ReDREAM
change your energy

D6.5: Portfolios of funding and financing schemes (Demo 4) [M16]

Identification, presentation and selection of funding and financing schemes

[31st of May 2022]

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Technical References

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PU = Public

PP = Restricted to other programme participants (including the Commission Services)

RE = Restricted to a group specified by the consortium (including the Commission Services)

CO = Confidential, only for members of the consortium (including the Commission Services)

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V2	15-01-2022	Angelo Giordano	Second draft elaborated after the 1st round of meetings with BWCE for data collection
V3	29-02-2022	Angelo Giordano	Third draft elaborated after the 2nd round of meetings with BWCE
V4	03-04-2022	Angelo Giordano	Forth draft elaborated after the 3rd round of meetings with BWCE
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V6	16-05-2022	Angelo Giordano	Sixth draft elaborated after the 1st review of COMILLAS and BWCE
V7	31-05-2022	Angelo Giordano	Final version elaborated after the final review of COMILLAS

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Summary

ReDREAM Project

The energy market is rapidly transforming and so is the role of the consumer. Yesterday's passive consumers are central actors in today's energy markets. As new prosumers, energy markets can benefit from their generation, consumption, and storage capabilities. The EU-funded ReDREAM project will enable the effective participation of consumers and prosumers in the energy market. The project will develop a strategy for the creation of a value generation chain based on a revolutionary service-dominant logic in which services are exchanged. The project will foster the demand response tools and energy/non-energy services that enable consumers to participate in the energy market. This will lead to the establishment of a new concept: a connected user-centred energy ecosystem.

Executive summary

Deliverable 6.5 has the aim of illustrating how the application of a series of pre-selected innovative business models could impact the already settled Bath & West Community Energy.

Starting by the foundations of REDREAM project, which is the REDREAM Business Model user centric-ecosystem for consumers, D6.5 describes how all the key players are involved into the REDREAM demonstrations in BWCE and what are their respective expertise and expectations from the project outcome. The Service Dominant Logic (SDL) approach is at the base of all demonstrations of REDREAM project and all the applicable business models, already mapped in D6.1….

D6.5 then illustrates the methodology that has been followed by CIVI, as Deliverable leader, in elaborating the content of this deliverable: a methodical process has been followed for identifying the applicable Business Models, always taking into account the individual business strategy, the local value chains and the local eco-system and partnerships, already present in the BWCE.

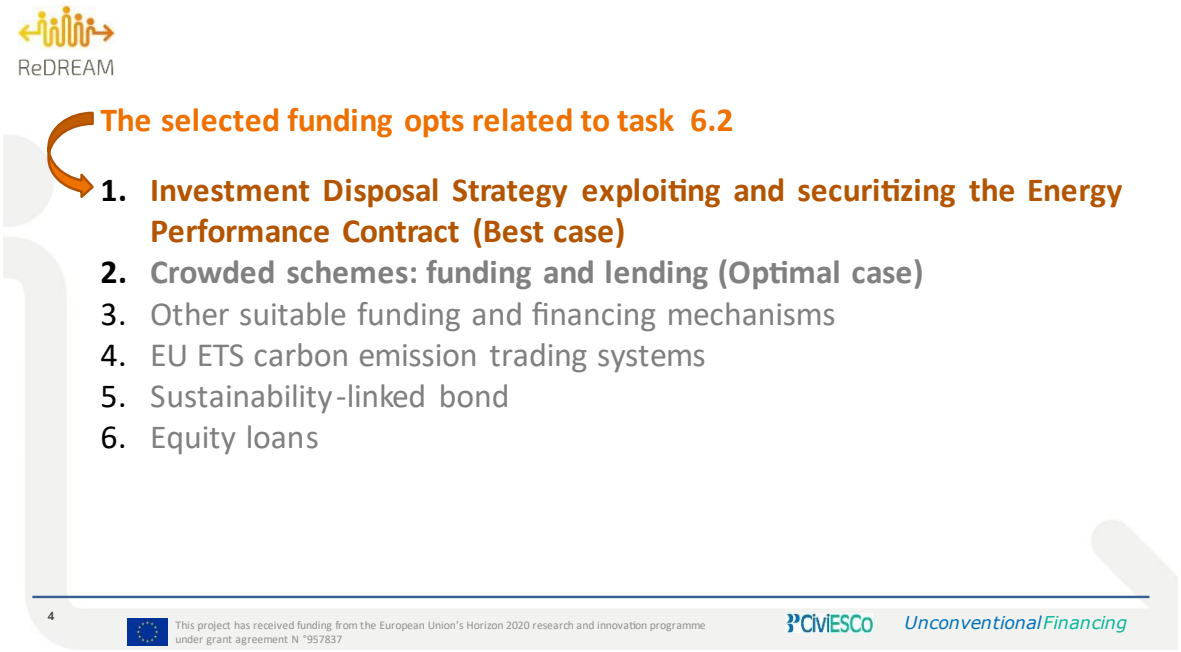

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Table of acronyms

Acronyms	Description
RED	Renewable energy directive
DR	Demand Response
EPC	Energy Performance Contract
ESCo	Energy Service Company
TSO	Transmission System Operator
DSO	Distribution System Operator
IRENA	International Renewable Energy Agency
PSF	Power System Flexibility
VRE	Variable Renewable Energy
MVP	Minimum Viable Product
3PF	Third Party Financing
IEA	International Energy Agency
BRP	Balance Responsible Parties
DER	Distributed Energy Resource
EE	Energy Efficiency
EV	Electric Vehicle
RES	Renewable Energy Sources
BESS	Battery Energy Storage Systems
CaPex	Capital Expenditure
Opex	Operational Expenditure
PED	Positive Energy District
V1G	Vehicle To Grid – unidirectional
V2G	Vehicle To Grid – bidirectional

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V2L	Vehicle To Load
SES	Smart Energy System
SMES	Smart Multi-Energy Systems
ESS	Energy storage system
IoT	Internet of Things
DLT	Distributed Ledgers Technology
IP	Intellectual Property
SPV	Special Purpose Vehicle
EMP	E-Mobility Provider
SDG	Sustainable Development Goals
ESG	Environmental, Social and Governance
mSMEs	micro, Small and Medium Enterprises
AI	Artificial Intelligence
O&M	Operation and Maintenance
EIB	European Investment Bank

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1 Introduction

The current Deliverable D6.2-5 is a technical document that is associated with the development of a methodology to identify, present and select business models that supports the delivery of the energy services. Therefore, the content of Deliverable D6.2-5 is strongly related to the content of the D6.1 and how to implement in the Demos.
Aim of this deliverable is to explain:

- (1) how to craft business models adapted to the features and ecosystem from demos blueprint, and
- (2) how to build a library of business models of affordable funding disposal strategies, for each demo to EU scale.

The first objective is covered in Section 2, whereas the latter is addressed in Section 3

1.1 What is REDREAM Business Model user centric-ecosystem for consumers?

Based on set of the exploitable results identified in REDREAM, an innovative business model (BM) has been defined that focus on the commercialisation of the REDREAM ecosystem:

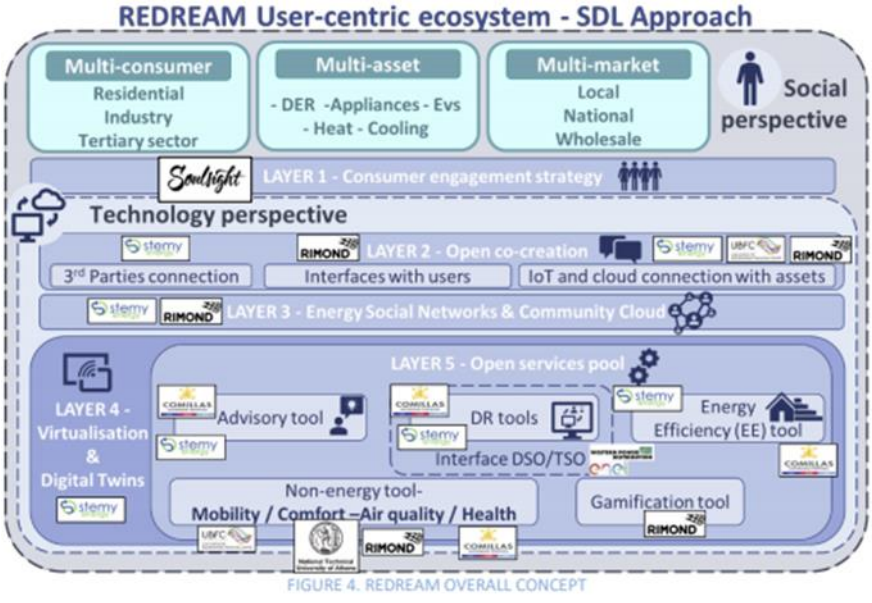

Figure 1 REDREAM User-centric ecosystem

The REDREAM user centric ecosystem for consumers with a settle ecosystem running around a portfolio of smart devices embedded to the DR interoperable platforms. As such, all partners will benefit from the sale through direct fees from the clients (users) or through internal fees among the partners under an exploitation agreement. The SDL approach will act as umbrella enabling several scalable business models as showcased in the D6.1 and here refined in the chapter 2.

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The commercialisation envisioned relies on a portfolio of functionalities that can be layered upon one another to produce incremental service packs that match each target user's requirements, needs and investment potential. STEMY, RIMOND and SOULSIGHT oversee the commercialisation of the technology, creating a joint task force, by the exploitation of a SaaS business model, chosen as the most suitable model for revenue maximisation.

