SUPER HEERO
Human Energy Efficiency Retrofitting Optimisation

D4.7 - TECHNICAL REPORT ON SUPER-HEERO REPLICATION POTENTIAL IN OTHER SECTORS

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Terms, definitions and abbreviated terms

List of Acronyms			
Acronym	**Definition**	**Acronym**	Definition
EPC	Energy Performance Contract	IMED	Electricity Market Directive
PAAS	Product as a Service	REC	Renewable Energy Community
WP	Work Package	CEC	Citizens Energy Community
ESCo	Energy Service Company	ESG	Environmental, Social and Governance
EU	European Union	CSR	Corporate Social Responsibility
EC	European Commission	UN	United Nations
HVAC	Heating, Ventilation, Air Conditioning	SDG	Sustainable Development Goals
RED	Renewable Energy Directive	GHG	Greenhouse Gas

1. Executive Summary

The Super Heero project aims at providing a replicable financial scheme for energy efficiency investment in small and medium supermarkets, based on stakeholder and community engagement. Note that by supermarkets we refer to stores and shops offering a wide variety of food, beverages and household products: they are larger and have a wider selection of products than grocery stores but are smaller and more limited in the range of merchandise than a hypermarket or big-box market.

The present document is Super Heero D4.7 and analyses the replication potential of innovative technical and financial tools developed in the Project into other sectors than supermarkets, including hotel and accommodation services, retail stores and shopping centres, energy communities, banks and other financial services, transport services, other services to the public.

The scope of this report is to create a reference for organisations in observer communities that could implement Super Heero technical and financial tools in other contexts to support the realization of community-based energy efficiency actions.

Starting from a summary of the technical and financial tools developed within Super Heero for energy efficiency in supermarkets, and from the analysis of other sectors sharing some features with supermarkets in terms of energy uses, ownership structure, business models and barriers encountered in energy efficiency, the potential matching between replication sectors and available tools is studied.

To conclude, general guidelines are presented, focused on the enhancement of corporate energy efficiency culture, with a focus on the importance of end-users/customers behaviour.

2. Introduction and Methodology

The present document constitutes D4.7 of the Super Heero project, focused on Super Heero replication potential in other sectors than supermarkets, which have been the main focus of the project. This deliverable has been prepared in the context of T4.6 of the Super Heero project, whose title is "Assessment of Super Heero replication potential in other sectors".

The scope of the work is to take the key lessons learnt from the engineering and implementation of the Super Heero financial instruments as well as the experience from the target pilot cases and extrapolate them to evaluate how the developed tools could be replicated in other high-energy-demanding sectors including among others hotel and accommodation and retail stores and shopping centres.

The present report intends to be a reference document for organisations in observer communities and other stakeholders willing to implement Super Heero technical and financial tools in other contexts to support the realization of community-based energy efficiency actions.

The present report is articulated as follows:

- the analysis starts (Chapter 3) with a review of the technical and financial tools developed within the Super Heero project for energy efficiency in supermarkets;
- other sectors are then identified (Chapter 4), which share some features with supermarkets in terms of energy uses, ownership structure, business models and barriers encountered in energy efficiency, and thus could potentially benefit of the implementation of the Super Heero tools presented in the previous section;
- matching between potential replication sectors and technical and financial tools is carried out (Chapter 5) and general guidelines are drawn on enhancing energy efficiency culture at corporate level, with a particular focus on the importance of end-users/customers behaviour.

3. Background Information: Mapping of the Technical and Financial Tools

This section aims at briefly presenting the innovative technical and financial tools developed in the Super Heero project, i.e.:

- Energy Performance Contract;
- Product-as-a-Service;
- Crowdfunding;
- Technology Catalogues and Renovation Packages.

The following paragraphs present the main features of the proposed tools, with background information taken from Super Heero WP2 deliverables (mainly D2.5 and D2.2).

It is highlighted that the tools listed above and presented in the following paragraphs are not applicable only as a standalone solution but can be coupled and integrated in order to maximize energy-related, environmental and financial benefits. For instance, renovation packages can be implemented by applying any of the three other financial tools, but also energy performance contracts can be implemented with the support of crowdfunding or making use of a product-as-a-service approach.

Moreover, Super Heero approach and value proposition brings added value to the mentioned technical and financial tools on at least three main aspects:

- the human component, related to the engagement of citizens/customers, whose aim is to bring supermarkets closer to the local community;
- the contribution to the energy transition of the territory where supermarkets are located, also linked with other initiatives promoted by the public and private sector;
- the integration of the above-listed models via a single project developer (the company promoting the EPC or PAAS) that brings stakeholders closer together.

