e-SAFE

DELIVERABLE REPORT

WP6 BM, Financial schemes, exploitation & technology transfer

D6.2 BUSINESS MODELS AND FINANCIAL SCHEMES: IDENTIFICATION AND DEVELOPMENT

Due date

M19 31.03.2022

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135

PROJECT DETAILS

PROJECT ACRONYM	PROJECT TITLE
e-SAFE	Energy and Seismic AFfordable rEnovation solutions
GRANT AGREEMENT NO:	FUNDING SCHEME
893135	H2020-EU.3.3.1. - Reducing energy consumption and carbon footprint by smart and sustainable use. LC-SC3-EE-1-2018-2019-2020 - Decarbonisation of the EU building stock: innovative approaches and affordable solutions changing the market for buildings renovation
START DATE	
01.10.2020	

WORK PACKAGE DETAILS

WORK PACKAGE ID	WORK PACKAGE TITLE
WP6	Business Models, Financial Schemes, Exploitation & Technology Transfer

WORK PACKAGE LEADER

Eliza Loucaidou (DELOITTE)

DELIVERABLE DETAILS

DELIVERABLE ID	DELIVERABLE TITLE
D6.2	Business Models and Financial Schemes: identification and development

DUE DATE	ACTUAL SUBMISSION DATE
M18 31.03.2022	21.04.2022

LEAD PARTNER

DELOITTE

CONTRIBUTING PARTNER(S)

UNICT

LEAD AUTHOR(S)

Eliza LOUCAIDOU (DELOITTE), Marianna MORAN (DELOITTE), Anthi CHATZIKYRIAKOU (DELOITTE), Rena FILIPPOU (DELOITTE)

DISSEMINATION LEVEL

- ☒ P - Public
- ☐ PP - Restricted to other programme participants & EC: (Specify)
- ☐ RE - Restricted to a group (Specify)
- ☐ CO - Confidential, only for members of the consortium

TYPE

- ☒ R - Report
- ☐ DEM - Demonstrator
- ☐ DEC Websites, patents filling, videos, etc.
- ☐ OTHER
- ☐ ETHICS – Ethics requirement
- ☐ OPRP - Open Research Data Pilot
- ☐ DATA – Data sets, microdata, etc.

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

REPORT DETAILS

ACTUAL SUBMISSION DATE	NUMBER OF PAGES
21.04.2022	40
VERSION	**FILE NAME**
1.0	e-SAFE_D6.2_BM financial schemes identification and development_V1.0.docx

DOCUMENT HISTORY

VER.	DATE	DESCRIPTION AND FILE NAME	AUTHOR(S) NAME
0.1	1.03.2022	Creation of the document e-SAFE_D6.2_BM & financial schemes: identification & development_V0.1	Marianna MORAN (Deloitte)
0.2	08.04.2022	Update of the document e-SAFE_D6.2_BM & financial schemes: identification & development _V0.2	Marianna MORAN (Deloitte)
0.3	18.04.2022	Critical review after UNICT comments e-SAFE_D6.2_BM & financial schemes: identification & development _V0.3	Marianna MORAN (Deloitte)
0.4	20.04.2022	Critical review e-SAFE_D6.2_BM & financial schemes: identification & development_V0.4	Gianpiero EVOLA, Giuseppe MARGANI (UNICT)
0.5	20.04.2022	Final revision, including Appendices e-SAFE_D6.2_BM & financial schemes: identification & development_V0.5	Marianna MORAN (Deloitte)
1.0	21.04.2022	Submitted version e-SAFE_D6.2_BM & financial schemes: identification & development_V1.0	Gianpiero EVOLA, Giuseppe MARGANI (UNICT)

DOCUMENT APPROVAL

VER.	NAME	POSITION IN THE PROJECT	BENEFICIARY	DATE	VISA
1.0	Gianpiero EVOLA	Technical Manager	UNICT	21.04.2022	GE
1.0	Giuseppe MARGANI	Project Coordinator	UNICT	21.04.2022	GM

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

CONTENTS

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

EXECUTIVE SUMMARY

The purpose of the present report is to analyse various potential business models and financial schemes that will be employed to commercialise the **e-**SAFE solutions.

After setting out the context, by providing an overview of **e-**SAFE's mission and purpose, this report sets out the foundations for developing the core **e-**SAFE actors' business model, namely **e-**IPR and **e-**FOUNDATION, utilising the business model canvas methodology.

e-IPR will be the entity managing the relationships with **e-**SAFE's target market and business partners and receive all license/royalty revenue emanating from such relationships. As a result, **e-**IPR will be the core **e-**SAFE trading company, in charge of holding and developing **e-**SAFE assets and trading profits.

e-FOUNDATION will act as the funding, financing and advocacy vehicle of **e-**SAFE, aiming to make **e-**SAFE affordable to the target customer segments that are not able to proceed with conventional financing. To this end, it will develop an array of financial/funding tools and schemes, which will be made available through new or existing One-Stop Shops in key target locations. Further, it will play an important advocacy role, engaging with stakeholders to promote deep seismic and energy renovation more generally.

This report also explores the financial/funding schemes/tools that **e-**FOUNDATION may have in store for its potential customers on a high-level basis, i.e. a dedicated crowdfunding platform (**e-**CROWD) incorporating a peer-to-peer lending platform, direct financing options, green bonds, energy trading via smart contracts as well as financial and fiscal incentives. D6.3 "White Paper for policy engagement" complements this exercise by aiming to design adaptable financial and fiscal incentives to be included in a template White Paper, to be used for advocacy purposes by **e-**FOUNDATION.

In the context of Task 6.2 "Business models and financial schemes: identification and development", this report constitutes the first out of three versions of D6.2, where Version 2 will aim to settle the set-up plan of the two **e-**SAFE actors and present the final **e-**IPR and **e-**FOUNDATION business models. Further, it will explore logistics, operational models, and governance models of these two entities. Version 3 will include a final plan with respect to logistics, operations, and governance. This will be reflected and updated, if necessary, within D6.4 "Exploitation plan (draft version)".

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

GLOSSARY OF TERMS

ACRONYM	DESCRIPTION
GA	General Assembly
BMC	Business Model Canvas
CLT	Cross Laminated Timber
DSO	Distribution System Operator
DSS	Decision Support System
EBRD	European Bank for Reconstruction and Development
EIA	Energy Investment Allowance
EIB	European Investment Bank
EPC	Energy Performance Contracting
EU	European Union
GEFF	Green Economy Financing Facility
IP	Intellectual Property
JV	Joint Venture
OSS	One-Stop Shop
P2G	Peer-to-grid
P2P	Peer-to-peer
RC	Reinforced Concrete
R&D	Research and Development
USA	United States of America

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

1. INTRODUCTION

1.1 Purpose

The present report emanates from the activities of Task 6.2 in WP6, which is the stage at which the **e-**NABLE group (see below), led by Deloitte Ltd, carries out the analysis of the various potential business models and financial schemes that will be employed to commercialise the **e-**SAFE solutions. The purpose of this Task is to plan how **e-**SAFE will be rolled-out in a strategic way to maximize its market potential, thus making it an affordable solution to any socio-economic context while also ensuring its business model is innovatively effective.

e-NABLE is the actor responsible for creating and updating the **e-**SAFE exploitation plan during the project lifetime. Thereafter, its activities will be subsumed by **e-**IPR and **e-**FOUNDATION (see section 2.2), which will be established by all **e-**SAFE partners in the last phase of the project. The present task leads up to the creation of the **e-**SAFE exploitation plan (Task 6.4) which will include the following elements:

- The business models to be adopted by **e-**SAFE to facilitate the widespread and sustainable uptake of **e-**safe system and methodology.
- The financing/funding schemes to be leveraged by **e-**FOUNDATION to encourage investment in **e-**SAFE renovation.
- The strategies and policies pertaining to **e-**SAFE IPR and knowledge management.
- The strategies and policies in relation to the advocacy activities to be undertaken by **e-**NABLE (and **e-**FOUNDATION after the project's end) for promoting support towards energy-efficient and anti-seismic renovation. Task 6.3 entails the creation of a White Paper that will be used by **e-**NABLE to solicit innovative adaptable financial and fiscal incentives in key target markets.

The present report is the first step of a thre**e-**layer analysis that will be updated twice during the project's lifetime (in M30 and M42). More specifically:

Version 1 of D6.2 (present report): This sets out the scene and context as to the purpose/functions of **e-**FOUNDATION and **e-**IPR, based on acceptable methods for spin offs/spin outs of R&I projects like H2020 (i.e., business model canvas (BMC)), thereby indicating the potential business models and financial schemes that **e-**SAFE may employ. This will form the basis for a series of discussion meetings among the rest of the members of the **e-**NABLE group with the Advisory Board or any other stakeholders to be consulted upon in the months that will follow.

Version 2 of D6.2 (due M30): Version 1 will be revised based on what will be agreed between the **e-**NABLE group members and taking into consideration the input received through consultations during M18-M30. As a result, certain options included in Version 1 may be ruled out and certain new ones may be added, resulting to a consensus for moving forward. Consideration will also be made to logistics, operational and governance matters relating to the two **e-**SAFE actors mentioned above.

Version 3 of D6.2 (due M42): This will reflect how the plan set out in Version 2 will be implemented in practice, e.g. which partnerships will be formed with other entities, and will explore relevant regulations in place to decide the extent to which each proposal in Version 2 can be implemented. As a result, Version 3 will aim to include a final plan with respect to logistics, operations, and governance.

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

1.2 Overview

After setting out the context, by providing an overview of **e-**SAFE's mission and purpose, this report will deliberate on the framework for developing the **e-**IPR and **e-**FOUNDATION's business model, utilizing the BMC methodology. By the end of Task 6.2, **e-**IPR and **e-**FOUNDATION's business model will be specified.

Furthermore, the report will explore, on a high-level basis, the use of the following potential financial/funding schemes/tools that may be employed by **e-**FOUNDATION: crowdfunding, peer-to-peer lending, green bonds, energy trading via smart contracts, fiscal and other financial incentives provided by governments and direct financing with flexible repayment terms.

By the end of Task 6.2 (Version 3), the financial schemes will be matched, in terms of relevance and effectiveness, with the needs of the potential end-users, considering their geographical context, based on the results derived from Task 6.4 (Exploitation of project results) which will be based on Task 6.1 (market segmentation strategy). Finally, this task will define the tools needed to make the financial schemes available and accessible after the end of the project, to **e-**SAFE's target market (e.g., **e-**CROWD, peer-to-peer lending platform etc.).

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

2. e-SAFE project

2.1 Mission & Purpose

e-SAFE's mission is the development of a market-ready decarbonising multi-purpose deep renovation system for buildings, encompassing technological, functional, aesthetic, financial and economic aspects, while overcoming the most significant barriers faced by deep renovation in EU today. It is important to mention that **e-**SAFE aims at combining energy and structural performances. In earthquak**e-**prone countries more particularly, **e-**SAFE integrates energy and seismic upgrades through innovative and combined technological solutions (namely **e-**PANEL, **e-**CLT and **e-**EXOS), applicable to non-historic buildings (i.e., built after 1950) and easily adaptable to specific climatic conditions, seismic levels, and other boundary conditions. Hence, **e-**SAFE will contribute to the decarbonisation of the EU building stock, reducing the occurrence of natural hazards related to climate changes and, at the same time, to the improvement of the social resilience against earthquakes.

The development of the **e-**SAFE system is also accompanied by the training of a wide variety of actors of the deep renovation market, with a focus on professionals and builders, with the aim of enhancing their capacity to address complex energy and seismic design issues in a timely and costly manner.

e-SAFE's key purpose is to combine energy efficiency with seismic safety in deep renovation, to ensure the sustainability of energy retrofitting, addressing a major gap in the market. Moreover, **e-**SAFE aims to offer ongoing technological and methodological innovations through a systematic engagement of stakeholders in co-design and mutual learning, contributing to the need for extensive social acceptance of retrofitting activities and for the development of reliable innovative business models and financial tools catering for various socio-economic statuses (including vulnerable groups), to make retrofitting more financially accessible.