In a nutshell:

- STEMY a start-up, supported by a financial plan certified in the due diligence carried out by the European institution KIC-Innoenergy, in the start-up boost program, and it is in advanced conversations with committed Venture Capital (VC) funds to attract a second round of investment. Additionally, they are considered an innovative SME by the Spanish government (NEOTEC 2019).
- RIMOND is already present worldwide with special emphasis on European market commercialising ICT solutions.
- SOULSIGHT is a Strategic Creative Agency, with a solid background with the industry: banking (BBVA, ABN Amro), automotive (VW, Audi, BMW), technology (Square, Diebold Nixdorf, Siemens). Its expansion to energy sector will be smooth taking advantage of these previous experiences.

The strategy for this new jointly distribution is principally based on Partners' commercialisation channels:

- Business Development Department: sales teams offer a tailored customer service, as well as a post-sale service, considering both its direct and final customers as key actors for an exponential future company growth.
- International Distribution Network: As previously remarked, REDREAM's target market is clearly international. That is why, international distribution sales teams is involved to easily place its service within the market.

The rest of partners involved with the solution development (COMILLAS, TIMELEX, NTUA, OMIE and OLIVO) receive fees from STEMY, RIMOND and SOULSIGHT for each contract involving REDREAM ecosystem, upon the signature of an exploitation agreement.

1.2 Brief description of the deliverable

T6.2. Identification, presentation and selection of funding and financing schemes (L: CIVI; P: COMILLAS, ENER, BIO, GALLESE, ZEZ, BWCE) (M7 - M20)

The task will work in order to deliver innovative funding and financing schemes supporting the scalability and replicability strategy of the project. The methodology will adopt as a key driver the exploitation of the revenue schemes as a proper underlying. In that way, the project proposition of business models will comply with the investors' expectation in terms of "capital requirements". This rationale, by leveraging the prosumers' empowerment, will ensure a holistic financial planning framework: all stakeholders could access and use the schemes for fund or finance the project follow-up or ramp-up phase in a de-risky way. This financial planning framework will pave the way for the design of new economic models as viewed by utilities, regulators and policymakers, as well as the end-user investors themselves. In this sense, innovative financial schemes for investment will be investigated based on promising forthcoming trends: ESCo hybrid models, Energy Performance Contacts and Power Purchase Agreements, crowdfunding/crowdlending cases, cooperative initiatives with centred revenue sharing mechanisms. Expected result: The set of schemes assessed will defined

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for each demo. According to the different features, tailored economic and financial KPIs will be settled for each demo.

Set of deliverables

D6.2: Portfolio of funding and financing schemes (Demo1)

D6.3: Portfolio of funding and financing schemes (Demo2)

D6.4: Portfolio of funding and financing schemes (Demo3)

D6.5: Portfolio of funding and financing schemes (Demo4)

The set of schemes assessed will defined for each demo. According to the different features, tailored economic and financial KPIs will be settled for each demo.

1.3 Market Status: how does the capital flows?

"Green financing is to increase level of financial flows (from banking, micro-credit, insurance and investment) from the public, private and not-for-profit sectors to sustainable development priorities. A key part…… is to better manage……. both a decent rate of return and environmental benefit and deliver greater accountability". [1]

The question mark is how to enable the green financing and how to promote it thanks to the game-changing rules given by new regulatory frameworks, new public financial incentives schemes, increased investment in clean and green technologies.

As indicated by the Q1 2022 report issued by the AFME[2], there is a long-lasting trend on the rapidly growing Sustainable Finance market in Europe. Indeed, even if in 2022 the market conditions have been unfavourable for ESG bonds, Global ESG and Carbon Emission prices, the EU and UK forward curves continue to anticipate long-term increase. In addition, the favourable EU regulatory update and high volatility of the energy-as-a-commodity price would determine the Green Finance to be mainstream into the financial system. This means in brief that the Market status is turning more and more toward the green financing aims to mobilize private capital flows in green investments.

As well, looking at the Global investment Market through Crowdfunding it could be noted there is the same trend of ESG Investment.

1.4 The Collaborative intra-project activities

Starting from the results of the D6.1 related to "Library of bankable business models. Identification, presentation and selection of business models", the report has underpinned the proposed BMs to Demos. As such, it is useful to explore the matrix co-designed with demo partners: compared to the previous deliverable, the matrix has been focused only on demo cases. Indeed, the methodology adopted for the matrix has followed the co-design and the co-decision process. At the beginning more than twelve relevant business models exploiting the energy efficiency, the flexibility, the demand-

1 The United Nations Environment Programme (UNEP), the global authority promoting the environmental agenda, its coherent implementation for the sustainable development within the United Nations system declares the Green Financing in this way.

2 The Association for Financial Markets in Europe (AFME) is the voice of Europe's wholesale financial markets, providing expertise across a broad range of regulatory and capital markets issues. We represent the leading global and European banks and other significant capital market players. AFME's members are the lead under- writers of 89% of European corporate and sovereign debt, and 75% of European listed equity capital issuances.

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response, the blockchain and the crypto assets were presented to demos. The comprehensive list has been redefined with demos according to the most relevant business models, as such the following matrix has been created to map the six selected BMs to match with each Redream Partners, including non-demo partners.

During the first physical Consortium meeting in Madrid it has been done a workshop with all partner to fine-tune the matrix and to match each BM with each involved partner. Beside the first two business models concerning non-core activities, it has been asked to demo to evaluate each proposed BM taking care of their:

- individual business strategy
- local value-chain
- local eco-systems and partnership.

Figure 2 Focus on topics discussed during the Workshop on Business Modelling organized in Madrid

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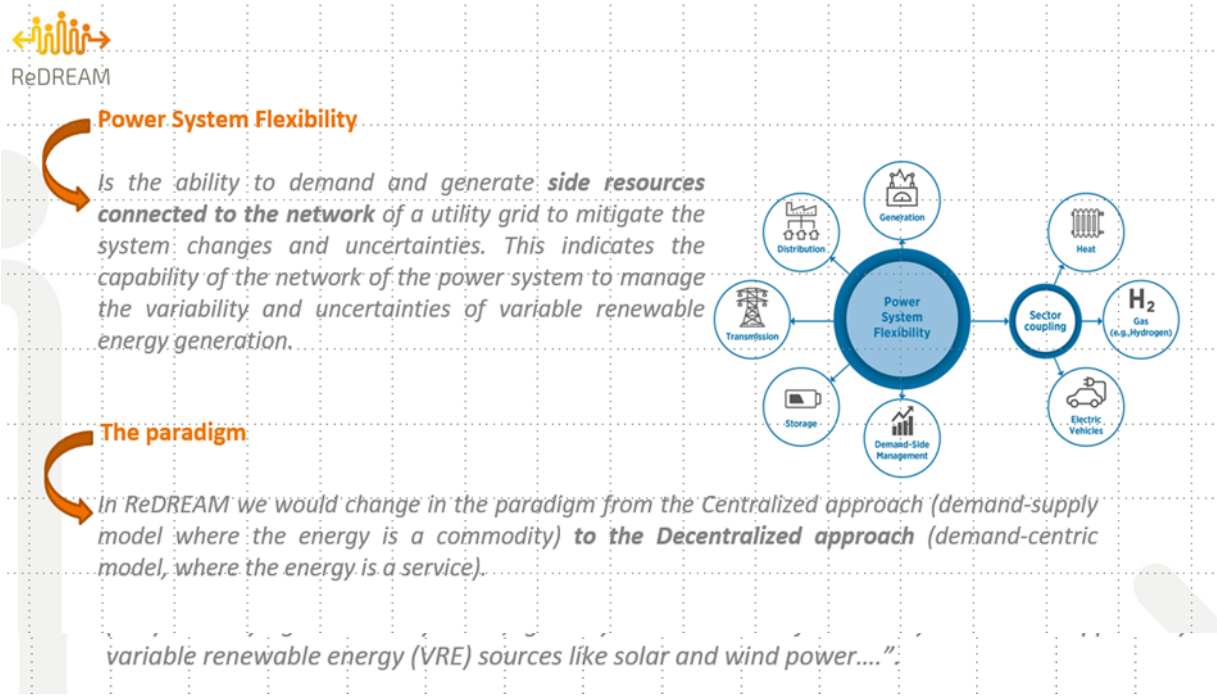

Figure 3 Focus on topics discussed during the Workshop on Business Modelling organized in Madrid