3.1 Energy Performance Contracts

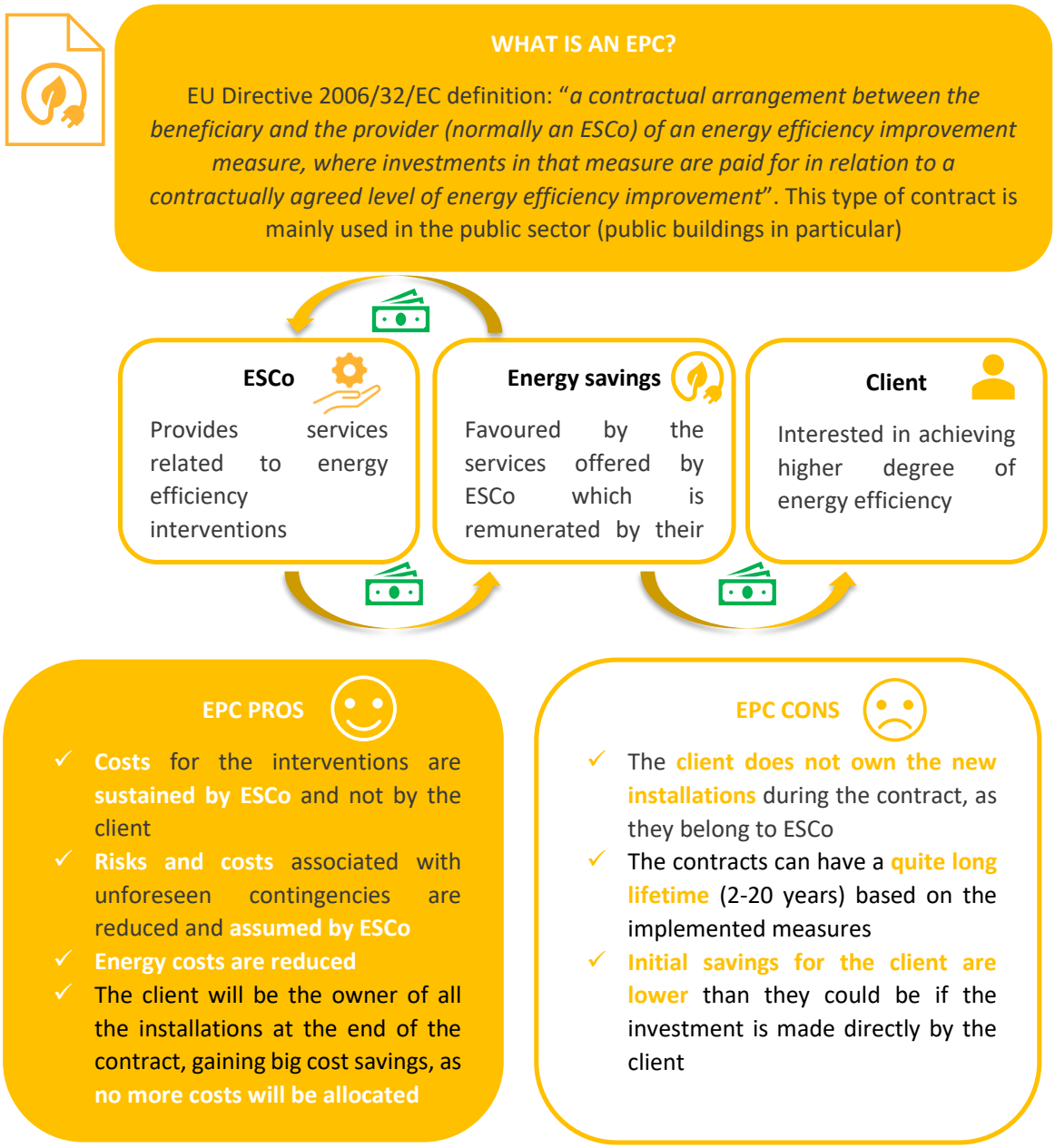


Figure 3.1 – Main Features of Energy Performance Contract Approach (from Super Heero D2.5)

3.2 Product-as-a-Service

Figure 3.2 – Main Features of Product-as-a-Service Approach (from Super Heero D2.5)

