinsically motivated to increase the comfort level, indoor air quality and energy performance of their building, the complexity of the process and regulations, perception of high risks, high upfront cost, difficulties to address liabilities during and after construction, etc. are preventing them to start an energy efficient renovation. These barriers are general and more or less similar in Europe, North America and Australia.

## 2.4. Classification building renovation business models

Moschetti and Brattebo [3] developed a classification of business models for the building renovation sector. As starting point the general business model canvas by Osterwalder et al. was used.

### Classification building renovation business models


Based on a thorough analyses they distinguished three main classes of promising new business models and incentive schemes relevant for the buildings renovation sector: i) one-stop-shop business models, ii) business models based on new revenue streams, and iii) business models based on innovative financing schemes.

### One-stop-shop business models

One-stop-shop business models are characterised by a single contractor offering all services related to the energy retrofit of the building, taking care of the complete process from design often up to guaranteed performance. Some also include an option to get easier access to capital, either public or private. The main barriers addressed are related to the general complexity of the renovation process, the multitude of stakeholders involved, getting access to the required skills and knowledge for building renovation, clear liabilities (performance guarantee), transparent governance, reduced lead time and generally reducing the burden for building owners to upgrade/renovate their building.

Special forms of the one-stop-shop business models include ESC (energy supply contracting) and EPC[2] (energy performance contracting) models often provided by an Energy Service Company (ESCO). An ESCO provides specific facilities to improve energy efficiency of users' property, and accepts at the same time some degree of financial risk. The remuneration for the offered services relies (either entirely or partly) on the accomplishment of energy efficiency improvements and on other agreed performance criteria [ref]. EPC or ESC contracts supplied to homeowners by an ESCO are rare.

## Business models based on innovative financing schemes

Business models based on new financing schemes are aiming to overcome the barrier of high upfront cost. Generally, the initiator is a public government or a mandatory regulatory scheme such as energy saving obligations for utilities. These schemes lead to investments in energy retrofit measures in buildings, through energy saving duties and innovative financing strategies. Financial institutions often play a central role in providing new financial products for boosting energy improvements in buildings.

## Business models based on new revenue streams

Business models based on new revenue streams are generally based on governmental incentives contributing to profits. Examples are tax reduction schemes in case of energy performance upgrading of existing buildings and feed-in tariffs, and financial incentives based on realized efficiency performance. New revenue streams might also result from additional value of a sustainability assessment scheme or building certification label. The use of a well-known label certifying improved qualities and performance of the building supports the owners in getting potential higher rent or sales prices.

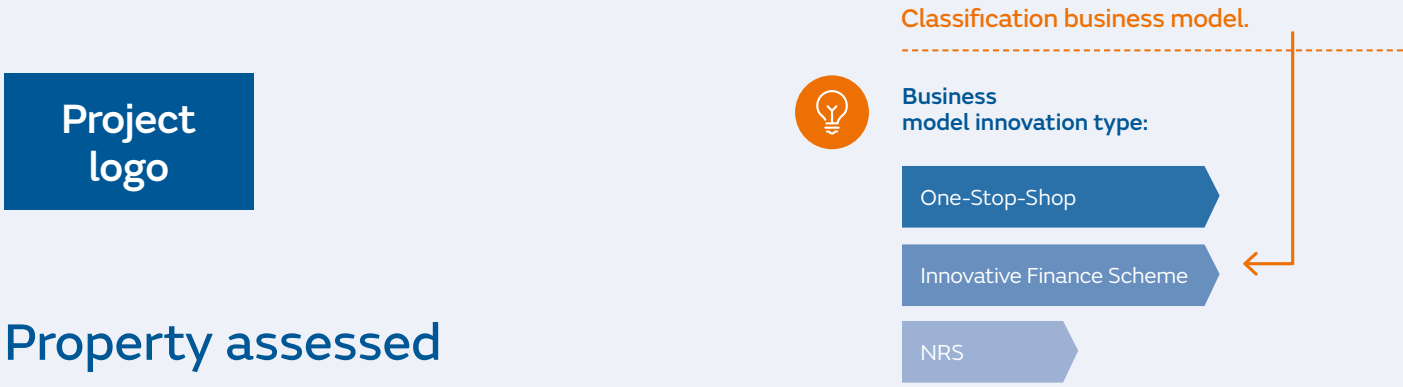
In practice, some of these business models are offered in an integrated manner: a combination of some kind of one-stop-shop approach with a new revenue model or a new financing scheme. Where relevant this will be highlighted in the next chapter.

In this report successful examples of these business models are elaborated. The elaborated cases originate from Europe, North America and Australia. To substantiate success, not only a description of the business model, involved stakeholders and country specific circumstances are included but also relevant achievements are listed (such as turnover, number of projects executed, etc.).

[2] EPC (Energy Performance Contracting). An ESCO guarantees energy cost savings in respect to a historical or calculated reference value. The EPC model is not very common in the residential sector, due to the small size of the individual projects and the risks involved to guarantee a cost saving. In the residential sector the occupant behaviour is difficult to predict or control, while it has a very significant effect on the actual energy saving realised.

## 2.5. Methodology

Examples of successful business models or initiatives to upscale energy renovation of buildings are represented in a standardised way in chapter 3. Each business model is described in a 4-pager format with the information shown in the next example.



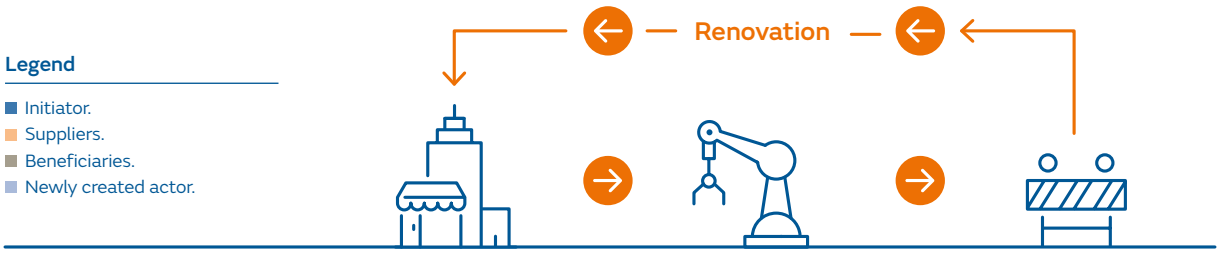

# Property assessed

### Business Model example

Description.

## Value Chain example

Value chain actors and their role in the business model.




| | Design & Engineering | Construction | Operation & Maintenance |
|---|---|---|---|
| Traditional Actors | NGO | Building owner | Contractor | Maintenance comp. |
| | | Architect | Architect | Building occupant |
| | | Engineer | Engineer | Building owner |
| Additional New Actors | | Aggregator: One-Stop-Shop. | | |
| | | Financial Institutions & Local Authorities Supporting the finance scheme. | | |

## Countries example

Countries where the BM is implemented.

## Barriers example

Description.

## Customer Journey example

**01 / First contact**

Description.

**02 / Identifying improvements**

Description.

**03 / Agreement and financing**

Description.

**04 / Refurbishment Project**

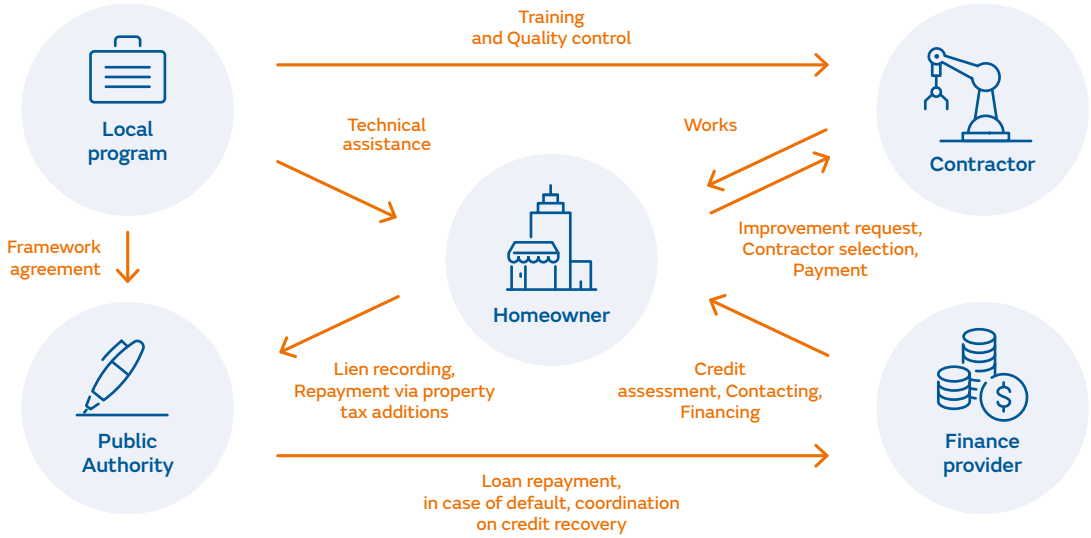
Description.

**05 / Repayments**

Description.

## Business Model example

Role and interaction of actors within the renovation process.




## Achievements example

- Main figures.

## Business Model Canvas example

### Key Partners

Who are the Key Partners?
Who are the key suppliers?
Which Key Activities do partners perform?

Motivations for partnerships may be:
Optimization and economy,
Reduction of risk and uncertainty,
Integration of particular resources and activities.

### Key Activities

What Key Activities are required for the:
Value Propositions?
Distribution Channels?
Customer Relationships?
Revenue streams?

Categories:
Production, Problem Solving, Connecting.

### Key Resources

What Key Resources are required for the:
Value Propositions?
Distribution Channels?
Customer Relationships?
Revenue Streams?

Types of resources:
Physical, Intellectual, Human, Financial, Platform/Network.

### Value Propositions

What value is delivered to the customer? Which one of the customer's problems are being solved? What bundles of products and services are offered? Which customer needs are being satisfied?

Characteristics:
Newness, Performance, Customization, Design, Price, Cost Reduction, Risk Reduction, Accessibility, Convenience/ Usability, Overcoming barriers.

### Customer Relationships

Which Customer Relationships are established?

How are they integrated with the rest of the business model?

### Channels

Through which Channels are the Customer Segments reached?

### Customer Segments

For whom is value being created?
What is the geographic scope?
Which of the following segments is targeted?:

- Single-family buildings.
- Multi-family buildings.
- Tertiary buildings.

### Cost Structure

What are the most important costs inherent in the business model?

Sample characteristics:
Fixed Costs (salaries, rents, utilities).

### Revenue Streams

For what value are the customers paying?
What are the sources for Revenue Streams?

Types:
Asset sale, Usage fee, Subscription Fees, Lending/Renting/ Leasing, Licensing, Brokerage fees, Advertising.

The business model classification indicates if the business model concerns a One-stop-shop, Innovative Finance Scheme or New Revenue Streams, following the definitions provided in 2.4. The roles of key actors within the business model are indicated with the Value Chain Illustration. The indication is provided through color code and specific Additional New Actors. The color code is also integrated in the Business Model illustration and represents the role of an actor in regards to the business model (initiator, supplier, beneficiary, newly created actor).

The role and interaction of actors within the renovation process are shown through a Business Model illustration. The spheres represent key actors, the arrows represent interactions which carry a form of value, an action, or a contract. Exchanged forms of value include payments, delivery of goods and services, or leads. An action undertaken could concern a homeowner selecting a contractor, or an actor providing supporting documentation such as invoices. An example of a contractual agreement such is an EPC which binds a supplier to performance KPI's throughout the contract period.

## Business Model Canvas Category Explanations

The Business Model Canvas is a strategic management tool to quickly and easily define and communicate a business concept. The canvas provides insights into the customers, value proposition offered, channels used, and how the company makes money. The right side of the Business Model Canvas focuses on the customer (external), while, the left side of the canvas focuses on the business (internal). Both external and internal parts meet around the value proposition, which is the exchange of value between the company's business and the customer/clients. The Business Model Canvas was developed by Alexander Osterwalder.

The last page of the business model description provides insight through the Osterwalder business canvas.

# 3.

# Successful renovation business models and incentive schemes

# Successful renovation business models and incentive schemes

Successful examples of implemented business models are depicted in a dashboard, see table. The examples are elaborated in more detail in paragraphs 3.1 till 3.4.

## Dashboard successful building renovation business models and initiatives

| | | | Type of business model | | | Market segment | | |
|---|---|---|---|---|---|---|---|---|
| Company | Founding year | Country of origin | OSS | NRS | IFS | Single | Multi | Tertiary |
| EnergieSprong | 2009 | Netherlands | ▪ | | | ▪ | ▪ | |
| EuroPace | 2018 | Spain | ▪ | | ▪ | ▪ | ▪ | |
| PACE | 2008 | USA | ▪ | | ▪ | ▪ | ▪ | |
| Oktave | 2015 | France | ▪ | | ▪ | ▪ | ▪ | |
| CleanBC Better Home | 2018 | Canada | | ▪ | ▪ | ▪ | ▪ | ▪ |
| EOS Energy | 2019 | Spain | ▪ | | ▪ | | ▪ | |
| Operene | 2014 | France | ▪ | | | | ▪ | |
| SiRE / ReformANERR | 2015 | Spain | ▪ | | | | ▪ | |
| Factory Zero | 2015 | Netherlands | ▪ | | | ▪ | | |
| Mon Carnet | 2015 | France | ▪ | | | ▪ | | |
| Retrofit Works | 2013 | UK | ▪ | | | ▪ | | |
| Sealed | 2012 | USA | ▪ | | ▪ | ▪ | | |
| Betterhome | 2015 | Denmark | ▪ | | | ▪ | | |
| EcoHome Financial | 2010 | Canada | | | ▪ | ▪ | | |
| Refresh Renovations | 2010 | New Zealand | ▪ | | | ▪ | | |
| Carbon Lighthouse | 2009 | USA | | ▪ | ▪ | | | ▪ |
| Metrus Energy | 2009 | USA | | | ▪ | | | ▪ |
| Sustainable Australia Fund | 2002 | Australia | | | ▪ | | | ▪ |
| Business Energy Pro | 2019 | USA | | ▪ | | | | ▪ |

Note: OSS = One-stop-shop, NRS = New Revenue Streams, IFS = Innovative Finance Schemes
Single = single-family buildings, multi = multi-family buildings, tertiary = commercial real estate

## 3.1. Business models addressing both single- and multi-family buildings market

### Dashboard successful building renovation business models and initiatives

| | | | Type of business model | | | Market segment | | |
|---|---|---|---|---|---|---|---|---|
| Company | Founding year | Country of origin | OSS | NRS | IFS | Single | Multi | Tertiary |
| EnergieSprong | 2009 | Netherlands | ▪ | | | ▪ | ▪ | |
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| PACE | 2008 | USA | ▪ | | ▪ | ▪ | ▪ | |
| Oktave | 2015 | France | ▪ | | ▪ | ▪ | ▪ | |
| CleanBC Better Home | 2018 | Canada | | ▪ | ▪ | ▪ | ▪ | ▪ |

# Energiesprong

**Business model innovation type:**

One-Stop-Shop

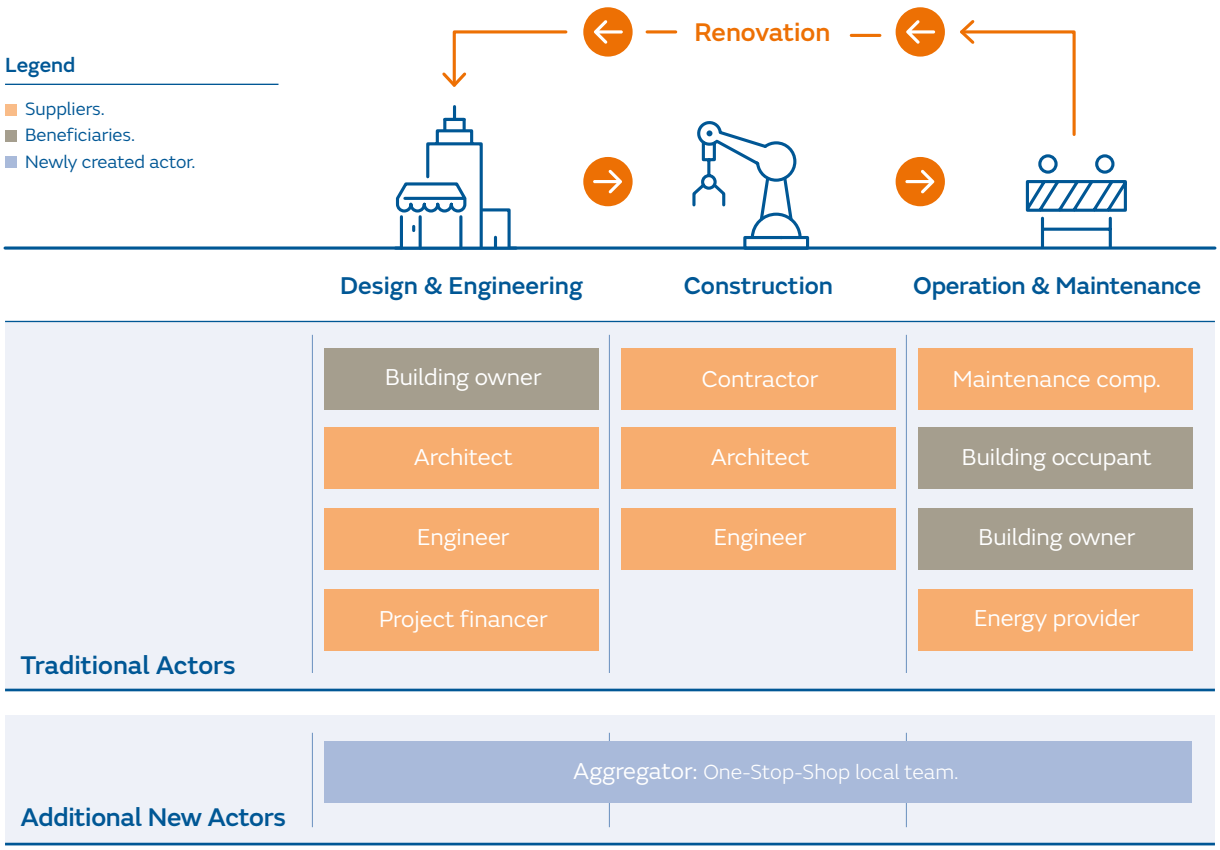
Innovative Finance Scheme

NRS

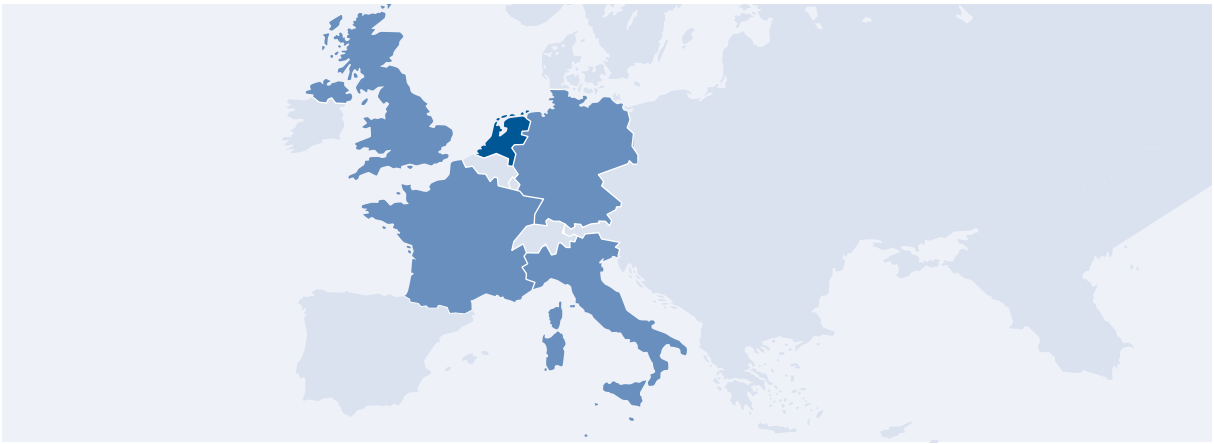
## Business Model

The Dutch initiative Energiesprong started as a government funded innovation program, striving to achieve net-zero energy renovations of (mainly) terraced houses. It aims to do so by restructuring the value chain, rapid installations, and usage of prefabricated materials. Energiesprong applies energy performance contracts, where most of the cost will be covered by lower future energy bills while performance is guaranteed within the contract. The initiative is designed for supporting deep renovation of houses to net-zero energy consumption level, that offer short installation on-site time, long performance guarantees, and a minimum set of indoor environmental quality parameters. The works typically comprises the use of prefabricated facades, PV panels and a heat pump.

## Value Chain




## Countries



## Barriers

Energy refurbishment brings complexity and high costs that may discourage homeowners. Through setting up a cooperative cluster, with fund providers, solution providers, market developers and contractors, refurbishment becomes more accessible for social housing associations.

## Customer Journey

**01 /**

A social housing association expresses interest in the Energiesprong solution.

**02 /**

A preparation phase that comprises an on-site visit(s) and comprehensive analysis of the buildings.

**03 /**

Call for tenders including target cost and energy performance level.

**04 /**

Planning of solution provider (responsible for whole renovation process) and preparation of contracts between both solution providers and housing association, as well as housing association and tenants.

**05 /**

Signing contracts.

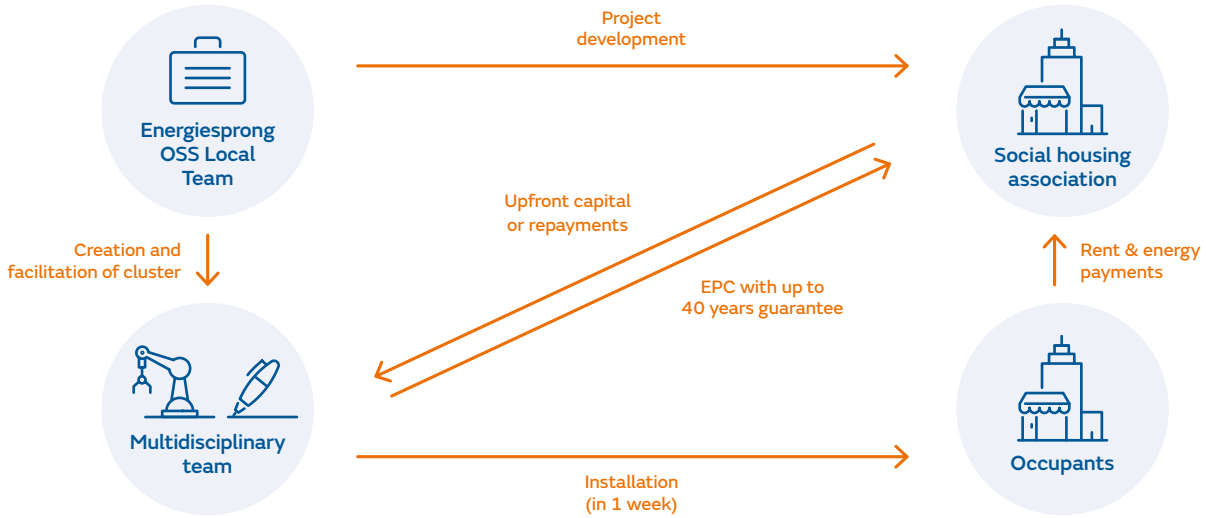
**06 /**

The renovation work is performed through a fast installation of the components (often less than one week for an individual house).

**07 /**

The performance is monitored over the agreed time period.

## Business Model




## Achievements

- Energiesprong realized 5,000 houses in the Netherlands, with another 14,400 planned. For another four countries (the UK, France, Germany, and Italy) and New York State, 41 houses have been realized, while another 6,926 are planned.
- The average project size amounts from €70,000 to €77,000 investment per parcel house, for deep renovations.
- Level of renovation: Net-zero energy performance guaranteed, homeowner enabled to monitor consumption.

## Business Model Canvas: Energiesprong

### Key Partners

The model brings together many different building professionals, from installers and SMEs to larger manufacturers. Stakeholders such as Social Housing Associations are engaged and updated via the network organization (formerly by the Energiesprong market development team), which organizes network events, bilateral conversations, as well as provision of guidance, tools and templates. In addition, Energiesprong sees the interaction with the residents as key to a successful implementation.

### Key Activities

- Whole house net zero renovations (typically with prefabricated facades, PV-panel and heat pump) with short installation time on-site.
- Project management.
- Providing and managing an up to 40 years performance guarantee obligations.

### Key Resources

- Project managers.
- Smart digital solution.
- Network of building professionals.
- Standardized solutions.

### Value Propositions

- Net zero renovation solution.
- Long-term performance guarantee.
- Collaboration among contractors, suppliers, etc.
- Installation in a week.
- OSS.
- Access to finance.
- The Multi-disciplinary team guarantees performance to the customer through an EPC.

### Customer Relationships

Energiesprong manages groups of building owners, which are managed by a project manager.

Also it manages relationships with social housing association and tenants (70% consent requirements).

### Channels

- Online portal.
- Network (suppliers, installers, etc.)
- Social media (Facebook, Twitter).

### Customer Segments

Social housing associations of mainly terraced and semi-detached houses but also multi-family buildings. Buildings built between 1946 and 1975 with a rather low energy performance and high energy bills.

### Cost Structure

- Labor cost (project managers, business developers, admin personnel, etc.)
- Organizational costs (network events, bilateral conventions, etc.)

### Revenue Streams

- The model offers a long-term performance guarantee (net zero energy consumption) where the renovation costs are paid for through an addition to the rent (i.e. by an energy service fee), while energy is produced on-site.
- Public support programs (EU and national).