2.2 e-SAFE Actors

2.2.1 **e-**IPR

For the purposes of appropriate management and protection of the IPRs and know-how (and/or trade secrets) arising from Research and Development (R&D) activities, **e-**SAFE partners will establish a new entity, **e-**IPR, that will own and manage the **e-**SAFE intellectual property rights portfolio (**e-**SAFE IP Portfolio) comprising, inter alia, the trademarks of **e-**SAFE systems, any business/trade names, registered patents, copyrights, know-how, domain-names and any upstream and downstream protection related agreements pertaining thereto, in all target countries.

The **e-**SAFE IP Portfolio will be determined according to the business plan and the R&D mission of **e-**SAFE partners, and the economic value of each IP, through a General Assembly (GA). The GA will also define and manage, for the duration of the project, an official Intellectual Property Rights Strategy (IPRs Strategy) and/or a Management of Intellectual Property Rights Strategy (Management of IPRs Strategy). The same strategy/ies will also be used and updated by **e-**IPR after the project completion. This/ese will be included in the IPR protection plan (Deliverable D1.6). The IPRs Strategy/ies will define **e-**SAFE current and future strategic business targets and the R&D direction.

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

Further, **e-**IPR will be the entity managing the relationships with **e-**SAFE's target market and business partners and receive all license/royalty revenue emanating from such relationships, exploiting the **e-**SAFE IPR. Section 3.1.2 elaborates on this role in more detail.

2.2.2 **e-**FOUNDATION

In accordance with the applicable legislation in its country of establishment, **e-**FOUNDATION will be an entity with multiple roles. To set the context, there are three **e**-SAFE organizational challenges that need to be tackled:

a) owning and managing the **e-**SAFE IP portfolio (to be carried out by **e**-IPR);

b) offering financing to customers, possibly through existing or new one-stop-shops (OSSs) (to be carried out by **e**-FOUNDATION);

c) managing a portion from profits (from a. and b. above) for charitable or non-profit purposes (to be carried out by **e**-FOUNDATION).

In its role as a financing vehicle, **e-**FOUNDATION will act as a financial intermediary/broker or cash pool to allow building owners access affordable (and in some cases free) financing to use the **e-**SAFE renovation system, according to their needs and characteristics. **e-**FOUNDATION will create its cash pool pairing the capital (arising from profits) received by **e-**IPR with a variety of other potential financial sources, such as green bonds and subsidies. In turn, a variety of financial instruments will be used by **e-**FOUNDATION to finance/fund building owners under preferential terms. In its capacity as a financial intermediary, **e-**FOUNDATION will arrange for financing through various financial tools, e.g., through crowdfunding or peer-to-peer lending. Further, **e-**FOUNDATION may set-up and manage the operation of OSSs (or internal/external partner with existing ones), to help ensure that financing is not only affordable but also convenient.

In addition, it is envisaged that **e-**FOUNDATION will play an advocacy and public engagement role whereby it will interact with and support initiatives that promote the deep seismic and energy renovation, especially of those that are most in need. In this respect, and as mentioned above, a portion from the profits can be diverted towards non-profit services and initiatives.

Section 3.2.2 analyses **e-**FOUNDATION's envisaged role in more detail.

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

3. Business models

The development of the business models for **e-**IPR and **e-**FOUNDATION entails identifying the problem(s) and needs that the innovative solutions are addressing, the target customers and users of the solutions, the value proposition differentiating the solutions from the existing ones, the channels through which the value proposition will be delivered, as well as the resources, activities and partnerships that are required for the successful exploitation and commercialization of the proposed solutions. The Business Model Canvas (BMC) is a tool that can help in conducting these activities. BMC is a strategic management tool widely used for developing new business models or documenting existing ones. It is indeed a great tool to represent linear aspects of businesses, however it may have drawbacks in capturing models where different players are involved and there are different customer journeys, depending on their needs, motivation to join, involvement in the value creation process, etc. [3]. Nevertheless, **e-**IPR and **e-**FOUNDATION's initial business models are designed using the BMC by identifying the nine**-**building blocks involved. At later stages, the business models may be modified accordingly depending on the results of further deliberations.

3.1 Initial Business model of e-IPR

This section seeks to concisely set out the preliminary idea of how **e-**IPR will work in practice, as well as the relevant considerations that need to be further deliberated upon.

3.1.1 Set-up

3.1.1.1 Purpose

e-IPR will be the entity owning and managing foreground (and any further developed) IPR to ensure a fair, sound, and sustainable commercial development of the **e-**SAFE brand.

In addition, **e-**IPR will be the primary entity (supported by **e-**FOUNDATION) to design and manage the customer relationships with **e-**SAFE's target market, thereby receiving income arising from such relationships.

3.1.1.2 Ownership

It is currently envisaged that the **e-**SAFE Partners will retain the legal ownership of the foreground IPR they (co)invented but will license the exclusive right to exploit the said IPR to **e-**IPR (legal entity). Hence, **e-**IPR will have the economic ownership of the IPR.

The terms of such a licence may be set out in a joint-venture (JV) agreement to be drawn between the Partners, such that once **e-**IPR is established, the agreed-upon licence agreement is immediately put in place.

3.1.1.3 Legal Form

It is foreseen that **e-**IPR will be a limited liability company with a variety of share classes, each corresponding to the various IPR to be owned by **e-**IPR, such that any profit distributions to be made to the Partners will be linked, in a manner to be agreed upon and specified in the JV agreement, to their inventions/contribution.

3.1.1.4 Incorporation

The place of **e-**IPR's incorporation and operation will be determined by all Partners after examining various options proposed by the **e-**NABLE group. In proposing and selecting the place of incorporation/operation, consideration should be paid to:

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

- Financial and fiscal incentives with respect to IP-related revenues (e.g., IP Box regimes).
- Legal framework surrounding **e-**IPR's operations.
- Practicality/efficiency of management.

3.1.2 Business Model Canvas

3.1.2.1 Customer segments

The key target segments can be categorized in the following groups:

A. Contractors/engineers

These are the building professionals that are directly involved in energy efficiency/seismic safety retrofitting and are expected to be the main customers of **e-**IPR and **e-**SAFE more generally.

They will be contracting directly with **e-**IPR, through one of the potential means set out in section 3.1.2.4 below. As a result, and depending on the contractual relationship, they will be paying license/royalty/training fees to **e-**IPR for the use of **e-**SAFE IPR.

B. Architects/designers

These building professionals are also directly involved in energy efficiency/seismic safety retrofitting but are not expected to be key customers of **e-**SAFE. It is expected that revenues in relation to this customer group will be derived predominantly from training and potentially licensing of **e-**SAFE methodology (to the extent this covers architectural/design issues).

C. Real estate agents/developers

This group comprises of real estate intermediaries which are not directly involved in the details of energy efficient/seismic safety retrofitting. However, as apparent from the indicative results of the market survey undertaken under Task 6.1, this group considered that their customers are generally interested in anti-seismic and energy efficient properties while they, themselves, are also generally very interested in developing/promoting anti-seismic and energy-efficient properties in the future. Therefore, the formation of business partnerships with this group is expected to have potential.

D. Consultants/ESCOs

This group refers to energy-efficiency consultancies which may refer end-customers to various energy renovation solutions, such as **e-**SAFE. As a result, business partnerships with this group also appear promising.

E. Building Owners

It is generally envisaged that **e-**SAFE will be commercialised based on a Business-to-Business (B2B) model. Hence, building owners may only be a potential customer segment if subcontracting (see customer relationship type C in section 3.1.2.4. below) is adopted as one of the potential business models to be employed by **e-**IPR.

If building owners form a key target segment for **e-**IPR, then building managers and associations of tenants will need to be considered as part of this group, apart from homeowners, landlords and individual tenants.

The above segments should be combined with building typology (e.g., public buildings, block of flats) and geographical parameters (i.e., specific location to reflect seismic activity, presence of incentives etc.), to form complete potential/actual target markets, as per the market segmentation strategy set out in D6.1.

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

3.1.2.2 Value propositions

e-IPR's value propositions should be considered to reflect the **e-**SAFE brand's value propositions, being the key **e-**SAFE trading entity.

e-SAFE integrates both energy and seismic upgrades through innovative and combined technological solutions (mainly **e-**PANEL, **e-**CLT and **e-**EXOS), applicable to non-historic buildings (i.e., built after 1950) and easily adaptable to specific climatic conditions, seismicity levels and other boundary conditions. Its constituent components/technical solutions are the following:

- **e-**PANEL consists in adding to the outer walls customizable, prefabricated, multifunctional panels with low environmental impact, made of a timber structure combined with local insulating biomaterials and the desired finishing.
- **e-**CLT consists in adding to the outer walls cross-laminated timber (CLT) panels, connected to the existing reinforced concrete (RC) frame via seismic energy dissipation devices (dampers).
- **e-**EXOS consists in strengthening the existing RC-framed structure with a metal exoskeleton, made of bi-dimensional bracings equipped with seismic dampers and connected to the existing RC frame.
- **e-**THERM consists of centralized thermal systems with high-efficiency and low-GWP heat pumps fed by PV modules, where storage tanks and suitable control logic will help maximising the PV self-consumption rate.
- **e-**TANK consists in innovative thin and easily integrable decentralized hot water tanks that include a plug-and-play hydraulic unit.
- **e-**BEMS: To ensure an effective monitoring and management of the technical systems, a specific open-source Building Energy Management System, namely **e-**BEMS, is being developed. **e-**BEMS will measure indoor temperature, CO2 concentration, indoor humidity and electricity consumption in real-time to collect information about performance of the **e-**SAFE system.
- **e-**DSS is a Decision Support System that will assist technicians (e.g., architects, designers, contractors, engineers, energy consultancies) during the co-design stage of a renovation project, providing information about efficiency, costs, and suitability of the different **e-**SAFE solutions.

Generally, the **e-**SAFE apparatus of solutions mentioned above is potentially relevant to all customer segments mentioned in section 3.1.2.1 above, to the extent these are involved in the exploitation process. Of course, the **e-**EXOS solution is mostly relevant to customers present in seismic countries though. Specific connections between **e-**SAFE solutions and customer segments will be explored in more detail in updated versions of D6.1.

e-IPR will be offering a set of accessible, effective, flexible, and aesthetically attractive retrofitting solutions (mentioned above). Compared to the various competitors in the market, **e-**SAFE, offered through **e-**IPR, may be unique in how well-rounded a solution it is, in catering for all or most of its customers' retrofitting needs.

In summary, the following points are considered to be **e-**IPR's key features and strengths, which add value to the service offering towards the customer segments identified above:

- Integrated seismic and energy retrofitting package system
- Co-design process and stakeholder engagement offering customised solutions
- Modular solutions, flexibility
- Prefabricated solutions, low disruption to occupants
- Innovative elements (including software tools)

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

3.1.2.3 Channels

Taking into account that channels are the avenues through which customers encounter **e-**SAFE and become part of the sales cycle, it is anticipated that **e-**IPR will be reached by potential customers and offering services through:

- OSSs potentially operated by **e-**FOUNDATION, or existing ones, where the **e-**SAFE system will be marketed and presented.
- The **e-**SAFE platform where training material and delivery will be made available.
- Physical/virtual training workshops where **e-**SAFE solutions will be presented and analysed.
- Influencers may also play a key role in connecting **e-**SAFE with potential customers [4].
- Offline advertising through exhibitions or fairs.
- Other existing platforms, affiliates (e.g., business partners), associations of professionals, energy agencies, targeted blogs for professionals.