3.3 Crowdfunding

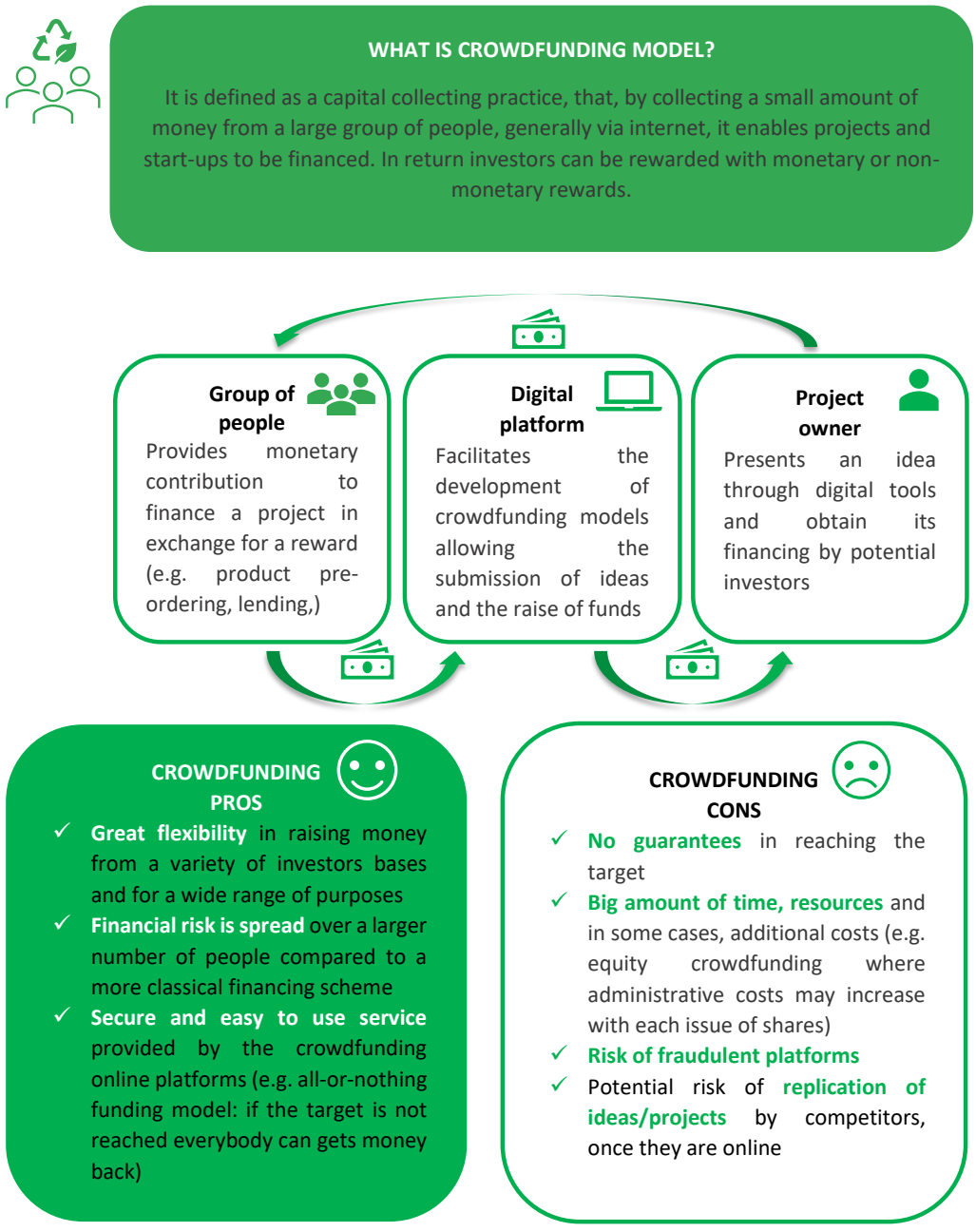


Figure 3.3 – Main Features of Crowdfunding Approach (from Super Heero D2.5)

3.4 Energy Efficiency Renovation Packages

Following the creation, in Super Heero D2.1, of a technology catalogue with 42 energy transition solutions applicable to supermarkets based on the review of their typical energy users and consumption, in Super Heero D2.2 guidelines for high-level design of all energy transition actions were drafted and energy efficiency renovation packages were created.

Energy efficiency renovation packages are groups of energy efficiency actions targeting to meet the requirements of supermarkets having specific baseline conditions (old, medium, new) and geographical locations (Northern or Southern Europe) and a given budget availability and consequent possibility for renovation depth (high, medium, low).

The concept behind the creation of renovation packages is graphically presented in Figure 3.4. Following this approach in implementing energy efficiency actions in supermarkets instead of proceeding with single actions allows optimizing the investment requirements and minimizing energy consumption, thus contemporarily achieving energy-related, environmental and economic objectives.

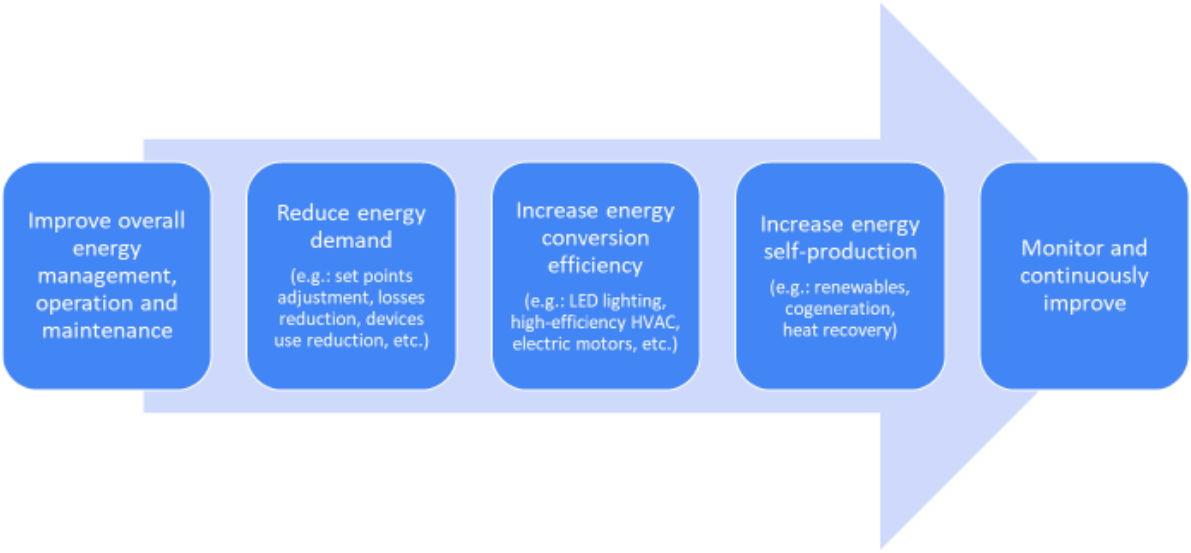


Figure 3.4 - Methodological Approach for the Adoption of Energy Efficiency Measures (from Super Heero D2.2)