**Website:** https://energiesprong.org/

# EuroPACE and PACE

**Business model innovation type:**

One-Stop-Shop

Innovative Finance Scheme

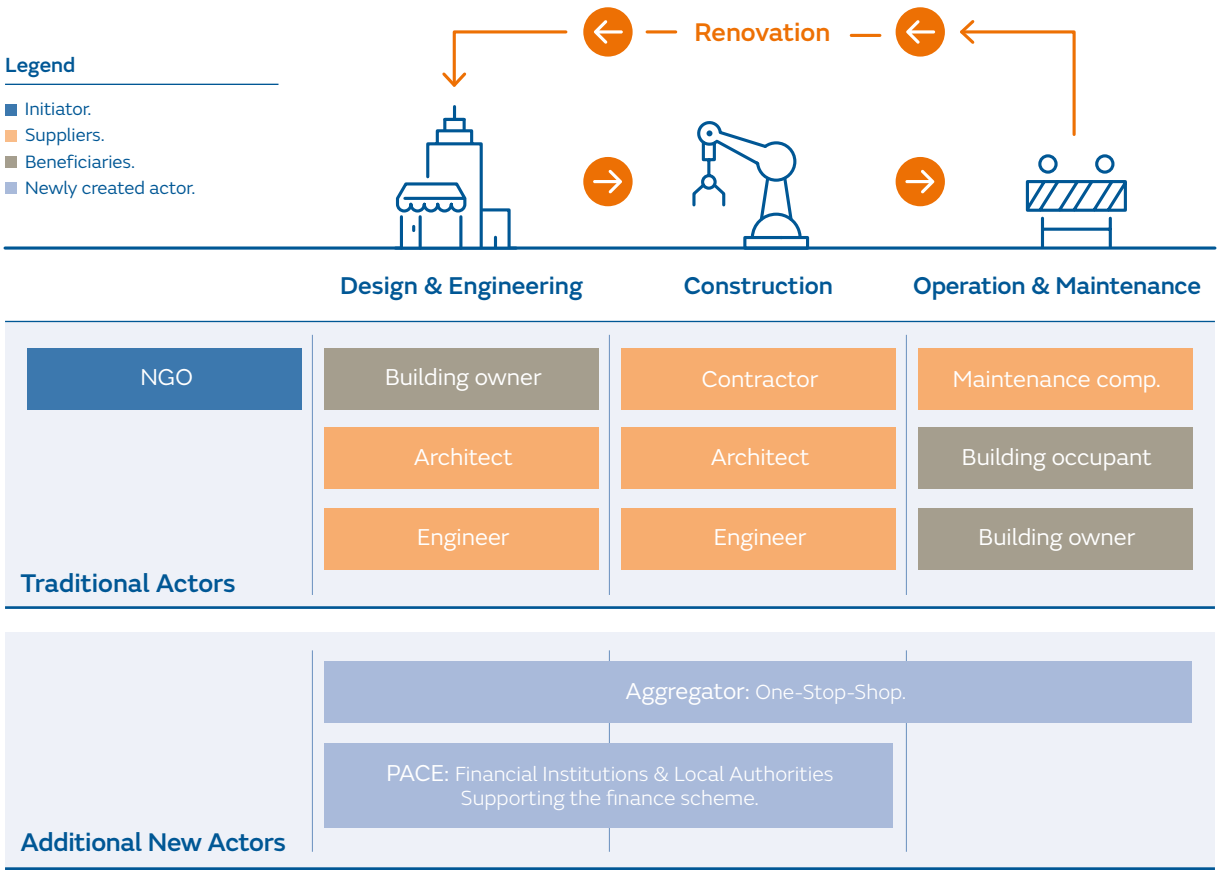
NRS

## Business Model

Property Assessed Clean Energy (PACE) provides integrated energy renovation services for the residential market by enabling homeowners to receive financing to cover 100% of the upfront costs for a retrofit project. The liability is secured against the property and repaid through an additional property tax, typically over extended timescales (up to 20 years) that make repayments more affordable. Importantly, the liability remains with the property if there is a change of ownership.

EuroPACE is inspired by the success of an innovative financing model called PACE, launched in California in 2008. To date, PACE schemes have mobilized over $5 billion into domestic retrofits and trials, including the retrofit of over 280,000 homes. EuroPACE project intends to build upon the best practices in the US and adapt this financing mechanism to Europe, starting with pilot programs in Spain: Olot and the Basque Country through the HIROSS4all EU project.

## Value Chain




## Countries

## Barriers

Among the main barriers addressed are: i) High upfront costs for improvements, and ii) Hassle and complexity for the building owners. Among the main barriers encountered during implementation are: i) engagement: Lack of strong public policies to stimulate demand, and ii) market readiness in different EU countries, based on legal suitability & enforceability and market potential.

## Customer Journey

### 01 / First contact

The EuroPACE market penetration is structured by a regional focus. For the pilot in Olot (Spain), local authorities contact potential clients for building renovations, and explain the benefits of PACE. Interested building owners may register, and need to pay an administration fee to the local government. An assessment is subsequently carried out by Fundació EuroPACE.

### 02 / Identifying improvements

Suitable energy efficiency improvements are identified and selected. The client is assisted in finding trained local contractors.

### 03 / Agreement and financing

Homeowner agrees to refurbishment and intervention proposal. The financer provides lending for a municipal bond.

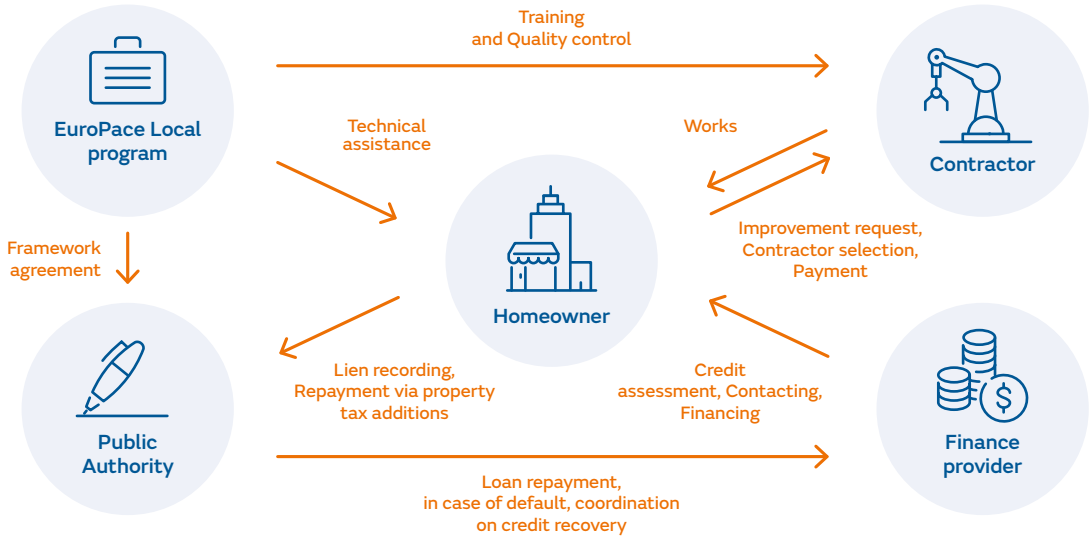
### 04 / Refurbishment Project

Works execution.

### 05 / Repayments

The renovation investment will be paid back over a long term (e.g. 20 years) through (property) tax additions.
Hence, change of ownership can be incorporated with repayments easily. Tax additions can be reclaimed at tenants pro rata.

## Business Model




## Achievements

- Through pilot projects in Spain, 17 multi-family buildings were registered as of July 2020 in Olot, replicated under the Opengela local programme in the Basque Country (Bilbao and Eibar) in 461 homes. Several more EU cities have expressed interest.
- Average project size: €20,000 to €25,000.
- In the US, PACE schemes have mobilized over $5 billion into domestic retrofits and trials, including the retrofit.

## Business Model Canvas: EuroPace

### Key Partners

- Fundació EuroPACE (Project elaboration and direction).
- Local authorities (renovation projects promotion and innovation financial mechanisms management).
- Banks, credit institutions and investors Selected contractors.
- 8 partners from 4 countries (Spain, Italy, the UK, and Poland) : Global New Energy Finance (GNE Finance), Center for Social and Economic Research (CASE), Joule Assets Europe, Climate Bonds Initiative, Ajuntament d'Olot, Energy Agency of Extremadura (AGENEX), Ente Vasco de la Energía (EVE), Up Social, Barcelona.

### Key Activities

- Financial package provision through local public administration.
- Bringing contractors in contact with building owners.
- Technical support.
- Home improvement packages.
- Quality control.

### Key Resources

- Financing model PACE, which includes partnerships with local governments and financial institutions.
- Network of trained and qualified energy contractors.

### Value Propositions

EuroPACE is a one stop shop that addresses customers' needs for energy efficiency renovations by coupling technical assistance and affordable and scalable finance, paying special attention to customer experience. Liabilities are secured against the property and the loan to carry out the works is repaid through an additional property tax, typically over extended timescales (up to 20 years) that make repayments more affordable.

The contractors guarantee renovation results to homeowners.

### Customer Relationships

- Through the local administration.
- People-Centric Assistance.
- Digital platform for quick and easy approvals.
- Technical and customer assistance throughout the process.

### Channels

- Cities and regions are targets are chosen.
- The EuroPACE program is showcased through direct commercial actions and via local governments.

### Customer Segments

- Residential: homes, apartments and multi-family buildings.
- Currently pilot projects in Spain and looking to target other EU countries.

### Cost Structure

- Staff/Labour costs.
- Communication/outreach costs.

### Revenue Streams

EuroPACE is currently developed as part of a EU funded Horizon 2020 project.
Payments will be paid upfront by the bank to the contractor. Local Authorities collect PACE repayments via council taxes or busines rates, who in turn will pay back to the investment platform and banks or financial institution. Revenue streams include:

- Secure repayment stream.
- Familiar property tax structure.
- Source of asset-backed green bonds.

**Website:** https://www.europace2020.eu/

# Oktave

**Business model innovation type:**

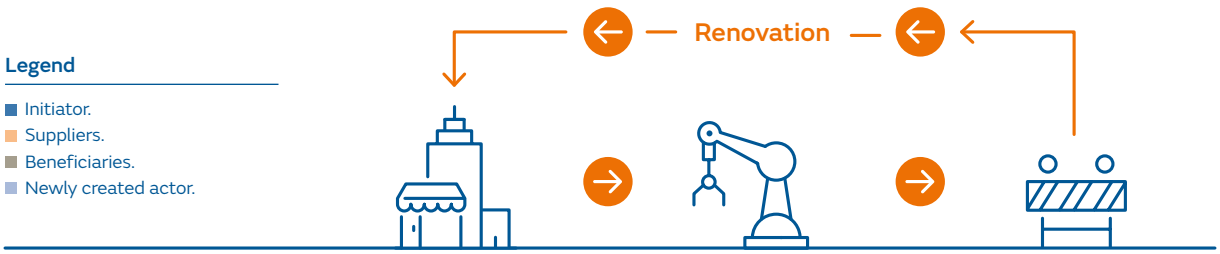
- One-Stop-Shop
- Innovative Finance Scheme
- NRS

## Business Model

Oktave, is the name of the integrated energy renovation service for housing, initiated by the Grand Est region in France and ADEME (French Environment and Energy Management Agency) in 2015. This service was set up to meet the requirements of the Energy Transition to Growth Law Green (LTECV), a law which imposes to have a building stock with nearly-zero energy standards by 2050. On the scale of the Grand Est region, this represents more than 38,000 renovations per year to be carried out.

Oktave offers comprehensive support to owners as one-stop-shop, identifying the most suitable work scenario for performing a successful renovation, selecting certified professionals trained in zero energy renovations, and implementing unique financial engineering. From decision-making until the end of the project, through the management of building professionals and the implementation of the financial tools necessary for the project (advance aid, promotion of Energy Performance Certifications, easier access to the French Eco PTZ and for a works loan), Oktave is positioned as the conductor of energy renovation projects through its service package.

## Value Chain




| | Design & Engineering | Construction | Operation & Maintenance |
|---|---|---|---|
| Traditional Actors | Governemental bodies | Building owner | Contractor | Maintenance comp. |
| | | Architect | Architect | Building occupant |
| | | Engineer | Engineer | Building owner |
| | | Project financer | | Energy provider |
| Additional New Actors | | Aggregator: One-Stop-Shop. | | |

## Countries

## Barriers

**Social:** Oktave is working towards gaining engagement with homeowners, which is known to be a barrier for energy renovations in France.

**Financial:** financial issues are typically a barrier when looking at refurbishment projects. Oktave offers competitive funding to overcome this.

## Customer Journey

### 01 / Initial contact and on-site visit

Recommendations for energy renovation are outlined, identifying homeowners' financial requirements.

### 02 / Renovation agreement

An Oktave advisor proposes the best solution and contractor to carry out the work after reviewing different quotes. A financial proposal is also agreed.

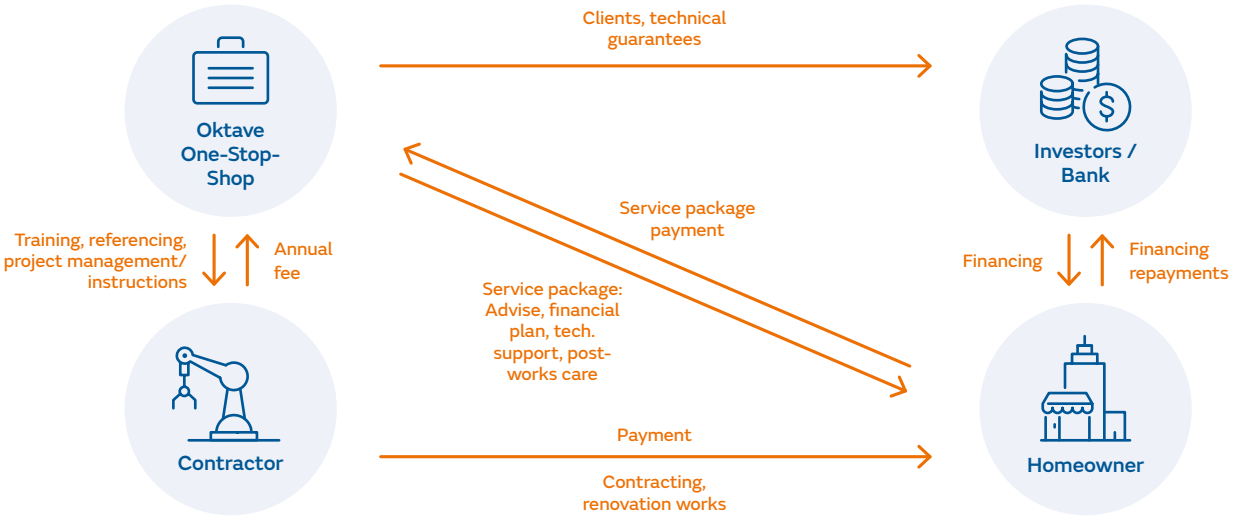
### 03 / Refurbishment project

Works execution, where the Oktave advisor is managing any potential issues and quality assurance.

### 04 / Follow-up

An Oktave advisor keeps in touch to ensure all has gone smoothly technically and financially.

## Business Model




## Achievements

- 1,000 single-family houses have been renovated so far.
- Average project sizes of 60,000 to 80,000 € per single-family household.
- Conversion rate of 12.5% from initial contact to actual contract.
- Total investment: €10.3 million, 14% share of public grants.
- Share of private investments: 86% (23% personal contribution, 63% loans).

## Business Model Canvas: Oktave

### Key Partners

- Collaboration with ADEME (French Environment and Energy Management Agency) to develop the program.
- Network of certified and trained installers.
- Financial support by the European Investment Bank (EIB).
- Partnership with the real-estate agency ORPI France.
- Oktave was incorporated as a semi-public company in 2018, by the shareholders:
- The Grand Est Region.
- Procivis Alsace.
- Banque des Territories (CDC).
- Caisse d'Epargne Grand Est Europe.

### Key Activities

- Project management assistance.
- Renovation advice. Tailored advice and a directory of qualified professionals available, trained by Oktave.
- Financial plan, combining potential grants, tax rebates and low-interest loans.
- 2 year "post-works care".

### Key Resources

- Operational management (renovation advisors, loan advisors, relationship with contractors and companies).
- Financial management (accounting, auditing, quality control, litigation).
- Strong network of local partners.

### Value Propositions

A complete energy efficiency refurbishment solution, covering financial and technical aspects. Simplified procedures with a single point of contact, with clear and understandable information to customers.

- Building specific technical renovation advice.
- Support with a financial plan, combining potential grants, tax rebates and low-interest loans.
- Project management assistance throughout the renovation process.
- Personalized "post-works care" for two years after completion of the renovation.
- A directory of qualified and experienced professionals trained by Oktave to guarantee long-term building performance.

### Customer Relationships

The customer has a single-point of contact throughout the whole renovation journey with Oktave guiding the customer during the entire process.

### Channels

- Local renovation advice centers.
- Local network (installers, architects, tradespeople etc.)
- Website and social media.

### Customer Segments

Single family houses and condominiums in France, Région Grand Est.

### Cost Structure

- Staff/Labor cost (advisors, admin).
- Communication/outreach cost.
- Development and maintenance of the online platform.

### Revenue Streams

- € 1.5 million starting grant from the Greater East Region of France.
- Fixed fee of €2,900 for the overall services package per project. The Oktave service is billed as a package of services, to be paid in three installments.
- Financial income generated through its credit intermediary activity.

**Website:** https://www.oktave.fr

# CleanBC Better Homes

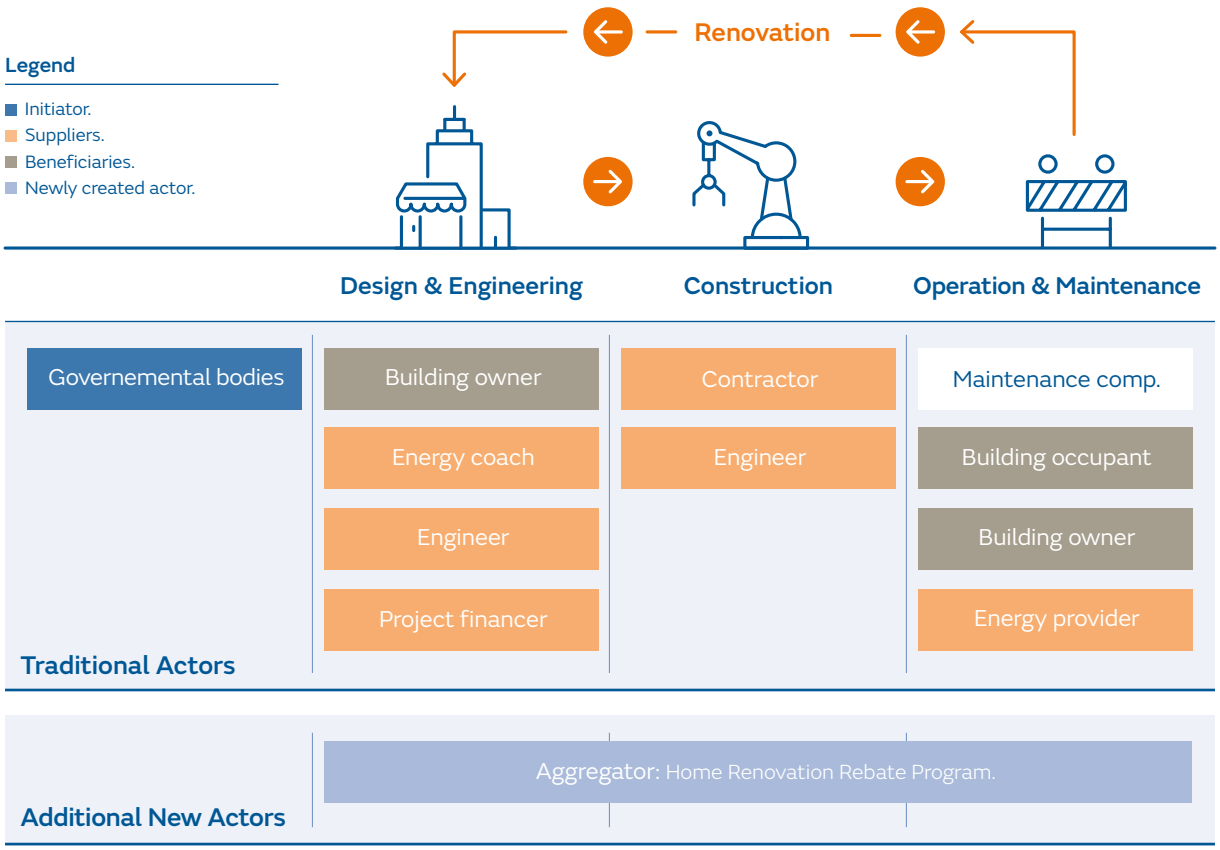
**Business model innovation type:**

- OSS
- Innovative Finance Scheme
- NRS

## Business Model

The Home Renovation Rebate Program (2018) by CleanBC Better Homes stimulates various home upgrades and renovations. It offers investment specific rebates, as well as additional financial solutions (investment and municipality specific low-interest loans, such as for heat pumps) while it also directs customers towards bank and credit union loans. The Low-Interest Financing Program of CleanBC supports highly efficient technologies through zero interest rates, while less efficient solutions may qualify for interest rates up to 5%. The rebate program is administered by utilities BC Hydro and FortisBC, and the province. To apply, homeowners require to be customers of the respective utilities. CleanBC Better Homes is British Columbia's online hub for homeowners and businesses to access information about home upgrades and the rebate program. The hub aims to reduce energy use and greenhouse gas emissions in new and existing homes and buildings. The rebate program is funded by the Province of British Columbia and the Government of Canada under the Low Carbon Economy Leadership Fund. In response to the Province's call for local governments to offer additional incentives to increase uptake in their jurisdiction, municipalities such as North Cowichan are providing an additional CAD 30,000, providing top-up rebates. Rebates can amount up to CAD 14,100 for a home and CAD 220,000 for a business.

## Value Chain




## Countries

## Barriers

**Complexity:** reduced by energy efficiency upgrades information, free energy coaching services, and certified contractors referencing.

**Financial:** rebates or low-interest financing for home upgrades, providing flexible financial support.

**Regulatory:** continuity through reliable stakeholder base (utilities, municipalities, province, state).

## Customer Journey

**01 /**

A homeowner and registered customer at utilities FortisBC, BC Hydro or a municipal utility, explores the online hub of Clean BC Better Homes identifying home upgrade specific rebates.

**02 /**

The homeowner engages with certified energy coaches and registered contractors, found via the online hub. Energy coach services are offered for free and assist home owners in identifying the optimal home upgrades.

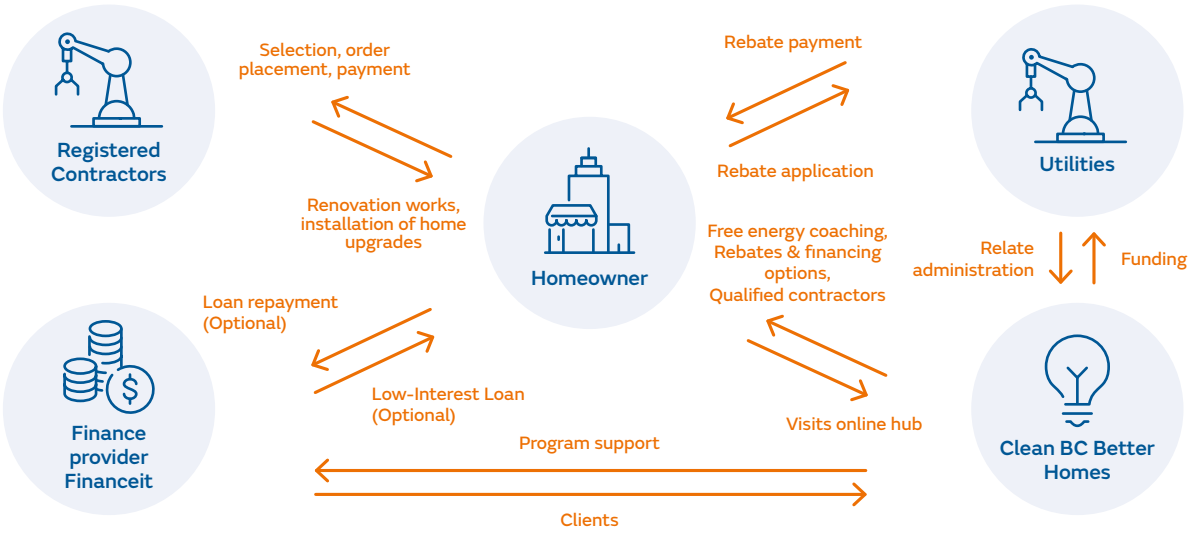
**03 /**

Once the home upgrades installations are completed, the customer can apply for the rebates by uploading supporting documentation such as invoices from certified contractors.

**04 /**

The owner receives the rebate payment, specific to the upgrades, bonuses, special promotions and financing support it opted for.

## Business Model




## Achievements

- Over 6,700 households have benefited, e.g. through heat pump upgrades. 47 capital incentive projects have been approved, for business and public sector installations of heat pumps, heat recovery chillers and high efficiency gas equipment.
- Heat pump sales increased by 23% in 2018 (7% and 11% for 2016 and 2017 respectively).
- The 2019 budget provided CAD 902 million (for home energy efficiency and other).

## Business Model Canvas: CleanBC Better Homes

### Key Partners

- Utilities: BC Hydro, FortisBC.
- Province of British Columbia (BC).
- BC Municipalities (adding municipality specific rebates and offers).