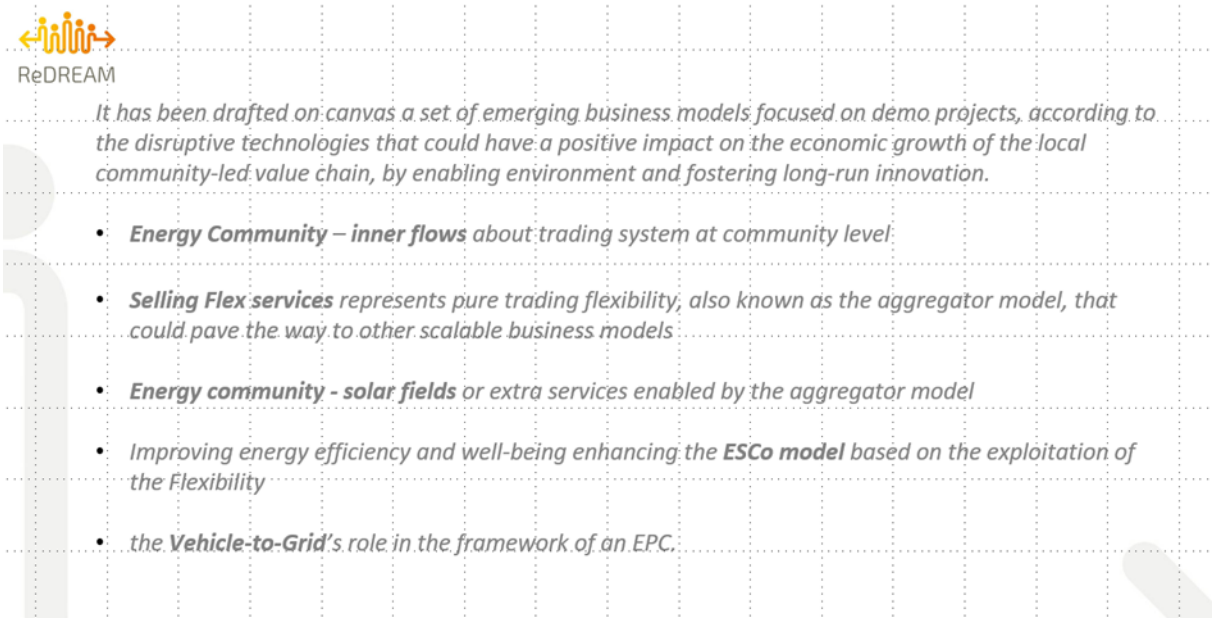

Figure 4 Focus on topics discussed during the Workshop on Business Modelling organized in Madrid

The results are in the D6.1, while for the purpose of this deliverable, it has been looked at the emerging trends and defined a set of viable and sustainable business models pointing out that they should be from the one side coupled with innovative public/private funding schemes and from the other side adapted to the four ReDREAM demonstration sites.

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The report has looked at the emerging trends and defined a set of viable and sustainable business models pointing out that they should be from the one side coupled with innovative public/private funding schemes and from the other side adapted to the four ReDREAM demonstration sites.

Being in the ReDREAM second and third steps of a stepped methodology, and in the middle of an iterative and shared path, this report is considering the second chapter of fourth, being integrated with the funding side, the assessment side (task 6.3), and the exploitation strategy (task 6.4). Indeed, this deliverable is focused on the business intelligence activities for market up-scaling: it will be coupled with a catalogue of viable and proper funding and financing scheme (Task 6.2 and deliverables 6.2, 6.3, 6.4 and 6.5). Afterwards, the Work Package will perform in the task 6.3 the scalability and replicability analysis of DR solutions deployed: if they could be scaled-up and replicate, and what if in case of different use cases. In a nutshell, there will be space for gathering real data on the assumptions and on the business model structure and verify whether the funding disposal strategies could comply with the economic assessment of each single use case. In addition, the Blueprint model will host a template used with demos to create assumptive dataset to populate each selected BM and to be verified, the consistency and the profitability, during the forthcoming months. As such, the data has been gathered from the demo partners based on the guidelines provided by Stemy in terms of Capex and mostly Opex.

Figure 5 Exploitation Strategy Roadmap

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2 Demo blueprint model: features and ecosystem

As the main object of Chapter 2 is to describe the economic impacts of the application of the Business Model selected by the UK demo within the proposals made through Deliverable 6.1, estimations of the cost of technology provided by STEMY (in terms of equipment and installation costs) are needed.

The following table is resuming the major assumptions elaborated by STEMY into their operation model and will be considered for building a draft Operational Statement of the selected Business Models in the following Section.

Type of Consumer	Manageable Energy (kW)	Energy Savings (%)	CAPEX (Euros)
RESIDENTIAL	3 kW	25%	450 Euros
INDUSTRIAL	900 kW	7%	9,500 Euros
COMMERCIAL	90 kW	30%	12,500 Euros

For the specific case of the **Selling Flex services (ref. 3.6 of the Del6.1) Business Model,** STEMY has elaborated the assumptions of the following table for respective revenues and costs:

Type of Consumer	Yearly Service Cost	Cost Savings	OPEX
RESIDENTIAL	112 Euros	220 Euros	102 Euros
INDUSTRIAL	9,800 Euros	12,500 Euros	6,170 Euros
COMMERCIAL	4,200 Euros	6,500 Euros	2,475 Euros

2.1 Features of the Business model: UK

The UK demo leader expressed the possibility to exploit the following models described into Del 6.1:

1. Energy Community – inner flows Model through Peer to Peer Trading (P2P)
2. Selling Flex Services Model

These two models will best operate in an integrated way in order to maximise financial viability as well as the impact on the consumer. By linking supply and demand it is possible to also motivate consumers to maximise self/community consumption of solar PV and shift demand away from peak times. This integrated model is illustrated in the diagram below.

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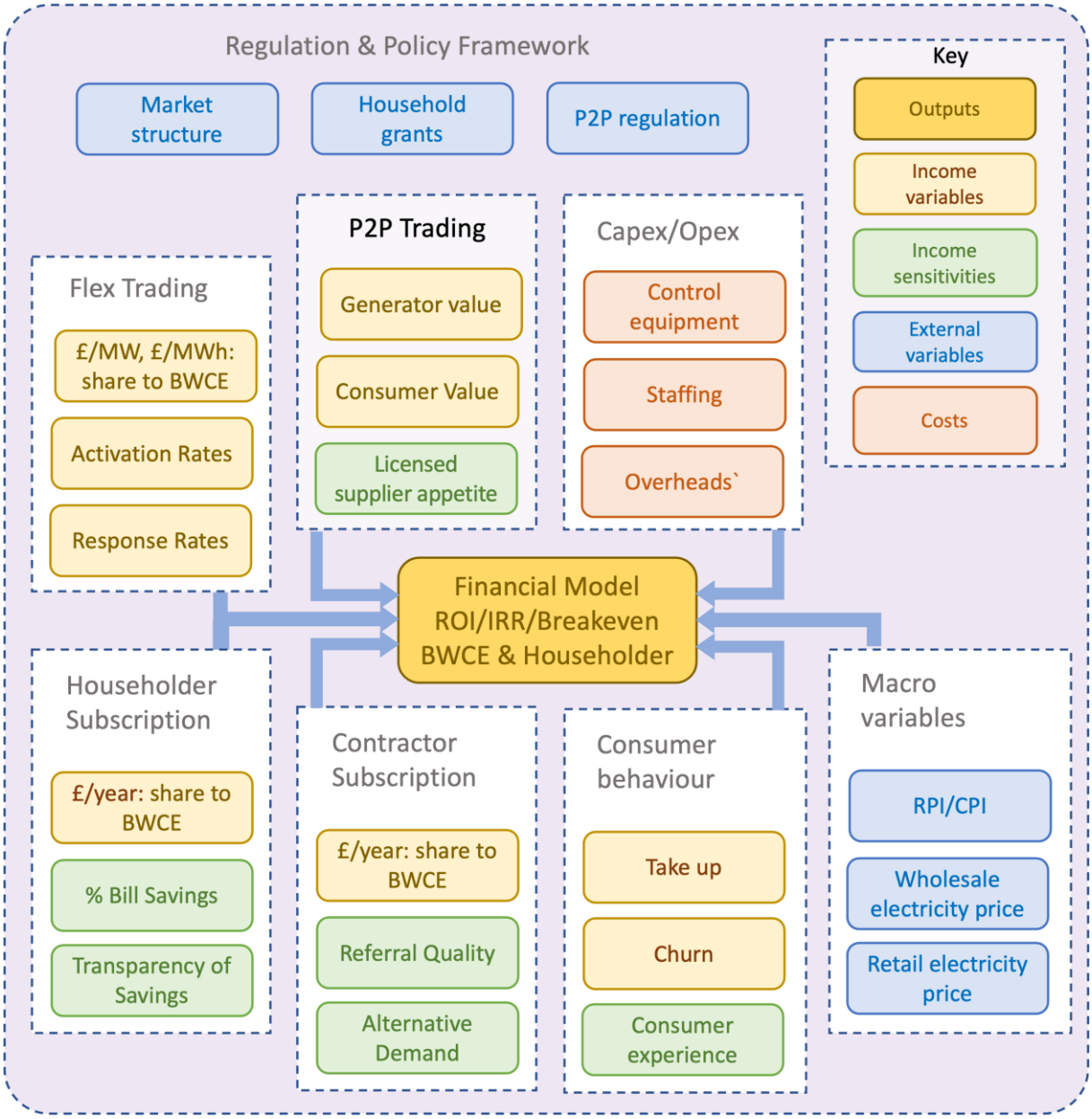

Figure 6 Integrated model

1. **Energy Community inner flows (re. 3.5 of the Del6.1), or even the P2P Trading** The value proposition runs around the development of a full local renewable energy community (even Virtual). A business case derived from the emerging P2P BM as described by IRENA "P2P electricity trading is a BM, based on an **interconnected platform**, that serves as an online **marketplace** where consumers and producers "meet" to trade electricity directly, without the need for an intermediary". Customers are more generally Prosumers and Consumers, energy suppliers and local energy business developers. The main **revenue stream** comes from the percentage on energy transactions and from the energy trading, the anonymized big data selling to third parties is an additional voice. Prosumers sell their energy excess to other prosumers in a local network. For a local renewable energy community, the boundaries are one of the main features as well as the presence (and the ownership) of the Storage facility that has the advantage to enable the energy balance and the flexibility. Despite of the P2P

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platform designed by IRENA the presence of a centralized player (an aggregator, a DSO, or a TSO) is fundamental. Prosumers and member of the local energy community: P2P energy trading allows energy consumers/producers to directly trade with each other, is one of the new paradigms driven by the decarbonization, decentralization, and digitalization of the energy supply chain. Also known as the "Uber" or "Airbnb" of energy, as it is a platform that allows local distributed energy generators to sell their electricity at the desired price to consumers willing to pay that price. The added value is the maximization of the comprehensive social welfare of the prosumers and the community itself. As a facilitator of P2P trade, an aggregator can enable automated transactions, optimize local energy use, and generate savings for consumers.