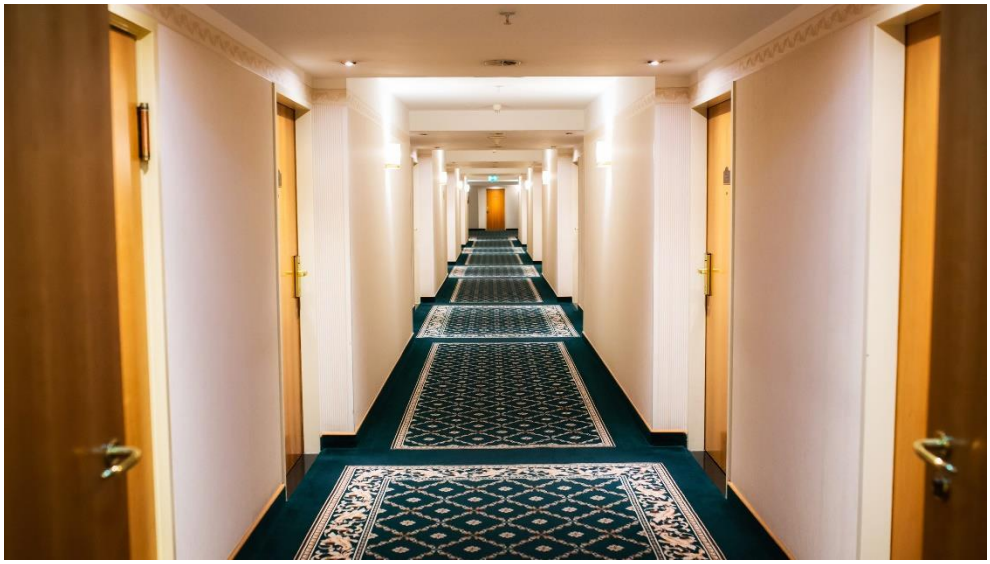
4. Identification of the Sectors of Interest for Replication of Super Heero Approach

This section is focused on the identification of sectors sharing similar features with supermarkets and thus potentially benefitting of the implementation of the Super Heero tools presented in the previous section.

Based on the analysis of typical energy consumption, ownership structure and business model and of the barriers encountered in the implementation of energy efficiency interventions, the sectors analysed in this section include: hotels, restaurants and accommodation services, retail stores and shopping centres, energy communities, banks and other financial services, transport services, other services to the public.

4.1 Hotels, Restaurants and Accommodation Services

Hotels, restaurants and other type of shared accommodation services are characterized by energy uses for heating, cooling and ventilation, for lighting, for the provision of services to clients, including kitchen and related services (especially relevant for restaurants), recreation facilities (e.g. swimming pools, SPA were present) as well as minor energy uses like office equipment, lifts, etc.



Based on the available literature on the topic[1], the average energy consumption of hotels is between 50 and 400 kWh/m^{2}y, variable depending on the location and consequent climate conditions, on the building characteristics, on the number of rooms and on the additional services offered to clients.

Moreover, similarly to supermarkets, hotels and restaurants can be independently operated as a single company, or part of a wider chain, which can operate them directly or through various contractual arrangements including franchising. They can be part of an existing building with shared services or be

[1] Balaras et al., "Energy Use Intensities for Non-Residential Buildings", 48th International Congress on Heating, Refrigeration and Air Conditioning, Belgrade, 2017

standalone buildings managing all services and potentially having opportunities for installation of own renewable energy self-production plants.

Based on these considerations, hotels and restaurants may face the same issues of supermarkets in their pathway to energy efficiency, including: lack of technical knowledge (which might be completely absent for small privately-owned sites or centralized at corporate level for hotel/restaurant chains, thus making more difficult the realization of energy efficiency actions at single building level) and difficulties in access to finance (more applicable to small privately-owned hotels/restaurants that work with investors on a project-finance approach, rather than large chains that work on a corporate finance approach).

Hotels and restaurants generally have significant opportunities for the engagement of customers, increasingly interested in the reduction of the environmental impact of their stay, and especially chains are implementing loyalty programmes that could be exploited for the implementation of community supported energy efficiency and sustainability actions. Moreover, companies managing large chains have generally adopted corporate social responsibility or sustainability or ESG-related policies and strategies, which could be supported by actions for the reduction of energy consumption, especially if implemented through a social and shared approach.

4.2 Retail Stores and Shopping Centres

Retail stores and shopping centres practically share the same energy-related features of supermarkets in terms of energy efficiency. Energy consumption is related – both for retail stores and shopping centres – to HVAC, to lighting, to product refrigeration (if selling fresh products) and for shopping centres also to general services like offices, toilets, lifts, parking lots, etc.

Retail stores located within a shopping centre have generally very limited room for implementation of energy efficiency actions, except for actions related to directly owned devices, e.g. lighting bodies, refrigerators, etc.; this is due to the fact that HVAC and other general services are generally managed at centralized level for the shopping centre. Similarly, they have very limited opportunities for the installation of renewable power production plants, since the roof and more in general the external areas of the store are not under their control.

