



# SmartSPIN

## Smart energy services to solve the **S**Plit **I**Ncentive problem in the commercial rented sector

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### D2.4 – RECOMMENDATIONS FOR THE SMARTSPIN SERVICE

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List of Abbreviations

Abbreviation	Meaning
<b>SMEs</b>	Small and Medium Enterprises
<b>EEaaS</b>	Energy Efficiency-as-a-Service
<b>EED</b>	Energy Efficiency Directive
<b>EPC</b>	Energy Performance Contracting
<b>ESCO</b>	Energy Service Companies
<b>GHG</b>	Greenhouse Gas
<b>MEETS</b>	Metered Energy Efficiency Transaction Structure
<b>M&amp;V</b>	Measurement & Verification
<b>KPIs</b>	Key Performance Indicators
<b>EU MS</b>	European Union Member State
<b>EU</b>	European Union
<b>O&amp;M</b>	Operation and Maintenance
<b>PPA</b>	Power Purchase Agreement
<b>SEAI</b>	Sustainable Energy Authority of Ireland
<b>SES</b>	Smart Energy Services
<b>DR</b>	Demand Response





## EXECUTIVE SUMMARY

This deliverable draws together the results from the review of existing business models for smart energy services (Task 2.1), the market & revenue stream mapping (Task 2.2), the review of policies supporting smart energy services (Task 2.3) along with ten stakeholders' interviews focusing on energy efficiency, business model for delivering energy efficiency measures, and the split incentive issue in the commercial rented sector.

The analysis conducted in WP2 enabled to evaluate the current state of the smart energy services market with a focus on commercial rented sector and to improve the understanding of the key challenges and drivers to deployment and uptake of smart energy services in such a sector. Furthermore, it enabled to better understand the attitudes and perceptions of stakeholders throughout the value chain of energy efficiency services. It has also revealed a number of gaps between the requirements of the stakeholders of the energy efficiency value chain and the existing energy services, including the performance based offerings currently in the market. These gaps will be further addressed by SmartSPIN in WP3 with the aim of improving the proposed market offering of smart energy services for the commercial rented sector.

The recommendations identified in this deliverable are suggestions for requirements or for amendments of existing energy services, which will allow SmartSPIN to deliver an enhanced and more effective service. The SmartSPIN service offering and the business model will be completed following the recommendations of this deliverable before testing the proposed solution in WP5.

One of the main findings of WP2 and of this deliverable is that the existing energy performance contracting (EPC) schemes need to be revised to be applicable to the rented properties. The EPC is sought to become a tripartite agreement between the landlord, tenant and Energy Service Company (ESCO) and this will require a joint effort of the stakeholders for contract design and validation.

SmartSPIN is already playing a primary role to foster the maturation process of a new energy performance contractual model and to establish a widely usable solution to remove the barrier of the split-incentive to energy efficiency improvements in the commercial rented sector across Europe.





## 1 INTRODUCTION

In Europe, buildings account for 40% of energy consumption and 36% of carbon emissions. It is estimated that 75% of buildings in the European Union (EU) are inefficient, yet only 1% of buildings are renovated each year<sup>1</sup>. According to a report by BPIE<sup>2</sup>, approximately 25% of Europe's 25 billion m<sup>2</sup> of useful building floor area is accounted for by non-residential buildings, of which 28% are wholesale or retail premises, 23% are offices, 11% are hotels and restaurants, and 4% are sports facilities. These types of building are often owned by a commercial landlord who rents or leases all or parts of the building to one or more tenants. One of the major barriers to energy efficient building renovations in commercially rented buildings is the split incentive problem – i.e., the conflict that arises when the benefits of a transaction do not accrue to the party who pays for it.

Removing the split incentive problem is a European priority as evidenced by Article 19 of the Energy Efficiency Directive (EED). Article 19 requires Member States to evaluate, and take appropriate measures to remove, the regulatory and non-regulatory barriers to energy efficiency with particular regard to the split of incentives between the owner and tenant of a building. The aim is to ensure that these parties are not deterred from making investments in energy efficiency that they would otherwise have made if they had received the full benefits. It is against this background that the challenge for SmartSPIN is set.

SmartSPIN is developing and will test, validate and exploit a new business model for ESCOs) that leads to greater uptake of Smart Energy Services (SES) deployed via performance-based contracting in the commercial rented sector. This sector has huge potential for energy savings but has avoided the use of performance based approaches like EPC because of two main barriers: (a) the long contract duration of EPCs and (b) the split incentive problem. SmartSPIN will remove both these barriers by demonstrating and validating an innovative Energy Efficiency-as-a-Service (EEaaS) business model in 3 pilot regions in Europe (Spain, Greece and Ireland).

The SmartSPIN business model integrates energy efficiency with other energy services such as flexibility and creates value from both energy and non-energy benefits. Combined with advanced Measurement & Verification (M&V) concepts that use big data from smart equipment and a contractual approach that splits the benefits between all stakeholders in a fair and transparent manner, SmartSPIN builds trust between the parties that will lead to greater uptake of SES in the commercial rented sector. To maximise impact and uptake, SmartSPIN will develop a business model toolkit and train 350 actors in the value chain on the key features of the business model.