The UK demo, Bath & West Community Energy, as a Community Benefit Society, could decide to adopt this model undertaking the role of a centralized player (aggregator), allowing the energy trade between the members of its Community, through the adoption of an interconnected platform (the energy marketplace), which will allow the energy trade.

At the status of the art The Bath & West Community, as Community Benefit Society, can pay interest on members' share capital but cannot distribute surpluses to members in form of dividends. Through the adoption of this model, allowing the energy trading, the Community could maximize the social welfare of its members, transforming them into active prosumers and consumers, exploiting the economic potential of the Community.

Key target of the application of the P2P Business Model:

- Recruiting 460 households.
- 460 households who will participate in the P2P trading trial.
- No target on the number of installers or how much of each type of energy technology or Stemy equipment that needs to be installed.
- No expectation of the amount of kWh of flexibility that will be offered from the households.

1.1 Hypothesis of P2P business model

This section intends to define a hypothetical prevision of the impacts of the application of the Peer to Peer and Community Self Consumption Model, taking into account the following assumptions of:

- RES production
- Energy Community dimension in terms of no. of households
- Economic Benefit Share between the tech supplier and the community
- Hypothesis on financing for purchase of technology

	Rooftop	Community	Notes
PV Systems	100	4	Community schemes are ground mount solar
Size (kW)	3	250	Community scheme set at 250kW to enable easy scaling within model. In reality schemes would be larger than 250kW.
Annual Yield (kWh/kW)	850	1000	
Annual Solar Generation (kWh)	255.000	1.000.000	

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Annual Solar Export (kWh)	102.000	1.000.000	50% of rooftop solar exported. 100% community solar exported.
Tariff differential	€ 0,07	€ 0,07	€0.07 difference between price charged and standard retail tariff
Potential benefit/year	€ 7.140	€ 70.000	
% of benefit to BWCE	20%	40%	Assumes 50:50 split between BWCE and Stemy with balance retained by solar generator households and solar consumers
Potential additional BWCE income	€ 1.428	€ 28.000	Only additional income from P2P is included, not any business as usual electricity sales income
Potential STEMY income	€ 1.428	€ 28.000	Assumes 50:50 split between BWCE and Stemy
% benefit to householder	60%	20%	Householder benefit for rooftop solar split between household solar generator and solar consumer
Annual benefit per household	€ 30	€ 34	Rooftop solar benefit split between household solar generator and solar consumers
No of participating consumer households	43	417	Assumes solar export is allocated to match 60% of consumer demand (total average annual demand of 4,000 kWh/yr)
Capex	€ 7.125	€ 22.833	Assumes data monitoring at community generator (€500) and ampere installed in all households (€50)
Cost of capital	5%		
Capital repayment term	5		
Staffing capacity (FTE)	0,5		Assumes client liaison capacity only. Activity an extension of existing business model so doesn't need additional senior staff.
Average salary inc. pension & NI	€ 34.500		Includes 15% National Insurance and Pension
Overhead/indirect cost rate	25%		Low

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The following extract can roughly resume the economic impact of this business model applied to BWCE:

Income	Value	Per household
BWCE revenue	€ 29.428	€ 64
Expenditure		
Capex	€ 29.958	€ 65
Financing cost	(€ 6.920)	(€ 15)
Staffing	(€ 17.250)	(€ 38)
Overhead	(€ 4.313)	(€ 9)
BWCE Profilt / (Loss)	€ 946	€ 2

The info marked in red shall be considered subject to a possible variation of about the **20% percentage** because the market value of STEMY technologies is still under definition as not yet in the market.

2. Selling Flex services (ref. 3.6 of the Del6.1), or even the Community Aggregator

Aggregator accumulates flexibility from Prosumers' flexible assets and sell it to the three players: BRPs, DSOs and TSOs. The value proposition is settled around the concept of the **maximization of the flexibility provided in the short term**; as such, it cut the uncertainties of energy waste from prosumers by ensuring it to the market. It means that prosumers are covered against the business risks. The main customers are prosumers, local energy communities and energy equipment providers, while the more consistent revenue stream is represented by selling the flexibility. Likewise renting agency, prosumers will be always paid for their individual flexibility services by the aggregator. The aggregator negotiates with BRPs, DSOs and TSOs prices of the aggregated flexibility services. The Aggregator main role is to angle prosumers (flexibility providers) with energy players (flexibility buyers). It pipelines the flexibility in a portfolio and diversifies services to different market players by acting new and diverse caps (the Balance Service Provider, the Constraint Managing Service Provider, the Capacity Service Provider and even the Balance Responsible partner) serving different market players. It is also possible to combine implicit and explicit models: as such, whether the Aggregator (responsible for explicit) and the ESCo (responsible for implicit) could be the same or different entities. The Aggregator cares about the remuneration process derived from aggregating the prosumers flexibility: as such, they close a deal on commercial terms and conditions for the procurement and control of flexibility. The most consistent revenue stream is the earnings from the flexibility to be shared. As well as the costs are related to the incentives for prosumers for sharing flexibility and maximize their load or generation. The most valuable role of the aggregator is to provide non-financial value in return to prosumers and active member of the local community by providing insight into consumption patterns or providing home energy managers, etc.

- Flexibility sources will be Heat pumps, EV charging posts, Immersion heaters for hot water
- So far, no integration with other services is foreseen.

The UK demo could decide to adopt this model, playing the role of aggregator as well as the role of the Energy Service Company.

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As the major revenue stream would come from flexibility, the major work of the Community would consist in providing insight to their large audience of members and/or playing the role of Energy Managers for the Community.

Concerning the Stakeholders involvement in the pilot, it has been drafted a detailed list of actors:

1. Householders with existing energy technologies (heat pumps, EV charging posts, immersion heaters) that can be connected to STEMY's platform, SPLODER, via the internet by the installation of novel, innovative, smart STEMY equipment;
2. Householders who are willing to have a pre-selected flex-enabled energy technologies (heat pumps, EV charging posts, immersion heaters) installed in their home, that can be connected to Stemy's platform, SPLODER, via the internet by the installation of novel, innovative, smart Stemy equipment;
3. Householders willing to engage with the P2P trial;
4. Installers of both the pre-selected flex-enabled energy technologies (heat pumps, EV charging posts, immersion heaters) and novel, innovative, smart Stemy equipment;
5. Stemy using their SPLODER platform;
6. DNO (WPD) to which SPLODER will connect to their Future Flex Platform;
7. DNO (WPD) to liaise re P2P trading trial;
8. TSO (National Grid) to which SPLODER will connect to their trading platform;
9. BWCE to use the data generated from the trial in the financial model to test the assumptions of the business case.

Key target of the application of the Flex Service Business Model:

- Recruiting up to 100 households in total across both business models.
- No target on the number of installers or how much of each type of energy technology or STEMY equipment that needs to be installed.
- 2,400 kWh of flexibility expected and offered from the households.

2.2 Hypothesis of the Flex Services Business Model

This section intends to outline the hypothetical impacts of the application of the Flex Services Business Model at a scale that might deliver financial viability (500-1000 households), rather than the more limited scale that can be resourced within this project (up to 100 households across both business models) .

The table below summarises a simple financial analysis across three scenarios, assuming:

- forecast flexibility income, based on estimates from partner Everoze, see appendix for assumptions, but average at £3.80 per kW per household per month.
- forecast householder subscriptions, based on a share of potential savings estimated from Stemy Energy experience
- baseline cost assumptions, extrapolated from experience in the Flex Community project

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	Baseline		Scenario 1		Scenario 2	
BWCE Income	Value	Per Household	Value	Per Household	Value	Per Household
No of households	1000	-	1000	-	500	-
Available flex (kW)	3750	-	3750	-	1875	-
Flex revenue	€ 67,059	€ 67	€ 67,059	€ 67	€ 53,137	€ 106
Householder subs revenue	€ 55,000	€ 55	€ 55,000	€ 55	€ 27,500	€ 55
BWCE Expenditure						
Capex	€ 505,882	€ 506	€ 126,471	€ 126	€ 0	€ 0
Annual financing cost	(€ 65,514)	(€ 66)	(€ 16,379)	(€ 16)	€ 0	€ 0
Staffing	(€ 82,800)	(€ 83)	(€ 82,800)	(€ 83)	(€ 62,100)	(€ 62)
Overhead	(€ 20,700)	(€ 21)	(€ 20,700)	(€ 21)	(€ 15,525)	(€ 16)
BWCE Profit / (Loss)	(€ 46,955)	(€ 47)	€ 2,180	€ 2	€ 3,012	€ 3
Stemy Profit / (Loss)	€ 20,059	€ 20	€ 20,059	€ 20	€ 29,637	€ 59

Baseline assumptions

No of households	1000		Assumes all participating households have all technologies, heat pump, EV chargepoint, electric hot water heating and solar PV
Tech. capacity (kW)	3	PV	
	7	EV	
	5	HP	
	3	HW	
Available Flex (kW)	0	PV	
	1.8	EV	
	1.3	HP	
	0.8	HW	
	3.75	TOTAL	
	3,750	**TOTAL portfolio**	
Potential Flex Revenue	€ 201	Income/hsld	BWCE revenue based on threeway split of income with household & Stemy. Assumes medium risk/return revenue
	€ 201,176	TOTAL portfolio	