On the other hand, independent stores located within a non-exclusive building have a slightly higher margin for implementation of energy efficiency actions, being able to invest also in the improvement of HVAC systems, provided that they fall under their control and are not shared with the rest of the building or with a local district heating and cooling network.

Within the present category, shopping centres are the type of energy users having the highest energy management and optimization potential: they generally are a large standalone building or series of buildings, owned by a single company, managing all energy systems and having external areas under their control (e.g.: rooftop, parking lots) that could be used for the installation of renewable energy production systems and for the provision of services to customers and other stakeholders (e.g.: electric vehicles recharging systems). Moreover, they can include within their boundaries supermarkets and single retail stores, thus sharing the same features, barriers and opportunities presented in this report and in other deliverables of the Super Heero project.

Based on the available literature on the topic[1], the average energy consumption of shopping centres is between 77 and 480 kWh/m^{2}y, variable depending on the location and consequent climate conditions, on the building characteristics and size and on the type of stores present and on the kind of services offered to clients.

Barriers to the implementation of energy efficiency actions are more significant for small independent stores than for large shopping centres, although both can experience lack of technical knowledge and difficulties in access to finance, especially for investments out of their core business.

Retail stores and shopping centres generally have good opportunities for the engagement of customers, increasingly interested in the reduction of the environmental impact of their purchase experience and – similarly to supermarkets and hotels – especially hotel chains are implementing loyalty programmes that could be exploited for the implementation of community supported energy efficiency and sustainability actions. Moreover, shopping centres and large store chains have typically adopted corporate social responsibility or sustainability policies and strategies, which could be supported by actions for the reduction of energy consumption, especially if implemented through a social and shared approach.

4.3 Energy Communities

According to the European Commission[2], energy communities aim at organizing collective and citizen-driven actions in the energy field that can make citizens the drivers of the energy transition. Benefits related to energy communities include the increase of public acceptance of renewable energy projects,

[2] https://energy.ec.europa.eu/topics/markets-and-consumers/energy-communities_en

an easier access to private finance, an improvement of energy efficiency for citizens with a reduction of energy supply costs and an improvement of security of supply. Moreover, energy communities can provide flexibility to the electricity system through demand/response and storage services.

Energy communities and their role and contribution to energy transition are specifically mentioned by the Clean Energy for All Europeans Package, by the recast Renewable Energy Directive (RED II) and recast Electricity market directive (IMED), which define and formally recognize respectively “renewable energy communities” (REC) and “citizen energy communities” (CEC) thus developing an enabling framework for energy communities in EU energy markets.

They can be formed in a wide range of legal entities (e.g.: non-profit company, association, cooperative, small or medium enterprise) that make easier for citizens and other public and private stakeholders to jointly invest in shared energy assets.

For energy communities it does not make sense to carry out an analysis of typical energy consumption, since they can potentially include any type of energy user, ranging from individual citizens with their homes and typically residential energy uses, to public and private buildings (including supermarkets and other categories included in the present analysis), to industries. However, the present high-level analysis can cover technical solutions generally implemented by energy communities and barriers typically encountered by this kind of actors.

As concerns technical solutions, actions implemented by energy communities are generally related on one hand to the production of energy in different forms from various renewable or sustainable sources (e.g.: power production from solar or wind, or excess heat recovery from industrial or urban sources) and on the other hand on the increase of demand-side energy efficiency (e.g.: thermal insulation of building

envelope, high-efficiency heat pumps, district heating/cooling solutions, smart grids, electric vehicles recharging stations, etc.).

On the other hand, barriers that energy communities encounter, in addition to those related to legal, regulatory and business model-related aspects in the legal entity constitution phase, are related similarly to the other sectors analysed in this report to the lack of technical knowledge and to the difficulties in the access to finance for this kind of solutions.

4.4 Banks and Other Financial Services

Bank branches and other offices focused on the provision of financial services to the public (e.g.: insurance agencies) are characterized, similarly to other types of office buildings, by energy consumption for computers and other office equipment, including datacentres that – if present – are responsible of the largest share of energy uses, plus additional energy consumption for HVAC, lighting and general services for employees and for clients.

Based on the available literature on the topic[1], the average energy consumption of offices is between 140 and 350 kWh/m^{2}y, variable depending on the location and consequent climate conditions, on the building characteristics and size, on the working hours and on the type of energy users installed (e.g.: on the presence, among other users, of a datacentre). Generally, these offices are located at the ground floor of a building also hosting residential and other office spaces and do not own or manage external areas.

Considering the type of energy uses characterizing this sector, the main opportunities for energy efficiency improvement are related to the conversion to high-efficiency devices for HVAC and lighting as well as for office equipment; in case a datacentre is present, additional opportunities exist with reference especially to cooling and to the potential recover of heat generated by the datacentre for self-consumption or feed to other users in the building or in the district, provided that the infrastructure is available.

Generally, bank branches and other offices providing financial services to the public have a corporate-level department dedicated to facility management including energy-related aspects, with no technical reference person at site level. This might constitute a barrier – related to the lack of technical knowledge – to the implementation of good energy management practices and also to the implementation of energy efficiency investments.