3.1.2.4 Customer relationships

It is contemplated that a business model co-creation approach should be adopted by **e-**IPR, where value and the value chain are co-created with customers, tailoring the offering and the relationship to their needs and circumstances. This approach has been suggested by a recent thorough review of various business models in the context of sustainable building renovation [5].

To this end, **e-**IPR should have an array of options developed, analysed and ready, to choose from. These options could be ranked by preference, depending on each customer segment/context. The ranking exercise would be a result of careful research on a target market location level and experience gained through operations. At the end though, **e-**IPR should be open to customer's suggestions even if these are outside the boundaries of the considered options and be flexible in the negotiation process with each customer.

Options:

A. Licensing: Through a licensing agreement, the licensor (property owner) gives permission to another party (licensee) to use their brand, patent, or trademark. The agreement contains details on the type of licensing agreement, the terms of usage, and the compensation to the licensor. Contract types vary based on what is being licensed. Licensing agreements also alleviate any disputes related to sales, issues of quality, and royalties [6]. Could be offered to any of the customer segments to the extent they would use the **e-**SAFE methodology, IPR & brand to carry out a project.

B. Franchising: A franchise is a type of license that grants a franchisee access to a franchisor's proprietary business knowledge, processes, and trademarks, allowing the franchisee to sell a product or service under the franchisor's business name. In exchange for acquiring a franchise, the franchisee usually pays the franchisor an initial start-up fee and annual licensing fees [7]. ESCOs or construction companies could obtain an **e-**SAFE franchise such that they would only implement **e-**SAFE methodology in their operations.

C. Subcontracting: Subcontracting is the practice of assigning, or outsourcing, part of the obligations and tasks under a contract to another party known as a subcontractor [8]. Under this option, **e-**IPR would be the main contracting party with the end-customer and would thus sub-contract the implementation of the project to all building professionals required. As a result, **e-**IPR would be the only one to enjoy profits and bear potential losses/risks/liability exposure on contracts with customers.

D. Partnership: A partnership is an official arrangement by two or more parties to manage and operate a business and share its profits [9]. **e-**IPR could partner with a main contractor [10]

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

with exposure to risks and profits/losses being proportionate to each party's partnership interest (to be negotiated in each case).

E. **Joint venture:** A joint venture (JV) is a business arrangement in which two or more parties agree to combine their resources and join forces to accomplish a specific task, which can be a new project or any other business activity [11]. **e-**IPR could partner with a main contractor [12], co-sharing risks and profits/losses (50-50).

F. **Consulting/training:** **e-**SAFE specialists to provide training and consulting services to all customer segments, according to their type of involvement in **e-**SAFE project implementation.

The details of each of the above options (e.g., timing, pricing) will be considered in further versions of D6.2 after deliberations within the **e-**NABLE group.

3.1.2.5 Key activities

The key **e-**IPR activities will be the following:

- Exploit **e-**SAFE IPR by developing and managing customer relationships according to the exploitation strategy.
- Maintenance of an IPR protection plan. The foundations of this plan will be laid by T1.6.
- Maintain and protect all **e-**SAFE IPR.
- Perform continuous market research to keep the market segmentation and market strategies evolving and updating the exploitation strategy. This should be done by taking lessons learned from previous activities, tracking new opportunities, exploring, and working on weaknesses and strengths (as per D6.1).
- Perform R&D to enhance the foreground IPR and/or produce new related IPR.

3.1.2.6 Key partnerships

Key partnerships will include:

- **e-**FOUNDATION which may operate or (internal or external) partner with OSSs that will act as a channel for **e-**IPR and will be financed by **e-**IPR through a variety of potential options, e.g., loans, non-refundable contributions, equity capital, convertible loans.
- Continuous collaboration with the Technical Partners for IP development/maintenance.
- Working closely with IP Lawyers specializing in each target market's legal framework, to maintain and/or enhance IP protection.
- Wider ecosystem actors, acting as awareness channels, such as local authorities, energy agencies, non-governmental organisations (NGOs) acting within this sphere etc.

3.1.2.7 Key resources

e-IPR's key resources will consist of:

- Intellectual property, such as the foreground IPR developed in the context of **e-**SAFE project.
- Human resources such as the trainers/consultants who will be involved in the delivery of the trainings/seminars and other advisory sessions, as well other experts (e.g., legal advisers, market analysts, marketing experts), project managers, and support staff.
- Financial resources to cover the cost of collaborators/subcontractors for example legal / financial advisors (if outsourced).

3.1.2.8 Cost structure

The cost structure of **e-**IPR is value**-**driven, as it is focuses more on the value created for the customers rather than minimising the costs of developing its innovative solutions.

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

Key costs to be incurred by **e-**IPR may include:

- Legal fees for IPR consulting and protection, negotiation and contracting with customer segments etc.
- Salary costs for internal experts
- Subscriptions/licenses to technical databases
- Market survey and research costs
- Marketing expenses
- R&D costs for IP development
- Loans provided to **e-**FOUNDATION

3.1.2.9 Revenue streams

Each of the following revenue streams relates to one of the customer relationship types listed in section 3.1.2.4 above and corresponds to the value propositions mentioned in section 3.1.2.2 above. In some cases, revenue streams can be linked with specific customer segments (section 3.1.2.1) but in other cases this is not feasible, at least at the current stage.

A. Licensing income: applied on the right to use the **e-**SAFE methodology and branding IP (fixed fee per year). In addition, this revenue stream could apply to the right to exploit the **e-**BEMS or **e-**DSS software. It is envisaged that this revenue stream would relate to all customer segments, especially designers and architects, but probably excluding real estate intermediaries.

B. Royalty income: applied on the sale of **e-**SAFE components (usag**e-**based). For example, each time an **e-**CLT is produced and sold, a fixed royalty fee would apply. We expect this revenue stream to mostly relate to contractors and engineers.

C. Franchise income: received from any entities carrying the **e-**SAFE franchise. This would generally apply to consultancies/ESCOs seeking to offer the **e-**SAFE solutions to clients. As a result, this revenue stream is not directly connected with any of the **e-**SAFE solutions but rather with the right to become an **e-**SAFE partner.

D. Revenue from building owners: service fees received to the extent **e-**IPR acts as the first contractor with the end-customers. This would apply to the sale of any **e-**SAFE solutions.

E. Partnership income: received in the context of any partnership formed with a building professional/intermediary/consultancy. This stream would comprise of profits arising from an **e-**SAFE renovation project where **e-**IPR would cooperate with another project partner to share risks and opportunities based on agreed-upon proportions.

F. Joint venture income: received in the context of any joint venture formed with a building professional/intermediary/consultancy. As above, this stream would consist of profits arising from an **e-**SAFE renovation project where **e-**IPR would cooperate with another project partner to share risks and opportunities equally.

G. Consulting/training fees: received for any consulting/training services offered to any of the customer segments mentioned in section 3.1.2.1.

The details regarding each potential revenue stream (e.g., percentages, pricing, terms etc.) will be explored in further versions of D6.2, after deliberation within the **e-**NABLE group.

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

3.2 Initial business model of e-FOUNDATION

This section seeks to concisely set out the initial business model of **e-**FOUNDATION, as well as the considerations that need to be further deliberated upon.

3.2.1 Set-up

3.2.1.1 Purpose

e-FOUNDATION will be the non-profit entity managing financial assistance for **e-**SAFE customers, who are not able to access conventional financing easily. In this respect and in accordance with the applicable legislation of its country of establishment, **e-**FOUNDATION will play the role of a financial intermediary, i.e., arrange for financing to be provided by third parties, or play the role of the financier/funding party, where all other options are ruled out.

The key mission of **e-**FOUNDATION would be to ensure that a financing option or a financial/fiscal incentive is available for each key potential **e-**SAFE customer. In this respect, **e-**FOUNDATION will match the potential financial schemes it may employ with each customer segment, according to their socioeconomic context (see section 4).

Further, **e-**FOUNDATION may set-up and manage OSSs (or internal/eternal partner with existing ones) in key target markets, potentially in a digital form. The purpose of the OSSs would be to support **e-**SAFE customers from a practical perspective, so that they are encouraged to proceed with **e-**SAFE renovation.

Last but not least, **e-**FOUNDATION will engage in policy and public engagement activities in order to further support energy and seismic renovation (especially for vulnerable communities), by allocating a portion of its available resources (e.g. profits) to such advocacy activities. Details will have to be defined in the entity's articles of association/bylaws upon establishment.

3.2.1.2 Ownership

e-FOUNDATION will be owned collectively by all **e-**SAFE partners. The specifics of ownership (e.g. holding percentages etc.) may be set out in the aforementioned JV agreement (see section 3.1.1.2) and will further be elaborated upon in subsequent stages.

3.2.1.3 Legal Form

It is foreseen that **e-**FOUNDATION will be originally incorporated as a limited liability company but currently there are three options considered with regard to its eventual classification:

A. Non-for-profit organisation

Not-for-profit organizations use their surplus revenue to help pursue the organization's objectives and purpose. This type of organizations does not aim at earning money for their owners and their income is not distributed to the group's members, directors, or officers [11].

B. Foundation

Private foundations are considered non-for-profit entities in some countries (e.g. Italy) while in others they are established under a separate legal framework (e.g. Cyprus). While the definition of a foundation differs from country to country, typically they involve the management of funds and assets dedicated to a specific purpose. They are usually created and maintained through funds received from an individual, a family, or a business [14]. All foundations in Cyprus are registered with the Ministry of Interior. The application to the Ministry has to include a founding act, the addresses and names of the administration members, the foundation's name, the headquarters address of the organization, and the

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

foundation emblem (if applicable). A foundation is established after registering its incorporation act with the Register of Institutions.

C. Social enterprise

As defined by the European Commission, a social enterprise is an operator in the social economy aiming at having a social impact rather than make a profit for its owners or shareholders [12]. The profits of a social enterprise are mainly reinvested to achieve its social objective. Nevertheless, a social enterprise should be financially sustainable and achieve its long-term viability as an independent entity.

In order to decide which form **e-**FOUNDATION will eventually take, the following aspects will be considered:

- Availability of grants/subsidies/other financial incentives
- Availability of fiscal incentives
- Ability to produce profits to be fully/predominantly reinvested
- Restrictions as to the ability to undertake financing or financing-related activities

3.2.1.4 Incorporation

The location of **e-**FOUNDATION's incorporation and operation will be determined by all Partners after examining various options proposed by the **e-**NABLE group. In proposing and selecting the place of incorporation/operation, consideration should be paid to:

- Financial and fiscal incentives available
- Regulatory framework surrounding **e-**FOUNDATION's operations
- Practicality/efficiency of management

3.2.2 Business Model Canvas

3.2.2.1 Customer segments

The main target segments can be categorized in the following groups:

A. Low-income/energy poor individuals

This customer segment entails individuals that are energy-poor at the time they seek to proceed with **e-**SAFE renovation or are foreseen to be so during the renovation works.

Further, this segment includes both owners of private condominiums (including building managers) and tenants seeking to organize with other tenants in order for the landlords to proceed with renovation or tenants' associations.

Fuel or energy poverty can be illustrated in three situations [13]:

i. Residents are not able to keep their homes warm sufficiently

ii. Dwellings with bad or dangerous construction issues such as leaking roof, rot windows and damp walls/ ceilings

iii. Inability to pay utility bills

According to BPIE's Energy Poverty Handbook, "energy poverty is a growing phenomenon everywhere in the EU since 2008. It is caused by an alarming mix of poorly insulated homes, rise in energy prices paid by the final consumers, and the stagnation of disposable income due to the general economic situation" [1].

B. Middle-class individuals

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

These are individuals that are above the energy-poor threshold, either at the time they seek to proceed with **e-**SAFE renovation or during the renovation works but are nonetheless not willing to proceed with conventional financing.

As above, this segment includes both owners of private condominiums (including building managers) and tenants seeking to organize with other tenants for the landlords to proceed with renovation or tenants' associations.