Additional actors involved:

- Program registered contractors.
- Program qualified energy advisors.

### Key Activities

Providing information, rebates and support for reducing energy use and greenhouse gas emissions. Investment types supported include:

- Space heating (heat pumps, electrical service upgrades, natural gas driven equipment.
- Water heating.
- Insulation, windows, doors (building envelope).

### Key Resources

- Easy to use rebate search tool for renovations.
- Information on energy efficiency upgrades.
- Free Energy Coaching services, including a phone and email hotline.
- Search tool and network for finding EnerGuide rated energy advisors, and contractors.

### Value Propositions

- Clean BC Better Homes provides easy access to rebates for greener home investments. Eligible investments are listed and a detailed rebate scheme is available, providing guaranteed savings.
- Bonusses for customers who opt for two or more upgrades.
- Additional financial unburdening through equal payment plans: Based on last 12 months usage equal monthly payments are determined. Amount billed is compared with actual consumption, the difference may result in a credit or amount due.
- Guarantees provided by contractors.

### Customer Relationships

- BC Hydro and FortisBC provide information, rebates and administrative (payment) services.
- Program registered contractors and program qualified advisors are involved with different stages of the renovation and agree contracts with the customers.

### Channels

- Website/online hub.

The websites of BC Hydro and FortisBC provide rebates and offers to existing customers/ Customers can retrieve information and apply for rebates online.

### Customer Segments

CleanBC Better Homes targets British Columbia (Canada) homeowners of single- and multi family buildings. Municipalities offer additional specific rebates.

### Cost Structure

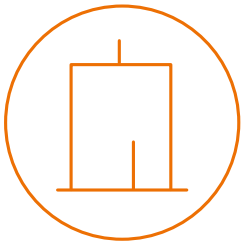
- Payment of rebates (CAD 902 million budget for 2019).
- Development and maintenance of the; rebate tool, online application platform, website with information.
- Free energy coaching services (hotline and e-mail), labor and overhead costs.
- Contractor directories/registrations, administration costs.
- Overall administrative and labor costs (support, communications, finance, administration etc.)

### Revenue Streams

CleanBC Better Home rebate payments, are primarily funded through the Low Carbon Economy Leadership Fund of Canada, a CAD 2 billion Fund. Municipal Top-Ups offers are funded by participating municipalities.

The Government of British Columbia provided CAD 84 million to both CleanBC Better Homes and Better Buildings (latter not included within the scope of this case), and funds rebates as well as operational support (e.g. implementation and monitoring).

**Website:** https://betterhomesbc.ca/



## 3.2. Business models addressing multi-family buildings market

### Dashboard successful building renovation business models and initiatives: multi-family buildings market

| | | | Type of business model | | | Market segment | | |
|---|---|---|---|---|---|---|---|---|
| Company | Founding yesar | Country of origin | OSS | NRS | IFS | Single | Multi | Tertiary |
| EOS Energy | 2019 | Spain | ▪ | | ▪ | | ▪ | |
| Operene | 2014 | France | ▪ | | | | ▪ | |
| SiRE / ReformANERR | 2015 | Spain | ▪ | | | | ▪ | |

# EOS Energy

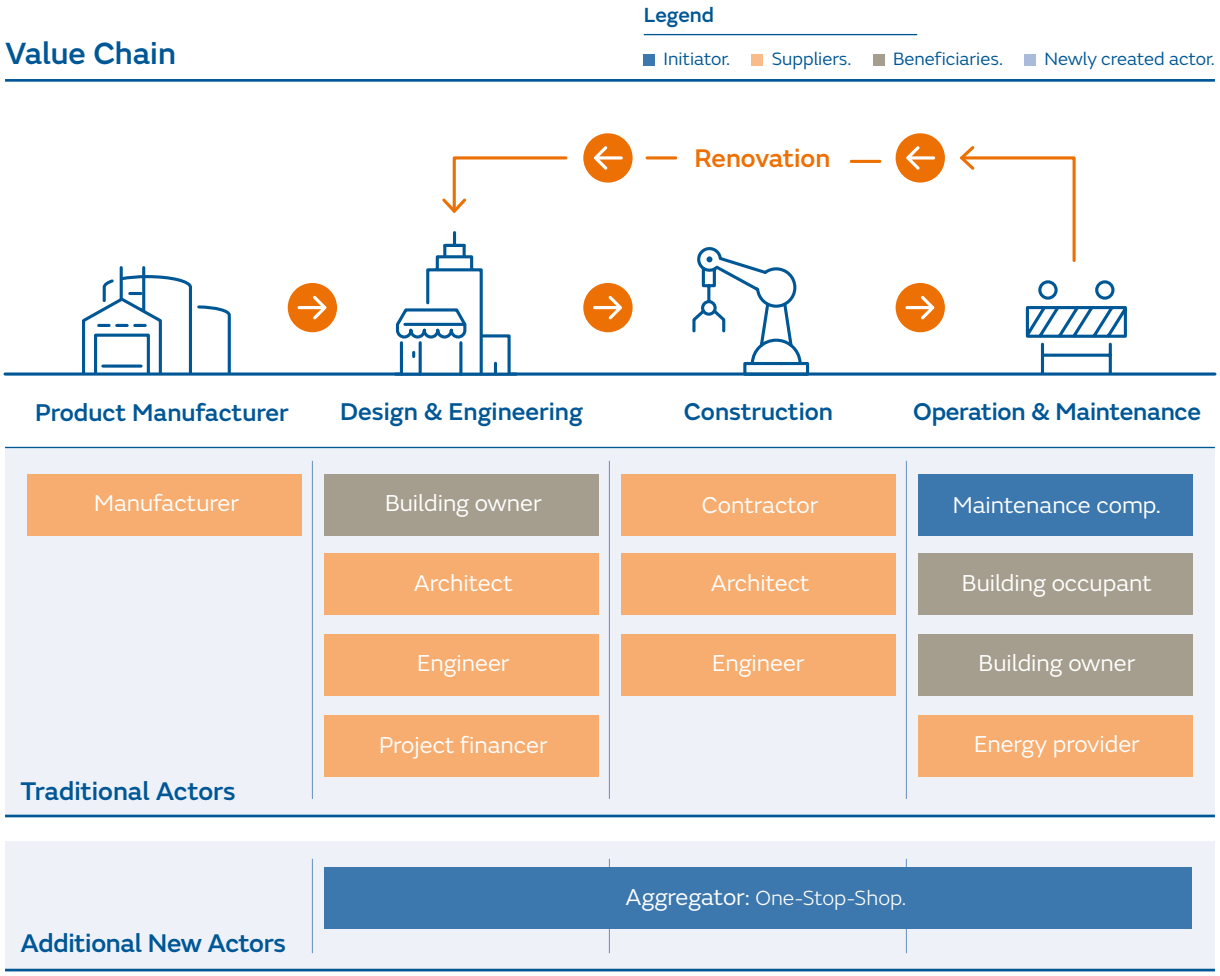
**Business model innovation type:**

- One-Stop-Shop
- Innovative Finance Scheme
- NRS

## Business Model

EOS Energy, founded in Spain 2019, offers turnkey solutions addressing all technical and financial challenges for energy renovations, while enabling clients to pay by savings capitalization. EOS Energy manages all the different stakeholders involved so that the solution is a one-stop-shop for the clients. Its services stretch beyond the renovations by also covering maintenance and providing full performance guarantees. For example, through usage of its telecontrol system, all operating parameters are monitored remotely in real time.

## Value Chain




## Countries

## Barriers

**Financial:** financial issues are typically a barrier when looking at refurbishment projects. EOS Energy offers competitive funding and savings capitalization to overcome high upfront costs and lack of access to capital.

**Complexity:** EOS Energy reduces the complexity of a refurbishment project.

**Social (encountered barrier):** engagement with all neighbors in a multi-family building can be a slow process before an agreement is achieved.

## Customer Journey

### 01 / Initial contact

Customer is alerted of the possibilities of building renovation and its benefits through different channels (commercial actions, property administrators...) and requests initial assessment.

### 02 / Initial report

First evaluation and report. Pathologies identification. Materials quality identification. Previous technical studies. Refurbishment possibility. Work intervention strategy.

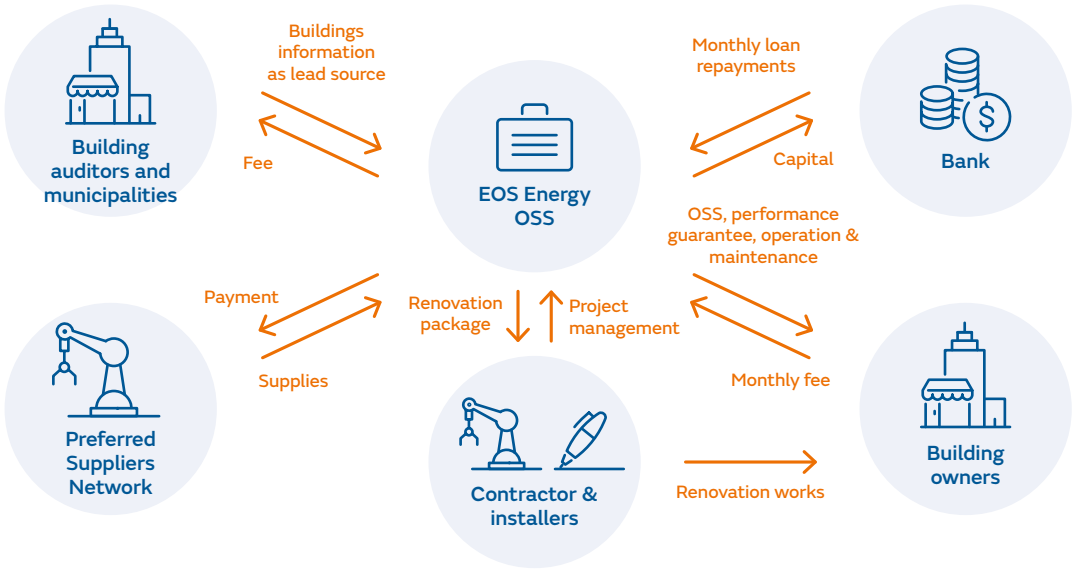
### 03 / Proposal

Refurbishment plan. Refurbishment and intervention proposals. Project cost estimation. Feasibility study.

### 04 / Refurbishment project

Technical documentation: Refurbishment project, Technical memory. Project Management: Licenses and authorizations, Financial and subsidies issues, Budgets and works contracts. Works execution. Works direction and final certification.

## Business Model




## Achievements

- Since the 2019 founding, 1 multi-family building composed of 24 dwellings is under renovation works, 17 more buildings (1,232 dwellings) are in the pipeline (to be signed).
- The cost of the renovation ranges between €13,000 and €20,000 per dwelling.

## Business Model Canvas: EOS Energy

### Key Partners

- Rehare (Architect, project elaboration and direction).
- Selected contractors.
- Business platform with companies specialized in building materials/ products.
- Banks to provide financing: BEI, ICO.
- EIT InnoEnergy as a key supporting partner.

### Key Activities

- Project management.
- Renovation advise (incorporation digital techniques, technical and economical risks incorporations).
- Financial packaging (including funds, grants, saving capitalization).
- Full management of works.
- Maintenance.

### Key Resources

- Project managers, architects and engineers in staff.
- Strong network of partners and suppliers.
- Monitoring e-platform: Consumers platform to monitor and control the facilities.

### Value Propositions

To offer a burden-free, one stop, complete refurbishment to improve building's energy performance, providing the property owner a solution tailored to their building, needs and financial means. EOS Energy helps fund energy refurbishments by savings capitalization to minimize investment costs and increase households disposable income providing guaranteed savings and ROI. EOS Energy offers the possibility of refurbishing buildings without big extra efforts, offering:

- A turn key project.
- Easy management.
- Competitive funding.
- Capitalization and savings guaranteed.
- Result guarantees.

### Customer Relationships

- The customer has a single-point of contact throughout the whole renovation journey with EOS Energy as the Project Manager guiding the customer during the entire process.

### Channels

- Direct commercial actions.
- Technical architects incentivizing.
- Refurbishment agreements with councils.
- Asset holding & real estate investment trusts.

### Customer Segments

Characteristics of the target building: inefficient/poor levels of insulation and building services. Buildings with centralized installations.

- Residential: multi-family buildings.
- Public.
- Tertiary.

### Cost Structure

- Staff/Labor cost (project managers, business developers, architects, engineers, admin, etc.)
- Communication/outreach cost.
- Development and maintenance of the online platform.

### Revenue Streams

- EOS Energy receives payment from the client's on-bill financing on the energy bills.
- Margins over contracting and building material supplies compensate overhead costs for EOS Energy.

**Website:** https://eosenergy.es/

# Operene

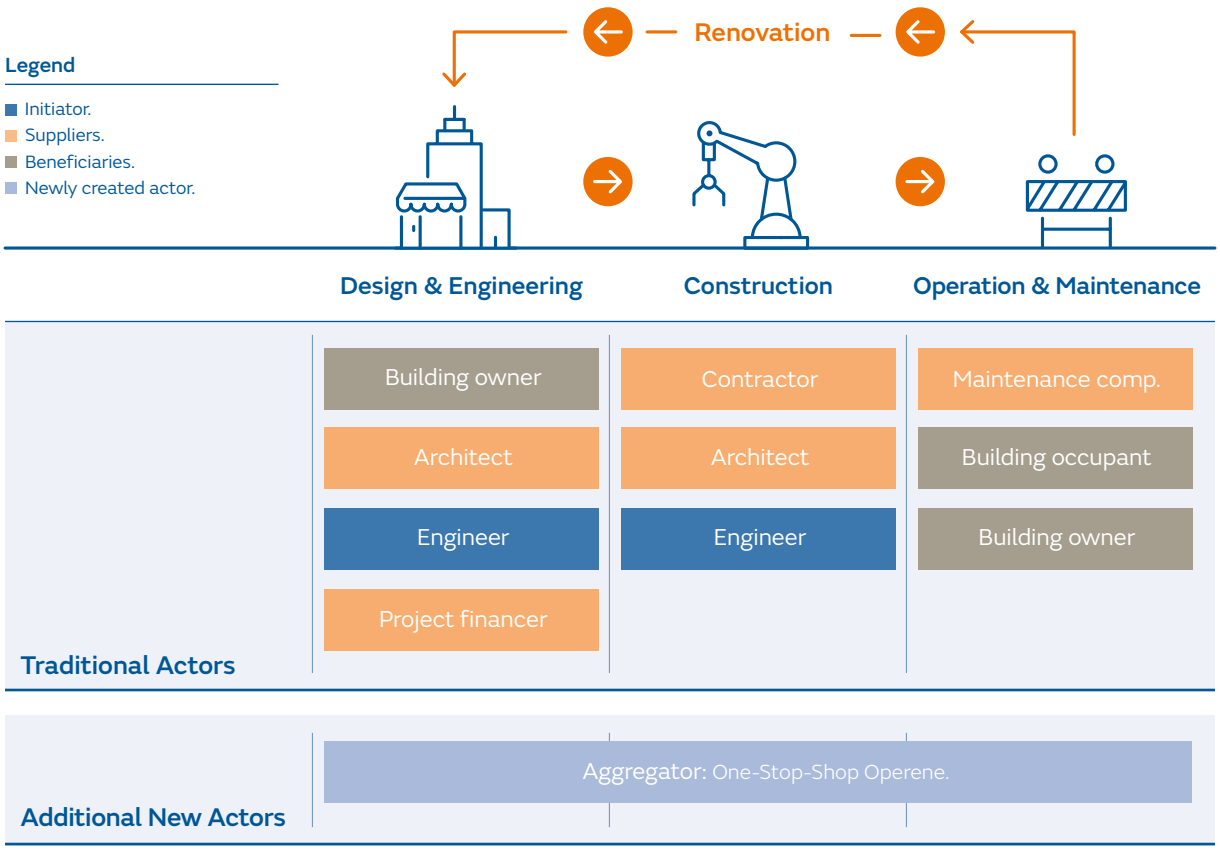
**Business model innovation type:**

- One-Stop-Shop
- IFS
- NRS

## Business Model

Engineering company Operene was created in 2014 and offers comprehensive energy renovation packages for multi-family houses (condominiums, social housing) and the public service sector, mainly in the Auvergne-Rhône-Alpes region. Operene intervenes at every stage of the project, from the financial study, through the coordination of a group of local businesses to guaranteeing the performance of the works.

## Value Chain




## Countries

## Barriers

**Complexity:** Operene reduces the complexity of a refurbishment.

**Social (encountered barrier):** homeowners are rarely Operene customers, the targeted customer is the co-ownership trustee (COT) representing the building co-owners. COT technical background is usually low, and the decision-making process is complex (decisions must be voted for).

## Customer Journey

### 01 / Initial contact

Awareness of building renovation possibilities and benefits for homeowners.

### 02 / Assessment

The project design is conducted by an architect, a thermal engineer's study or surveyors. The contractor (or a contractors consortium) then provides Operene with the renovation program.

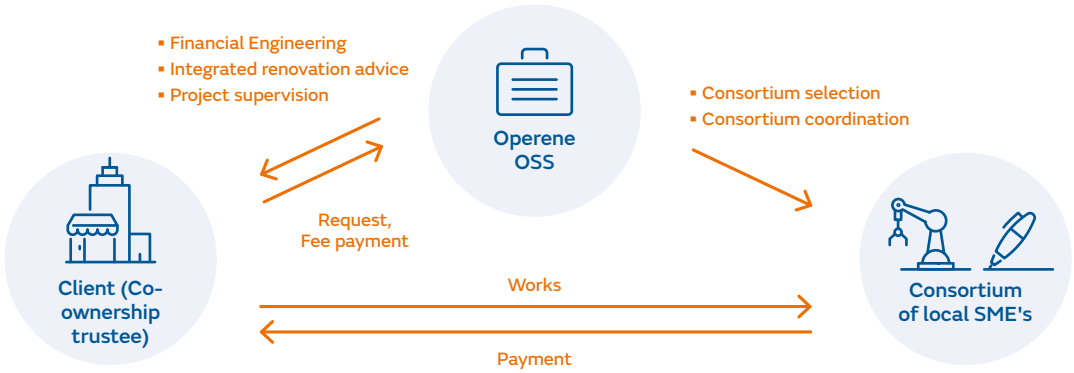
### 03 / Proposal

Operene selects SMEs specialized in each work package needed to realize the work program and defines and outlines a project in collaboration with selected SMEs including the cost, the means used and the objective to be achieved.

### 04 / Refurbishment project and follow-up

Operene supervises the project and is the unique contact point for the client, ensuring quality control during the construction phase to guarantee the proper performance of the work.

## Business Model




## Achievements

- 4,000 dwellings renovated.
- Average project size of 800,000 € per multi-family building.
- 80% of the performed financial engineering services result in actual renovation works. 33% of the organization's tenders for private buildings are successful.
- Operene has generated over €30 million of investment.

## Business Model Canvas: Operene

### Key Partners

- Operene: Single-point contact and project manager. Technical and administrative assistance.
- In larger projects, Operene joins a consortium of organizations and leads the project as project manager.
- Network of contractors, installers, architects, designers, as well as a consultancy office conducting thermal studies of buildings.
- Financing partners.

### Key Activities

- Single point of contact and coordinator of complete renovation process.
- On-site work coordination (construction-site supervision, work planning, financial follow-up and representation).
- Consulting services (financial simulations, energy performance, quality management, either in-house or in design consortiums.

### Key Resources

- Staff of project managers and promoters.
- Network of local professionals.

### Value Propositions

To provide an integrated renovation service for multi-family buildings worth a one stop shop approach to simplify the process to all customers.

- Technical renovation advice.
- Project management assistance throughout the renovation process.
- Ensure high quality work and provide energy performance guarantee.
- The SME consortium coordinated by Operene guarantees the results to the customer.

### Customer Relationships

- Via Operene, the customer is connected with a network of local construction SMEs.
- Operene is the customer's single-point contact, maintaining the relationship throughout the whole renovation journey.

### Channels

- Local renovation advice centers.
- Local network.
- Website.

### Customer Segments

Multi-family buildings, social housing and public buildings. Operational area is limited to the Auvergne and Rhone-Alpes regions in France although a deployment outside this region is under investigation.

### Cost Structure

- Staff/Labor cost (project management, admin).
- Communication/outreach cost.

### Revenue Streams

- Operene gets its main revenues from a project management support task in each new renovation project.
- For consulting services, Operene charges a fixed fee (depending on the building size).
- For a temporary consortium coordination, Operene income represents a few percent of the total project cost.

**Website:** http://operene.fr

# SiRE

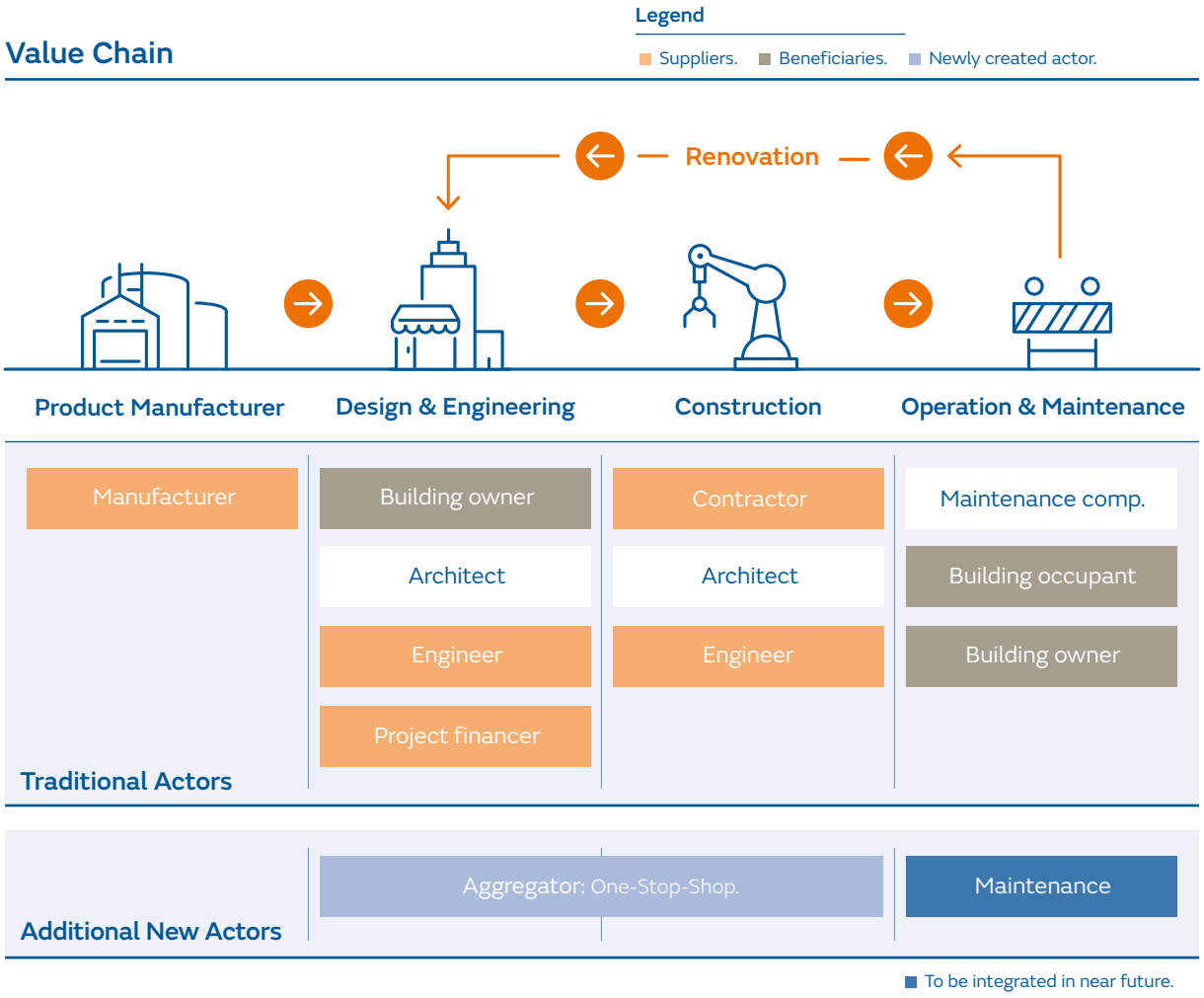
**Business model innovation type:**

- One-Stop-Shop
- Innovative Finance Scheme
- NRS

## Business Model

The SiRE (Servicio de Información de Rehabilitación) platform aims to be the meeting point of all actors involved in the renovation process, including administration, construction workers, suppliers, and citizens. SiRE also provides citizens with advice, information, and knowledge on how to reduce their energy bill through energy renovation. ANERR is the name of the association, while SiRE is the OSS and ReformANERR is the name of the website.

## Value Chain




## Countries

## Barriers

**Social:** engagement with all neighbors in a multi-family building can be a slow process before an agreement is achieved.

**Financial:** financial issues are typically a barrier when looking at refurbishment projects. ANERR has special agreements with banks to overcome this.

## Customer Journey

### 01 / Initial contact

The customer visits the ReformAnerr website. Visitors interested in a renovation project fill out a basic form about their needs and receive initial information about the process. Following this, the customer is contacted by a specialist within two days.

### 02 / Quotes

Renovation proposal in two steps:

- Developing a questionnaire for the building owner about the project and finding the right contractors. With the initial questionnaire, the professionals make an initial diagnostic about renovation needs and financial ability, based on which a suitable contractor is selected. The online questionnaire is complemented by a phone call.
- Suggesting a financial solution for the specific project, including information about public and private funding options. ANERR's associates sometimes help to facilitate a financial solution with better conditions.