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	€ 67,059	**TOTAL BWCE/yr**	strategy. See appendix for more details and assumptions.
Potential Optimisation Revenue	€ 220	Bill redcuction/hsld	Household retains 50% of reduction, balance split with Stemy. Potential savings based on Stemy experience.
	€ 220,000	TOTAL portfolio	
	€ 55,000	**TOTAL BWCE/yr**	
Equipment cost	€ 506/hsld	Includes installation. Based on Stemy control equipment costs and assumes the householder covers the cost of the primary technology.	
Cost of capital	5%	10 year repayment term may be to tough to achieve given the nature of the equipment	
Repayment term	10		
Staffing capcity (FTE)	2.0	Assumes project management, marketing & client liaison capacity - But 2 FTE will be tight in terms of capacity	
Average salary	€ 41,400	Includes a higher salary for more senior staff and includes NI and pension	
Overhead cost	25%	Low %, needs to be more like 50%, even when organisation operates on a virtual basis	

Scenario 2 assumptions:

As outlined for the baseline plus a 75% cut in the control equipment cost

Scenario 3 assumptions:

As outlined for the baseline plus:

- Reduction to 500 households,
- A 25% reduction in staffing capacity/costs
- Reliance on cloud to cloud communication only for appliance control, avoiding need for capital expenditure
- Revenue increased by 25-30% per household, either through (a) a higher risk revenue strategy (b) integration of value from carbon reduction within flexibility markets (c) a significant long term increase in electricity bills increasing potential savings (d) additional income from referral fees/subscription from installers/contractors, or some mixture of all four.

Sensitivities and risks

Risk	Detail	Impact on Analysis	Mitigation
Participant profile	The analysis assumes that all participants have all technologies installed. In reality, there will be a	• Integrating a range of participant profiles will reduce the overall income per household and increase the pressure on numbers	• The analysis doesn't take into account the recent significant increase in retail electricity tariffs.

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	mix of profiles of technology and also different levels of demand.	of participants required to break even and/or the need for a higher risk flex revenue strategy or greater market value. • Significantly higher risk strategy for flex revenue may not however be compatible with a community finance model.	• It's not clear how long this will last and whether tariffs will ever return to levels seen pre crisis. • Clearly if these increases are long term it will increase consumer motivation to engage with increased savings also offering the potential for an increased revenue share from household subscriptions. • Nor does the analysis include potential supply chain income. This element will require increased scale in order to test with installers on the back of evidence of significant workflow.
Revenue	In addition to the issues outlined above, the revenue figures are based on assumptions outlined in the appendix and are drawn from a market review carried out by Everoze for BWCE. monthly estimates of revenue that in reality will vary during the year	• Without greater validation through real world testing its difficult to comment on how accurate these estimates are. • The evidence from the Flex Community project so far doesn't imply that they are significantly adrift from what might be seen in practice.	• These results will need to be reviewed following further real world testing as the Flex Community project develops. • Including a more detailed quarterly analysis of income and expenditure will enable consideration of seasonal and inflationary factors over time and as the Flex Community project increases its scale of operation.
Equipment costs	The baseline assumptions for equipment costs are based on actual figures provided by Stemy. Scenario 3 assumes that the control of household appliances is carried out via cloud to cloud communication between the platform and the technology in the home.	• Equipment costs have a significant impact on the viability of the model. • But they also introduce an added step required to on board participants, increasing complexity of the offer, the time taken to get participants involved and adding a point of weakness in the system that could increase downtime and operational costs.	• The reduction in equipment costs in Scenario 2 will only be possible through significant hardware development and scaling by Stemy, the use of existing commercially available equipment, if compatible with Stemy's platform or assuming that some of the households use cloud to cloud communication to control technology instead. • Increasing the proportion of households that utilise cloud to cloud communications to 100% as assumed within scenario 3 will require harmonisation of standards and protocols employed by heat pump and EV chargepoint technologies.
Financing capital costs	Where equipment costs for control technology need to be met, then both the cost of capital and the repayment term for capital raised become key variables.	• The cost of capital at 5% is reasonable for community finance now, though inflationary pressures may reduce the attractiveness of this figure over time. • Interest payments on community finance will need to be in line with the risk appetite of community investors and align with regulatory restrictions on interest payments associated with community businesses	• If community shares become difficult to raise at 5% then it could be possible to issues community bonds that can be placed with a lower interest rate. • Though bonds will reduce flexibility around discretionary payments and increase risk if revenue targets are not met. • Lower cost finance might be able to be secured through partnership with local authorities able to secure

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		• Debt will be difficult to attract with limited options for providing security • The analysis assumes a 10 year repayment profile which should perhaps be more like 5 years given the nature of the equipment employed.	investment through the Public Works Loan Board. Though this is untested for investment in this sort of project. • A 10 year capital repayment profile could be difficult to achieve with unsecured debt but is more achievable when considering community finance that provides a route to more patient capital
Staffing costs	Staffing costs are based on an average of salaries required for differing roles in delivering the project, together with a percentage contribution to overheads.	• Salaries may vary depending on the geographical region • The capacity required in all scenarios assumes streamlined systems following pilot testing and development. Though the figures are of course just an estimate at this stage based on the experience of delivering the pilot to date. • The 25% overhead contribution could be low for many organisations, depending on their scale and set up.	• The requirement to install control equipment rather than utilise cloud to cloud communications has a significant impact on staff time and so cost. • Moving as close as possible to scenario 3 and removing the need to additional control equipment would reduce risk and cost significantly.

Conclusions from analysis

A target of 1000 households to break even in scenario 1 is a major undertaking and will require significant upfront investment to get to that scale of operation.

500 households to break even in scenario 2 is still challenging but is more achievable, particularly without the need for additional control equipment, reducing hassle and transaction cost per household and speeding up take. Though this scale is still beyond the immediate scope of this project.

However, the smaller target for participating households will require higher revenue per participant to achieve, bringing implications for strategy and/or market development.

So in summary, to be profitable, as well as increasing scale significantly, smart control device costs need to fall by 75% at least, (though preferably be removed totally through the use of cloud to cloud communication) and income needs to increase by 25-30%.

However, staffing levels and indirect cost assumptions are also tight. So, in reality the target required to secure profitability could well be higher.

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3 Library of affordable funding disposal strategies

3.1 The funding strategy rationale

Given the Energy Service Company (owned by a joint stock bank) experience, it has been underpinned some concerns on the banking system side. As such, it has been proposed a powerful approach developed the energy efficiency and the renewable energy systems applied in private and public projects through the Energy Performance Contract. Thus, to enable the banking system to figure out the role and the value of the energy savings.

Having assess the possible business cases, it is strongly suggested to divide the development project in two stepped phases:

- The funding scheme (harmonization of three main sources: non-refundable rewards, loans and equity) and the implementation
- The long-term securitization of Energy Performance Contract.

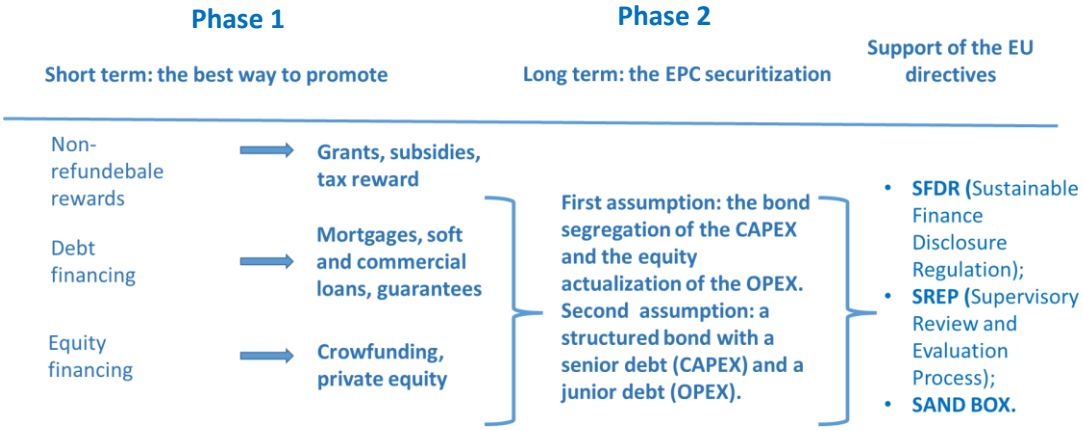

Figure 7 Funding Strategy Rationale

The second step is the capstone because it will "strip" the contract clearly distinguish CAPEX from OPEX. This scheme represents a game changer while reducing the cost of funding compared with a possible larger scheme, such as a green bond emission. In this sense the lates legislative novelties the SFDR[3] directive and the ESG SREP[4] by EBA, are following the green transition pathway. Indeed, thanks to enter into force of the Taxonomy and to the introduction of the European directive SFDR (Sustainable Finance Disclosure Regulation) the financial originators are asked to declare in their

[3] Regulation (EU) 2019/2088 of the European Parliament and of the Council of 27 November 2019 on sustainability-related disclosures in the financial services sector (Text with EEA relevance) https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32019R2088

[4] The European Banking Authority (EBA) published today its final revised Guidelines on common procedures and methodologies for the supervisory review and evaluation process (SREP) and supervisory stress testing. The revisions aim at implementing the amendments to the Capital Requirements Directive (CRD V) and Capital Requirements Regulation (CRR II) and promoting convergence towards best supervisory practices.
https://www.eba.europa.eu/sites/default/documents/files/document_library/News%20and%20Press/Communication%20materials/Infographics/ESG%20disclosure/1026178/EBA%20summary%20of%20ESG%20disclosures%20-%20Pillar%203.jpg

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financial product whether ESG principles are present and in which percentage. This is a first step against "greenwashing". As well, EBA (European Banking Authority) will introduce the ESG principles in the SREP (Supervisory Review and Evaluation Process).