C. Private bodies

This category may include any private institutions, which are generally profit-making. For instance, these would include private social housing corporations, real estate (e.g., block of flats) owners, commercial building owners, private schools etc.

D. Public/non-for-profit bodies

This segment refers to non-for-profit institutions, whether these are governmental, semi-governmental or civil society organisations.

For example, these could be public school owners, public building owners, public housing providers etc.

3.2.2.2 Value propositions

The key **e-**FOUNDATION value propositions essentially constitute the following:

- Provision of OSS experience where procedural, financial, engagement, and organising support will be provided, fre**e-**of-charge to potential **e-**SAFE customers. Technical and design advice may also be provided on a high-level by OSSs, while reference to licensed building professionals/intermediaries/consultancies will be made for more in-depth advice. This value proposition corresponds to all customer segments mentioned above as the need for a practical and convenient retrofitting planning process is held by all potential customer segments.
- Affordability of the **e-**SAFE renovation package through the provision of a variety of financial schemes, catering for a variety of socio-economic contexts. Again, this value proposition corresponds to all customer segments mentioned above but particularly to segment A for which obtaining of financing is the hardest.

3.2.2.3 Channels

Taking into account that channels are the avenues through which customers encounter **e-**SAFE financing tools and become part of the sales cycle, it is anticipated that **e-**FOUNDATION may be reached by potential customers and offering services through:

- OSSs through which **e-**FOUNDATION will be interacting with potential customers and offering its services (see more details in section 3.1.2.4. below).
- The **e-**SAFE platform where the **e-**FOUNDATION will be marketed and presented.
- Physical workshops where **e-**SAFE financing tools may be presented.
- Influencers may also play a key role in connecting **e-**SAFE with potential customers, through the **e-**FOUNDATION [3].
- Offline advertising through exhibitions or fairs.

3.2.2.4 Customer relationships

e-FOUNDATION will have a direct and personalised customer relationship potentially through the OSSs it may be managing. Customers include any person/entity that proceeds with **e-**SAFE renovation, whether or not they pay consideration for this service (e.g. in cases of fully-funded projects). Through the OSSs, the following services/activities would be provided/engaged in:

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

- Provision of tailored-made advice as to appropriate financing tools/schemes, according to each potential customer's profile.
- Provision of procedural guidance as to the application for various financing & fiscal incentives (see sections 4.5 & 4.6), including administrative filling.
- Negotiation with potential customers regarding the provision of direct financing or funding, where other options are not available (section 4.7).
- Acting as an intermediary for raising finance/funding through others (see sections 4.1, 4.2 and 4.3).

e-FOUNDATION will, under a separate organisational division, play an advocacy and social impact role whereby the following are examples of the activities to be undertaken:

- Soliciting further help ensure all socio-economic contexts can potentially access energy and seismic retrofitting. Supporting this activity is Task 6.3 which entails the design of a White Paper, including innovative adaptable fiscal and financial incentives, to be used by **e-**NABLE and **e-**FOUNDATION for their advocacy activities.
- Reach out to vulnerable communities (e.g. through existing programs, NGOs, energy agencies, public bodies) to invite them to visit the OSSs and explore available options in order to help them proceed with **e-**SAFE renovation.
- Engage in public engagement activities to help educate the public about the pressing need of energy and seismic retrofitting.
- Advocate for public intervention where common utility issues interfere with **e-**safe implementation.
- Help organise tenants to request from their landlords to proceed with renovation.

3.2.2.5 Key activities

e-FOUNDATION's key activities will consist of:

- Financing or acting as a financial intermediary.
- Potential set-up and management of OSSs or interacting with existing ones.
- R&D activities.
- Policy engagement.

3.2.2.6 Key resources

The resources which are necessary for successful operation of the **e-**FOUNDATION consist of:

- OSSs (the organisational and operational structure of these will be further considered at later versions of D6.2).
- Internal staff costs (e.g., support staff, project managers, financial advisors, researchers).
- External financial advisors to inform/guide the potential operation of OSSs at each target market location.
- External legal advisors for the negotiation and conclusion of financing agreements.
- Capital provided by **e-**IPR through equity or loan financing.
- External funds provided by national and supranational bodies/schemes
- Volunteers (to help with policy/public engagement activities).

3.2.2.7 Revenue streams

e-FOUNDATION's main revenue streams consist of the following:

- Interest income accrued on direct financing activities. As direct financing may be provided only where no other options exist (see section 3.2.2.4), it is envisaged that this source of income

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

will be mainly derived from customer segment A which is segment least likely to have other financing options available to them.
- Facilitation income earned on arranging for third-party financing. This may be derived from any of the customer segments identified in section 3.2.2.1 where **e-**FOUNDATION arranges for financing to be provided by third parties (see sections 4.1, 4.2 and 4.3).

The specific methods and levels of generating the abovementioned revenue streams will be explored in the context of the updated versions of D6.2, as already mentioned.

It is considered that certain **e-**FOUNDATION's activities will be non-for-profit, for example:

- Services offered through OSSs, where little or no revenue will be generated through the provision of advice.
- Financial support to low-income/energy poor individuals (see section 4.7).
- Advocacy/public engagement activities (see section 3.2.2.4)

3.2.2.8 Key partnerships

Key partnerships will include:

- Financing relationship with **e-**IPR, which will provide capital for **e-**FOUNDATION's operations. It is envisaged that part of this capital will be non-refundable, e.g., equity capital or non-refundable contributions.
- National energy agencies/bodies/other stakeholders.
- Organisations representing the OSSs, either existing or new ones to be perated by **e-**FOUNDATION, whether these are governmental, semi-governmental, civil, or private organisations.

3.2.2.9 Cost structure

Key costs to be incurred by **e-**FOUNDATION will include:

- Legal fees (e.g., consulting, negotiation, contracting etc.).
- Salary costs.
- External financial advisors.
- Potential operating & maintenance costs of OSSs.
- Interest expense on any loans payable to **e-**IPR.
- Loans provided to customers

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

4. FINANCIAL SCHEMES

The present section explores certain financial schemes or tools that **e-**FOUNDATION may offer or present to potential customers (see section 3.2.2.1).

4.1 Crowdfunding

4.1.1 Definition

Crowdfunding is a way of raising money to finance projects or businesses by collecting money from a large number of people via crowdfunding platforms which are expected to provide a secure and easy service.

The key types of crowdfunding relevant to **e-**FOUNDATION's potential customers are:

- Donation-based crowdfunding, involving the provision of financial support without the expectation of a financial or material return. Individuals offer small amounts to meet a larger funding target which typically relates to a charitable purpose [5].
- Rewards-based crowdfunding involving the provision of financial support in return for a (non-financial) material reward, prize or gift, at a later stage of their contribution [5].
- Generation-based crowdfunding, a type of rewards-based crowdfunding in which the return consists in the supply of electricity or a discount on electricity rates.
- Profit-sharing/revenue-sharing, involving financial support for sharing future profits or revenues with the crowd later [5].
- Peer-to-peer lending which is explored in a section 4.2 below.

4.1.2 Relevant market segment(s)

Citizen financing (another term for crowdfunding) is generally mostly applicable for owners of rented and owned residential buildings rather than public or corporate buildings [15]. Hence, crowdfunding is expected to meet the needs of customer segments A (low-income/energy poor individuals) and B (middle**-**class individuals).

It is expected that donation-based crowdfunding would be more suitable to customer segment A (low-income/energy poor individuals) which may be considered a vulnerable group, since this type of crowdfunding is mostly applicable to charitable purposes.

Rewards-based crowdfunding could be more appropriate to customer segment B (middle**-**class individuals) since this segment is not considered a vulnerable group and hence supporting this segment would generally coincide with an expectation of return.

It may be envisaged that customer segments C and D (owners of corporate or public buildings) could benefit from profit-sharing/revenue-sharing crowdfunding insofar as the owners are engaged in commercialising renovated properties (e.g., through deriving rental income). In addition, they could be engaged in generation-based crowdfunding insofar as they expect to derive material energy savings from retrofitting (applicable to energy-intensive/major building complexes) that they could share with the funding crowd.

4.1.3 Existing crowdfunding platforms

Examples of existing crowdfunding platforms are the following:

Abundance investments is a UK-based online platform allowing investors the opportunity to invest in green and social projects that contribute towards a clean, sustainable infrastructure. This platform is accessible to virtually everyone with investments starting from as little as 5 GPB [16].

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

Econeers is a crowdfunding platform running in Germany since 2013. It offers the opportunity to invest funds in pre-selected projects starting from 250 EURO with attractive return options. This gives investors the opportunity to invest in projects undertaking renewable energy efficiency and sustainable energy production while receiving returns from the profits of sustainable projects [17].

CitizenEnergy has been used EU-wide since 2014 and is funded by the Intelligent Energy Europe Programme of the European Union. It is based in Portugal and has funded projects in Portugal, Italy, Spain, Greece, Belgium, and France, among others. It works as a portal that brings individuals interested in the energy transition in contact with energy efficiency projects looking for funders. This allows funders to acquire equity, issue a loan, or purchase a bond (as well as some projects with traditional crowdfunding 'rewards' for more charitable endeavours) specifically for sustainable energy projects across Europe [18].

4.1.4 **e-**CROWD

It is foreseen that **e-**SAFE renovation projects could be funded both through existing platforms focusing on environmental sustainability (as above), and a new dedicated platform called **e-**CROWD.

e-CROWD would specifically host projects that implement the **e-**SAFE methodology. As potential projects would be subject to broad due diligence for their potential to implement **e-**SAFE, what will be a tried and-tested methodology, potential investors are expected to be more comfortable in proceeding with investment through such a dedicated platform. In addition, **e-**SAFE projects would conserve their branding by being hosted on an **e-**SAFE branded platform, increasing their market appeal and sense of **e-**SAFE community.

The platform may allow for various types of crowdfunding mentioned above (section 4.1.1) through private or institutional investors who would finance the implementation of the **e-**SAFE system in specific projects. Investors making a donation-based contribution would have a lower minimum contribution threshold than those making a rewards/generation-based contribution or have a revenue/profit-sharing arrangement.

As regards the potential of hosting generation-based crowdfunding, the platform could agree with energy suppliers on a discount to the investor's electricity bill, paid for either via a monetary payment or in exchange for excess energy produced by the various building-owners through the application of the **e-**SAFE methodology.

Further details about the scope and logistics of the **e-**CROWD platform will be explored in updated versions of D6.2. Considerations to be made include the following:

- Set-up costs of a new platform
- Potential to use a white label platform
- Potential to partner with an existing platform
- Regulatory framework of crowdfunding platforms in specific locations
- Marketing plan
- Follow-up work after project funding
- Due diligence processes [19]

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

4.2 Peer-to-peer lending

4.2.1 Definition

Peer-to-peer lending is a type of crowdfunding and is an alternative to a bank loan. The matching of lenders with borrowers is made via an online platform which performs financial due diligence on the borrowers.

Some of the key features of peer-to-peer lending are the greater flexibility of interest rates, the loan is repaid through direct debits to the platform and disclosure requirements are the same as those of a bank, but they are made public to all crowd-lenders [20].

4.2.2 Relevant market segment(s)

It is expected that peer-to-peer lending is mostly applicable to customer segment B (middle-class owners of residential buildings) but also to customer segment C (private bodies), small/medium sized entities most probably.

This is so because customer segment D (public bodies) may be expected to seek raising funding through other more preferential means which do not feature borrowing risks, while customer segment A is not expected to be able or willing to take out a loan, even though a peer-to-peer lending platform.

4.2.3 Existing peer-to-peer lending platforms

Examples of existing crowdfunding platforms that incorporate peer-to-peer-lending are the following:

In Germany, a crowdfunding platform named **Bettervest** has been used to raise capital for energy efficiency and renewable energy projects since 2013. Bettervest only finances projects that are ecologically sound and able to achieve high savings in both costs and energy. The investors receive back part of their investment and a fixed interest rate annually throughout the contract period [21].