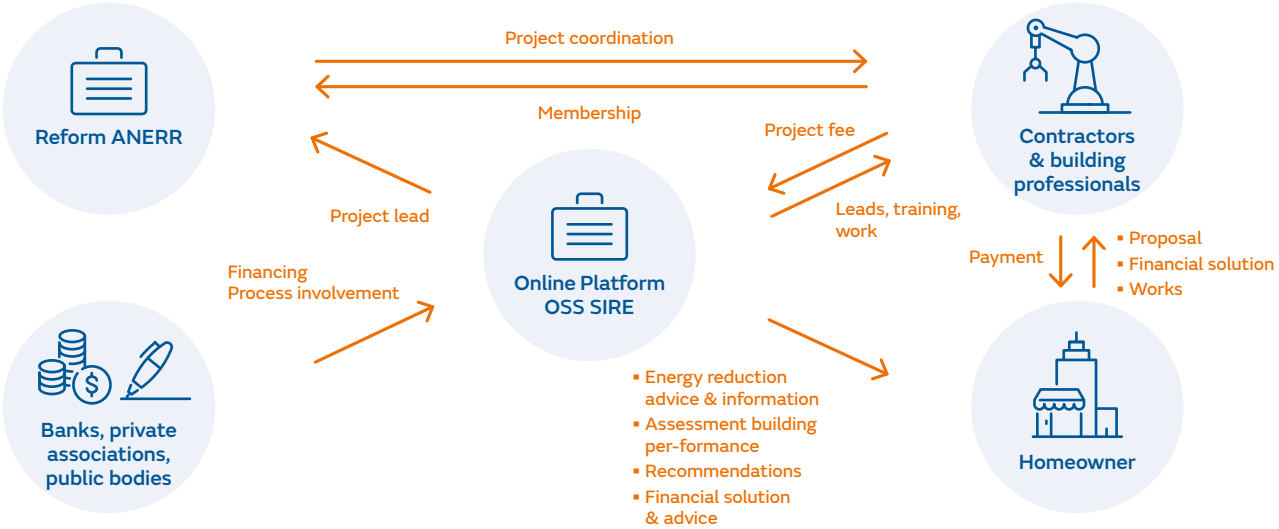
### 03 / Refurbishment Project

The renovation is implemented and ANERR keeps in contact with the building owner throughout the process.

### 04 / Follow-up

Following completion, a user survey is conducted.

## Business Model




## Achievements

- 74 multi-family building renovations.
- Average project size of €72,900.
- Conversion rate of 5.8%.
- SiRE has generated over €30 million of investment.

## Business Model Canvas: SiRE

### Key Partners

- Lead partner developing the project: Asociación Nacional de Empress's de Rehabilitación y Reforma (ANERR).
- Financial: special agreements with banks, Banco Santander, Deutsche Bank and Bankia.
- Network of contractors.
- Manufacturers: involved in offering training and product demonstrations. They are private companies and members of ANERR, including companies like Vaillant, MAPEI and UPONOR.
- ANERR collaborates with the EMVS (Empresa Municipal de Vivienda y Suelo), which is a public institution in Madrid in charge of promoting building-relevant information.
- Association for building managers (dissemination and process involvement).

### Key Activities

SiRE is the meeting point between government, professionals and citizens. It promotes benefits of energy renovation measures and provides advice for the renovation process, and provides:

- Assessment of the building performance and possibilities, from which recommendations and cost estimates are provided.
- Recommendations of suitable professionals and renovation companies for the specific work.
- Advice on which measures to install, including information on available subsidies etc.
- SiRE also offers awareness raising activities (workshops, seminars etc.), including information and training days.

### Value Propositions

SiRE provides citizens with free advice, information and knowledge on how to reduce their energy bill, while bringing work to local companies.

Performance guarantees delivered by the local companies that carry out the works.

### Customer Relationships

The customer is guided throughout the whole renovation journey.

### Customer Segments

Mainly multi-family buildings and may also include single-family houses.

### Key Resources

- Strong network of building professionals.
- Several forums, private and public, to disseminate the information.

### Channels

- Local network (companies, association of building managers etc.)
- Renovation advice centers.
- Website.

### Cost Structure

- Staff/Labor cost (project management, admin).
- Communication/outreach cost.

### Revenue Streams

- The model retrieves an overhead cost for every contracted work, which amounts to over 6% of the total cost. The fee is paid by the company that wins the work through the SiRE model. Companies that are involved in the offering process, but not selected, do not have to pay anything.
- ANERR is an association which receives private sponsorship that supports SiRE. The association also sponsors events and technical trainings that indirectly support the SiRE renovation model.

**Website:** https://reformanerr.com

## 3.3. Business models addressing single-family buildings market

### Dashboard successful building renovation business models and initiatives: single family buildings market

| | | | Type of business model | | | Market segment | | |
|---|---|---|---|---|---|---|---|---|
| Company | Founding year | Country of origin | OSS | NRS | IFS | Single | Multi | Tertiary |
| Factory Zero | 2015 | Netherlands | ▪ | | | ▪ | | |
| Mon Carnet | 2015 | France | ▪ | | | ▪ | | |
| Retrofit Works | 2013 | UK | ▪ | | | ▪ | | |
| Sealed | 2012 | USA | ▪ | | ▪ | ▪ | | |
| Betterhome | 2015 | Denmark | ▪ | | | ▪ | | |
| EcoHome Financial | 2010 | Canada | | | ▪ | ▪ | | |
| Refresh Renovations | 2010 | New Zealand | ▪ | | | ▪ | | |

# Factory Zero

**Business model innovation type:**

One-Stop-Shop

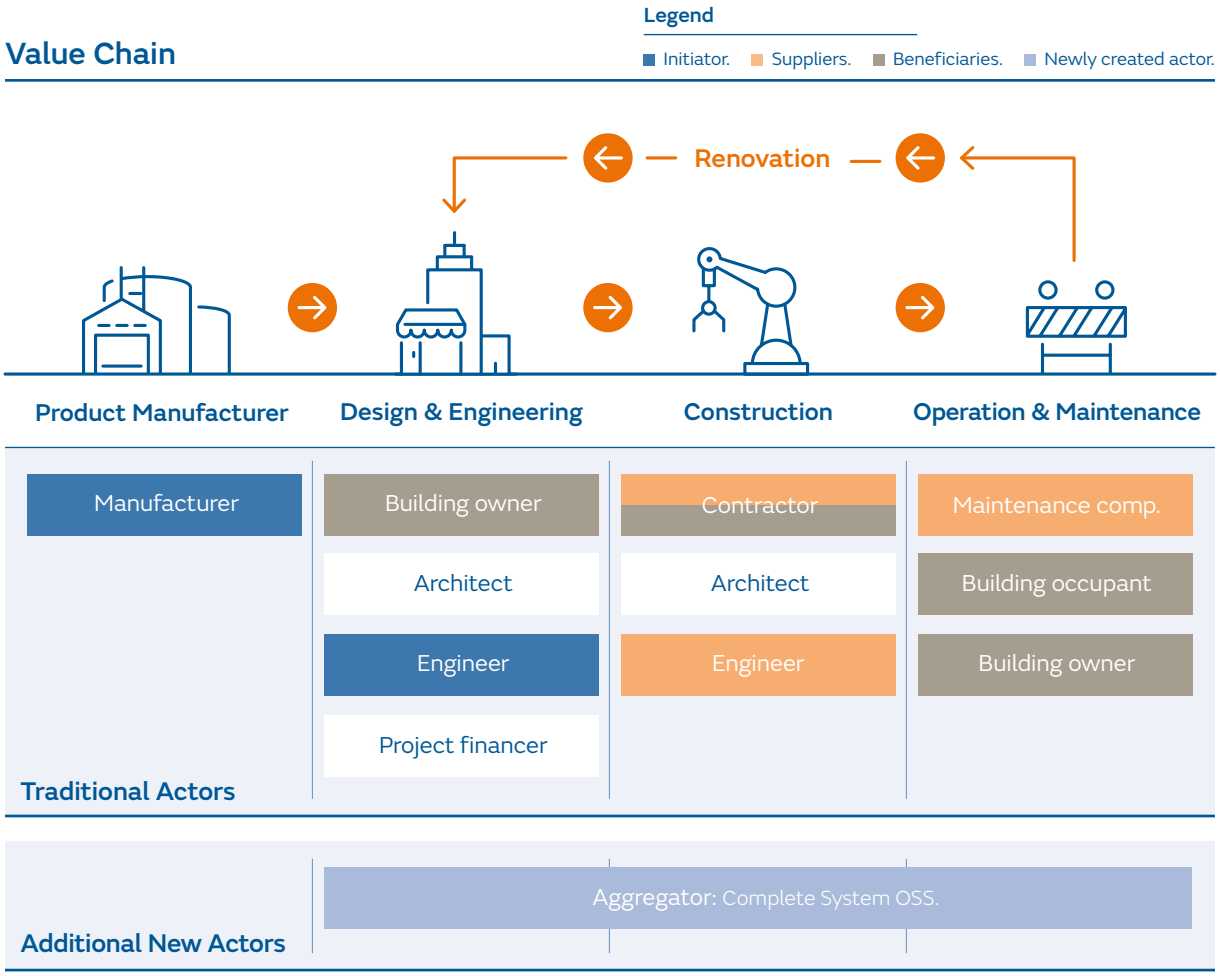
IFS

NRS

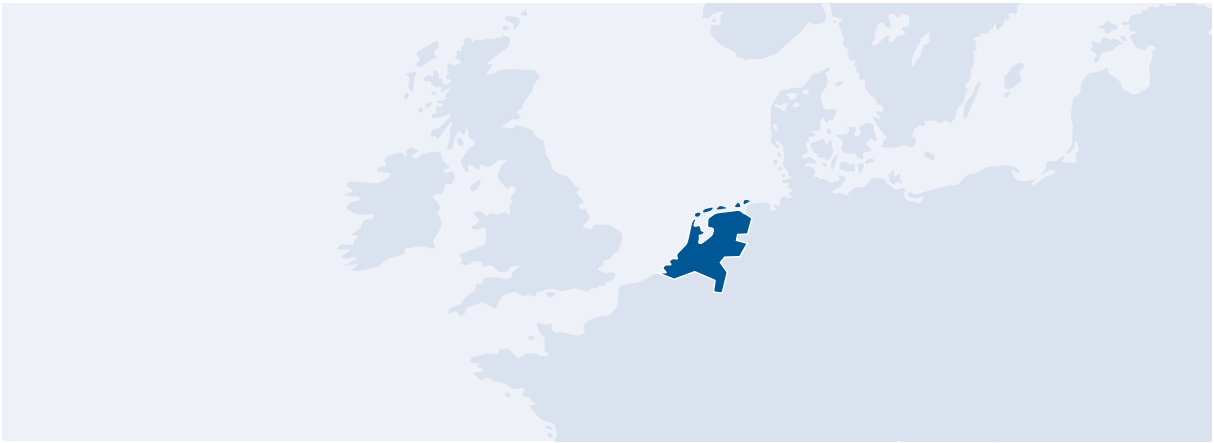
## Business Model

Factory Zero (F0) provides affordable energy efficient renovation solutions by offering a completely integrated module containing all installation components that can be placed directly outside the home. Its advantages are a fully optimized system, almost no construction work inside the building, easy access for maintenance, and improved comfort at lower monthly cost. Additionally, F0 provides performance guarantees and maintenance for a typical duration of 10 years, enabled by a smart remote monitoring system. The unique business revolves around leveraging on industrialization and economies of scale advantages, as multiple roles within the value chain are incorporated by F0, while it targets large volume customers in social housing associations. F0 combines an innovative business model with innovative technology, and offers; low investment and costs, unburdening and quality.  F0's business model enables lower investment amounts and a higher level of service during operation and the guarantee period. Also, the system is designed for placement and installation simplicity.

## Value Chain




## Countries



## Barriers

**Financial:** total CAPEX is reduced by offering a completely integrated renovation module that can directly be placed next to the building.

**Complexity:** Reduced number of failures during installation by installers due to integrated module (already assembled in factory).

**Knowledge-Informative (encountered barrier):** Service contracts and energy performance guarantees are less known.

## Customer Journey

### 01 / Initial contact

Contractors and sequentially the housing associations owning housing property are contacted. After initial contact, offerings are explained and information is collected, through conducting an intake of the properties.

### 02 / Quotes

F0 integrates the collected property information and provides a quote for a complete solution (including a heat pump, external units, monitoring, heat recovery, etc.), which may include all necessary steps from engineering to maintenance. No finance scheme is included, as F0 views upfront investment as beneficial for realizing a competitive quote. The quote is offered to the house association via the contractor.

### 03 / Implementation

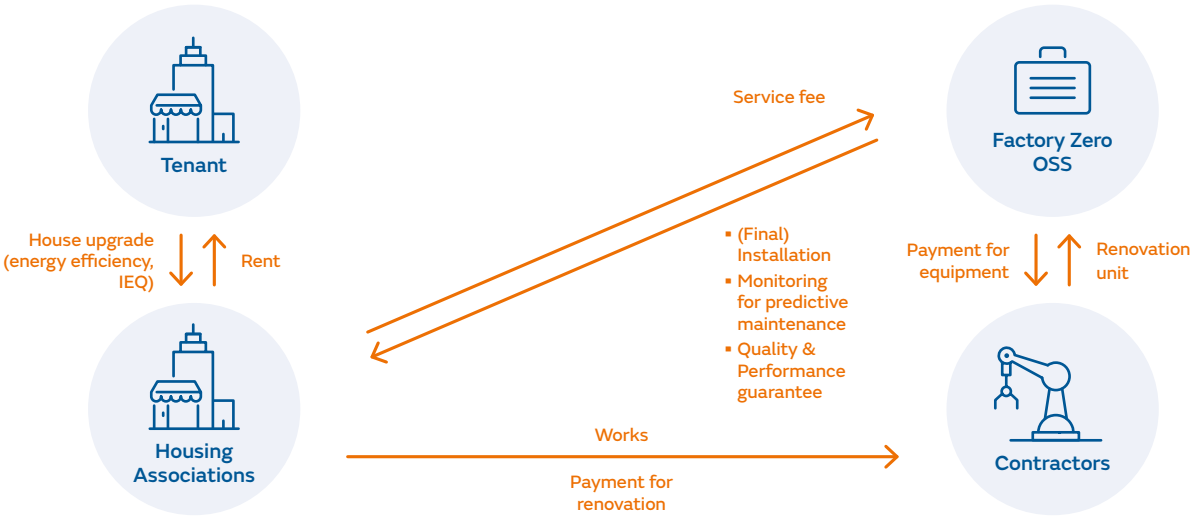
Minimally 70% of the tenants need to agree with the renovation. F0 facilitates installation by providing preferred and trained installers of the equipment and will remain the contact point during installation and performs a final quality check.

### 04 / After delivery

After delivery, F0 monitors performance, provides maintenance without a signaling requirement by the user, and settles the energy bills with the energy provider. Users pay through a monthly service fee to Factory Zero.

An effective annual energy balance of 0 can be enabled with F0's technology, given the required conditions are in place, such as sufficient solar PV capacity, battery capacity and insulation.

## Business Model




## Achievements

- The amount of renovation units installed by Factory Zero are 1050 from 2017 to 2019 and another 1000 are planned for 2020.
- 50% concern renovation projects, 50% new buildings.

## Business Model Canvas: Factory Zero

### Key Partners

- Network of professionals, project developers and contractors.
- Suppliers of components.
- Software provider.

### Key Activities

- One Stop Shop for energy efficient renovations.
- Production, engineering, operational support, project coordination, quality control.
- Remote (performance) monitoring, automatic error detection and predictive maintenance.

### Key Resources

- Monitoring and control platform.
- Industrialized renovation unit.
- Professionals network, including self trained installers.

### Value Propositions

- Factory Zero offers solutions that enable a net 0 annual energy balance.
- Maintenance: In exchange for a monthly service fee, Factory Zero ensures a high energy and IEQ performance, through remote monitoring.
- Integrated and industrialized renovation unit to be installed next to the building enabling fast and cost-effective renovation.

### Customer Relationships

- Single point of contact.
- Remote monitoring.
- Maintenance.

### Channels

- Housing associations.
- Website.
- Sales team.

### Customer Segments

F0 provides energy efficiency solutions to newly build and renovation projects. Regarding renovations, it primarily targets housing associations that can offer a larger volume to enable economies of scale advantages and lucrative cost reductions per house. F0 sells its solution via the contractor. The contractor installs the solution for the social housing association.

### Cost Structure

- Staff/Labor cost (advisors, admin).
- Communication/outreach cost.
- Manufacturing cost.
- Engineering cost.

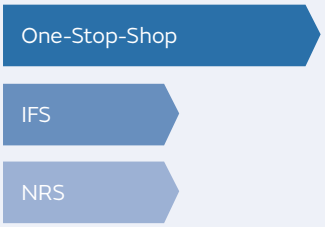
### Revenue Streams

- Factory Zero sells the equipment to contractors.
- After implementation, Factory Zero offers services for monthly fees, regarding performance guarantees and maintenance.
- Revenue hardware sales.

**Website:** https://factoryzero.nl/

# Mon Carnet

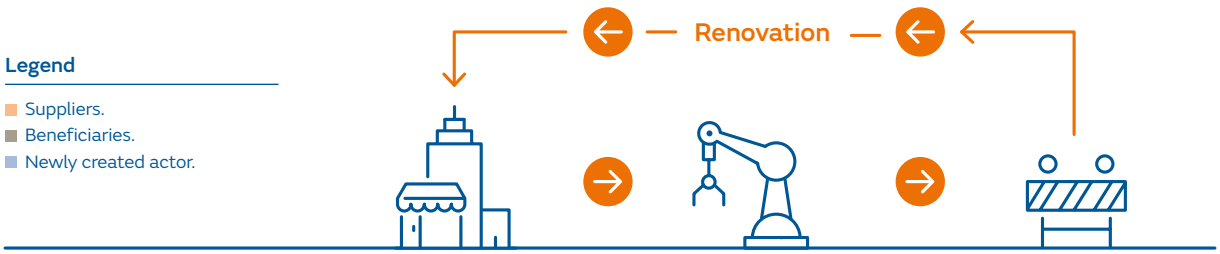
**Business model innovation type:**




## Business Model

Mon Carnet (formerly Izigloo) is a digitally driven service, targeted at single-family housing, which offers a wide range of services which go beyond energy performance and make home improvement a desirable process. Various categories of data are collected and processed by the Mon Carnet platform, such as geometric modelling or available sunshine, to predict potential costs and energy savings. With Mon Carnet, homeowners can check their energy balance online, get a tailor made advise on EE and IEQ building improvement, and get connected with local high-quality professionals. Mon Carnet was initiated to digitalize the support that is needed to face the complexity, time consuming and expensive aspects of renovation.

## Value Chain




## Countries

## Barriers

**Financial:** the digitalization of the early project stages allows for low-to-zero costs for the customer, before starting a renovation. Through energy savings modelling, customers can be increasingly certain on the financial consequences of a renovation project, hence financial risks are minimalized.

**Social:** Mon Carnet engages with homeowners by using a digitally driven service, a social barrier for energy renovations in France. By digitalization, renovation advise is made more accessible.

## Customer Journey

### 01 / Initial contact

10 to 20 easy to handle questions are asked to the homeowner to have a clear picture of the building, collect data and calculate an energy performance indicator.

### 02 / Assessment

From this energy diagnosis, various energy saving measures are proposed to the homeowner, each being associated with a specific quotation including financial and tax incentives.

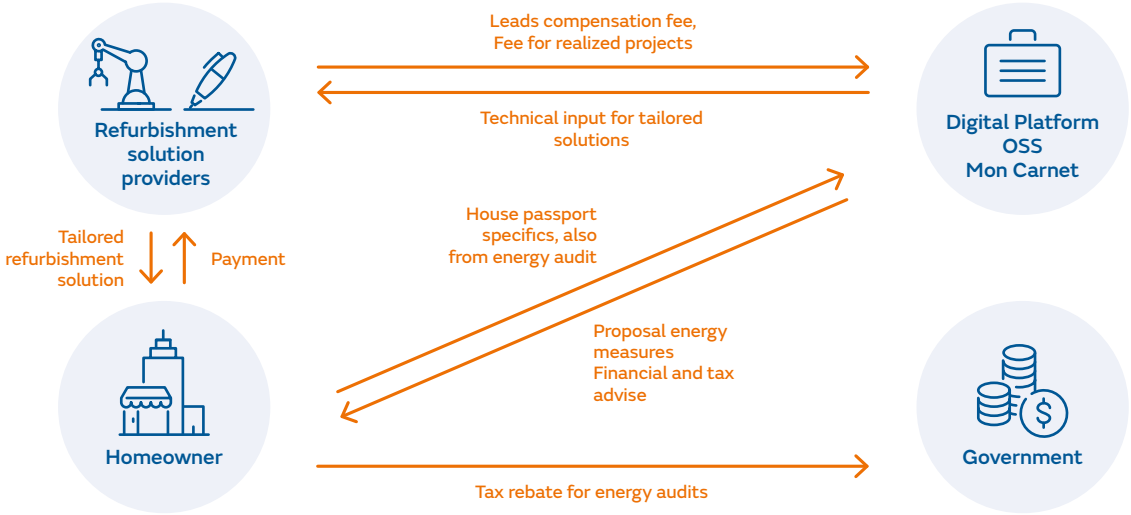
### 03 / Quotes

If the customer wants to go forward with his/her project, he/she can ask for an appointment with an EP advisor (still for free). This advisor will check the customer financial capacity and put the project on the EP-market place. The homeowner will then be contacted (through the digital platform) by 2 to 3 (maximum) contractors (mostly installers), affiliated to the EP network. It is up to the homeowner to select the contractor who will make refurbishment works.

### 04 / Follow-up

All collected data including a description of achieved works are then put together and integrated in a digital energy passport which belongs to the homeowner. In France this passport will be mandatory for all new constructions by 2020 and for existing buildings by 2025.

## Business Model




## Achievements

- Conversion rate of 10%.
- The average projects size amounts to €9,000.
- The program has generated over 55 million € investment.
- Since the 2015 founding, more than 3750 single-family house projects have been executed.

## Business Model Canvas: Mon Carnet

### Key Partners

- Lead partner developing the project: Energie Perspective (EP).
- Contractors (mostly installers), affiliated to the EP network of 3000 verified and certified partners.
- Designed and developed in collaboration with several public and private partners (CSTB, a Turnkey Retrofit project coordinator; IGN, the French National Geographical Information Institute; ADEME, the French Environment & Energy Management Agency; Etalab, the French government service of public and open data; Météo France, the French national meteorological service; and ICAM Nantes, a leading French Engineering school).

### Key Activities

- Provides automated calculation and estimations of the required cost, energy savings, available subsidies relating to a potential renovation project.
- Energy renovation advisory.
- Allocates the right building professionals to a project.

### Key Resources

- Online portal and extrapolation solution.
- Network of professionals.

### Value Propositions

An online renovation advice instrument that sets home owners up with the right professionals.

- The platform is both a digital home passport (that tracks homes' history, maintenance, performance, etc.) and a large data collection, which is available to energy renovation stakeholders from home owners to contractors.
- Holistic service for managing and upgrading homes in a simpler and cost-effective way.
- Wide range of services beyond energy improvements, such as automation, ambient assisted living solution, home improvement and arrangement (e.g. installation of a new kitchen), changing energy provider, etc.
- The by the homeowner selected contractor is responsible for the performance guarantees agreed upon.

### Customer Relationships

Mon Carnet reaches most customers through online marketing and guides them through the steps of the renovation journey.

### Channels

- Online (social media and website).
- Network of actors.

### Customer Segments

Single-family housing. Initially launched in Loire-Atlantique and Rhône regions, now available at national level in France.

### Cost Structure

- Staff/Labor cost (project developer/promoters).
- Online renovation solution and related data crunching.
- Communication/outreach cost. Marketing (mainly Google and social media).

### Revenue Streams

- Selling potential projects to professionals (i.e. leads).
- Percentage of the project value when a project is carried out.