3.2 Investment Disposal Strategy

As such, it has been created an investment disposal strategy, capitalizing what it has been already profiled for the complex Positive Energy Districts development under the Smart City scenario[5]. It has been assumed that despite of the overall amount of the gross investment, the rationale could be sized according to the 4 demo needs.

A derivate part of the retail investments should be able to finance the equity in phase one, after that the securitization of the debt in phase two ends with the segregation of the assets in a long-term investment product, like in a pension plan scheme.

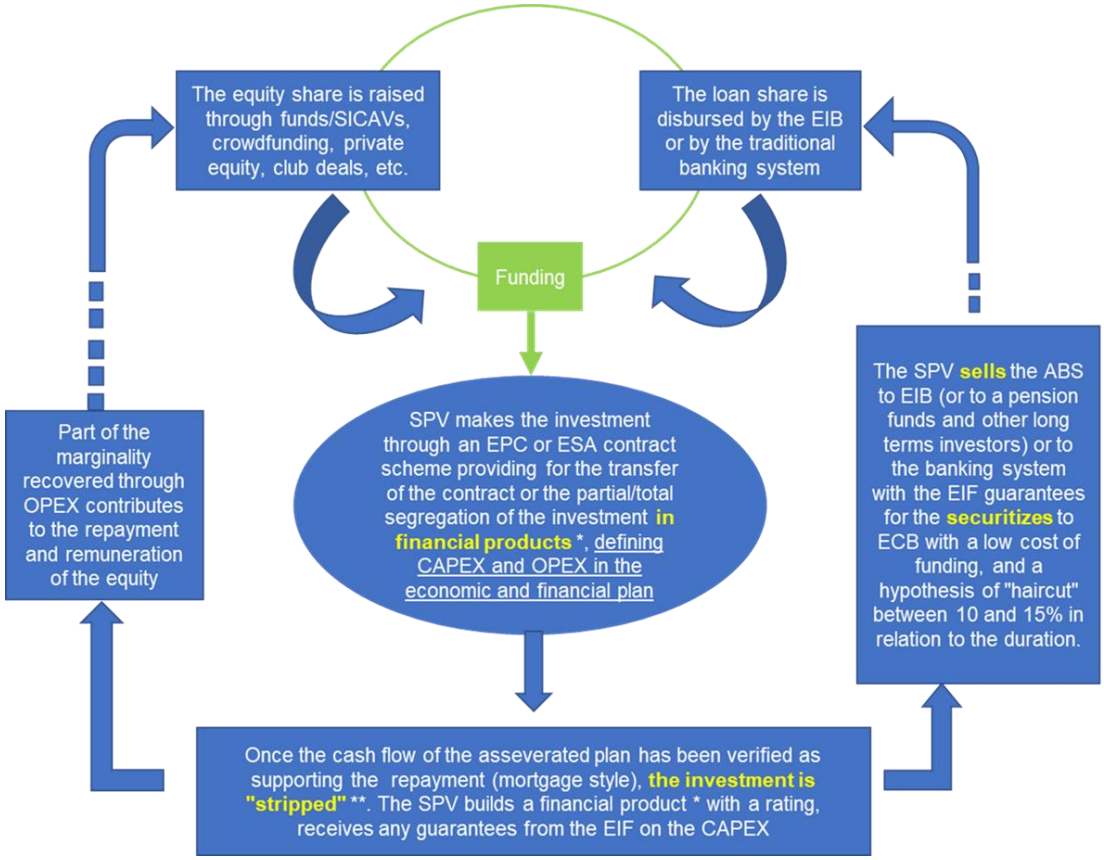

Figure 8 Investment Disposal Strategy

As explained in the following sub chapter, the turnkey for ReDREAM is to leverage the so called "fixed coupon": a floating premium based on savings and a capital fully protected at maturity. Indeed, the envisaged funding scheme gives the investor, thanks to the creation of a solid community for which energy is the pivotal element, the possibility to fully exploit the regulatory innovation, given by the EU Directive 2001/2018 (RED II) on energy communities.

[5] https://www.sparcs.info/sites/default/files/2020-11/D7.1_BusinessModelsAndFinancingMechanismsForWideUptake.pdf

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The prospect to monetize energy savings aims to stimulate virtuous behavior within the community. In the proposed architecture, and in relation to the monetization process of virtuous energy behaviors, the systematic use of EPC (Energy Performance Contracting) contracts that fix the floor beyond which savings become revenue for the user is crucial, through the involvement of 3PF (third party financing) in the form of ESCos (Energy Service Companies).

3.3 Crowdfunding[6]

Over the past years, and especially during the pandemic period, the public sector finance has been stressed without possibility to Fund and Finance any "low income or long-term returns project". Nevertheless, crowdfunding has the potential to offer a new model of finance via an investment-based business model that generates social, environmental and economic returns. Indeed, on 10 November 2020, The European Commission issued the new Regulation on European Crowdfunding Service Providers (ECSP)[7] for business, creating uniform rules across the EU for the provision of investment-based and lending-based crowdfunding services related to business financing. It is addressed to the growing market of Investment Crowded platforms with an EU passport based and it allows them to offer their services across the EU with a single authorisation.

Two financial considerations for equity crowdfunding:

- Risk differences between equity and loan. If it will be used a strict process of evaluation, the difference is only on the lasting side
- Whether the above assumption is basically true, it should be possible to give guarantees on the equity crowdfunding through the platforms, when related to the rating systems

If we look at the energy demand response and the flexibility investment projects, those based on crowdfunding schemes shows several features:

- citizens/households/consumers (they will become Prosumers) invest in their own social dimensioned district, even with a focus on renewable energy sources and low pollutant activities
- new financially viable business cases generating green local jobs
- new use of abandoned and brown field public and private spaces

For ReDREAM it has benchmarked the crowdfunding instruments for deploying energy community or more generally local equity projects. Apart from the result that the crowdfunding would be a new tool of civic engagement with local residents and service users, it has been investigated the average size of several crowdfunding campaign for projects deployment.

It must be underlined that the sector is yet to make the most of crowdfunding and to realise the financial and non-financial benefits it has been shown to generate. When looking at the 4 ReDREAM

[6] The assumption is that new use cases can be covered, in financial coverage terms, through crowdfunding or fintech closing the loop of the capex with investors, who could cover the opex needs. For instance, the adoption of decentralized ledger technology (DLT) for green bonds can lower the costs for municipal green bond issuance and increase investors' confidence in investing in green projects for their local communities. Considering how sensitive millennials and generation Z are to climate and environmental issues and how eagerly they use digital devices, there is an opportunity to foster sustainable investing through digital channels.

7 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32020R1503

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demo cases the possible cap for their demo district demonstration is around 350k € for each of the district.

The commitment will be addressed, according to the benchmark, to the Institutional public investors/authorities for the 45% and to the private investors for the 55% equally split between Institutional Private Investors and small-retail-crowded investors. Below three best practices.

Aruka Midway[8], USA	An investment opportunity in the Aruka East Baltimore Midway revitalization project. Urban revival. Investing in the community, block by block.	213.500 $ raised open to everyone, with 100% of 100,000 $ goal raised and with 21% of 1.000.000 $ goal raised. 66 investors. Ongoing campaign.
De Nieuwe Meent[9], The Netherlands	de Nieuwe Meent organised around the principles of communing. Combining affordable housing, shared living, social care and solidarity economy, we intend to contribute to a sustainable, inclusive and fair society.	Closed campaign with 450.000 € of Funding Goal of which 439.609 € of Funds Raised 97.69%
Homes4all[10], Italy	A programme with the aim of reducing the housing emergency through a process of urban regeneration that combines demand and supply of properties on the market by providing services and financial and social tools aimed at reducing the rental risk.	Two rounds of raising, the first has collected 399.500€ the second 300.00€. Campaign closed

When the objective is to increase private/citizens contributions in energy efficiency, it should be considered that embracing the paradigm from commodity to service, the financial “bottom up” should be surfed: the renewable energy systems are more efficient when producers/prosumers are closed to consumers: that means talking about small amounts. As such, and considering the demos’ size, a green bond emission could not be the best/optimal idea to accelerate the energy efficiency transition.

Especially now, because the interest rates are negative or near to zero but as soon as the inflation increases, the interest rate curve will be steeper than now, and the financial costs will be unsustainable, or the amortization period will be so long to be very expensive.

To ping-pong this strategy, it must be considered the impact in the reduction of the Greenhouse Gas Emissions in the financial revenues: as such, the ETS system is necessary, better if more like the Italian

8 https://www.smallchange.co/projects/aruka-midway

9 https://nieuwemeent.nl/en/crowdfunding/dashboard/
10 https://homes4all.it/

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White Certificates for financing the no direct revenues and the role of crowdfunding paves the share of the targets in a community and the closure of the cleavage between finance and economy.

3.4 Other suitable Funding and Financing mechanisms

- The EU Commission and the EIB group settled a "Coordinated economic response to the Covid-19 outbreak" and additional EIB measures. The financial impact and the budgetary effort amounts €40bn of additional support to SMEs and mid-caps and €2.5bn from the EU budget (repurposing of the EFSI guarantee). The support to companies is for:

  - expansion and improvement of conditions of existing EIF loan guarantee schemes for SMEs (COSME LGF and InnovFIN SMEG) with additional €1bn from EFSI to support COSME LFG and InnovFin SMEG. The risk coverage is up to 80% (as opposed to standard 50 %), while the minimum guaranteed cap rate (COSME) increased from 20 to 25%. The novelty is represented by a simplified and fast approval process by the EIF Board, a more flexible terms, including postponement, rescheduling or payment holidays

  - €5bn from EIB own resource to expand existing EIB framework loans and lending facilities to banks. Goal is to expand liquidity of banks to ensure €10bn additional working capital support for SMEs and mid-caps

  €1.5bn of EFSI guarantee to the purchase of asset-backed securities from banks. The aim is to allow banks to transfer risk of existing SME loans to the EIB, freeing up €10bn for new SME loans.