On the other hand, an opportunity for the implementation of energy efficiency actions at site level is related to the ESG policies that all banks and financial players have adopted in line with the increasing attention of the financial sector to sustainability. This sector is not affected by difficulties in access to finance, but it can benefit of initiatives related to the engagement of stakeholders and of the community of customers e.g. in terms of reputation and marketing.

4.5 Transport Services

The sector subject of the present paragraph includes a wide range of companies, stakeholders providing a wide range of transport services, i.e. local public transport, vehicle sharing, car rental, taxi, couriers.

Given the wide range of services included in the sector it does not make sense to analyse the typical energy consumption of vehicles employed in the target companies, but it is interesting to highlight the typical energy efficiency and more in general sustainability actions that could be undertaken by these players, and the barriers that they generally encounter in the implementation.

Energy efficiency and sustainability actions are nowadays mainly related to the replacement of the existing fleet of vehicles, based on diesel- or gasoline-fueled engines, with new vehicles either fully-electric or hybrid or using innovative and more sustainable fuels like biodiesel, bioethanol or hydrogen. In addition to the actions required for the replacement of vehicles (ranging from scooters to cars, from buses to vans and trucks and potentially including also e-scooters and e-bicycles), further actions might be required for the creation of the infrastructure for the recharge/refuelling of the new vehicles. Indeed,

with reference to electric vehicles, these additional actions might be related to the installation of new renewable power generation systems, of energy storage systems and of vehicles recharging systems.

Since managing fleets of vehicles is the core business of these companies, the lack of technical knowledge is generally not a relevant barrier, except potentially for the component of the investment related to the recharging/refuelling infrastructure. On the other hand, barriers could be related to the capacity to attract finance for this kind of investments.

All transport services providers are generally characterized by good opportunities for the engagement of customers, increasingly interested in the reduction of the environmental impact of their transports. Public transport operators generally rely on a significant share of revenues from monthly or annual tickets, which are purchased by loyal and regular customers; moreover, car rental and vehicle sharing companies are typically implementing loyalty programmes that could be exploited for the implementation of community supported energy efficiency and sustainability actions. To conclude, all large corporates active in the sector (e.g.: couriers, car rental operators, etc.) have generally adopted corporate social responsibility or sustainability policies and strategies, which could be supported by actions for the reduction of energy consumption, especially if implemented through an approach based on customers engagement.

4.6 Other Services to the Public

This last sector is focused on facilities providing services to the public that are not covered by the previous paragraphs. They might include among others all welfare services like education, healthcare, sport facilities and associations.

Similarly to some of the previous sectors, due to the wide range of services provided by this kind of facilities it is not possible to discuss about typical energy consumption values, but the most relevant opportunities for the improvement of energy efficiency and sustainability level can be mentioned. These are related on one hand to the reduction of final energy uses (e.g.: through replacement of specific devices characterizing the service, or thermal insulation of building envelope, or increase of efficiency of HVAC or lighting devices) and on the other hand to the self-production of energy in different forms from renewable or sustainable sources (since these sectors generally have a significant thermal energy demand, additional opportunities exist, including cogeneration of heat and power and biomass or geothermal heating solutions, in addition to the conventional solar/wind power generation systems).

Another similarity with other sectors covered in the analysis is related to the lack of technical knowledge, due to the fact that energy-related devices are auxiliary systems for this kind of facilities and not their core business. The same explanation is applicable to the difficulties in access to finance, which is a relevant barrier since players in this sector are generally small companies or even non-profit associations that are evaluated as high-risk counterparts by banks and investors.

To conclude, it is highlighted that the nature of these services, related to the provision of services to the person, can be exploited in order to promote investments in energy efficiency and sustainability solutions engaging stakeholders.

5. Matching Tools with Replication Sectors

In the previous sections the innovative technical and financial tools developed in the Super Heero project for application to the supermarkets sector have been presented and additional sectors sharing some features with supermarkets and thus potentially being of interest for replicating the Super Heero experience have been identified and described.

Based on those sources of information, in the present section a matching is carried out between the Super Heero innovative tools and the identified potential replication sectors, in order to highlight the most promising coupling between sectors and technical/financial tools. Then, more general guidelines are drawn with reference to the enhancement of energy efficiency culture at corporate level, with a particular focus on the importance of end-users/customers behaviour in energy efficiency.

5.1 Identification of Best Suitable Tools per Replication Sector

This paragraph aims at matching the Super Heero innovative technical/financial tools with the selected potential replication sectors, to identify the most promising coupling between sectors and available technical/financial tools. Specifically, these couplings are analysed in Table 1.