Operating in the Netherlands since 2012 is **Oneplanetcrowd**, a platform that finances sustainable innovation and energy projects (among others). In respect of energy projects, flexible crowd-based financing options can range from 200.000 Euro to more than 10 million Euro, with interest rates ranging from 4-7% and a duration of 1-15 years [22].

Another crowdfunding platform is **Fundeen** operating in Spain since 2017, allowing citizens to invest in environmentally sustainable projects and receive benefits from their investments. The projects financed thus far have been solar PV projects (not like **e-**SAFE). Individuals can invest as little as 500 Euro with annual returns of over 7% [23].

Future Bricks offers corporate and institutional lenders the opportunity to fund UK's residential-led property development projects [24].

4.2.4 **e-**SAFE peer-to-peer lending platform

It is envisaged that the **e-**CROWD platform may also incorporate a peer-to-peer lending function, exclusively hosting projects implementing **e-**SAFE, which would allow financiers to obtain mortgages over respective properties, making funding of larger-scale projects more feasible and faster.

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

However, for such a platform to operate, a very stringent risk assessment and management process would have to be followed in selecting projects to be onboarded onto the platform, including the following steps:

- Financial risk assessment (looking at profit margins, contingency planning, financials, comparables etc.)
- Asset quality assessment (looking at whether it is subject to a first/second charge, its market strength and its current valuation)
- Independent due diligence (looking at title checks, individual checks, independent valuation etc.)
- Borrower's track record (looking at background checks, credit checks, reference checks, historical experience etc.) [24]

The same considerations that apply to the set-up of **e-**CROWD, mentioned in section 4.1.4, also apply to incorporating a peer-to-peer lending platform within **e-**CROWD.

4.3 Green bonds

4.3.1 Definition

A green bond is a type of fixed-income instrument that is specifically earmarked to raise money for climate and environmental projects, and it works as any other corporate or government bond. Borrowers issue these securities in order to secure financing for projects that will have a positive environmental impact and investors who purchase these bonds can expect to make profit as the bond matures, and there are often tax benefits for investing in green bonds [25].

In 2017, green bonds scored a record high value, $161 billion worth of investment worldwide and the leaders of green bonds are the USA and the EU [24]. In 2020, Green bonds issued by supranational organizations totalled 10.17 billion U.S. dollars, while in the first half of 2021, the green bond issuance in the United States equalled 37.6 billion U.S. Dollars and in Germany equalled 29.1 billion U.S. dollars [26].

The prevalence of green bonds rises every year. An example is the decision of the EU to establish an EU green bond standard (EUGBS) which can play an increasingly important role in financing assets needed for the low-carbon transition. At the current moment the EUGBS is a voluntary standard to help scale up and raise the environmental ambitions of the green bond market [27].

Sustainability bonds are similar to green bonds, but their scope is wider, encompassing both environmental and social sustainability [28].

4.3.2 Relevant market segment(s)

Green bonds are generally mostly applicable to private and public bodies [29] as these require economies of scale to overcome the cost associated with raising them. Hence, customer segments C and D are expected to potentially benefit from the issuance of green bonds while projects associated with customer segments A and B are expected to be of too small a size for the issuance of green bonds, also providing no/little return to cover the green bond costs.

4.3.3 Examples

Examples of institutions that have raised green bonds and initiatives relating to green bonds are the following:

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

The "National Bank of Greece" became the first Banking Institution in the country to issue a green bond in 2020. It issued a six-year green bond and raised 500 million Euro to fund green economy projects such as hydropower, wind parks, and photovoltaic parks [30].

Another example is "TenneT", an electricity company that operates in the Netherlands and Germany that issued two bonds during 2020, raising over 1 billion Euro. Both were issued to finance projects on the interconnection of larg**e-**scale offshore wind turbines [31].

The Malta Stock Exchange has introduced a new framework to encourage green finance in Malta, in the form of a Green Bond List. Potential issuers looking to obtain financing through the listing of qualifying securities may expect to benefit from a 50% reduction in listing fees and enhanced visibility to investors looking for green investments [32].

Another example is the Luxemburg Green Exchange (LGX) which was created in 2016 by Luxemburg Stock Exchange (LuxSE) and it is a platform for green, social and sustainable securities. It has an international footprint with 135 issuers from 32 countries, issuing securities in a total of 32 currencies [33].

Slovenia issued its first sustainability bond in 2021, becoming the second EU member state to proceed with sustainability bonds (Luxemburg was the first). The issue counted on €1 billion which can be considered as oversubscribed. The demand was over €8.4 billion among more than 200 investors [34].

Other countries, such as Cyprus [29], are planning to issue a green or sustainability bond in the near future.

4.3.4 **e-**SAFE green bonds

Green (or sustainability) bonds are relevant to **e-**SAFE in the following ways:

- If governments of target market locations issue green/sustainability bonds, they could use the funds raised to finance or subsidise **e-**FOUNDATION's operations, including the provision of financing to low-income/energy-poor individuals.
- **e-**FOUNDATION could raise green bonds in its own name to finance various customer projects. However, the regulatory and operational implications of issuing a green bond will be manifold and will differ from country to country. This may be an option for **e-** FOUNDATION to consider once it is mature. The green bond could be combined with another financial scheme/tool (e.g., subsidy, crowdfunding) to reduce the costs of issuing the bond. **e-**FOUNDATION may be able to raise a green bond in a customer's name (e.g., Private/public bodies) where such a customer is not able to or willing to raise the bond on its own. Additionally, **e-**FOUNDATION may raise a green bond on behalf of two or more customers where these would not be able to raise a green bond on a standalone basis.

4.4 Energy trading via smart contracts

4.4.1 Definition

Smart contracts are one application of blockchain technology that is arguably the most relevant for the energy application layer [35]. Smart contracts are effectively programs which are loaded into, and sit alongside traditional transactions within a blockchain, that can automatically execute pre-definable code when called (for example, automatically executing the terms of a contract when trigger events occur). The important thing about smart contracts is that they reside in a decentralised system accessible to anyone, that doesn't require the involvement of an intermediary party [36].

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

As a result, smart contracts help automate and accelerate negotiations and contracting between the parties [37]. In turn, they can lead to self-organising energy communities or microgrids [5].

However, according to a recent systematic review of smart contracts used for energy applications specifically (based on 178 peer-reviewed articles), smart contracting is still at a development stage and there are still open challenges surrounding its implementation, such as privacy concerns, risk of cyber-attacks (such as hacking) and the energy required for computation and blockchain deployment of the contracts. So far, smart contract applications in energy systems have been mostly focused on research, proof-of-concept and demonstration projects (such as P2P demonstration projects run in a local community or microgrid) [19].

Smart contracts are used for energy trading by matching buyers with sellers (comparing the amount of energy and price of incoming bids and offers) and validating a trade as the bids come. Once the smart contract has validated a trade, which consists of a price, an amount of energy and a time of delivery, the smart contract for peer-to-peer (P2P) trading can then be used to analyse the monitoring of actual consumption and production coming from the smart metering infrastructure. In turn, this triggers the settlement within the smart contract, in order to distribute rewards and penalties according to the contract conditions. When P2P trades do not cover all the needs of consumers or the generation from producers, smart contracts can then facilitate transactions between the peers and the grid (P2G) [19].

4.4.2 Relevant market segment(s)

Any customer implementing sustainable energy solutions is theoretically capable of participating in P2P or P2G trading through smart contracts, as long as the necessary infrastructure is in place, which at the time-being is nowhere established.

4.4.3 Examples

The pilot use of smart contracts has been prevalent in countries such as Australia, Italy, China, and the UK with more projects arising in Germany and the USA [19].

Examples of the application of smart contracts in energy trading are the following:

Grid singularity is a German start-up focused on a decentralised energy exchange platform for local communities. The energy exchange can be operated by a unique distribution system operator (DSO) or multiple agents, using smart contracts to define the energy trading and matching between the customers [38].

LO3 energy [39] aims to improve the community-based local generation and energy exchange. The Brooklyn Microgrid [40] was developed by LO3 Energy as a proof-of-concept peer-to-peer energy trading using existing grid infrastructure. In December 2019, L03 Energy along with Green Mountain Power deployed a pilot energy marketplace called Vermont Green [41] as the first US authorised marketplace.

4.4.4 **e-**SAFE application

Energy trading via smart contracts may be applicable for **e-**SAFE in the following way:

Building owners adopting the **e-**SAFE methodology could sell excess energy produced to interested consumers (P2P trading) and energy suppliers/the grid (P2G trading). Any profits arising from such activity could be used in the following ways:

- To pay generation-based crowdfunding investors through selling energy trading to energy suppliers to secure a discount on the investors' energy bill (see section 4.1.4);
- To repay direct financing provided by **e-**FOUNDATION (see section 3.2.2.4);

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

- To help repay peer-to-peer lending obtained on the **e-**crowd platform (see section 4.2.4).

However, the above will only be feasible for further analysis and implementation once the required technology becomes established in target markets. Any significant developments in this space will be considered in updated versions of D6.2.

4.5 Fiscal incentives

4.5.1 Definition

Fiscal incentives are characteristics of fiscal policy which can influence individuals and companies to take specific actions, by offer a financial reward for such actions. Types of fiscal incentives include tax credits, tax holidays, tax exemptions etc. [42]

4.5.2 Relevant market segment(s)

It is considered that fiscal or tax incentives are mostly relevant to customer segments B and C. Customer segment A would not be expected to be induced by a fiscal incentive, in the face of (total) absence of funds to be invested in retrofitting. Customer segment D is also not expected to be influenced by fiscal incentives given that such institutions are generally not subject to tax in their jurisdictions of operation.

4.5.3 Prevalent markets

Examples of relevant fiscal incentives in European countries are the following:

In France, the "**Energy Transition Tax Credit**" supports owners, leaseholders, or dwelling occupiers for free (main residence) who pay tax in France in purchasing efficient materials and equipment to limit energy consumption and greenhouse gas emissions. Since 2015, 30% of the expenses on eligible renovation works can be claimed as a tax credit with a maximum subsidy of 8,000 Euro for a single person, 16,000 Euro for a couple and an additional 400 Euro for each minor child in the household. This allowance can be utilised once within a 5-year consecutive period. The scheme covers a range of renovation activities to increase energy efficiency and to improve heating systems in private dwellings, ranging from double glazing windows, wall insulation and the installation of heat pumps or different types of efficient boilers. In addition, the renovation work must be carried out by a registered builder to ensure a minimum standard for the quality of renovation work to be eligible to participate in the scheme. One of the success factors identified from this scheme was the outreach to hard-to-reach groups as cost limits for equipment were capped higher for low-income households, making funding more accessible to them [43].

In the Netherlands, "**The Energy Investment Allowance (EIA)**" is a fiscal measure that offers the possibility of an additional allowance on taxable profit. EIA applications can be made for the purchase of designated energy-efficient equipment. The Minister of Economic Affairs annually compiles an 'energy list' for that purpose in the EIA Implementing Regulation, which details the equipment that is eligible for an allowance [44].

In Flanders, Belgium, a property tax reduction of 50% or 100% is offered for 5 years for major renovations that reach certain energy performance standards, which are more ambitious than the minimum requirements. The requirements are getting stricter over the years, following the evolution of the minimum requirements.

In Italy, the Government has implemented strong incentives to encourage the restructuring of Italian buildings. The incentives granted are in the form of tax credits. To be eligible to benefit from this scheme, the restructuring must be aimed to increase the seismic safety (where **Sismabonus** applies) and/or increase the energy efficiency (where the **Ecobonus** applies).