Following this approach, the national development banks of Italy (Cassa Depositi e Prestiti) and Spain (Instituto de Crédito Oficial) mobilized several guarantee schemes. Apart from them, even the national development bank of Croatia (HBOR) expanded the credit guarantees with a risk coverage of up to 90% for SMEs, but also to larger companies. These are financial schemes targeted for the so called green transition.

3.5 EU ETS

Emissions trading system is a market-based approach to controlling pollution by providing economic incentives for reducing the emissions of pollutants. The EU emissions trading system (EU ETS) is a cornerstone of the European Union's policy to combat climate change and its key tool for reducing industrial greenhouse gas emissions cost-effectively. During the first months of Q2'22, spot prices have increased EuA prices have recovered from €55 in March 2022 to €82 in mid-May 2022. A similar volatility was observed in the UK.

3.6 Sustainability-linked bond - SLBs

Looking at the development of mid cap demo development and quite in line with the accountability of the energy saving and of the flexibility, the Sustainability-linked bonds are bonds whose financial and structural characteristics (the coupon) are linked to pre-established sustainability objectives. These objectives are measured through the definition of Key Performance Indicators (KPIs) and evaluated against predefined Sustainability Performance Targets (SPTs).

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The demo leaders mostly have not a single project to deploy but an overall energy transition strategy. Indeed, the SLBs are not tied to the implementation of a single energy/sustainable project. The proceeds from the issue of the security can in fact be used for more general purposes, linked to an entire strategy centred on the Sustainable Development Goals of the UN 2030 Agenda, with measurable targets from year to year. As such, Green Bonds has been discarded due to their size, too big for demo purposes.

More in detail, SLBs are recognized at the monetary policy level: as such, ECB established (since Jan 2021) SLBs with coupons linked to sustainability objectives can be used as collateral in Eurosystem credit operations; and they are suitable for securities purchase programs, including the extraordinary one related to the pandemic response.

Operationally, the International Capital Market Association drawn up non-binding guidelines for the issuance of financial instruments that incorporate the achievement of future sustainability objectives for Sustainability-linked bonds.

The principles (SLBPs) are best practices focused on clarity and transparency, which investors can use to understand the financial and structural characteristics of a given product. These are five:

- Selection of Key Performance Indicators (KPIs)
- Calibration of Sustainability Performance Targets (SPTs)
- Characteristics of the bond
- Reporting
- Verify.

3.7 Equity loans

This scheme is used to be adopted by private companies of all sizes, especially those expanding their market status or entering a foreign market. As such, the classical example of Stemy in the ReDREAM consortium: being a partner of each demo would mean enter in four different markets with the possibility to activate local territorial debt partner for the Capex needs. But the equity loan could enable companies in providing resources for the Opex, for example.

It is an instrument that works via national development or commercial banks: they provide direct equity partnership, with a medium-long term. The stake could be settled in the constitution phase (greenfield initiatives) (by sharing capital increase) or in M&A transactions. This scheme is compatible with additional financial resources by granting loans.

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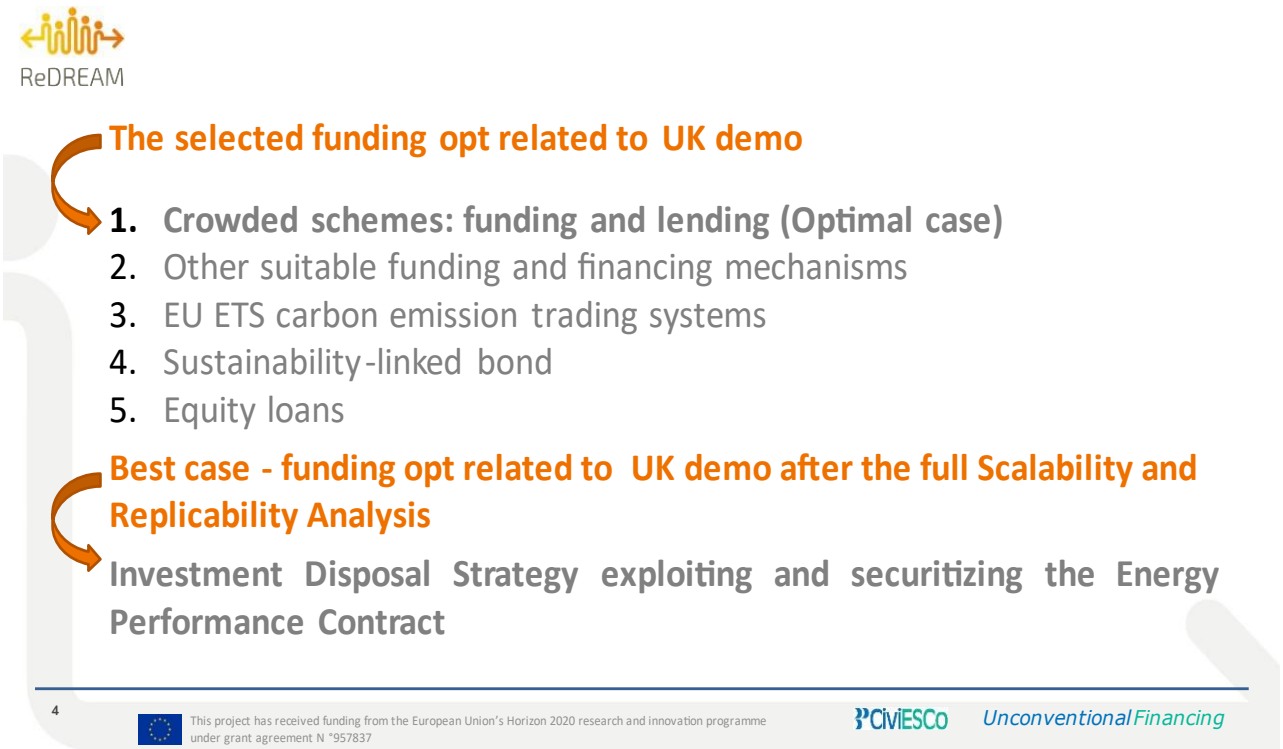
4 Conclusion

The assumption drafted in the docs must be verified and to be implemented more in detail in the Scalability and Replicability related task. Indeed, once the estimation will turn in to consistent data, it will be possible to avoid the granularity and to populate the business plan. This could give the operational revenues a push-up and could settle the dimension of the Capex and Opex, as well. As considered before, the two selected models seem to be cooperative and integrated: the right way to enhance the financial self-sustainability, the impact on the consumers. However, the overall dimension of the investment remains very low.

There are many useful financial solutions in for developing the two selected business models, or a combination of both. Nevertheless, the selection of the financial instrument should be adapted to the business plans of the project and customized around the volume.

As such, and standing for the finetuning in task 6.3, the most adaptable financing methods to be adopted by the BWCE among those listed in chapter three seems to be the crowdfunding scheme.

However, it is possible that after the real dimension of the demo to be performed in task 6.3, the best opt for the BWCE could be the construction of the fist Investment disposal strategy by using the company as a Special Purpose Vehicle. An SPV created by a parent company to isolate financial risk. Its legal status as a separate company makes its obligations secure even if the parent company goes bankrupt. The means could be the Asset-Backed Security. The ABS is an investment security collateralized by a pool of assets, (loans, leases, credit card debt, royalties, or receivables). ABS is like an MBS mortgage-backed security, except that the underlying securities are not mortgage-based. For investors, asset-backed securities can be an alternative to corporate debt. ABS is financing schemes, issued against securitization operations, like the normal bonds. The procedure for creating an ABS - securitization - is the act by which a company separates a series of receivables from its balance sheet, "packages" them appropriately and sells them on the market, together with the cash flows they generate, through the SPV with the aim of generating liquidity.