**Website:** https://moncarnet.ep.fr/

# Retrofit Works

**Business model innovation type:**

One-Stop-Shop

Innovative Finance Scheme

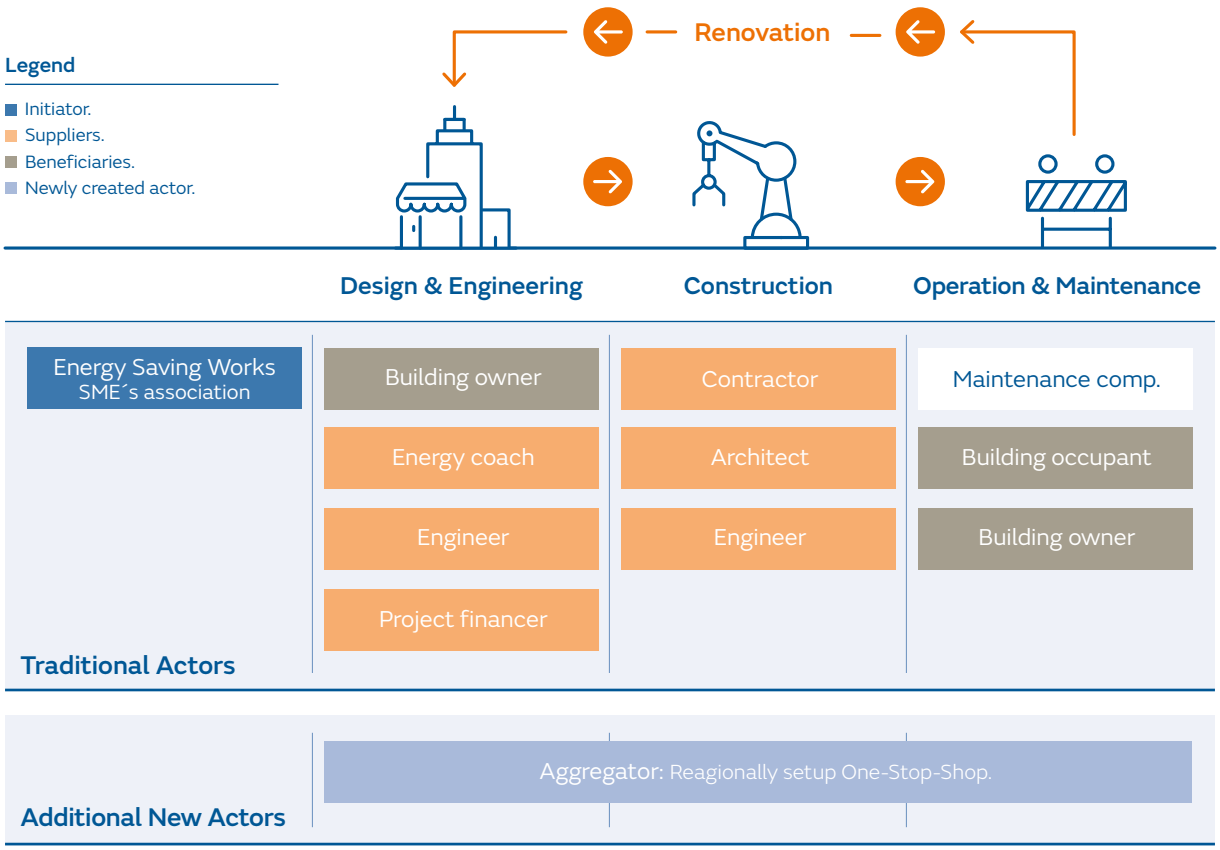
NRS

## Business Model

RetrofitWorks is a 'not for private profit' co-operative, matching communities and homeowners who want to retrofit their homes, with local, quality assured SME assessors and installers. It was developed by Parity Projects, shortly before the Green Deal policy launched by the UK government, a public fund which supports homeowner payment for energy efficiency improvements. Since operating as a Green Deal finance provider, the RetrofitWorks model has since been set up in multiple regions and communities to offer financing for retrofitting, not exclusively by Green Deal finance. RetrofitWorks was founded to enable SME contractors' access to Green Deal funds, through becoming part of this network and provide its services to it.

Green Deal finance has been the primary financer of RetrofitWorks projects, followed by homeowners' mortgages, and competitive loans provided by charity finance providers.

## Value Chain




## Countries

## Barriers

**Financial:** Financial issues are typically a barrier for refurbishment projects, e.g. due to uncompetitive interest rates. RetrofitWorks offers a multitude of financing options.

**Technical:** Multi-family buildings have greater barriers for deep retrofits compared to single-family buildings. RetrofitWorks aims at building a supply chain out of SMEs which can provide competitive solutions through collaboration, cost-minimalization by digitalization and a strong network.

## Customer Journey

### 01 / Initial contact

A homeowner within an area where a RetrofitWorks OSS has been set up, visits the online portal and requests a on-site visit by a recommended surveyor.

### 02 / On-site visit

A surveyor from the SME network conducts an on-site survey of the residential building.

### 03 / Quotes

Three quotes are generated from the energy survey from local SME companies via a software portal (depending of the pricing methodology locally applied, see Business Model Canvas – Value Proposition).

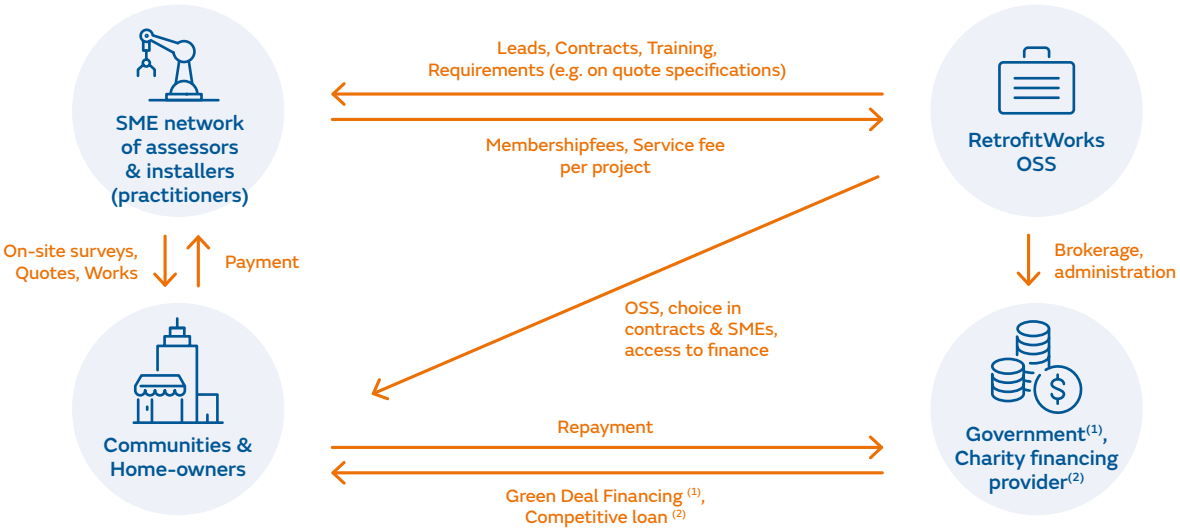
### 04 / Agreement

Standardized contracts are generated by the portal, covering the full width of selected solutions and respective quotes.

### 05 / Implementation Follow-up

RetrofitWorks oversees installation and satisfactory sign off. This includes photos of all work, before and after completion.

## Business Model




## Achievements

- Over 300 individual properties retrofitted (2018 data).
- Project scopes include several energy efficiency improvements to deep renovation.
- 60% conversion rate (approx.).
- £1.6 million worth of investment was made on a sample of 249 domestic projects.

## Business Model Canvas: Retrofit Works

### Key Partners

- Local authorities to promote renovation projects and articulate renovation schemes (incl. Advocate members).
- Lead partner & founder: Parity Projects are the lead partner, and are responsible for delivery of the One-Stop-Shop framework.
- Practitioner members (Contractors & Installers): certified companies that carry out retrofit advice, assessment, design, coordination, and installation. All Practitioners are fully trained, including PAS2030 accreditation for SME businesses.
- Advocate members: Community groups and local authorities.
- Associate members (other supporting stakeholders).
- Charity finance providers.

### Key Activities

- Renovation advice and work execution through practitioners.
- 3 pricing methods, facilitating lead turnover into projects, integrating energy survey by local SME companies via a software portal.
- Financial advise and facilitating access to finance.
- Quality assurance.

### Key Resources

- Staff.
- Online web-portal.
- Network of professionals (Practitioners and Associate members), professional institutions, trade associations, installers, energy auditors etc.
- Refurbify software: Facilitates online tendering process and Quality Control.

### Value Propositions

RetrofitWorks is a not-for-private-profit cooperative, matching communities and homeowners who want to retrofit their homes, with local, quality-assured SME assessors and installers. It offers financing while homeowners can repay through electricity bill installments, by facilitating access to Green Deal Financing and charity finance providers. Result guarantees can be provided by the local SME assessors and installers.

The model offers 3 pricing methods:

- Estimates quotes: (practitioners compete with price estimates before any visits).
- Set prices: Practitioner specific quote with quality reassurance.
- Pre-price schedules for contractors. Where a surveyor measures on-site, after which 3 quotes are generated.

### Customer Relationships

Local schemes are developed to which customers can connect through an online portal.

The customer is assigned a retrofit coordinator by RetrofitWorks who oversees the development and implementation of the whole renovation journey.

### Channels

- Online web-portal.
- Network of members.
- Site survey.

### Customer Segments

The RetrofitWorks business model's customer focusses on building a supply chain that can benefit an area or community. These subsequently consisting of customers withing the segments listed below.

- Single-family and multi-family buildings.
- Community buildings.
- Commercial buildings.

### Cost Structure

- Staff/Labor cost for the administration of the program and project management.
- Development and maintenance of the online platform.
- The objective to reduce costs for municipalities to promote energy efficiency is also reflected by the fact that the infrastructure provided by Parity Projects, comes in the form of an online rather than a physical One-Stop-Shop.

### Revenue Streams

- Margins to cover overhead costs, a percentage of the work for every job (charged from practitioner members by RetrofitWorks).
- Membership fees (charged from any membership type by RetrofitWorks).
- As a cooperative, profits are returned to the cooperative membership.

**Website:** https://retrofitworks.co.uk

# Sealed

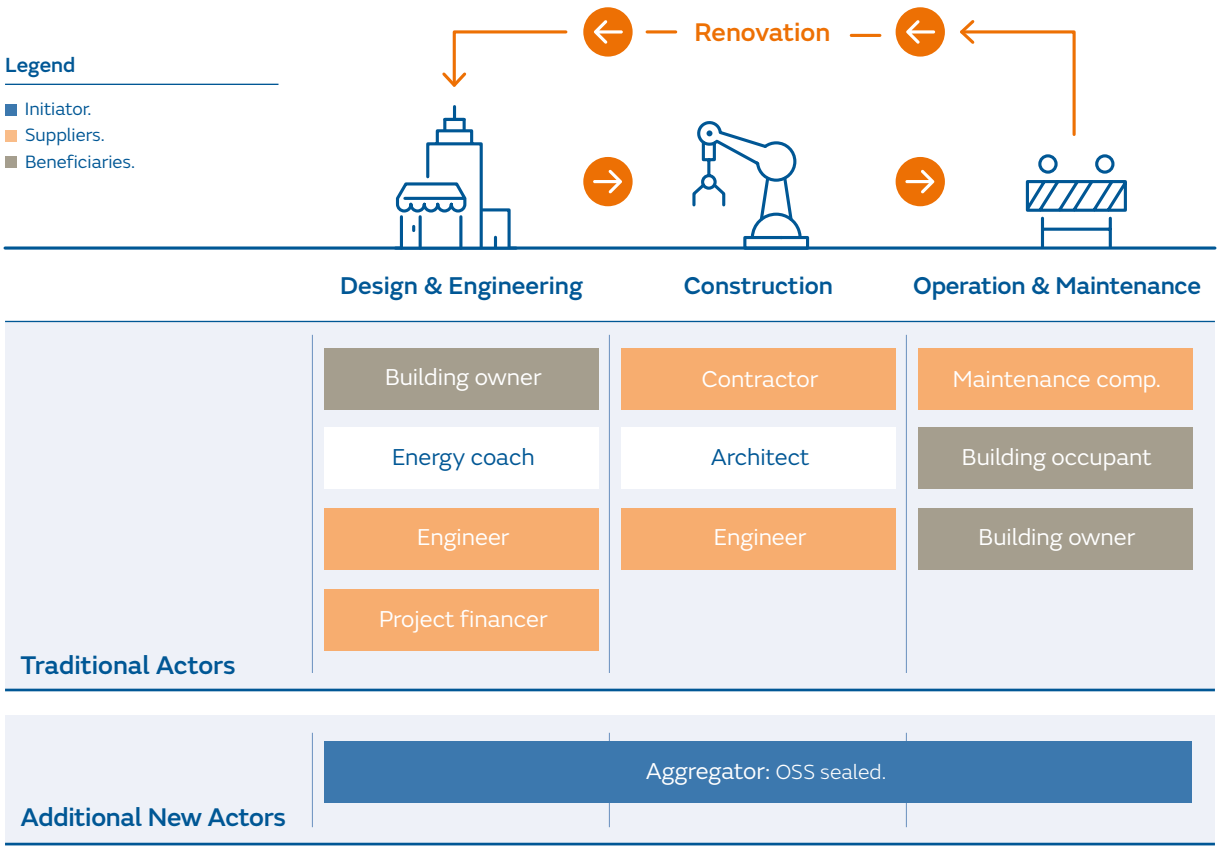
**Business model innovation type:**

- One-Stop-Shop
- Innovative Finance Scheme
- NRS

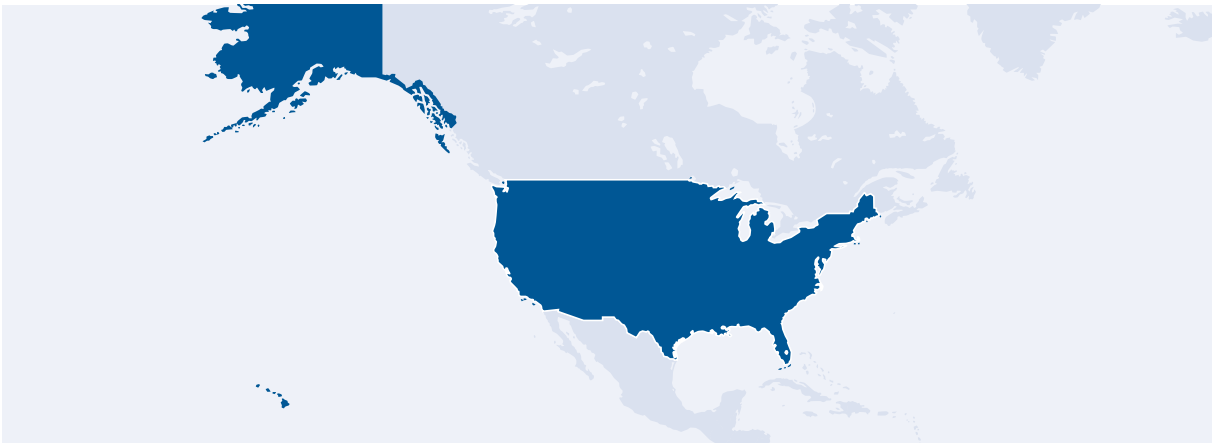
## Business Model

Sealed is a one-stop-shop for home efficiency improvements focusing on the residential market. It is successful in realizing relatively small projects with energy service agreements, through delivering standardized solutions. The value proposition offers renovation and financing, enabling comfort and savings. It relies on local partners for the installation of quick, unobtrusive improvements. Furthermore, the utility bill is integrated with a single Sealed Energy Bill and is guaranteed to be lower than normal. Through partnering with local utilities, the homeowners are identified and targeted which are most likely to opt for an audit and energy efficiency upgrade. Through periodic payments, Sealed compensates the project financers and utilities for the client within this model. The client will have a guaranteed reduction in monthly costs compared to the energy bill before the renovation.

## Value Chain




## Countries



## Barriers

**Financial:** by de-risking the project through insurance, debt interest rates decrease, and the cost of capital is lower.

**Complexity:** customers are identified by utilities and offered a hassle free and guaranteed performance solution.

## Customer Journey

### 01 / Free energy assessment

Homeowners will get a free assessment by a contractor partner to see where energy can be saved.

### 02 / Home improvements

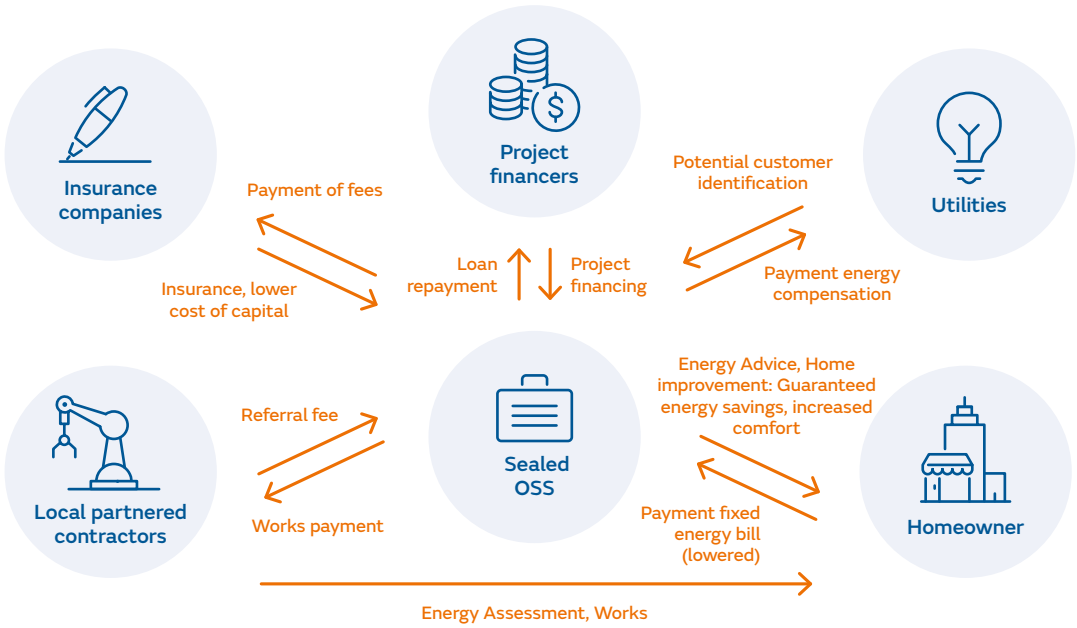
Building requirements include a 10-25% minimal savings potential, while tenants need to have rented the property for longer than 6 months while also need to pass a creditworthiness check.

A Sealed energy advisor will create a customized plan for the customer and then implement all efficiency improvements.

### 03 / One bill

Sealed will become the utility billing agent, paying the energy and loan bills for the customer. Customers receive a single bill and guaranteed savings.

## Business Model




## Achievements

- 500 buildings retrofitted in 2018.
- Typical package costs $6,000-$7,000.
- Service agreements duration of 20 years.
- 10-25% energy savings (medium level retrofit).

## Business Model Canvas: Sealed

### Key Partners

- Project financers (NY Green Bank).
- Local utilities.
- Local contractors.
- Community partners (non-profits & civic institutions).
- Insurance companies (Munich Re).

### Key Activities

- Brokerage between financers and energy retrofit projects.
- One-Stop-Shop (data capturing, analytics, engineering, projects, design, billing, performance management).

### Key Resources

- External relations/ network: mentioned key partners.
- Property analytics and software.

### Value Propositions

- Free energy assessment.
- Guaranteed reduction of energy costs, relative to the situation before the energy retrofit.
- Improving the comfort and IEQ of the home.
- Promised results are supported by guaranteed.

### Customer Relationships

Sealed offers a complete unburdening for the home owner during the renovation, and remains the single point of contact throughout the duration of a long term contract (20 years).

### Channels

- Website.
- Sales through telephone, email.
- Local presence, including through utilities whom are incentivized to realize energy efficiency increases.

### Customer Segments

- Single family houses.

### Cost Structure

- Staff/Labor cost (project developers, engineers, sales, advisors, admin).
- Communication/outreach costs.
- Software licenses.
- Interest over project finance.
- Premiums to project insurers.
- Compensation to local contractors.
- Maintenance costs.

### Revenue Streams

- Monthly fees by the occupant over a 20 year contract lifespan.
- When Sealed customers save more energy as guaranteed, Sealed generates a gross profit.
- Fees from contractors for providing leads.

**Website:** https://sealed.com/

# BetterHome

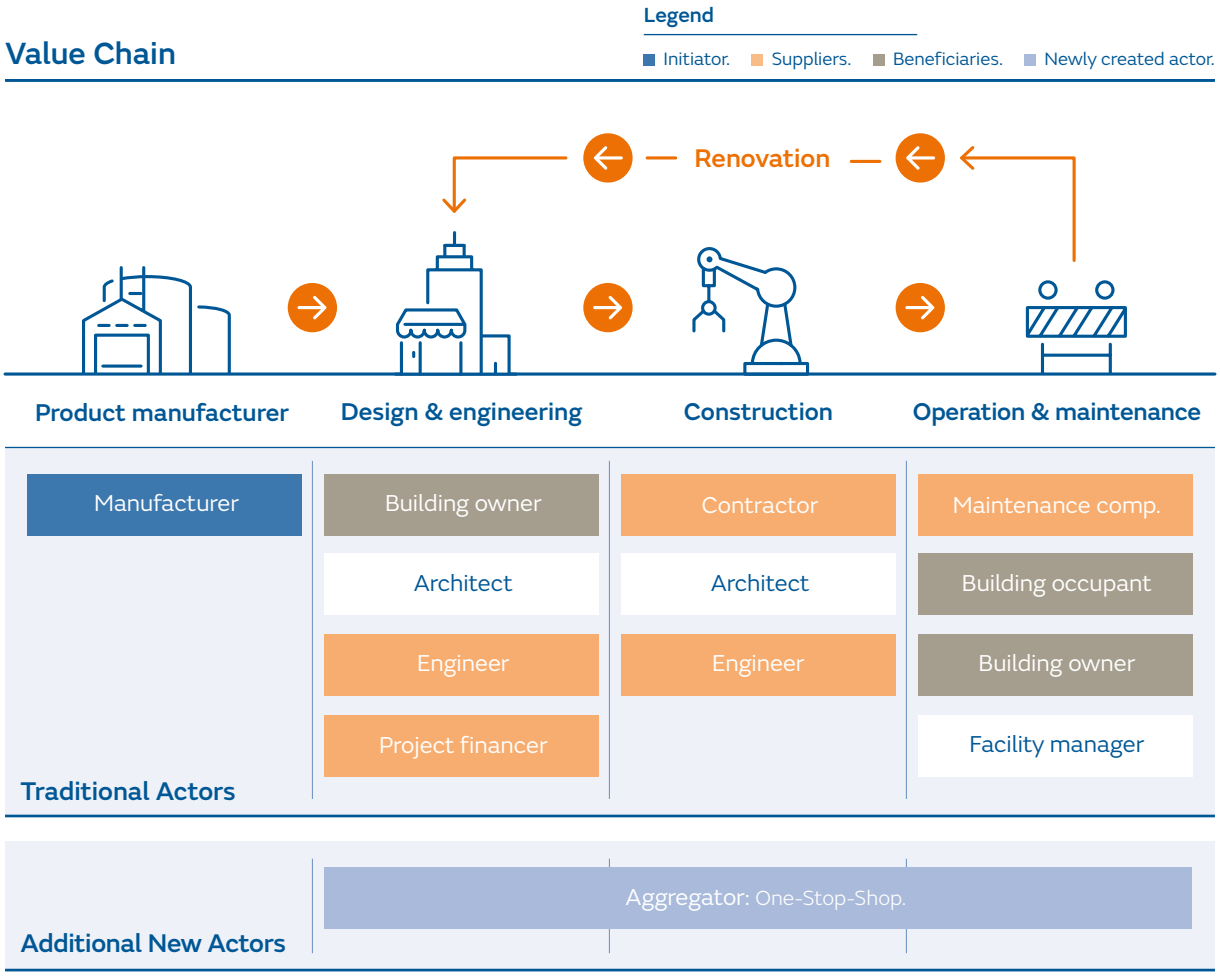
**Business model innovation type:**

- One-Stop-Shop
- IFS
- NRS

## Business Model

A one-stop-shop solution, hassle free for the building owner, supported by an online portal first intake. BetterHome acts as credible and trusted partner who guarantees quality (backed by well-known industrials Rockwool, Danfoss and Grundfos), from the start to the end of the renovation process. BetterHome offers of standardized solutions (products known for quality). BetterHome establishes a sole point of contact during the whole renovation journey for the customer with a local installer/contractor within her network. All installers/ contractors within the network are trained by BetterHome. BetterHome cooperates closely with local banks to enable easier access to finance.  BetterHome offers Energy Efficiency and Indoor Environmental Quality.

## Value Chain




## Countries

## Barriers

- Complexity of renovation process (caused by the multitude of stakeholders, who to trust). Tackled by the one-stop-shop solution.
- Project finance. Tackled by providing easier access to finance. BetterHome works closely with local banks. The banks know and trust the BetterHome process and quality, and thus offer better financial terms to the building owner. BetterHome credibility is supported by the brand of the founders (well-known industrials Danfoss, Velux, Grundfos and Rockwool).

## Customer Journey

### 01 / First contact

The building owner uses the BetterHome online portal to get a first estimate for their building and indicates their information needs. Then, an advisor calls the owner to inquire about the building and expectations, and an on-site visit can be scheduled.

### 02 / On-Site visit

A building performance check is conducted, different renovation possibilities are discussed as well as indoor environmental quality aspects. Based on the online survey, the contractor can present energy and cost saving potential for different renovation alternatives.

### 03 / Proposal

Based on the identified and selected solution, a contract is signed. BetterHome assists in providing standardized contracts, the contract is signed between the contractor and the building owner.

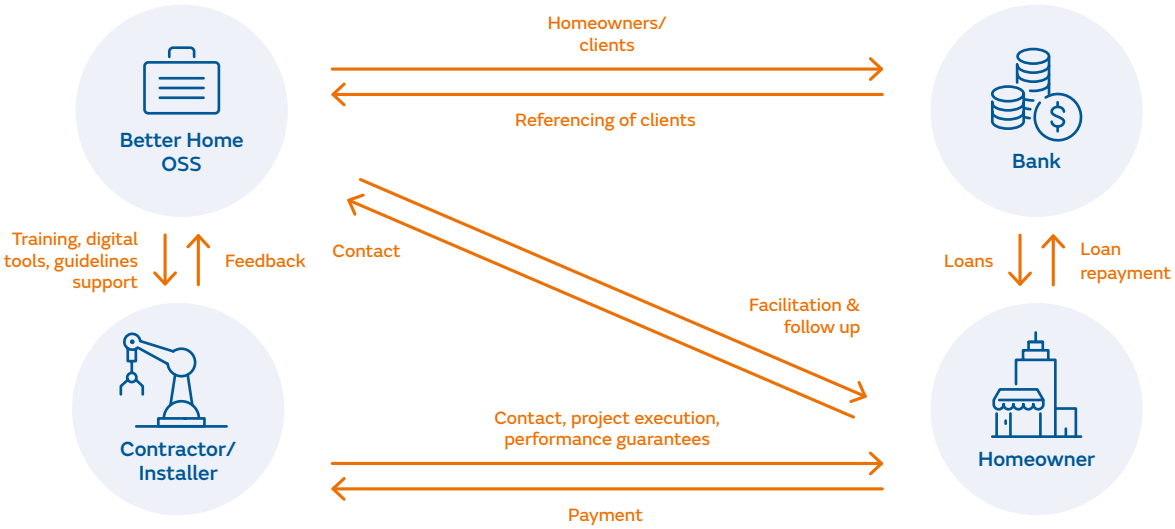
### 04 / Renovation

Renovation is carried out.