Based on the analysis shown in Table 1, the following conclusions regarding technical and financial tools can be identified:

- energy performance contracts show a high potential for replication in all the identified sectors, where they contribute to overcome barriers related to access to finance for energy efficiency investments, except for the banking/financial sector where funding is generally not a key issue and in the transport sector where this contractual arrangement is not fully applicable to the whole range of technical solutions;
- product-as-a-service solutions have a high potential in all the selected sectors, since they allow overcoming the barrier related to the lack of technical knowledge that generally characterizes all the analysed sectors, at least at site level (since for large companies or chains of stores, energy managers or technical experts can be present at corporate level and not for each site);
- crowdfunding has a high replication potential in all sectors except for the banking/financial one (where funding energy efficiency solutions is not a key barrier), with particularly good results potentially applicable to sectors like energy communities (that are by definition a citizen-driven initiative) or local transport and other services to public (where citizens might be more willing to invest to improve the sustainability of the service they directly receive);
- renovation packages have a high potential for replication in all the selected sectors (except for the transport sector where this technical approach is not fully applicable to all solutions) due to the wide range of solutions that could be implemented and could benefit of an integrated approach shaped according to good engineering practices in order to obtain better financial performances.

Table 1: Sector-Tool Coupling Matrix

	Energy Performance Contracts	Product-as-a-Service	Crowdfunding	Renovation Packages
Hotels, Restaurants and Accommodation Services	**High potential** Especially for independent hotels/restaurants, where EPC can contribute to overcoming barriers related to access to finance for energy efficiency.	**High potential** Since it helps overcoming the barrier related to the lack of technical personnel in the site that can manage newly installed energy devices.	**High potential** Since customers can drive the sector energy transition also contributing to overcome issues in accessing finance for these solutions, being contemporarily rewarded for their support through loyalty programmes.	**High potential** Since actions for energy efficiency in hotels/restaurants are easy to cluster in renovation packages characterized by a technically correct approach and a financially sound performance.
Retail Stores and Shopping Centres	**High potential** Due to the fact that access to finance for the implementation of energy efficiency actions is generally a key barrier for companies and associations active in this sector.	**High potential** Since it helps overcoming the barrier related to the lack of technical personnel in the retail store or shopping centre that can manage newly installed energy devices.	**High potential** Due to the significant possibility to engage customers in the financing of energy efficiency actions, overcoming access to finance issues and potentially rewarding them through loyalty programmes.	**High potential** Since actions for energy efficiency in the retail sector (especially shopping centres) can easily build renovation packages with a technically correct approach and sufficient financial performances.
Energy Communities	**High potential** Due to the fact that access to finance for the creation of energy communities and installation of energy-related plants is a key barrier for this sector.	**High potential** Since it helps overcoming the barrier related to the lack of technical knowledge of citizens belonging to the energy community to manage new energy devices.	**High potential** Since energy communities are by definition a bottom-up initiative that is therefore suitable for receiving further support by other citizens not part of the association.	**High potential** Since actions promoted by energy communities are easily integrated into renovation packages with a technically correct approach and sufficient financial performances.

	Energy Performance Contracts	Product-as-a-Service	Crowdfunding	Renovation Packages
Banks and Other Financial Services	**Medium potential** Since funding is not a key issue for financial players, they have less interest in EPC.	**High potential** Since it helps overcoming the barrier related to the lack of technical knowledge of personnel in the specific bank office to manage newly installed energy devices.	**Medium potential** Since funding is not a key issue for financial players, they have less interest in crowdfunding, although the engagement of clients could contribute to ESG/CSR objectives.	**High potential** Since actions for energy efficiency in bank branches and other offices are easy to cluster in renovation packages with technically correct approach and financially sound results.
Transport Services	**Medium potential** Since EPC is applicable for actions on e-vehicles charging infrastructure and for installation of renewable plants but is less applicable to actions on vehicles.	**High potential** Since PAAS is applicable both to e-vehicles charging infrastructure and installation of renewable plants as well as to actions on vehicles.	**High potential** Since customers/end-users can act as drivers of the energy transition of the transport sector contributing to overcome issues related to access to finance.	**Low potential** Since actions identified for this sector are less likely to be combined into renovation packages compared to actions on buildings energy transition.
Other Services to the Public	**High potential** Due to the fact that access to finance for the implementation of energy efficiency actions is a key barrier for companies and associations active in this sector.	**High potential** Since it helps overcoming the barrier related to the lack of technical knowledge of personnel in the site and in the company/association to manage new energy devices.	**High potential** Since this sector is active in providing services to citizens, crowdfunding is a suitable option to allow citizens supporting the energy-related initiatives of associations and companies of this sector.	**High potential** Since actions for energy efficiency in other services to the public are easily grouped into technically feasible and financially profitable renovation packages.

5.2 Guidelines for Enhancing Corporate Energy Efficiency Culture

Following the increasing recognition of the threats posed by climate change and environmental issues at worldwide level, and the commitments taken by international organizations and national governments, also several private companies are acting to increase their level of sustainability by implementing policies, strategies, investments and operation and maintenance actions.

The most relevant initiatives that drive companies in the definition of these strategies are, among others, the UN Sustainable Development Goals (SDG) and the EU Taxonomy for Sustainable Finance:

- the former have been introduced in 2015 by the 2030 Agenda for Sustainable Development and provide "a shared blueprint for peace and prosperity for people and the planet"; the 17 SDG "recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests".
- the latter has been introduced in 2020 by Regulation EU 2020/852 and is "a classification system, establishing a list of environmentally sustainable economic activities, which could play an important role helping the EU scale up sustainable investment and implement the European green deal. The EU taxonomy would provide companies, investors and policymakers with appropriate definitions for which economic activities can be considered environmentally sustainable. In this way, it should create security for investors, protect private investors from greenwashing, help companies to become more climate-friendly, mitigate market fragmentation and help shift investments where they are most needed".