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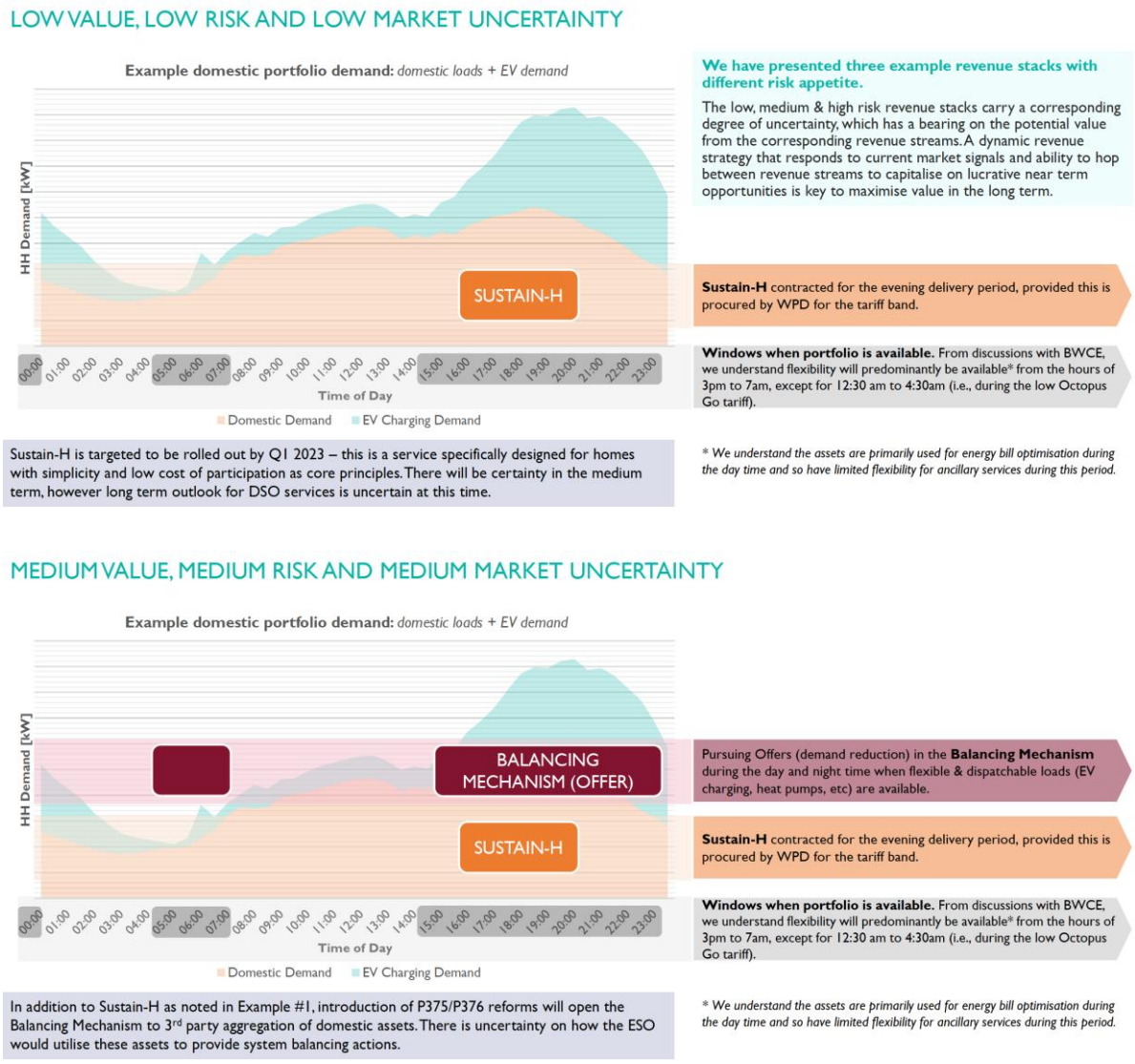
Appendix – Revenue Assumptions Drawn from Everoze Modelling

The following extracts are taken from an Everoze Domestic Flex Market Review undertaken for BWCE.

Figure 1: Revenue stacking options



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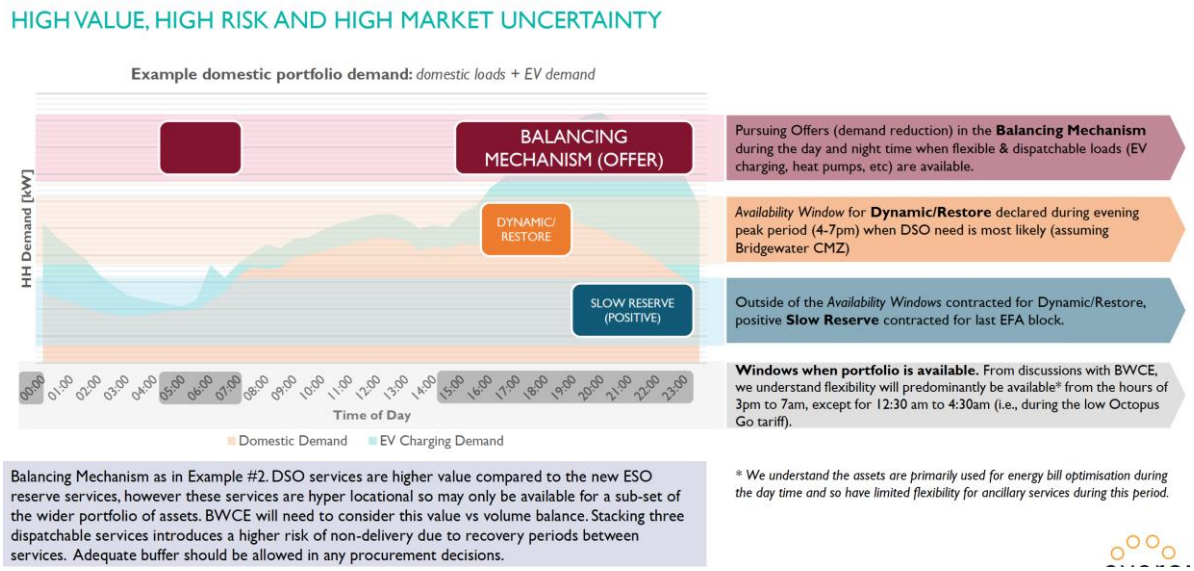
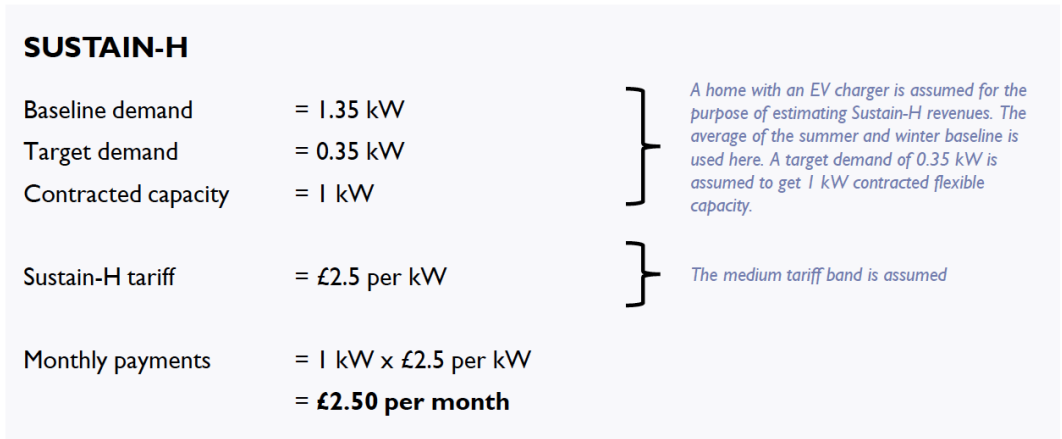


Figure 2: Estimate of Gross Revenues

Figure 3: Summary of Revenue Estimate Assumptions



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BALANCING MECHANISM (BM)

Contracted flexible capacity	= 1 kW	*Assumed unit flex capacity per home*
Days service is offered	= 30 days	
Number of dispatch events	= 15 events per month	*Subject to high uncertainty as it is unclear how the ESO would dispatch domestic assets in the BM.*
Avg. duration of dispatch event	= 30 minutes	
Hours service is utilised in month	= 15 events x 30 minutes	
	= 7.5 hours	***Revenue critical assumptions subject to high uncertainty***
Utilisation estimate	= 7.5 hrs x 1 kW	
	= 7.5 kWh	
BM Offer price	= £175 /MWh	*Price assumption based on example prices offered by utility scale storage in the BM*
Monthly payments	= 7.5 kWh x £175 /MWh	
	= **£1.31 per month**	

SLOW RESERVE

Contracted flexible capacity	= 1 kW	*Assumed unit flex capacity per home*
Days service is offered	= 30 days	*Revenue stack assumes service is offered for the last EFA block in the day, from 8-11pm*
Number of EFA blocks contracted per day	= 1 EFA block	
Probability of securing contract	= 75%	*Indicative assumption*
Hours service is utilised in month	= 30 days x 4 hrs x 75%	
	= 90 hours	***Revenue critical assumption subject to high uncertainty***

Remuneration for the Slow Reserve service is pay-as-bid for the kWh utilised by the ESO. The service is yet to be commercially launched, and so there is no information on the value of the service at this time. We have used recent clearing prices for the STOR service to estimate value.

STOR clearing price	= £ 4 /MW/hr	*Indicative assumption based on recent clearing price for STOR*
Monthly payments	= 1 kW x £4 /MW/hr x 90 hrs	
	= **£0.36 per month**	

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DYNAMIC SERVICE

Contracted flexible capacity	= 1 kW	*Assumed unit flex capacity per home*
Days service is offered	= 30 days	*Bridgewater CMZ requires volumes all days of the week. Revenue stack assumes 3 hours offered from 4-7pm*
Availability window duration	= 3 hours	
Probability of securing weekly tender	= 75%	*Indicative assumption based on anecdotal view from WPD from the MADE innovation project*
Hours service is offered in month	= 67.5 hours	***Revenue critical assumption subject to high uncertainty***
Probability of utilisation	= 20%	*Indicative assumption based on anecdotal view from WPD from the MADE innovation project*
Utilisation estimate	= 30 days x 20% x 3 hrs x 1 kW	
	= 18 kWh	***Revenue critical assumption subject to high uncertainty***
Availability payments	= 1 kW x £5 /MW/hr x 67.5 hrs	*£5 /MW/hr availability tariff and £300 /MWh utilisation tariff per WPD's current published tariffs for the Dynamic services*
	= £0.34 per month	
Utilisation payments	= £300 /MWh x 18 kWh	
	= £5.40 per month	
Monthly payments	= £0.34 + £5.40	*These payments will not be available every month but only for the months the DSO has a need for the service in that CMZ*
	= **£5.74 per month**	

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