### 05 / Post renovation survey

A post renovation survey is send to make sure everything went as planned. Contractors that receive significant complaints are removed form the BetterHome network.

## Business Model




## Achievements

- 1358 projects executed from 2015 to 2018.
- €50k-€60k average project size for single-family houses.
- Renovation leads (initial online tool filled out) to meetings = 57%.
- Meeting to renovation offer = 72%.
- Renovation offer to order = 83%.

## Business Model Canvas: BetterHome

### Key Partners

- Danfoss, Grundfoss and Rockwool as shareholders.
- Shareholders + other manufacturers as suppliers.
- Local banks.
- Providing affordable and accessible loans for homeowners. Local banks refer their customers to BetterHome as well.
- Network of trained, local installers and contractors.
- Relationship to public authorities, including Copenhagen and Frederikshavn.

### Key Activities

- Customer intake via the online platform.
- Renovation advice, standardized packages.
- Project coordination (optional).
- Training and guidelines for local professionals.

### Key Resources

- Project managers.
- Smart digital solution (online tool).
- Network of building professionals.

### Value Propositions

To offer homeowners a burden-free, organized renovation opportunity at a One-stop-shop, to improve energy performance and indoor climate, based on standardized packages.

Providing the homeowner a solution tailored to their building, needs and financial means. BetterHome strives to be synonymous with quality products and installers.

The project management and the final contract management is carried out by the installer/contractor who is also responsible for the result (quality).

### Customer Relationships

The customer has a single-point of contact throughout the whole renovation journey. While the customer mainly talks with the installer (who is the single point contact), BetterHome monitors the process to safeguard a good renovation journey for the customer.

### Channels

- Online portal.
- Professional network (suppliers, installers, etc.)
- Social media (Facebook, Twitter).

### Customer Segments

The online portal provides the customer with a first estimate of the energy efficiency potential based on data from a public registry (including energy consumption, year built, heating type, etc.). Buildings that are already energy efficient, with a higher EPC rating, are not actively encouraged to proceed with their energy renovation plans. The main customer segments are:

- Single family houses.
- Multi-family buildings.

### Cost Structure

- Labor cost (project managers, business developers, admin, etc.)
- Development and maintenance of the online portal/solution.

### Revenue Streams

There are no payments between BetterHome and the installers or the building owners. BetterHome receives its whole budget from Danfoss, Grundfos, Rockwool Group and Velux Group, who in return, retrieve indirect sales revenues. While BetterHome and its owners have an incentive to increase the sales revenues of their products, the installers are not obliged to exclusively sell these brands. In the end, the renovation contract is only between the building owner and the installer.

**Website:** http://betterhome.eu/

# EcoHome Financial

**Business model innovation type:**

One-Stop-Shop

Innovative Finance Scheme

NRS

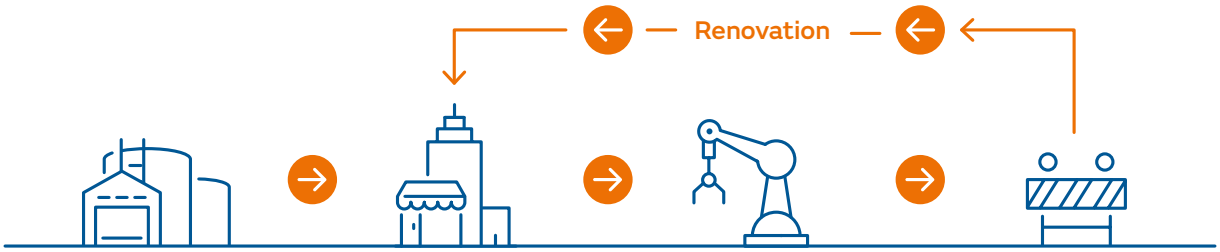
## Business Model

Acquired in 2016 by Dealernet, EcoHome Financial offers homeowners on the Canadian and American market easy access to loans for financing the installation and acquisition of capital assets. Through EcoHome Financial, funding is accessible for home improvements relating to water (e.g. hot water tanks), renovations (e.g. roofing) and air (e.g. boilers). Through the MyHome wallet, a dealer network and customer network are brought into contact, enabling a wide range of renovation related services. Through its eSignature service, customers and dealers are provided with a credit check and approvable amount for a loan in a single minute, requiring only the driver's license of the homeowner. EcoHome Financial offers its dealers various benefits for joining the dealer network, such as lead generation, customer support and back office servicing, and discount on credit card processing services.

## Value Chain

Legend

Initiator. Suppliers. Beneficiaries. Newly created actor.




| Product Manufacturer | Design & Engineering | Construction | Operation & Maintenance |
|---|---|---|---|
| Manufacturer | Building owner | Contractor | Maintenance comp. |
| | Architect | Architect | Building occupant |
| | Engineer | Engineer | Building owner |
| | Project financer | | Facility manager |

**Traditional Actors**

**Additional New Actors**

Aggregator: Finance provider & Fukk service contact.

## Countries

## Barriers

- Complexity of renovation process, tackled by easy access to expert renovation advice, high quality contractors, and customer service available during and after the renovation.
- Project finance. Tackled by providing easy access to finance (loans).

## Customer Journey

### 01 / Joining the Network

Interested home owners become part of the MyHome wallet network of customers.

### 02 / Providing information

The customer selects its home improvement (+30 options) and writes a brief description.

### 03 / Trusted home professional contact

Based on location, a home professional is identified to service the project, out of a 500+ service provider network who are vetted and reputable. The selected home professional will provide a project estimate and arranges a meeting.

### 04 / Loan/lease offering

Home professionals/service providers can offer customers an EcoHome Financial loan or lease offer:

Loan - A standard loan offer where customers make a monthly payment to EcoHome Financial. All loans are open and may be paid in full without penalty.

Lease - A 120 month-only leasing option. In order to qualify for this program, dealers are required to add EcoHome Financial to their insurance as an additional insurer.

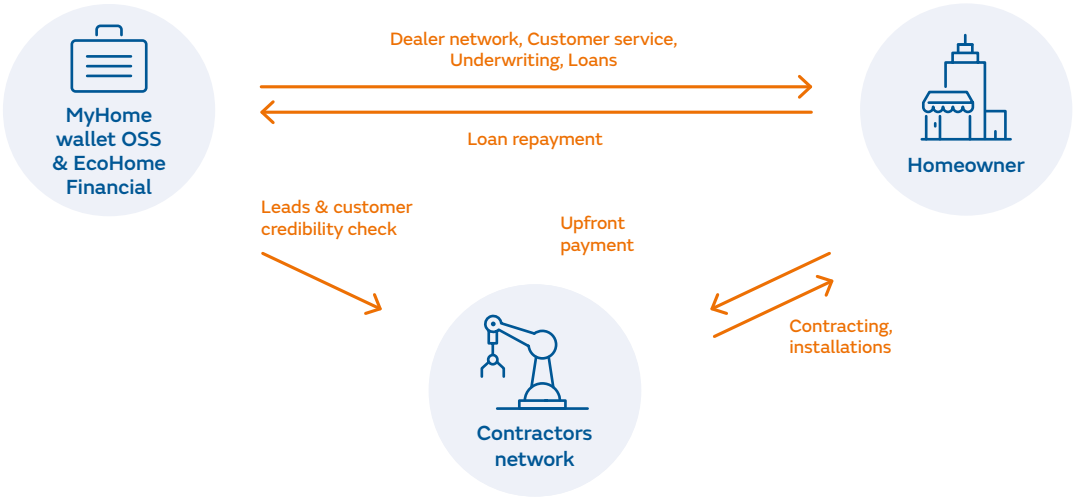
### 05 / Renovation

Contractors commence the renovation and install equipment and assets.

### 06 / Post Renovation

Customer repays the loan and can opt for a buyout. EcoHome Financial remains full service contact point until the remainder of the contract.

## Business Model




## Achievements

- Approx. CAD 7 million revenues.
- CAD 60 million seasoned loan book in 2016, in an estimated CAD 20 billion market.
- Historical demonstration of low default rates, predictable revenues, and cash flows.
- Dealernet (parent) named one of the Top 25 Companies for the 2019 Leaders in Lending Awards by the Canadian Lenders Association.

## Business Model Canvas: EcoHome Financial

### Key Partners

- Dealer network: Network of high quality home improvement dealers.
- DocuSign: enabler of easy approval process for customer loans.

### Key Activities

- Home improvement consumer financing.
- Generation of qualified sales leads for its dealer network.

### Key Resources

- eSignature by DocuSign: credit check in a minute by customers driving license.
- Full-service contact centers in Canada and the US.
- End-to-end mobile marketing platform.

### Value Propositions

Upfront financing by providing loans and leases for the acquisition and installation of capital assets improving the quality, comfort and safety of homes. EcoHome is positioned as service oriented & engagement-powered.

The contracted home improvement dealers are responsible for result guarantees.

### Customer Relationships

The customer has access to full-service contact centers in Canada and the US, throughout the customer journey including after installation. Through the customer network MyHome wallet, customers are provided with pre-approved loans and put into contact with the high quality home improvement dealers.

### Channels

- Website with extensive and detailed renovation inspiration and advise.

### Customer Segments

EcoHome has a strong focus on the home improvement markets of Canada and the US, servicing three areas:

- WATER

Hot water tanks, plumbing projects, pools, spas, tankless water heaters, water treatment systems.

- RENOS

Basement repairs, doors, flooring, kitchen renovations, porch enclosures, roofing, home siding, sunrooms, windows.

- AIR

Air conditioners, air handlers, boilers, fireplaces, furnaces, heat pumps, HEPA filtration systems, HRV systems.

### Cost Structure

- Underwriting, origination funding and servicing of loans and leases.
- Treasury functions, technology, risk and credit management capabilities.
- Full service contact centers (labor, property, etc.)
- Development and maintenance of the website and the MyHome wallet.
- Labor cost (sales and support, communications, finance, admin, etc.)

### Revenue Streams

EcoHome Financial generates revenues over the payback of loans that may extend to 15 years, over which it collects premiums periodically to cover costs and generate a profit.

**Website:** https://ecohomefinancial.com/

# Refresh Renovations

**Business model innovation type:**

One-Stop-Shop

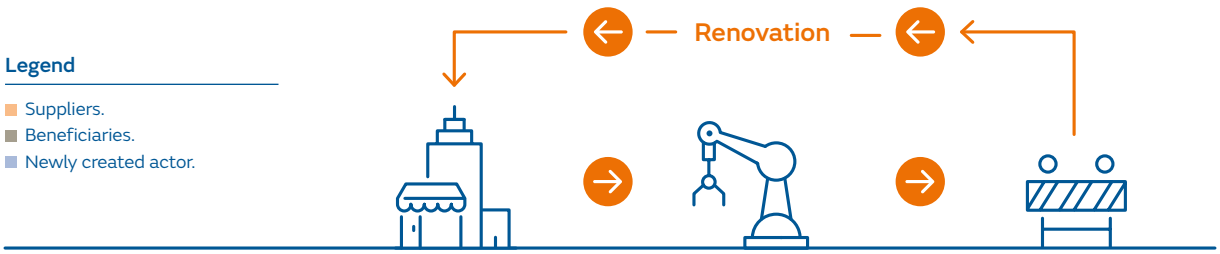
IFS

NRS

## Business Model

Founded in New Zealand in 2010, it currently counts 66 renovation specialist franchisees, including 3 in the recently entered American market. The model provides one-stop-shop experiences to building owners looking to renovate. The franchise package offers; a stream of leads, a strong brand, training, support such as capacity building. The offerings include sustainable solutions through sustainable materials offerings, investments in potentially efficiency improving measures such as insulation, HVAC, water usage and solar PV, enabling professionals to focus on the home renovation market niche. Customers are promised ease and efficiency, and with the aid of innovative online systems supporting project management, cost controls. Refresh describes itself as a one-of-a-kind renovation franchise and is globally scalable.

## Value Chain




| | Design & Engineering | Construction | Operation & Maintenance |
|---|---|---|---|
| Traditional Actors | Building owner | Contractor | Maintenance comp. |
| | Energy coach | Architect | Building occupant |
| | Engineer | Engineer | Building owner |
| | Project financer | | Energy provider |
| Additional New Actors | Aggregator: One-Stop-Shop franchise. | | |

## Countries

## Barriers

- Complexity, tackled by; managing the whole renovation from start to finish, providing a safe solution through industry professionals, a single point of contact.
- Financial; costs are limited through planning support, designed to save homeowner money (30% of a homeowner's budget goes to waste in a typical renovation, according to Refresh).
- Skilled personnel; through an attractive franchising model, involving skilled professionals.

## Customer Journey

### 01 / Briefing/Initial Consultation

Initial consultations are offered for free, and without obligations. The first thing which the renovation specialist requires to know is what the goal of the home renovation is. In the initial consultation, homeowners can throw all their ideas on the table - the specialist will then tailor them to the property and budget.

### 02 / Concept and Feasibility

With a clear understanding of the renovation goals, the specialist can arrange for an architectural concept to be drawn up. This allows assessment of whether or not the homeowners ideas are feasible, and allows for pointing out any changes that the homeowner would like in the design - before any work begins.

### 03 / Working Drawings and Costings

Next, working drawings will be developed. These will take into account the engineering, structural, design and aesthetic decisions that have been made. If the homeowner requests any further changes, now is the time to do so. From there, the specialist will present a fixed-quote as well as a contract.

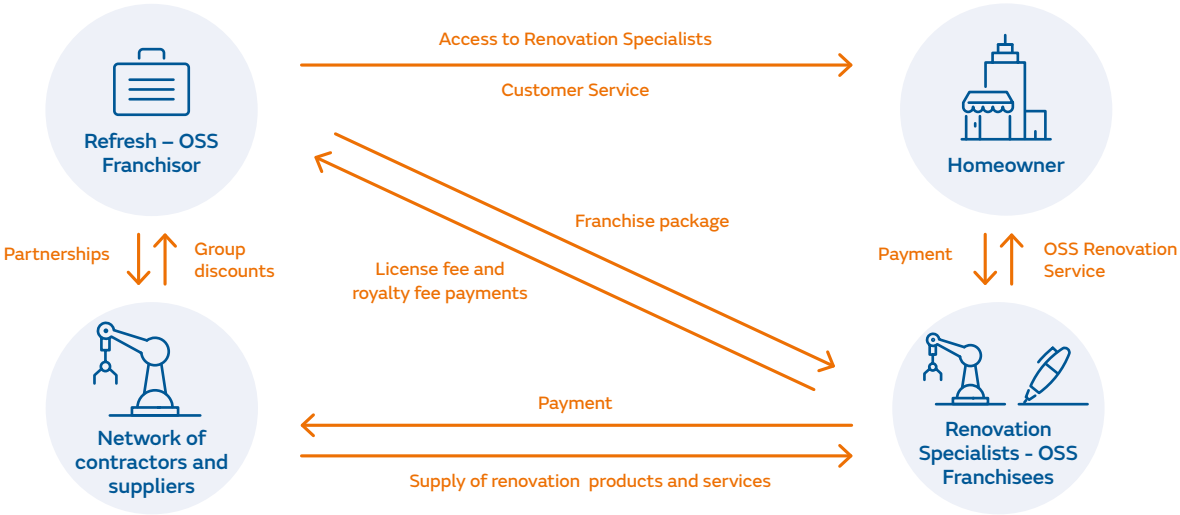
### 04 / Build/Construction Stage

Finally, the homeowner get to witness your project transition from the page to your property. Every aspect of the build will be managed for the customer. The specialist will do everything in their power to keep the project on schedule so that it can be completed within a set timeframe and budget.

### 05 / A Finished Home

The final stage is for the local specialist to ensure that all Council documentation is completed and to hand the necessary Code of Compliance documentation.

## Business Model




## Achievements

- In 2014, listed among “Deloitte’s Fast 50” (a list of New Zealand’s fastest growing businesses). Since then, three other national awards were won (TVNZ New Zealand Marketing Awards’ “Transformational Award”, “Platinum” at the Summit Marketing Effectiveness Awards and “Best Emerging System Award” at the New Zealand Franchise Awards.
- 66 franchises operational in 2020 (in New Zealand, Australia, the UK, and the US.).

## Business Model Canvas: Refresh Renovations

### Key Partners

- Local renovation specialists, franchisees.
- Partnerships with leading industry suppliers; leading brands in the construction and design industry; networks of designers and sub-contractors. Partners include:
- GIB.
- Mitre 10.
- PDL by Schneider Electric.
- Placemakers.
- Resene.
- Robertson Bathware.
- The Tile Depot.
- DVS.
- Flooring Design.

### Key Activities

Local franchisees do project management, supporting the customer in every step of the renovation (e.g. design, costings, council consents, scheduling, construction, decorating.)

The franchise package includes providing customer leads, constant marketing, IT systems, training, coaching & support, capacity building.

### Key Resources

- Innovative online systems; project management systems, customer portal. The online systems allow for; easy communication, project timeline management, requesting changes and approving selections, finance management.
- Dedicated call center.

### Value Propositions

A process created to support achieving beautiful renovations, on-time and within budget. Refresh aims to deliver high quality and efficient home renovations through franchisers acting as a single point of contact for homeowners. Refresh processes and systems simplify the home renovation experience, allowing each stage to be carefully planned and managed. The model is globally scalable.

### Customer Relationships

Through the customer portal, homeowners can identify online a local franchisee OSS. The franchisee acts as a single point of contact throughout the renovation, while franchisor's dedicated call center is primarily focused on the initial sales process, by forwarding qualified leads through ERP systems to franchisees.

### Channels

- Constant marketing campaign.
- Website.
- Franchisees sales & marketing reach.

### Customer Segments

Refresh Renovations OSS franchisees are active in New Zealand (founding country), Australia, the United Kingdom and the United States. Renovation solutions are primarily offered to single family buildings.

Renovation services offering scope:
Home wide, design & planning, bathroom renovations, kitchen renovations, home office, roof extensions, creative spaces, additions & extensions, indoor-outdoor flow, garage conversions, loft room conversions, luxury, open plan, outdoor renovations, heating & aircon, sunroom, re-clad & re-paint.

### Cost Structure

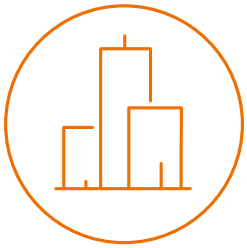
- Development and maintenance of the website, innovative online systems (project management and customer portal).
- Labor cost (sales and support, communications, finance, administration, etc.)
- Dedicated call centers (labor, property, etc.)
- Constant marketing campaigns.
- Franchise support package (incl. training, coaching, support, capacity building).

### Revenue Streams

Refresh renovation collects revenues through its franchising offering. Depending on the local market and region, fixed fees and royalty fees are collected. For a US vacant franchising slot, these amount to:
Initial Franchise Fee: $75,000.
Royalty Fee: 6.0%.
Franchisee financial requirements include:
Total Investment: $128,927 to $189,977.
Working Capital: $10,000 to $30,000.

In New Zealand and Australia, initial Franchise Fees are offered for NZD 150,000 and AUD 100,000.

**Website:** https://www.refreshrenovations.global/



## 3.4. Business models addressing the commercial real estate market

### Dashboard successful building renovation business models and initiatives: commercial real estate market

| | | | Type of business model | | | Market segment | | |
|---|---|---|---|---|---|---|---|---|
| Company | Founding year | Country of origin | OSS | NRS | IFS | Single | Multi | Tertiary |
| Carbon Lighthouse | 2009 | USA | | ▪ | ▪ | | | ▪ |
| Metrus Energy | 2009 | USA | | | ▪ | | | ▪ |
| Sustainable Australia Fund | 2002 | Australia | | | ▪ | | | ▪ |
| Business Energy Pro | 2019 | USA | | ▪ | | | | ▪ |

# Carbon Lighthouse

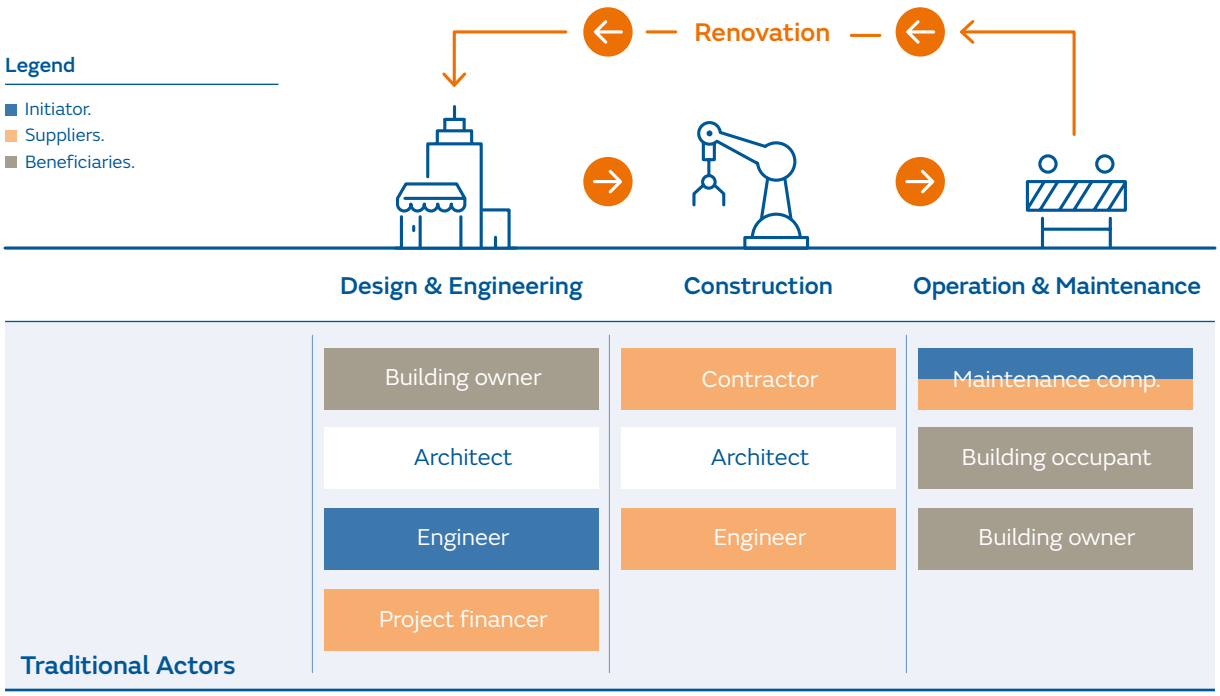
**Business model innovation type:**

- OSS
- Innovative Finance Scheme
- New revenue streams

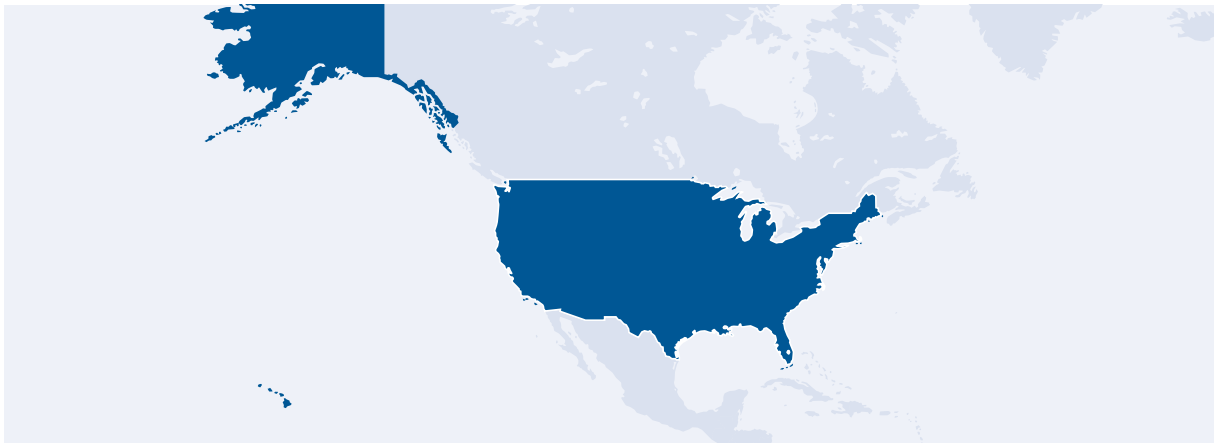
## Business Model

Carbon Lighthouse performs energy retrofits for the commercial real estate sector. It offers energy efficiency optimalisation, through usage of sensors and data analytics. The offering combines a building optimalisation undertaking with continuous commissioning. This allows prevention of an energy efficiency drift over time and guaranteeing long term savings. Through the innovative business model which generates new revenue streams, for the building owner, both the building owner and tenant receive advantages, while upfront investments requirements are avoided. Carbon Lighthouse guarantees savings and compensates clients for unrealized savings, while it also provides project financing. If the owner and tenant are the same actor, billing is straightforward as a monthly fee is paid to Carbon Lighthouse in exchange for performance management, energy savings and improved indoor air quality. When the owner and tenant are two different actors, the user pays a fee for the mentioned services while the building owner will receive a compensation fee. Additionally, the owner benefits through increased property value.