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

Under the original regime, maximum expenditure covered by the Ecobonus was 40.000 Euro and by the Sismabonus 96.000 Euro, while both credits could be claimed at the same time, covering up to 85% of the relevant expenditure. The Sismabonus and Ecobonus tax credits could generally be purchased by entities performing relevant work (or who are linked to it), for example, construction/energy companies, material suppliers, subcontractors, etc [45].

The Superbonus scheme [46] made available in 2020 applies to individuals incurring expenses for interventions between 1 July 2020 and 30 June 2022, but the Italian government has already announced that the scheme will be probably extended at least to 2023. The scheme provides that certain 'leading' interventions, and also other 'secondary' interventions when combined with the 'leading' ones, attract a tax credit of 110% of qualifying expenditure. Where 'secondary' interventions are performed on a standalone basis, the tax credits available range between 50%-65% of the qualifying expenditure. Examples of 'leading' interventions, attracting a 110% tax credit (under conditions) are:

- Thermal insulation of the building envelope (on at least 25% of the overall surface).
- Replacement of the existing heating system with high-efficiency systems, such as condensing boilers and heat pumps.
- Seismic upgrading.

The tax credits can be transferred to other entities, including banks and insurance companies. When acquired, these can be offset against taxes due on a fixed basis over 5 years for the Sismabonus and over 10 years for the Ecobonus and Ecobonus combined with Sismabonus, disregarding the annual threshold of 700.000 Euros normally provided for by the law [45, 46].

4.5.4 **e-**SAFE application

e-FOUNDATION, potentially through the OSSs it may operate/manage, would provide information to potential customers about the availability of fiscal incentives, as well as the conditions and procedures to be followed in claiming them.

Ultimately, fiscal incentives will form an option within a pool of other options for potential customers that may be combined with other financial schemes/tools [47].

Additionally, adaptable fiscal incentives will be designed and included in the white paper to be formed as part of T6.3, for policy engagement purposes.

4.6 Financial incentives

4.6.1 Definition

A financial incentive is a monetary benefit offered to encourage behaviour or actions which otherwise would not occur without the monetary benefit. It is a policy instrument for the state, and it can be stand-alone or linked to financial instrument.

Typically, financial incentives take the form of a loan with preferential terms or a grant/subsidy, that covers a percentage of the costs incurred for eligible projects.

4.6.2 Relevant market segment(s)

Financial incentives could apply to any of the **e-**FOUNDATION's customer segments. These are generally most often applicable to customer segment B (as middle**-**class homeowners) rather than customer segment A, as partial financing or subsidies/grants are not of interest to low-income individuals. Certain financial incentives may be applicable to corporate and public bodies for property retrofitting, but these are more rarely seen.

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

4.6.3 Prevalent markets

The following are examples of relevant financial incentives in European countries:

In Portugal, the "**Edificios + Sustentáveis 2021**" programme supports efficiency investments by families towards rehabilitation, decarbonisation, energy efficiency, water efficiency, and overall contribution to the improvement of the energy and environmental performance of a building. Each candidate is able to secure a maximum total incentive of 7,500 Euro per single-family building or and 15,000 Euro in the private case of a multifamily building in total ownership. Approved expenditure includes application or replacement of thermal insulation in roofs, walls, or floors, installation of photovoltaic panels, and interventions for the incorporation of bioclimatic architecture solutions, involving the installation or adaptation of fixed elements of buildings such as shadings, greenhouses, and green roofs or facades, favouring natural-based solutions [48].

In Germany the scheme "**KfW Energy-efficient refurbishment Programme**" administered by the German state-owned Bank for Reconstruction manages two programmes to improve the energy efficiency of German residential buildings. These programmes include loans of a maximum of 15.000 Euro per residential unit and investment grants to promote energy-efficient refurbishment and support insulation, energy-efficient equipment installation as well as replacement of exterior walls, doors, ceilings and so on [43].

In France, the "**Zero-rated eco-loan**" allows landlords to obtain a loan to finance energy refurbishment works (insulation, heating or water heating using renewable energies) for their main residence. The maximum amount of this loan is 30.000 Euro, refundable for 10 years (up to 15 years in cases of heavy works or "3-action bunches"). It is granted by banks which have concluded specific agreement with the French State, under conditions fixed in the General Taxes Code. The tax-free loan is aimed at individual owner-occupiers or landlords to finance major renovation work [42].

The "**Casa Eficiente 2020**" ("Efficient House 2020") program is available in Portugal, which provides loans on favourable terms for improvement of environmental performance of private housing buildings by improving energy and water efficiency. Interventions may focus on the envelope of the building and its systems. The Programme is financed by the European Investment Bank (EIB) and participating Commercial Bank and has total funding of 200 million Euro for the period 2018-2021 [49].

Also, in Portugal, the "**IFRRU 2020**" programme is designed for urban renovation through special loans which are also backed by the EIB, but with longer maturities on specific urban areas. Any entity with a title that gives them the power to carry out an intervention which has buildings located in the territories defined by the municipality are able to benefit from this program in two ways; a loan with up to 20 years' maturity, grace periods and interest rated below market rates and guarantees for projects that do not have sufficient guarantee. All expenses relating to energy efficiency measures for the rehabilitation of qualifying buildings are supported (i.e. aged 30 years or more, or in the case of younger buildings a conservation level of 2 or lower, abandoned industrial spaces and private/social housing units) [50].

Further, in Norway, "**Enova**", a state-owned corporation, offers financial support to companies and individuals for energy and climate friendly initiatives. Enova will cover the extra project costs incurred by companies pursuing energy and climate friendly solutions. In addition, Enova provides funding of up to 25% of the documented expenses for privately owned residential households which fulfil all applicable criteria [51].

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

In Italy, the "**Intesa San Paolo Condominium Scheme**" provides a medium-long term loan intended to finance renovation works or other interventions on the building of single condominiums or condominium complexes (e.g. replacement or installation of boilers, photovoltaic systems, electrical systems, etc.). The funding cannot exceed 80% of the costs incurred [44].

The European Bank for Reconstruction and Development (EBRD) is launching a new "**Green Economy Financing Facility**" (GEFF) in Montenegro that will provide loans to households for energy efficiency improvements. Homeowners who are approved and will receive funding from the scheme, will also be eligible to apply for an EU grant for up to 20% of their investment. Eligible expenditure includes thermal insulation, double-glazed windows, high-efficiency boilers, heat pumps, solar collectors/solar water heaters and photovoltaic systems [52].

At a European level, the **European Investment bank (EIB)** has a series of sustainability-related instruments. However, these are often of significant size (>25-50M€), so they are more intended as city-wide initiatives rather than isolated ones. Nonetheless, once a city has applied and received the loan it can then distribute the funds to individual projects [18].

Other emerging financing schemes/tools include:

- **On-tax or bill financing:** a mechanism to repay energy efficiency investments within utility or tax bill and recovered through the existing payment collection infrastructure. Through research made by Europace (collection through property-related taxes), it is apparent that this kind of financing is not viable everywhere. The most suitable countries to adopt this scheme were: Austria, Belgium, Italy, Poland, Romania, and Spain [20]. On-bill financing is prevalent in the US and Canada but efforts are being made to develop such schemes in various EU countries [53]
- **Revolving funds** refer to reserves of money which is used to finance a set of activities by lending to one or more borrowers. The borrower is expected to repay the original amount over a specified period of time as well as an interest which is usually a fee for administrative costs as well as to protect the fund from depletion [54]. An example is the energy fund Utrecht (efru) in the Netherlands.
- **Recurring funds** is an innovative financial tool introduced by the Gent "knapt op" pilot project in Belgium whereby the homes of vulnerable homeowners were renovated through a financial contribution of up to 30.000 euros and repayment is made upon disposal of the renovated property, where the owner pays back the loan using the sale proceeds, plus an additional premium calculated on the basis of the added value of the house at the moment of selling [55].

4.6.4 **e-**SAFE application

As with fiscal incentives, **e-**FOUNDATION, potentially through the OSSs it may operate/manage, would provide information to potential customers about the availability of financial incentives, as well as the conditions and procedures to be followed in claiming them.

Ultimately, financial incentives will form an option within a pool of other options for potential customers, which may be combined with other financial schemes/tools [35].

Financial incentives may also be claimed by **e-**FOUNDATION itself though, to fund direct loans to be provided to potential customers (section 3.2.2.4). Once **e-**FOUNDATION establishes its target market location-wise, local financial incentives should be immediately looked into and utilised, given that **e-**IPR will be at a start-up stage and will not have the capital to fund **e-**FOUNDATION's operations.

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

Finally, adaptable financial incentives will be designed and included in the white paper to be formed as part of T6.3, for policy engagement purposes.

4.7 Direct financing/funding

4.7.1 Definition

Direct financing is defined here as the provision of financing to customers through own funds rather than third party funds. Financing involves the provision of financial assistance in a contractual framework, with the expectation of repayment of the capital provided and payment of interest (optionally).

Direct funding is here defined as the provision of funding to beneficiaries through own funds rather than third party funds. Funding involves the provision of financial assistance, without the expectation of repayment of capital or the payment of interest. Since no consideration is provided by the beneficiary, there is usually no contractual relationship between the provider and the beneficiary.

4.7.2 Relevant target markets

As indicated above (section 3.2.2.4), direct financing/funding options will only be made available to energy poor/low-income customers where no other realistic financing options exist, and subject to any limitations placed by law and/or the articles of association of **e-**FOUNDATION.

4.7.3 Prevalent markets

A variety of direct financing and funding schemes have been around for a long time therefore examples can be drawn from any jurisdiction/context. More research will be performed by the **e-**NABLE group to understand what types of direct financing/funding are provided by NGOs/social-enterprises/foundations that are relevant to **e-**FOUNDATION.

4.7.4 **e-**SAFE application

Direct financing may take one (or a combination) of the following forms:

- Energy performance contracting (EPC), whereby repayment is made through energy savings or cost savings.
- Property based contracting, whereby repayment is made through increased rent or capital appreciation (upon sale), though anti-gentrification strategies should be considered.
- Soft loans with flexible/preferential terms, e.g., zero-interest loans.
- Repayment made through profits arising from energy trading (see section 4.4).

Direct funding is envisaged to involve direct payment for renovation works to contractors and other professionals for the benefit of the beneficiary. A contractual relationship will be formed with the main contractor while a contractual relationship will not be formed between the beneficiary and **e-**FOUNDATION or the contractor unless it is considered preferable.

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

5. CONCLUSION

The present report, constituting Version 1 of D6.2, aimed to set out the foundations of developing the core **e-**SAFE actors' business model, namely **e-**IPR and **e-**FOUNDATION, utilising the BMC model. Ideas and options were set out, as well as considerations that will need to be made in updated versions of D6.2. The process of arriving at final business models will be followed through discussions among the **e-**NABLE group, as well as with stakeholders and the Advisory Board.

e-IPR will be the legal entity managing the relationships with **e-**SAFE's target market and business partners and receive all license/royalty revenue emanating from such relationships. As a result, **e-**IPR will be the core **e-**SAFE trading company, in charge of holding, managing and developing **e-**SAFE assets and trading profits.

e-FOUNDATION will act as a non-profit entity with different arms. It will act as the financing/funding vehicle of **e-**SAFE, aiming to make **e-**SAFE affordable to the target customer segments that are not able to proceed with conventional financing and fund initiatives, projects and activities aimed at pushing for deep renovation in poor and distressed areas. It will develop an array of financial tools and schemes, which may be made available through the OSSs it may be operating (or partnering with) in key target locations. Moreover, it will play an important advocacy (public and policy engagement) role.

This report also explores the financial schemes/tools that **e-**FOUNDATION may have in store for its potential customers on a high-level basis, i.e., a dedicated crowdfunding platform (**e-**CROWD) incorporating a peer-to-peer lending platform, direct financing options, green bonds, energy trading via smart contracts as well as financial and fiscal incentives. D6.3 complements this exercise by aiming to design adaptable financial and fiscal incentives to be included in a white paper, to be used by **e-**FOUNDATION for advocacy purposes.