In addition, several specific initiatives exist that aim at supporting private companies in their pathway to sustainability in its different dimensions.

Given the wide range of reference standards they might follow, sustainability strategies assume different forms, also considering the specific needs of the company; possible forms include decarbonization strategies (if the focus is on the reduction of GHG emissions contributing to climate change), climate resilience strategies (in case they target adaptation to climate change effects), green energy transition strategies (if the focus is on the transition to renewable sources), energy and resource efficiency action plans (if the target is the reduction of energy and material consumption), circular economy action plans (if they aim at increasing the reuse of waste or secondary raw materials), CSR policies (Corporate Social Responsibility – if the focus is on social aspects, which however can include also environmental considerations) and ESG policies (Environmental, Social and Governance – if their target is sustainability in its three main dimensions).

These strategic documents, independently from the specific context, start from the analysis of the baseline situation, then carry out a comparison with peers based on the most suitable indicators and to conclude define the commitments of the company and a set of priority actions to be implemented to reach those targets. They also might include evaluation of investment needs and stakeholders engagement techniques to ask suppliers, clients and other actors interacting with the company to contribute to the company targets.

In this context, energy topics play a key role, due to strong correlation between energy consumption and GHG emissions and therefore with climate change. Therefore, several companies have designed and implemented energy efficiency strategies, carried out energy audits and prepared action plans focused on the reduction of final energy uses and the increase of energy supply from renewable sources.

Based on the experience of companies having already developed these strategic documents, guidelines for the elaboration of a corporate-level energy efficiency strategies can be drawn. The proposed approach follows a phased approach:

- start from a qualitative analysis focused on the company, its activities, its operational sites and the main interacting stakeholders;
- analyse the baseline energy consumption and the associated GHG emissions, including the breakdown of energy uses by site, department and equipment and the breakdown of GHG emissions by energy carrier;
- calculate indicators characterizing the baseline energy consumption level, which could be used to compare the company performance with peer companies (external benchmarking), to compare the performance of different sites of the same company (internal benchmarking) as well as to monitor the performance of the same company/site in different years;
- define the targets for the reduction of energy uses and GHG emissions, based on the comparison of the calculated indicators with relevant benchmarks and on the level of ambition of the specific company, also considering targets set by other companies of the same market; targets can be set on absolute or relative bases, with reference to a fixed or a rolling baseline, and for the short-, medium- or long-term;
- identify the actions required to reach the defined targets; actions might distinguished between those requiring an investment and those only implying a change in operational practices; the latter are those where the role of stakeholders, including suppliers and customers, plays a key role, which could be activated through dedicated stakeholders engagement campaigns; actions shall be characterized in terms of technical pre-requisites, required costs (both in terms of initial investment and operational expenditure), achievable energy savings and consequent economic savings and avoided GHG emissions, financial performance (pay-back time and other financial indicators resulting from the analysis, potentially also including the available public incentives);
- quantify the investment needs and evaluate the potentially applicable funding sources, including conventional ones (banks, private investors) and the more innovative ones including crowdfunding;
- proceed with the implementation of the defined action plan, periodically monitor the results achieved against the indicators defined in the baseline assessment and take corrective actions where needed.

6. Conclusions

In this report, the replication potential for the innovative technical and financial tools developed in the Super Heero project into other sectors than supermarkets was studied. The target sectors include hotel and accommodation services, retail stores and shopping centres, energy communities, banks and other financial services, transport services, other services to the public.

The analysis has started from a summary of the innovative technical and financial tools developed in Super Heero for energy efficiency in supermarkets, and from the identification of other sectors with suitable energy uses, ownership structure, business models and encountered barriers for the replication of Super Heero tools . Then, the potential matching between replication sectors and available tools is studied and to conclude general guidelines are presented for the enhancement of corporate energy efficiency culture, focused on end-users/customers behaviour.

The results obtained for the replication of the Super Heero tools are summarized below:

- energy performance contracts show a high potential for replication in all the identified sectors, where they contribute to overcome barriers related to access to finance for energy efficiency investments, except for the banking/financial sector where funding is generally not a key issue and in the transport sector where this contractual arrangement is not fully applicable to the whole range of technical solutions;
- product-as-a-service solutions have a high potential in all the selected sectors, since they allow overcoming the barrier related to the lack of technical knowledge that generally characterizes all the analysed sectors, at least at site level (since for large companies or chains of stores, energy managers or technical experts can be present at corporate level and not for each site);
- crowdfunding has a high replication potential in all sectors except for the banking/financial one (where funding energy efficiency solutions is not a key barrier), with particularly good results potentially applicable to sectors like energy communities (that are by definition a citizen-driven initiative) or local transport and other services to public (where citizens might be more willing to invest to improve the sustainability of the service they directly receive);
- renovation packages have a high potential for replication in all the selected sectors (except for the transport sector where this technical approach is not fully applicable to all solutions) due to the wide range of solutions that could be implemented and could benefit of an integrated approach shaped according to good engineering practices in order to obtain better financial performances.