## Value Chain




## Countries



## Barriers

**Split incentive:** both the building owner and tenant are incentivized by the business model, as the owner is offered a monthly new revenue stream and the tenant is offered energy savings.

**Financial:** this barrier is overcome as no upfront costs are paid by the client.

**Performance uncertainty:** By applying sensor technology, performance guarantees can be provided with increased certainty.

## Customer Journey

### 01 / First contact

Through the strategic advisory board consisting of large real estate businesses, contact with property owners is initiated.

### 02 / Intake and finance for quote

Engineers conduct an initial intake of the building and place sensors which are connected with the cloud platform. Subsequentially, a solution, finance plan and quote can be produced, which includes a quantified savings guarantee.

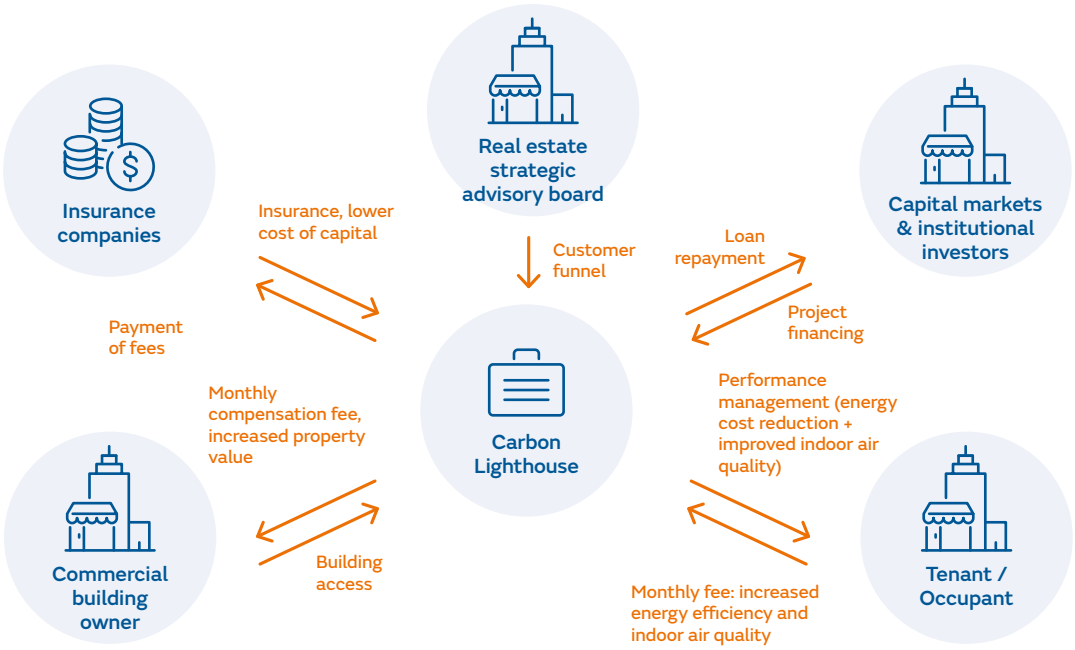
### 03 / Implementation

The optimization project is implemented, energy efficient equipment is installed.

### 04 / Continuation

During the service contract of 10 years, the customer pays a monthly fee while frequent contact with remote engineers and the facility manager on site is conducted. Optimizations are identified and conducted on time, enabling a guarantee of energy savings.

## Business Model




## Achievements

- 260,676 metric tons of carbon reduced.
- $250,000,000 client energy savings.
- Over 220 sites energy retrofitted.
- Typical savings of 10-20% for whole building.
- Typical 5-10% savings for high-performing assets, 20%> savings for low performing assets.

## Business Model Canvas: Carbon Lighthouse

### Key Partners

- Strategic advisory board, which includes large real estate industry parties.
- Insurance companies (Munich Re).
- Equity investors (Including utility provider United Grid Partners).
- Project financers (incl. banks).

### Key Activities

- Data collection & analytics.
- Energy efficient equipment retrofitting.
- Performance management.
- Developing customized financial schemes.

### Key Resources

- External relations/ network: mentioned key partners.
- Online Cloud Platform CLUES (intellectual property).

### Value Propositions

Deployment of energy efficiency retrofit solutions without upfront capital expenditures for the customer, through a financed guaranteed savings commitment. The building owner is offered an increased value of its property, the user benefits from lowered energy consumption and increased indoor air quality. Through accurate performance predictions before and after the optimization, operational risk is reduced and project financers and insurers are able and persuaded to engage. Result guarantees are provided by Carbon Lighthouse.

### Customer Relationships

Due to continuous commissioning, frequent customer contact will occur throughout the 10 year contract. Both the owner and occupant can profit from Carbon Lighthouse's ongoing servicing.

### Channels

- Website.
- Sales through (sales) employee network by engaging key partners / direct outreach.
- Partner relationships with utilities and other channels.

### Customer Segments

- Commercial real estate (offices, industrial buildings, hotels).
- Public schools.

### Cost Structure

- Staff/Labor cost (project developers, engineers, sales, advisors, admin).
- Communication/outreach costs.
- Maintenance & development of the online cloud platform CLUES.
- Interest over project finance.
- Premiums to project insurers.

### Revenue Streams

- Monthly fees by the occupant over a 10 year contract lifespan.

**Website:** https://www.carbonlighthouse.com/

# Metrus Energy

**Business model innovation type:**

One-Stop-Shop

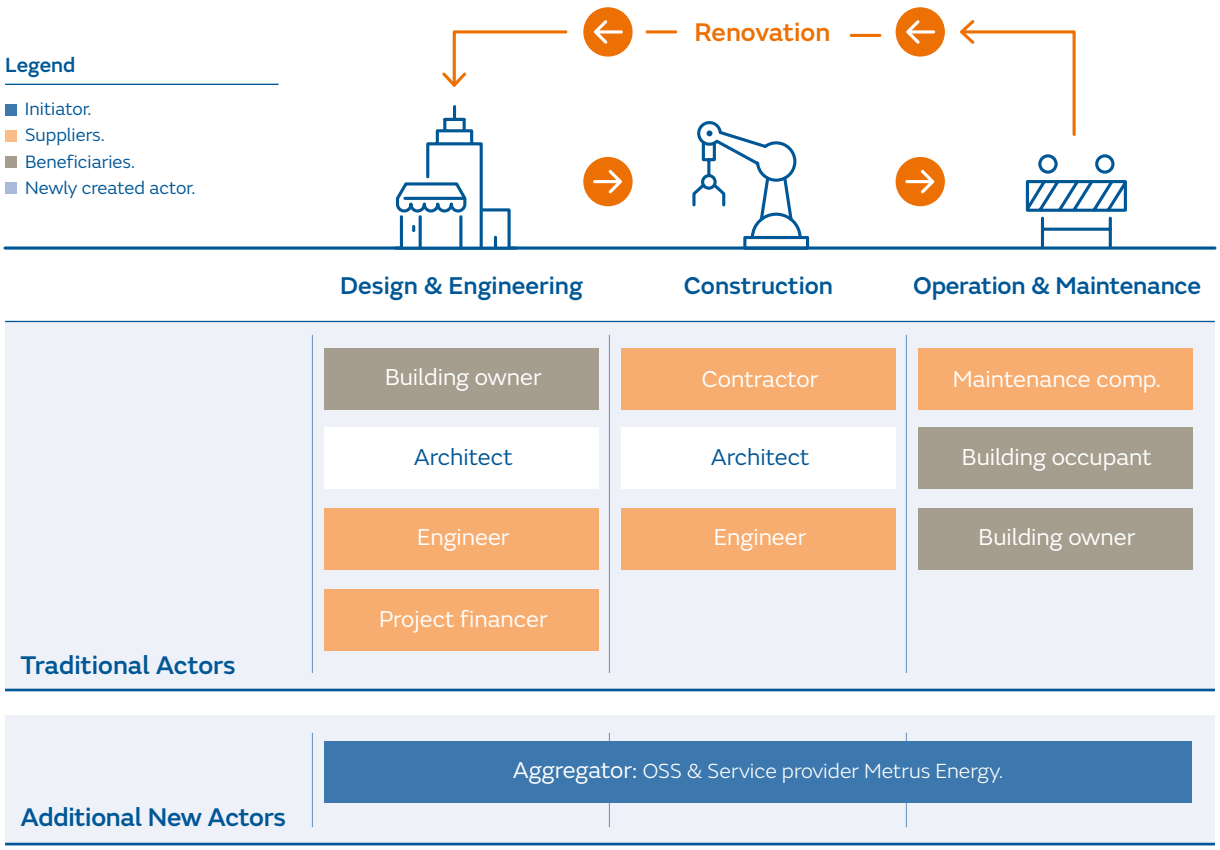
Innovative Finance Scheme

NRS

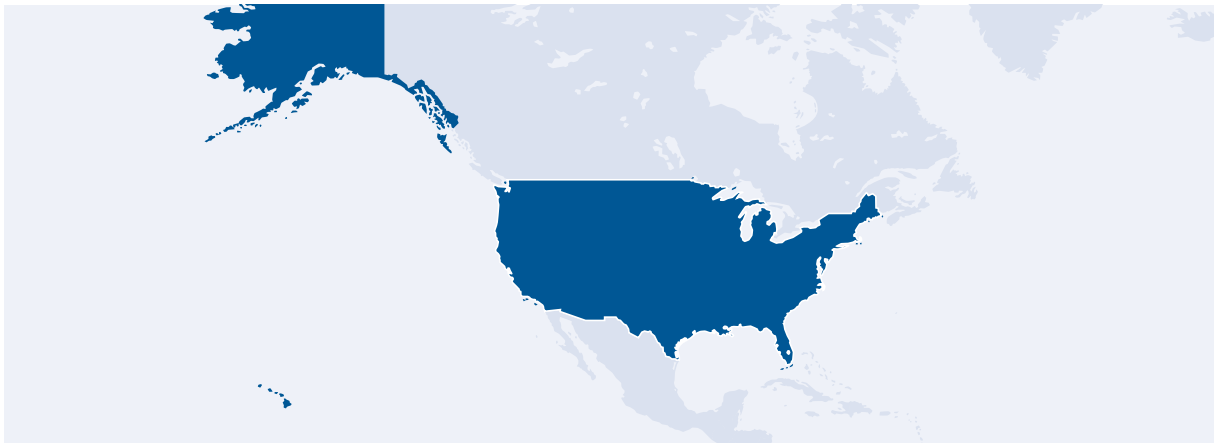
## Business Model

Metrus is an American developer and financer of energy efficient retrofit and building upgrade projects. Through an ESA (Efficiency Services Agreement) model (PACE and MESA are also on offer), its customers are offered to pay back efficiency upgrading equipment through monthly service fees, while they are also guaranteed a price reduction in their monthly fees. Metrus Energy focusses on tapping into the market potential for energy efficient renovations through an Innovative Finance Scheme. It tackles their customers payback challenges through energy efficiency as a service, offering no initial investments, no upfront cost, innovative energy & water saving solutions. Through the increased efficiency, the monthly fees will be lowered after the refurbishment project is completed, by including the new service costs and subtracting new savings to the calculation. By creating large project portfolio's, individual project risks are manageable for Metrus Energy.

## Value Chain




## Countries



## Barriers

**Financial:** Metrus Energy overcomes financial barriers for clients as no capital expenditures are to be made by the client, while through energy savings, a lowering of monthly costs is guaranteed.

**Social:** aversion to long term contracts.

## Customer Journey

### 01 / First contact

Metrus Energy finances efficiency projects in all key sectors of the US. Also, it is involved with alliances and partnerships where a share of potential customers can establish initial contact.

### 02 / Development phase

Potential efficiency upgrades are identified, the project scope is designed, and a financing solution is structured (which funds 100% of project costs and monetizes available incentives).

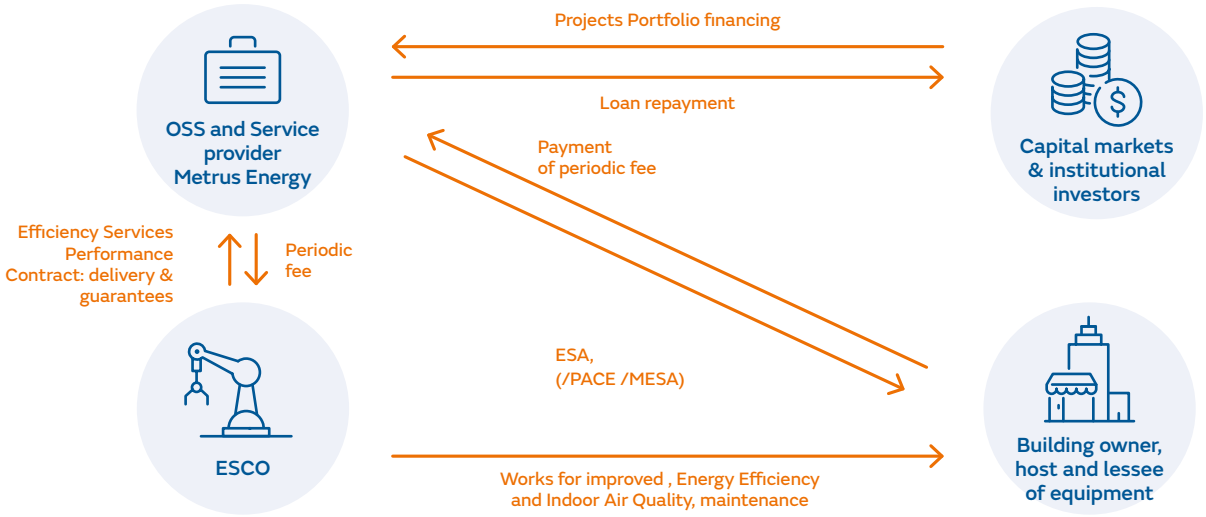
### 03 / Operation

Performance and savings are measured. Ongoing maintenance costs are covered by Metrus Energy and new saving opportunities are identified.

### 04 / Contract expiration

After the long term project is expired, typically 5 to 10 years, the user is offered three options. The contract can be extended, the equipment can be purchased, or it can request for a removal.

## Business Model




## Achievements

- Average projects portfolio size of $2-$4 million.
- Average pay-back period <6 years.
- 1.5 billion kWh saved.
- 1.1 million ton of $CO_2$ saved.
- 26 US States included in its project portfolio.
- 310 thousand square meter of total properties.
- 82.8 thousand kg of water saved.
- $149 million investment by December ‘19.

## Business Model Canvas: Metrus Energy

### Key Partners

Debt providing project financers, including CitiBank.

Network of project deployment support partners, incl. ESCO's that deliver equipment.

### Key Activities

Project design, execution, performance monitoring. Metrus Energy projects use a combination of efficiency measures and technologies that generate the maximum electric, thermal and water savings as well as operational and environmental co-benefits.

### Key Resources

- Internal human resources: sales team, project developers, etc.
- External relations/ network: solutions providers, installers, financers.

### Value Propositions

Enabling energy efficient renovations through an Innovative Finance Scheme. It tackles customers' payback challenges through energy efficiency as a service, offering no initial investments, no upfront cost, innovative energy & water saving solutions. Through the increased efficiency, the monthly fees will be lowered after the refurbishment project. By creating large project portfolio's, individual project risks are hedged. Metrus Energy guarantees the results through the ESA to the customer. The ESCOs are contracted by Metrus.

### Customer Relationships

Due to the nature of the ESA structure, Metrus Energy is in contact with the customer from the initial contact until the ending of the multi-year contract. At this final stage, customers can choose to purchase the equipment, extend the contract, or request removal.

### Channels

- Website.
- Sales through (sales) employee network by engaging key partners / direct outreach.
- Partner relationships with ESCOs, contractors, utilities and other channels.

### Customer Segments

- Commercial real estate.
- Higher education buildings.

Metrus Energy targets projects over $1,000,000, although smaller-sized projects can be funded through aggregating projects.

### Cost Structure

- Interest on project finance loans.
- Typically, the benefits of the ESA carry a premium of a 100 to 200 basis points over a capital lease. Put in general terms, the ESA's cost of capital is about 5-7% compared to 4-6% for a capital lease.
- Staff/Labor cost (project developers, sales, advisors, admin).
- Communication/outreach costs.

### Revenue Streams

Service payments by the client are revenues for Metrus Energy. The fees are based on actual avoided kilowatt-hours of electricity or terms of natural gas. Service fee bills are paid after a project becomes operational. Metrus Energy does not mark-up or add margin on to any project costs.

**Website:** https://metrusenergy.com/

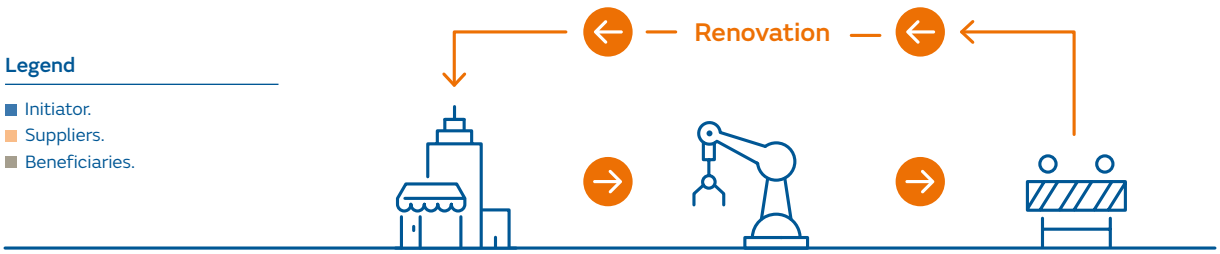
# Sustainable Australia Fund

**Business model innovation type:**


## Business Model

The Sustainable Australia Fund (SAF) makes Environmental Upgrade Agreements (EUA) possible in partnerships with municipalities. An Environmental Upgrade Agreement (EUA) helps businesses with financing to upgrade commercial buildings and maximize energy efficiency. Under an EUA, a lender provides loans for upgrades to commercial buildings to improve the building's energy efficiency, and the local council collects repayments for the loan through the rates system. This provides a more secure loan for lenders, who can then offer them at competitive rates and for longer terms. The loans are tied to the land, not the owner. No upfront capital or additional security is required by real estate owners. Repayments can be split between landlord and tenants.

## Value Chain




| | Design & Engineering | Construction | Operation & Maintenance |
|---|---|---|---|
| Traditional Actors | Municipality councils | Building owner | Contractor | Maintenance comp. |
| | Architect | Architect | Building occupant |
| | Engineer | Engineer | Building owner |
| | Project financer | | |
| Additional New Actors | Sustainable Australia Fund. | | |

## Countries

## Barriers

**Split incentive:** as refurbishments are paid by property tax additions through the municipality council, the tenant and not the owner is billed.

**Council administrative burden (encountered barriers):** although this business model provides municipalities a means to realize sustainability goals, it also brings additional administrative demands. Applicability depends on local regulatory framework.

## Customer Journey

### 01 / First contact

A customer engages a contractor to scope and quote on the works.

### 02 / Fund

The SAF expert team will match an Upgrade-, Capital-, or Solar- Fund, depending on the type of project. The Fund will maximize the clients business cashflow.

### 03 / Contract signing

The project is greenlit, and the business, local council and SAF sign an Environmental Upgrade Agreement (EUA).

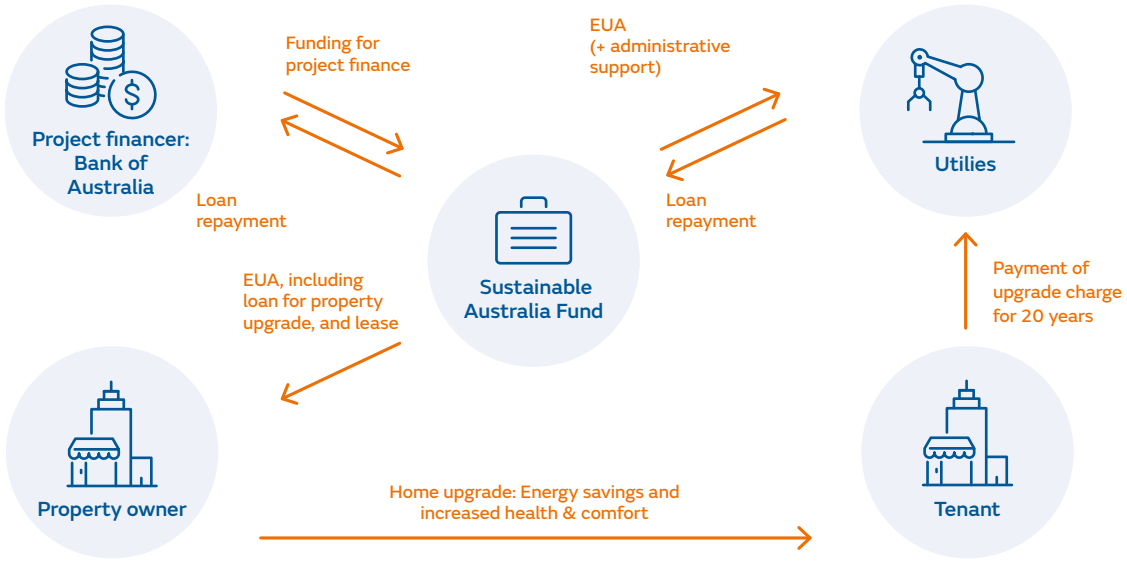
### 04 / Payments

Up to three progress payments can be made as down payments, to be refunded to the customer.

### 05 / Environmental Upgrade Charge

A fixed Environmental Upgrade Charge (EUC) will be send with the next local council rates notice.

## Business Model




## Achievements

- 37 municipalities in Victoria state.
- 70 projects have been financed.
- SAF will expand to New South Wales and South Australia, with already AUD 200 million made available by Bank of Australia.
- 10-25% energy savings (medium level retrofit).

## Business Model Canvas: Sustainable Australia Fund

### Key Partners

- Municipalities/ councils.
- Project financers (Bank of Australia).
- Local suppliers and installation companies.

### Key Activities

Through the Upgrade Fund, Capital Fund and Solar Fund, flexible and smart funding solutions are offered for innovative environmental upgrade projects, construction projects, and solar system projects.

### Key Resources

- External relations/ network.
- Digital platform.

### Value Propositions

SAF offers debt and capital access by Environmental upgrade agreements (EUAs), to upgrade buildings and solar systems. Through involving municipality councils, it facilitates the management of split incentives for property owner and tenant, as loans end up tied to the building, not to the owner.

SAF leverages EUAs as part of the renovations' reduced bank loan and equity requirements, minimized long-term financial risk, and increased short-term cashflow.

### Customer Relationships

Extensive marketing campaigning for 'SAF brings the jigsaw together'.

SAF and clients are mostly in contact until the contract is agreed upon. After this, the majority of the customer contact (administrative, periodical billing) is conducted by the council.

### Channels

- Marketing campaigns.
- Website.
- Local presence, including through councils and installation companies.

### Customer Segments

- Commercial real estate (CRE) owners.
- CRE in the Australian states Victoria (present), NSW and South Australia (upcoming), as only these have the required EUAs legislation.

### Cost Structure

- Staff/Labor cost.
- Communication/outreach/marketing costs.
- Platform maintenance costs.
- Interest and fees on capital.

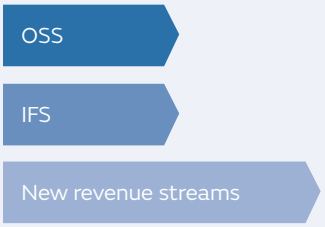
### Revenue Streams

- SAF receives a margin of the periodic fee that is charged at the client (Environmental Upgrade Charge) via the council charges.