Version 2 of D6.2 will aim to settle the set-up plan of the two **e-**SAFE actors and present the final **e-**IPR and **e-**FOUNDATION business models. Further, it will explore logistics, operational models, and governance models of these two entities. Version 3 will aim to arrive at a final plan with respect to logistics, operations and governance. The overall and final plan to be created by Task 6.2 will be reflected and updated, if necessary, within D6.4, the **e-**SAFE exploitation plan.

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

6. ACKNOWLEDGEMENTS

This deliverable was carried out in the framework of the *Energy and seismic affordable renovation solutions* (**e-**SAFE) project, which has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

7. REFERENCES

[1] European Parliament, Energy poverty : handbook, Csiba, K.(editor), European Parliament, 2017, https://data.europa.eu/doi/10.2861/94270

[2] Hayes Adam. White Paper. Available from: https://www.investopedia.com/terms/w/whitepaper.asp [Accessed 28/02/2022]

[3] TripleA-reno project. "Exploitation strategy and business plan for continuation of the training platform after project", Available from: https://triplea-reno.eu/wp-content/uploads/2022/01/Exploitation-strategy-and-business-plan-for-continuation-of-the-training.pdf [Accessed 28/02/2022]

[4] HORIZON 2020 STUNNING project. Policy Brief, 2019. Available from: https://renovation-hub.eu/wp-content/uploads/2019/09/STUNNING%20Policy%20brief_final.pdf [Accessed 28/02/2022]

[5] Francois Emmanuael and Laffont-Eloire Karine, 2021, "White Paper- Task Force 4: Cross-cutting issues: Business & Finance, data, education & upskilling Topic A : Financing and business models", Smart Built4EU Project.

[6] Bloomenthal Andrew. Licensing Agreement. Available from: https://www.investopedia.com/terms/l/licensing-agreement.asp#toc-what-is-a-licensing-agreement [Accessed 28/02/2022]

[7] Hayes Adam. Franchise. Available from : https://www.investopedia.com/terms/f/franchise.asp [Accessed 28/02/2022]

[8] Hayes Adam. Subcontracting. Available from https://www.investopedia.com/terms/s/subcontracting.asp [Accessed 28/002/2022]

[9] Solintel Grasset Hugo. D4.2 Ensuring successful replicability in EE renovation business schemes, 2019, HORIZON 2020 STUNNING project.

[10] Hargrave Marshall. Joint Venture. Available from: https://www.investopedia.com/terms/j/jointventure.asp [Accessed 28/02/2022]

[11] Internal Revenue Service. "Exemption Requirements - 501(c)(3) Organizations, https://www.irs.gov/charities-non-profits/charitable-organizations/exemption-requirements-501c3-organizations " [Accessed 28/02/2022]

[12] European Commission. Social enterprises. Available from: https://ec.europa.eu/growth/sectors/proximity-and-social-economy/social-economy-eu/social-enterprises_en [Accessed 28/02/2022]

[13] BPIE, ROCKWOOL, EIT Climate-KI. Upscaling urban regeneration - Europeanfrontrunner cases are leading the way, 2018.

[14] Investopedia. Private Foundation. Available from: https://www.investopedia.com/terms/p/privatefoundation.asp [Accessed 07/04/2022]

[15] European Commission. Energy Efficiency Financial Institutions Group. Energy Efficiency – the first fuel for the EU Economy, 2015. Available from: https://ec.europa.eu/eefig/index_en [Accessed 28/02/2022]

[16] Abundance Investment. Available from: Mobilise your money for good - Abundance (abundanceinvestment.com) [Accessed 02.09.2021]

[17] Econeers. Available from: https://www.econeers.de/ [Accessed 02.09.2021]

[18] Citizens Energy Group. Available from: https://www.citizensenergygroup.com/ [Accessed 02.09.2021]

[19] Crowdfunding Renewable Energy: A practical guide for Crowdfunding Platforms, Project Developers, Investors and Policy Makers. Brussels and Munich, CrowdFundRES Consortium, 2018

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

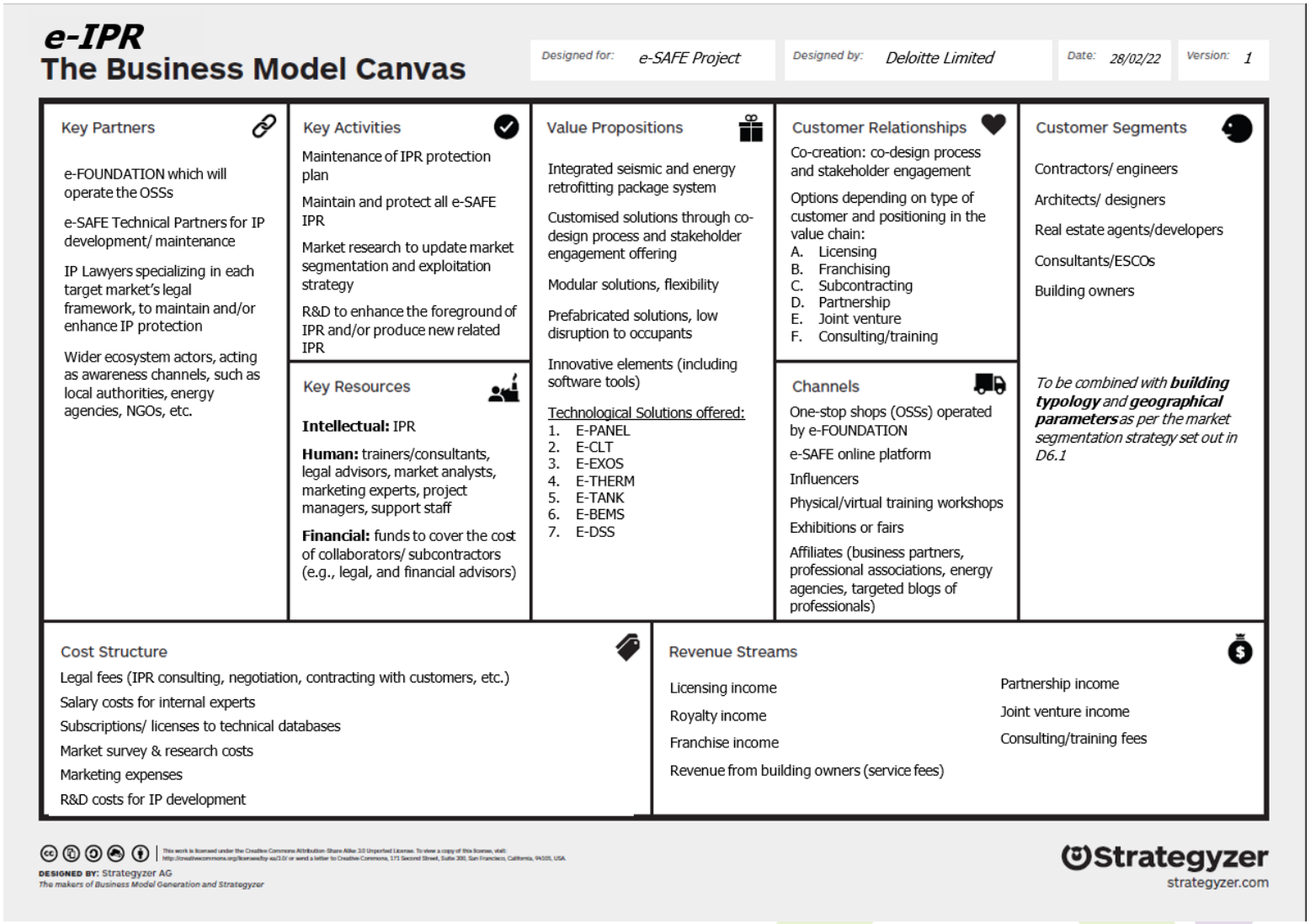
[20] European Commission. Peer-to-peer lending. Available from: https://ec.europa.eu/growth/access-finance-smes/guide-crowdfunding/different-types-crowdfunding/peer-peer-lending_en [Accessed 28/02/2022]
[21] Bettervest. Available from: https://www.bettervest.com/en/ [Accessed 02.09.2021]
[22] One Planet Group. Available from: https://www.oneplanetcrowd.com/en [Accessed 02.09.2021]
[23] Fundeen. Available from: https://www.fundeen.com [Accessed 02.09.2021]
[24] Future bricks. Available from: https://futurebricks.com/ [Accessed 28/02/2022]
[25] Segal Toy. Green Bonds. Available from: https://www.investopedia.com/terms/g/green-bond.asp [Accessed 28/02/2022]
[26] Statista Research Department. Global green bond market value 2021, by country, 2022. Available from: https://www.statista.com/statistics/512030/share-of-green-bond-market-value-globally-by-major-country/ [Accessed 28/02/2022]
[27] European Commission. European Green Bond Standard. Available from: https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/european-green-bond-standard_en [Accessed 28/02/2022]
[28] Flanders Finance & Budget. What is a Sustainable Bond and How does it work?. Available from: https://financeflanders.be/1-what-is-a-sustainable-bond-how-does-it-work [Accessed 28/02/2022]
[29] Bahceli Yoruk. Cyprus planning green or sustainability bond, debt agency official says. Reuters, 2022, Available from: https://www.reuters.com/business/sustainable-business/cyprus-planning-green-or-sustainability-bond-debt-agency-official-2022-01-24/ [Accessed 25/02/2022]
[30] Koundouri Ph, Sachs J. Transformations for the Joint Implementation of Agenda 2030 for Sustainable Development and the European Green Deal A Green and Digital, Job-Based and Inclusive Recovery from the COVID-19 Pandemic. Sustainable Development Solution Network (SDSN). 2021
[31] EMTN programme. Tennet. Available from: https://www.tennet.eu/company/investor-relations/emtn-programme/ [Accessed 02.09.2021]
[32] Deloitte. Malta Stock Exchange Introduces the 'Malta Stock Exchange: Green Market'. Available from: https://www2.deloitte.com/mt/en/pages/about-deloitte/press-releases/2021/mt-news-alert-21-01-malta-stock-exchange-introduces-the-green-market.html [Accessed on 16.09.2021]
[33] Luxemburg stock exchange. Green Bonds. Available from: https://www.bourse.lu/green-bonds [Accessed 25/02/2022]
[34] Euractiv. Slovenia issues first green bond, 2021. Available from: https://www.euractiv.com/section/politics/short_news/slovenia-issues-first-green-bond/ [Accessed 28/02/2022]
[35] Desen Kirli, Benoit Couraud, Valentin Robu, Marcelo Salgado-Bravo, Sonam Norbu, Merlinda Andoni, Ioannis Antonopoulos, Matias Negrete-Pincetic, David Flynn, Aristides Kiprakis, Smart contracts in energy systems: A systematic review of fundamental approaches and implementations, Renewable and Sustainable Energy Reviews, Volume 158, 2022, Available from: https://www.sciencedirect.com/science/article/pii/S1364032121012764 [Accessed 28/02/2022]
[36] Raffaeke Dario, Bolwerk Vincent, Kraan Oscar. Peer to peer energy trading -Accelerating the energy transition and capturing business value with AI and data. Deloitte. Available from: https://www2.deloitte.com/nl/nl/pages/energy-resources-industrials/articles/peer-to-peer-energy-trading.html [Accessed 28/02/2022]