**Website:** https://sustainableaustraliafund.com.au/

# Business Energy Pro

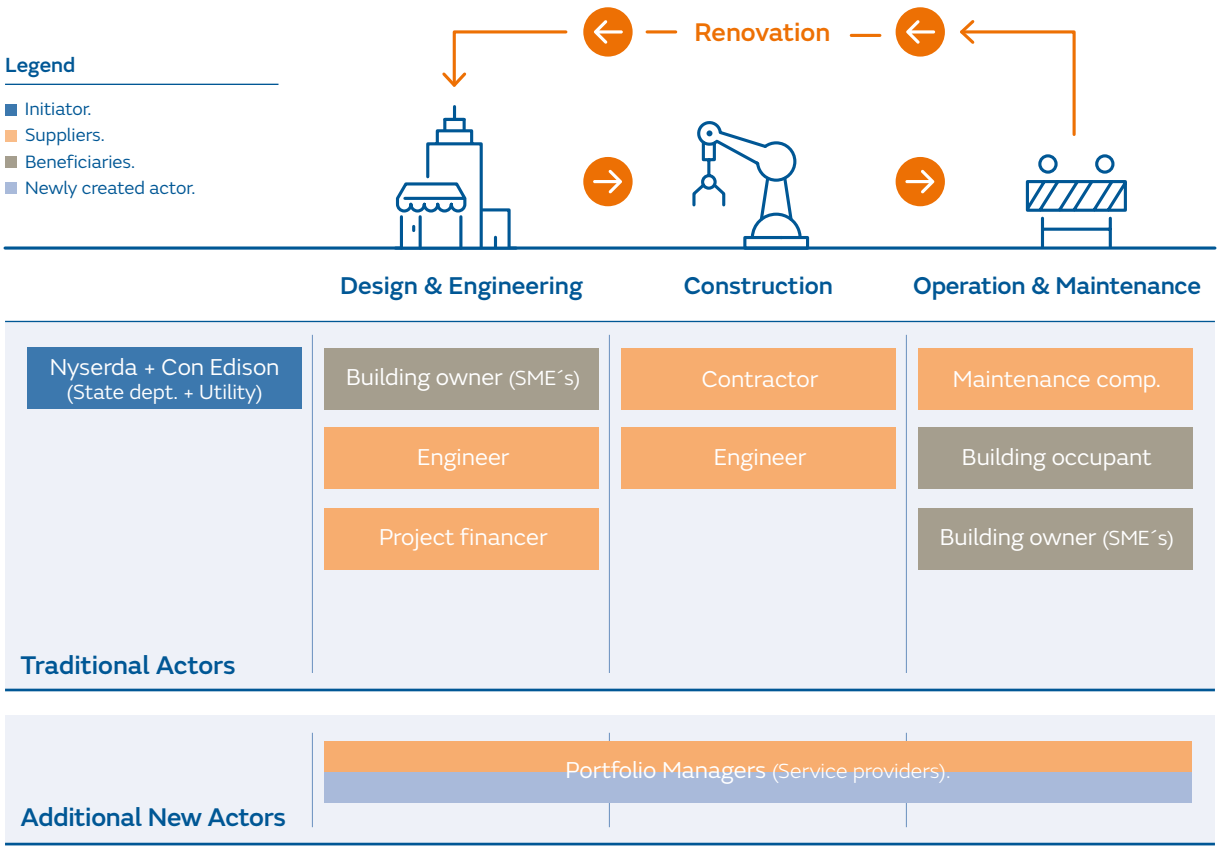
**Business model innovation type:**



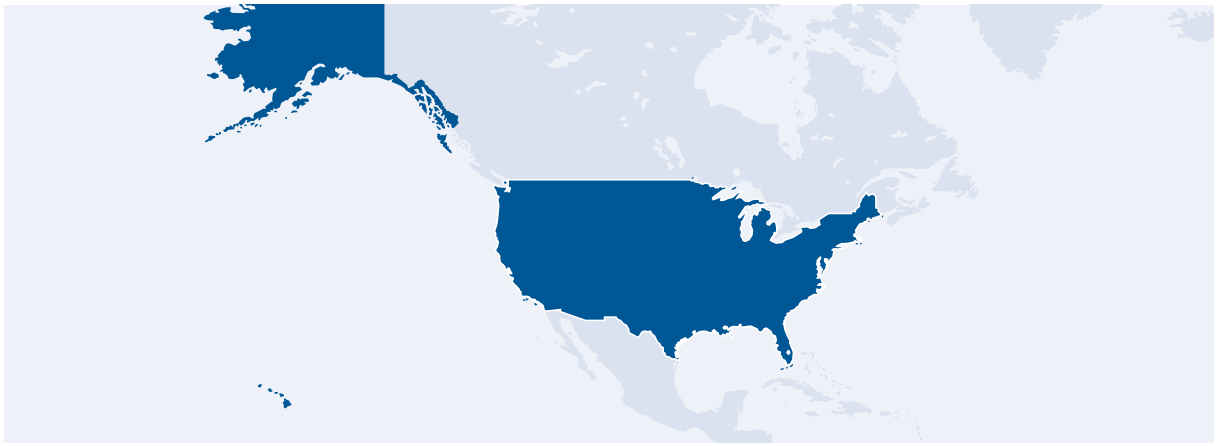

## Business Model

A Pay for Performance initiative that is an innovative collaboration between NYSERDA, New York utilities, energy efficiency service providers (portfolio managers) and their supporting partners. Unlike typical energy efficiency programs which compensate for measure-specific investments, Business Energy Pro compensates service providers based on the realized savings over time (e.g. 3 years) over a portfolio of customers, consisting of SMEs. The model leaves room for the service providers and customers through a technology agnostic approach, while the additional revenue streams create attractive investment potential for the private capital which is needed for upfront financing. This flexible approach allows service providers to innovate and provide a comprehensive approach for delivering customer value, realizing large-scale savings and energy efficiency. A similar Home Energy Savings Program has been announced, targeting residential Central New York.

## Value Chain




## Countries



## Barriers

**Market inefficiencies & low confidence in energy savings:** providers are incentivized for achieving continuous performance, customers can therefor trust efficiency performances.

**Planning horizons:** public financial support extends over a specified (3 year) period.

## Customer Journey

### 01 / First contact

The customer identifies and selects an energy efficiency service provider, which can be accessed through the utility´s website. Subsequently will the efficiency service provider reach out to the customer to schedule a free energy assessment.

### 02 / Identifying improvements

The energy efficiency provider will propose energy solutions based on the assessment.

### 03 / Data sharing

Customers need to share data with a third-party data manager that will work whith the energy efficiency provider to help realizing saving.

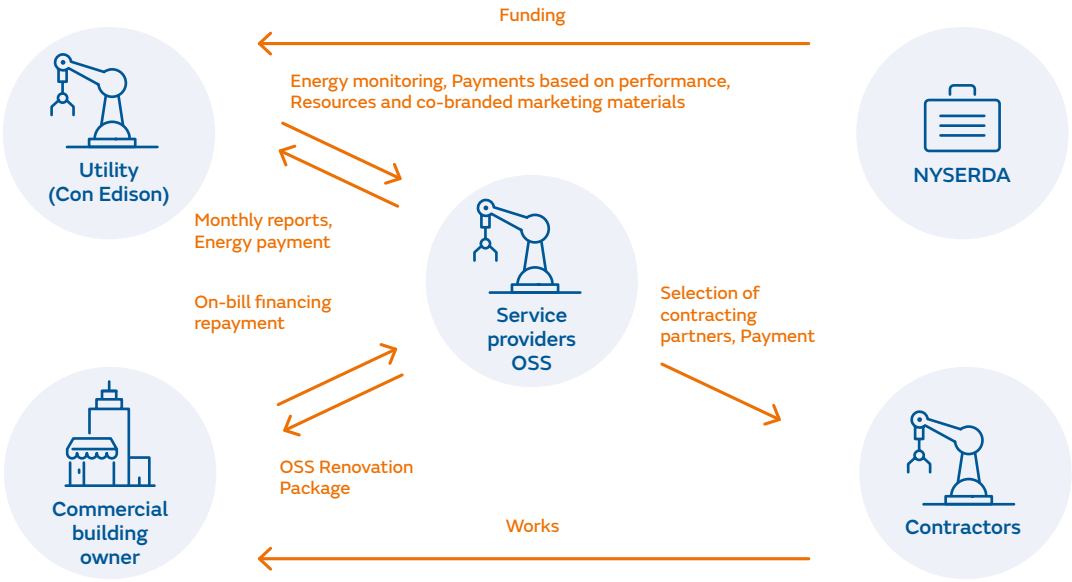
### 04 / Refurbishment Project

Contractors (partners of the service provider/portfolio manager) will install equipment.

### 05 / Repayments

Dependent on the portfolio manager's offering, in the case of Lime Energy and JouleSmart, the customer has no out of pocket costs, full services, and savings on monthly energy bills.

## Business Model




## Achievements

The first pilot (2019) aims for reaching 60,000 commercial building owner Con Edison customers, and targets to avoid an equivalent of 11,698 metric tons of $CO_2$ in Westchester County, and Staten Island. The total budget available is $10 million under this pilot.

## Business Model Canvas: Business Energy Pro

### Key Partners

- Service Providers / Portfolio Managers.

Lime Energy & JouleSmart are responsible for partnering with contractors, accessing finance, providing optimal solutions to customers, and Quality Assurance & Quality Control.

New York State Utilities (Con Edison).

NYSERDA

Con Edison and NYSERDA partnered to launch and operate the Business Energy Pro initiative. NYSERDA provides funding while Con Edison is the utility administrator who's responsibilities include managing performance and the contractual relationship with the Portfolio Managers, distributing payments, and maintaining the Business Energy Pro website.

### Key Activities

Pay for Performance support, compensating service providers over time for measured energy efficiency over a large portfolio of SMEs. Compensation is calculated from expected energy savings and Portfolio Managers are awarded RFPs based on promised /estimated efficiency performance through bids.

### Key Resources

- AMV Platform, a multi-node, decentralized architecture storing project and utility data, producing energy savings calculations, serving as a system record.
- CalTRACK methodology calculating energy savings via an Advanced Measurement and Verification platform.

### Value Propositions

Business Energy Pro provides flexibility, minimizes transaction and administrative costs, and secures a multi-year cash flow to support innovative solutions and services for larger portfolios of projects by a pay-for-performance model. It provides market actors space, through a measure agnostic approach to innovate, identify and apply optimal solutions to provide customer value and attract private sector investment. The program aims to help SMEs reducing their operating costs, and improve equipment reliability and productivity, while also facilitating their access to performance-based financing mechanisms that are typically reserved for larger customers.

### Customer Relationships

Customers can partner with a dedicated energy efficiency service provider who will analyze business's smart meter data, provide a custom set of solutions that will optimize business performance, reduce operational costs and may offer financing solutions.

### Channels

- Service Providers are responsible for the marketing and outreach.
- Utility Con Edison provides information and access to energy savings offerings of available Portfolio Managers within the state's county's or regions.

### Customer Segments

Business Energy Pro geographic scope is limited to the state of New York, where by RFPs, Portfolio Managers are assigned to specified regions or counties, such as the pilot P4P in Staten Island and Westchester county. This pilot targets SMEs specifically, while the announced Home Energy Savings Program targets residential customers in Central New York.

The program supports a measure-agnostic approach that accommodates diverse energy efficiency improvements, such as equipment upgrades, building retrofits, and behavioral, operational, and retro-commissioning activities.

### Cost Structure

- Development and maintenance of the website, and AMV Platform operational costs / license fee's.
- Project administration.
- Labor cost (sales and support, communications, finance, administration, etc.)

### Revenue Streams

Business Energy Pro is financed through the Clean Energy Fund: The 10-year, $5.3 billion Clean Energy Fund (CEF) is a core component of New York State's Reforming the Energy Vision strategy to achieve a clean, resilient and affordable energy system for all New Yorkers.

Funding is provided by NYSERDA to Con Edison, who administers and pays Portfolio Managers. Performance payments per project are received in sixfold: three initial payments and three annual adjusted payments. Performance payments are made over the first three operational years of a project, and are based on a normalized meter performance basis for energy savings delivered.

**Website:** https://www.nyserda.ny.gov/All-Programs/Programs/Business-Energy-Pro, https://www.coned.com/en/save-money/rebates-incentives-tax-credits/rebates-incentives-tax-credits-for-commercial-industrial-buildings-customers/business-energy-pro

# 4.

# Benchmark

# Benchmark

The business models and initiatives are benchmarked per market segment where they have the most traction. In some cases the local regulatory framework and/or specific market structure are instrumental for the success of the business model. In those cases, this is specifically highlighted in the observations.

## Single and multi-family buildings market

All business models and initiatives addressing both the market of single- and multi-family buildings are characterized by offering a One-Stop-Shop solution in combination with an alternative financing scheme.

- The two most replicated business models in the benchmark are the American PACE model and the Dutch Energiesprong. In Canada and several European countries, both models are being studied and/or replicated to accelerate renovation of single- and multi-family buildings.
- In terms of number of buildings renovated, PACE is the most successful building renovation business model. PACE pioneered through offering innovative financing in combination with skilled professionals that deliver quality. PACE enables pay back through an additional property tax, where the liability remains bound to the property when a change of ownership occurs. A successful PACE implementation requires public policies to stimulate demand, and market readiness through legal suitability and enforceability (in most geographies this requires an adoption of the current regulatory framework).
- The EnergieSprong model was designed to accelerate all levels of renovation (shallow up to deep renovation). Basically, it emphasizes on restructuring the value chain, rapid installations, and usage of prefabricated systems. It also offers the option of energy performance contracts, where most of the investment will be repaid through lower future energy bills. The energy performance is guaranteed within the contract.
- All business models address common barriers such as complexity and hassle through the OSS approach. Important aspect of the guaranteed performance and quality in these business models, is the creation of networks of trained and qualified professionals who are exclusively executing the renovation works.

## Benchmark of business models and initiatives addressing especially refurbishment of single and multi-family buildings

| | | Class of business model | | | | |
|---|---|---|---|---|---|---|
| Company | Founding year | OSS | NRS | IFS | Numbers of buildings retrofitted | Main barriers addressed |
| EnergieSprong | 2009 | ▪ | | | ca. 5000 homes, 14,400 planned | - uncertainty of energy performance<br>- lack of good quality and reliable information<br>- duration, hassle and complexity of renovation process<br>- high upfront costs of renovation<br>- low confidence in energy bill savings<br>- skilled personnel<br>- economies of scale<br>- gaining permission / collective agreement tenants |
| PACE | 2008 | ▪ | | ▪ | ca. 200.000 homes | - market readiness dependent on national regulatory framework<br>- uncertainty of performance<br>- low awareness among property owners<br>- lack of good quality information<br>- hassle and complexity of renovation process<br>- high up-front costs for improvements<br>- fragmented value chain |
| EuroPace | 2018 | ▪ | | ▪ | 478 homes | - market readiness dependent on national regulatory framework<br>- uncertainty of performance<br>- low awareness among property owners<br>- lack of good quality information<br>- hassle and complexity of renovation process<br>- high up-front costs for improvements<br>- fragmented value chain |
| Oktave | 2015 | ▪ | | ▪ | 188 homes | - low awareness of benefits<br>- lack of good quality and reliable information<br>- duration, hassle and complexity of renovation process<br>- lack of access to capital<br>- high up-front cost<br>- lack of qualified personnel<br>- fragmented value chain |
| CleanBC Better Home | 2018 | | | ▪ | 6700 homes | - complexity of energy renovations<br>- high upfront costs of renovation<br>- lack of access to capital<br>- lack of good quality information |

## Multi-family buildings market

A crucial success factor for this market segment is getting all owners aligned and thus getting collective agreements to start the renovation for the whole building. The recently founded Spanish EOS Energy is collaborating with local public authorities to collect building performance information to identify potential customers where the renovation benefits will be the highest. In a targeted marketing effort to apartment owners, they offer improved comfort levels, upgrade of the building, reduced energy cost, an innovative financing scheme and a one-stop-stop renovation journey. EOS is gaining considerable market traction with this approach.

Operene and SiRE follow similar approaches by collaborating with public authorities or associations for lead generation and using supporting digital platforms. Key elements of their business models include the OSS approach, performance guarantees and providing access to more favorable financing arrangements.

## Benchmark business models and initiatives focusing on multi-family buildings

| | | Class of business model | | | | |
|---|---|---|---|---|---|---|
| Company | Founding year | OSS | NRS | IFS | Numbers of buildings retrofitted | Main barriers addressed |
| EOS Energy | 2019 | ▪ | | ▪ | ca. 24 homes, 1232 in funnel | - uncertainty of performance<br>- low awareness among property owners<br>- hassle and complexity of renovation process<br>- high up-front costs<br>- access to capital<br>- low confidence in energy bill savings<br>- lack of attractive financial offers for EE measures<br>- gaining permission/collective agreements appartment owners<br>- fragmented value chain |
| Operene | 2014 | ▪ | | | ca. 4000 homes | - lack of technology/integrated renovation packages<br>- low awareness<br>- lack of reliable information<br>- split incentive<br>- hassle and complexity of renovation journey<br>- fragmented value chain<br>- gaining permission/getting collective agreements |
| SIRE / ReformANERR | 2015 | ▪ | | | ca. 74 multi-family buildings | - uncertainty of performance<br>- low awareness<br>- lack of reliable information<br>- split incentive<br>- duration, hassle and complexity of renovation journey<br>- lack of access to capital<br>- fragmented value chain<br>- getting collective agreements |

## Single family buildings market

The business models targeting single-family buildings are based on the One-Stop-Shop approach in combination with offering varying degrees of financial support.

Specifically in this market segment, an important success factor is gaining sufficient market traction and getting economies of scale. This is reflected in the successful business models. All of them offer to some extend standardized solutions. BetterHome, Factory Zero and Sealed seek their advantages in offering standardized products, while BetterHome, Retrofit Works and Mon Carnet have standardized the customer journey by integrating digital platforms that facilitate connecting professionals with building owners, data collection and analytics for generating tailored but standardized renovation packages.

## Benchmark business models and initiatives focusing on single family buildings

| | | Class of business model | | | | |
|---|---|---|---|---|---|---|
| Company | Founding year | OSS | NRS | IFS | Numbers of buildings retrofitted | Main barriers addressed |
| Betterhome | 2015 | ▪ | | | 1532 homes | - uncertainty of performance and quality<br>- lack of reliable information<br>- hassle and complexity<br>- lack of access to capital<br>- skilled personnel<br>- fragmented value chain |
| Factory Zero | 2015 | ▪ | | | ca. 1050 homes, (plus ca. 1000 in 2020) | - lack of integrated renovation systems<br>- difficulties in proving non-energy benefits of renovation<br>- low awareness<br>- duration, hassle and complexity of renovation journey<br>- high up-front costs<br>- low confidence in energy bill savings<br>- skilled personnel<br>- fragmented value chain<br>- economy of scale<br>- getting collective agreements of tenants |
| Mon Carnet | 2015 | ▪ | | | ca. 3750 homes | - low awareness at building owners<br>- lack of good quality and reliable information<br>- duration, hassle and complexity of renovation process<br>- low confidence in energy bill savings<br>- low quality auditing<br>- fragmented value chain |
| Retrofit Works | 2013 | ▪ | | | ca. 300 homes | - low awareness<br>- lack of reliable and good quality information<br>- hassle and complexity of renovation journey<br>- low confidence in energy bill savings<br>- lack of skilled personnel<br>- fragmented value chain |
| Sealed | 2012 | ▪ | | ▪ | ca. 500 homes | - uncertainty of performance<br>- low awareness<br>- lack of reliable information<br>- duration, hassle and complexity of renovation journey<br>- high upfront costs<br>- lack of access to capital<br>- low confidence in energy bill savings<br>- fragmented value chain |
| EcoHome | 2010 | ▪ | | ▪ | n.a. | - Hassle and complexity of renovation journey<br>- high upfront costs<br>- lack of access to capital |
| Refresh Renovations | 2010 | ▪ | | | 66 franchises | - lack of skilled personnel<br>- hassle and complexity<br>- fragmented value chain |

n.a.: only aggregated data is available, not translated to building level.

## Commercial real estate market

The business models focusing on the commercial real estate market are characterized by their offering of innovative finance schemes in combination with energy retrofits. In some cases they are also unlocking new revenue streams for the building owners.

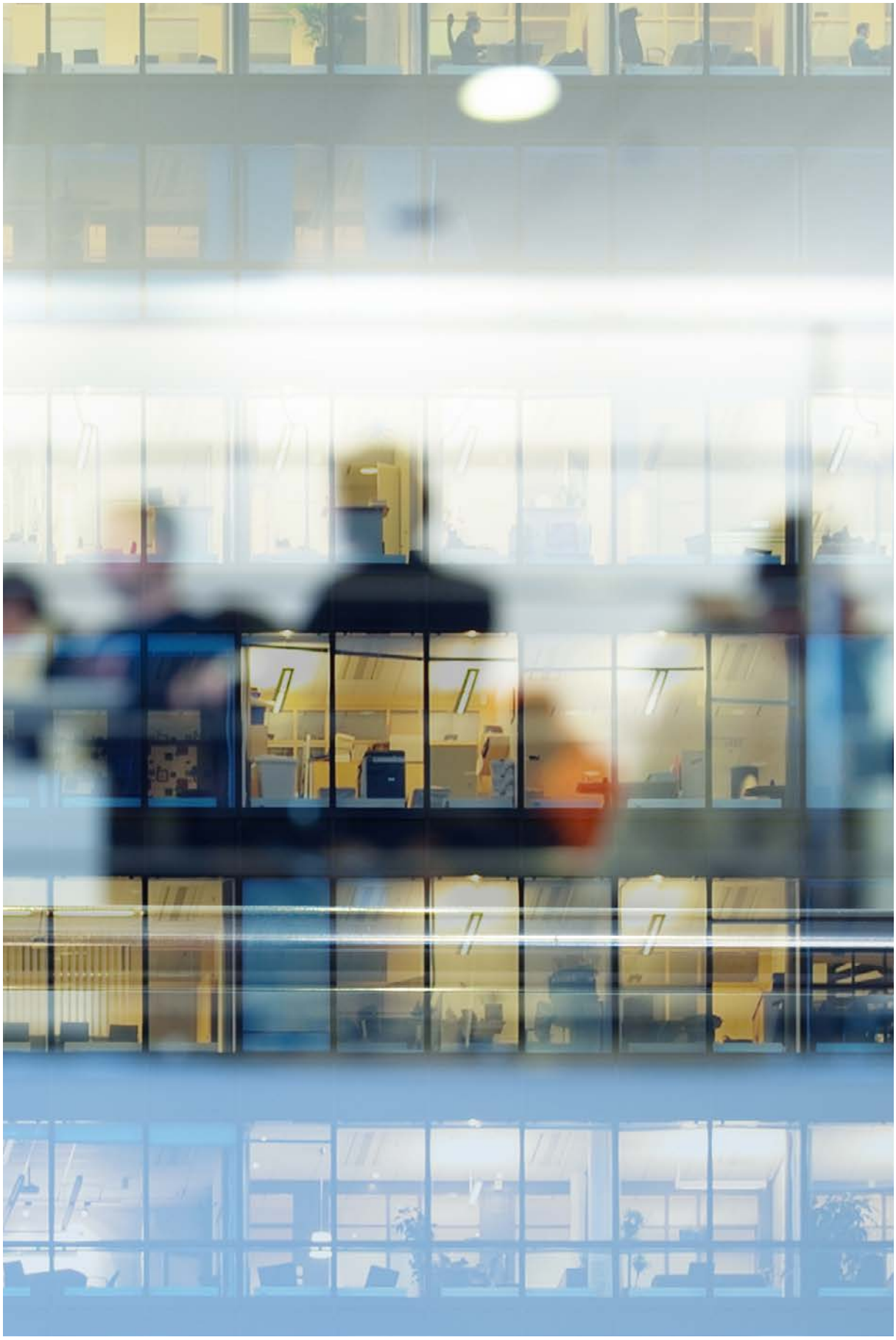
The split incentive is a common barrier in the commercial real estate market. The owner bares the investment, while mainly the tenant receives the benefits. The offering of the Sustainable Australia Fund is addressing this barrier by offering Environmental Upgrading Agreements for building renovations in close cooperation with local councils. Under an EUA, a lender provides loans for upgrades to commercial building owners to improve the buildings energy efficiency, and the local council will collect the repayments for the loan through the rates system mainly from the tenants. The EUA is linked to the land/property, not to the building owner. This provides a more secure loan for lenders, who can then offer them at competitive rates and for longer terms. An important barrier for replicating this model is the local regulatory framework, that often needs to be adopted to make this model feasible.

Carbon Lighthouse addresses the split incentive in an alternative way. They developed a business model where both the owner and tenant benefit. In case of a split incentive Carbon Lighthouse pays the building owner a monthly fee for access to the building and the installations, unlocking a new revenue stream for the building owner. While the tenant is charged for continuous and guaranteed energy efficiency and improved indoor air quality.

## Benchmark business models focusing on tertiary buildings

| | | Class of business model | | | | |
|---|---|---|---|---|---|---|
| Company | Founding year | OSS | NRS | IFS | Numbers of buildings retrofitted | Main barriers addressed |
| Carbon Lighthouse | 2009 | | ▪ | ▪ | ca. 1000 tertiary buildings | - performance gap<br>- split incentive<br>- high up-front costs<br>- lack of access to capital<br>- uncaptured value<br>- low confidence in energy bill savings |
| Metrus Energy | 2009 | | | ▪ | ca. 50 tertiary buildings* | - uncertainty of performance<br>- hassle and complexity of energy retrofit<br>- high upfront costs<br>- lack of access to capital<br>- fragmented value chain |
| Sustainable Australia Fund | 2002 | | | ▪ | ca. 70 tertiary buildings | - split incentive<br>- high up-front costs<br>- lack of access to capital<br>- availability and accessibility attractive financial offers for EE measures |
| Business Energy Pro | 2019 | | ▪ | | target: 60000 buildings | - market inefficiencies<br>- low confidence in energy savings<br>- performance gap<br>- split incentive<br>- high up-front costs<br>- availability and accessibility attractive financial offers for EE measures |

* This is a rough estimate based on the published number of 36 million square feet of properties delivered.



## General observations and comments

- The one-stop-shop approach is gaining considerable traction to overcome the barrier of too much hassle and complexity of a renovation journey for building owners.
- Utilities and local governments play in several business models an important role in identifying and approaching potential customers.
- In Canada and the USA, utilities are instrumental in identifying and contacting suitable potential customers for building energy renovations. An example is BC Hydro in Canada.
- In several business cases, the role of local governments was instrumental going well beyond subsidies, grants, and legislation.
- For upscaling innovative financing schemes such as PACE and Sustainable Australia Fund, often an adoption of the local regulatory framework is required.
- An interesting feature of the American based Sealed, Carbon Lighthouse and Metrus Energy business models is that they implemented a portfolio approach to tap into more favorable large-scale project financing. Basically, they aggregate the single building renovation projects into one large project portfolio that is financed. The portfolio is further de-risked by an insurance of the energy savings performance by Munich RE, resulting in a lower cost of capital.
- Another business model worth mentioning is Refresh Renovations. Its offering standardized (interior, energy and exterior) renovation packages. It offers a one-stop-shop approach from design to implementation. However, no financial solutions or energy performance guarantees are provided. The model is replicated as a franchise model in Australia, New Zealand, and the UK.

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