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

[37] Makhdoom I., Zhou I., Abolhasan M., Lipman J., Ni W. Privysharing: A blockchain-based framework for privacy-preserving and secure data sharing in smart cities Comput Secur, 88 (2020), 10.1016/j.cose.2019.101653
[38] Grid singularity. Available from: https://gridsingularity.com/ [Accessed 28/02/2022)
[39] LO3ENERGY. Available from: https://lo3energy.com/ [Accessed 28/02/2022]
[40] Mengelkamp E., Gärttner J., Rock K., Kessler S., Orsini L., Weinhardt C. Designing microgrid energy markets: A case study: The Brooklyn microgrid. Appl Energy, 210 (2018), pp. 870-880, 10.1016/j.apenergy.2017.06.054
[41] Close Energy marketplace: Share with Vermont green (2020) https://greenmountainpower.com/vermont-green/ [Accessed 12 August 2020] Google Scholar
[42] J.M.K.C. Donev et al. (2016). Energy Education - Fiscal incentive [Online]. Available: https://energyeducation.ca/encyclopedia/Fiscal_incentive [Accessed 28/02/2022].
[43] German Federal Ministry for the Environment. The Energy Transition Tax Credit (CITE) in France. Available from: https://www.euki.de/wp-content/uploads/2018/09/fact-sheet-energy-transition-tax-credit-fr.pdf [Accessed 02/09/2021]
[44] Economidou, M., Todeschi, V. and Bertoldi, P., Accelerating energy renovation investments in buildings, EUR 29890 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-12195-4, doi:10.2760/086805, JRC117816.
[45] The New Solution dedicated to the acquisition of Sismabonus and Ecobonus Tax credits. Deloitte. Available from: https://www2.deloitte.com/content/dam/Deloitte/it/Documents/tax/ecosisma%20bonus%20tax%20credit_eng.pdf [Accessed 02/09/2021]
[46] Ecobonus and Sismabonus. Available from: https://www2.deloitte.com/it/it/pages/tax/solutions/ecobonus-e-sismabonus-110----deloitte-italy---tax.html [Accessed on 08/10/2021]
[47] Kari Thunshelle, Michael Klinski. D4.5: Regional adaptable financial instruments. HORIZON 2020 4RinEU PROJECT, 2020. Available from: https://ec.europa.eu/research/participants/documents/downloadPublic?documentIds=080166e5cea4dda5&appId=PPGMS [Accessed 22/02/2022]
[48] Fundoambiental. Available from: https://www.fundoambiental.pt/ [Accessed 02/09/2021]
[49] Casa Eficiente 2020. Sobre o programa. Available from: casaeficiente2020.pt [Accessed 20/09/2021]
[50] IFRRU. Available from: O IFRRU2020 - IFRRU (ihru.pt) [Accessed 02/09/2021]
[51] Enova project. Available from: https://www.enova.no/bedrift/ [Accessed 02.09.2021]
[52] European Bank for Reconstruction and Development. Green Economy Financing Facility. Available from: https://www.ebrd.com/news/2021/ebrd-and-partners-launch-energy-efficiency-programme-for-homes-in-montenegro.html [Accessed on 10.09.2021]
[53] European Commission. Energy Communities. Available from: https://ec.europa.eu/energy/topics/markets-and-consumers/energy-communities_en [Accessed on 20/09/2021]
[54] Covenant of Mayors Community. Innovative Financing Schemes. Available from: https://www.eumayors.eu/index.php?option=com_attachments&task=download&id=627:Innovative-Financing-Schemes---EUCoM [Accessed 02/09/2021]
[55] ICCARus (Gent knapt op) - Improving housing Conditions for Captive Residents in Ghent. The Urban Lab of Europe. Available from: https://www.uia-initiative.eu/en/uia-cities/ghent-call3 [Accessed 02.09.2021]

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

APPENDIX 1: e-IPR BUSINESS MODEL CANVAS



e-IPR
The Business Model Canvas

Designed for: e-SAFE Project | Designed by: Deloitte Limited | Date: 28/02/22 | Version: 1

Key Partners

e-FOUNDATION which will operate the OSSs

e-SAFE Technical Partners for IP development/ maintenance

IP Lawyers specializing in each target market's legal framework, to maintain and/or enhance IP protection

Wider ecosystem actors, acting as awareness channels, such as local authorities, energy agencies, NGOs, etc.

Key Activities

Maintenance of IPR protection plan

Maintain and protect all e-SAFE IPR

Market research to update market segmentation and exploitation strategy

R&D to enhance the foreground of IPR and/or produce new related IPR

Key Resources

Intellectual: IPR

Human: trainers/consultants, legal advisors, market analysts, marketing experts, project managers, support staff

Financial: funds to cover the cost of collaborators/ subcontractors (e.g., legal, and financial advisors)

Value Propositions

Integrated seismic and energy retrofitting package system

Customised solutions through co-design process and stakeholder engagement offering

Modular solutions, flexibility

Prefabricated solutions, low disruption to occupants

Innovative elements (including software tools)

Technological Solutions offered:

1. E-PANEL
2. E-CLT
3. E-EXOS
4. E-THERM
5. E-TANK
6. E-BEMS
7. E-DSS

Customer Relationships

Co-creation: co-design process and stakeholder engagement

Options depending on type of customer and positioning in the value chain:

A. Licensing
B. Franchising
C. Subcontracting
D. Partnership
E. Joint venture
F. Consulting/training

Channels

One-stop shops (OSSs) operated by e-FOUNDATION

e-SAFE online platform

Influencers

Physical/virtual training workshops

Exhibitions or fairs

Affiliates (business partners, professional associations, energy agencies, targeted blogs of professionals)

Customer Segments

Contractors/ engineers

Architects/ designers

Real estate agents/developers

Consultants/ESCOs

Building owners

*To be combined with **building typology** and **geographical parameters** as per the market segmentation strategy set out in D6.1*

Cost Structure

Legal fees (IPR consulting, negotiation, contracting with customers, etc.)

Salary costs for internal experts

Subscriptions/ licenses to technical databases

Market survey & research costs

Marketing expenses

R&D costs for IP development

Revenue Streams

Licensing income

Royalty income

Franchise income

Revenue from building owners (service fees)

Partnership income

Joint venture income

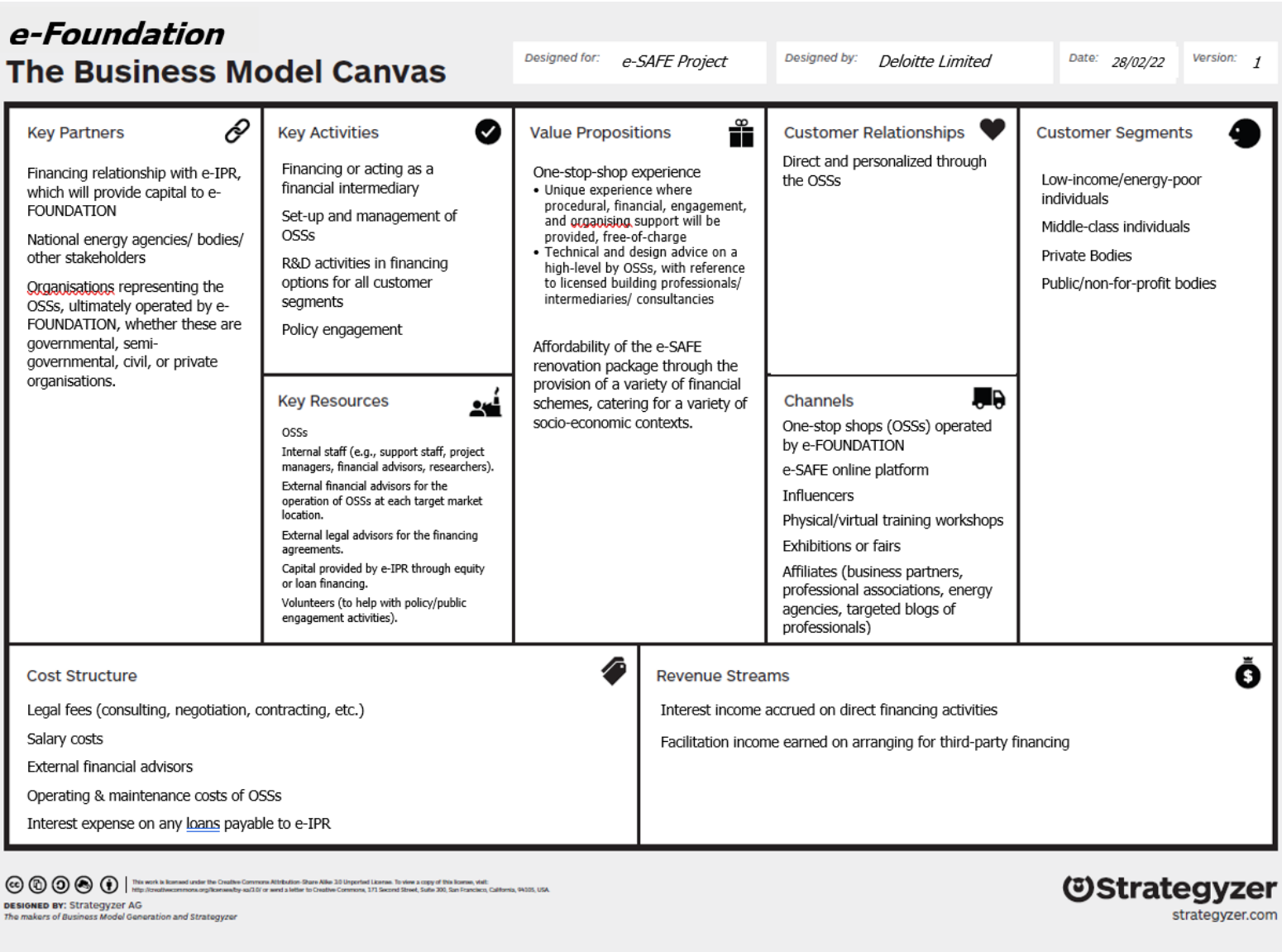
Consulting/training fees

DESIGNED BY: Strategyzer AG
The makers of Business Model Generation and Strategyzer

Strategyzer
strategyzer.com

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.

APPENDIX 2: e-FOUNDATION BUSINESS MODEL CANVAS



e-Foundation

The Business Model Canvas

Designed for: *e-SAFE Project* | Designed by: *Deloitte Limited* | Date: *28/02/22* | Version: *1*

Key Partners

Financing relationship with e-IPR, which will provide capital to e-FOUNDATION

National energy agencies/ bodies/ other stakeholders

Organisations representing the OSSs, ultimately operated by e-FOUNDATION, whether these are governmental, semi-governmental, civil, or private organisations.

Key Activities

Financing or acting as a financial intermediary

Set-up and management of OSSs

R&D activities in financing options for all customer segments

Policy engagement

Key Resources

OSSs

Internal staff (e.g., support staff, project managers, financial advisors, researchers).

External financial advisors for the operation of OSSs at each target market location.

External legal advisors for the financing agreements.

Capital provided by e-IPR through equity or loan financing.

Volunteers (to help with policy/public engagement activities).

Value Propositions

One-stop-shop experience

- Unique experience where procedural, financial, engagement, and organising support will be provided, free-of-charge
- Technical and design advice on a high-level by OSSs, with reference to licensed building professionals/ intermediaries/ consultancies

Affordability of the e-SAFE renovation package through the provision of a variety of financial schemes, catering for a variety of socio-economic contexts.

Customer Relationships

Direct and personalized through the OSSs

Channels

One-stop shops (OSSs) operated by e-FOUNDATION

e-SAFE online platform

Influencers

Physical/virtual training workshops

Exhibitions or fairs

Affiliates (business partners, professional associations, energy agencies, targeted blogs of professionals)

Customer Segments

Low-income/energy-poor individuals

Middle-class individuals

Private Bodies

Public/non-for-profit bodies

Cost Structure

Legal fees (consulting, negotiation, contracting, etc.)

Salary costs

External financial advisors

Operating & maintenance costs of OSSs

Interest expense on any loans payable to e-IPR

Revenue Streams

Interest income accrued on direct financing activities

Facilitation income earned on arranging for third-party financing

DESIGNED BY: Strategyzer AG

The makers of Business Model Generation and Strategyzer

Strategyzer

strategyzer.com

e-SAFE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 893135.