SmartSPIN brings together a consortium of experts from the entire value chain: ESCOs (LS); cloud based energy management platform provider (SMARKIA); energy supplier (EUNICE); M&V specialist (HEBES). Combined with a research team that is highly experienced in developing business models for performance based contracting (IERC), an expert in the development of predictive models and algorithms (TEC) and a specialist in successful exploitation of sustainable innovations (EGEN), the SmartSPIN team has all the skills needed to facilitate the roll out of this innovative business model in Europe.

SmartSPIN WP2 is about review of smart energy services market for commercial rented sector, where SmartSPIN team conducted review of existing business models for smart energy service, and mapping of smart energy services and ESCO market & revenue stream. SmartSPIN WP3 is about developing contractual service definition, where SmartSPIN team developed several options on

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<sup>1</sup> [https://ec.europa.eu/energy/topics/energy-efficiency/energy-efficient-buildings/energy-performance-buildings-directive\\_en#energyperformance-of-buildings-standards](https://ec.europa.eu/energy/topics/energy-efficiency/energy-efficient-buildings/energy-performance-buildings-directive_en#energyperformance-of-buildings-standards)

<sup>2</sup> Europe's buildings under the microscope, Marina Economidou, Building Performance Institute Europe (BPIE), October 2011, ISBN:9789491143014





automated transactions in a smart contract design and drew some recommendations to address split incentive issues between landlord and tenant of rented commercial building.

This deliverable D2.4 draws a list of recommendations to enhance SmartSPIN services based on identified gaps between the requirements of key stakeholders in the energy efficiency value chain, the existing energy services and performance based offerings currently in the market and the proposed market offering developed in WP3.

## 2 EXISTING SMART ENERGY SERVICES AND PERFORMANCE BASED OFFERINGS CURRENTLY ON THE MARKET

The selected and reviewed business models are categorized into following three categories:

- Asset-based models, where the consumer pays for the fact that an energy asset is made available;
- Output-based models, where the consumer pays for the output of the energy asset and not for the asset itself;
- Outcome-based models, the consumer pays for the management and optimization of a building's operational conditions.

For each category, selected business models were described and evaluated according to their applicability for use in commercial rented buildings

Asset-based business model involves leasing of energy consuming equipment. Solar-as-Service can be considered as one of the examples for asset-based business model. Where a company establishes a long-term agreement to finance, install and maintain the solar energy system at the customer premises and supply electricity for the customer building. Customer pays a monthly charge/fee to the installer. This business model is also known as third-party-ownership. The customer may purchase the electricity from the locally installed PV-panels at a predetermined rate<sup>3</sup>.

Output purchase agreement (for example power purchase agreement), EPC<sup>4 5</sup> and EEaaS<sup>6 7 8</sup> are the example for Output-based business model. EPC and EEaaS are substantially similar concepts even though the term EPC may sometimes be used to refer to specific contractual templates, whereas EEaaS is a general term to indicate a class of business models. Output purchase agreement is a long term purchase agreement, where a third party owns, installs and manages the

<sup>3</sup> Overholm, H. (2015). Spreading the rooftop revolution: What policies enable solar-as-a-service?. *Energy Policy*, 84, 69-79.

<sup>4</sup> Shang, T., Zhang, K., Liu, P., & Chen, Z. (2017). A review of energy performance contracting business models: Status and recommendation. *Sustainable cities and society*, 34, 203-210.

<sup>5</sup> Sustainable Energy Authority of Ireland. Energy Contracting. Retrieved at: <https://www.seai.ie/business-and-public-sector/business-grants-and-supports/energy-contracting/>

<sup>6</sup> Efficiency as a service. Plugging a new energy model. Retrieved at: <https://www.eaas-initiative.org/>

<sup>7</sup> Better Buildings. US Department of Energy. A Guide to Efficiency as a Service. Retrieved at: <https://betterbuildingssolutioncenter.energy.gov/toolkits/efficiency-a-service>

<sup>8</sup> Better Buildings. US Department of Energy. What is Efficiency as a Service? Retrieved at: <https://betterbuildingssolutioncenter.energy.gov/financing-navigator/option/efficiency-a-service>





operation of an energy system at customer's premises. Under EPC agreement, an ESCO provides energy service with the guaranteed energy and cost saving and customer is responsible for arranging the required finance for the capital investment needed for implementation of energy services. SmartSPIN team is working devised a business model to include tenants in the EPC business model<sup>9</sup>. In this new business model, either the building owner or a third-party financier provides capital investment to ESCO for energy efficiency upgrades undertaken and ESCO pays rent to landlord for accessing their building and equipment, whereas tenants pay to ESCO for energy saving and/or efficiency gain achieved.

EEaaS agreement offers combined service of installation, performance monitoring, maintenance and support services and customers pay a service fee to the EEaaS provider, in most cases from the cost saved due to the energy efficiency actions undertaken by EEaaS provider. The idea behind EEaaS agreement is to introduce the role of EEaaS provider who provides capital for energy efficiency upgrades and removes burden of capital investment from the building owner who might be already under the pressure of mortgage payment. Building user pays to EEaaS according to achieved energy savings. Pay-for-performance rules and transactions govern the relationships of all the involved parties in the model. EEaaS models incentivize active management and optimization: the greater the performance of the service, the higher the added value for the consumer and the payments to the service provider.

Managed Energy Service Agreement (MESA)<sup>10</sup>, On-Bill Repayment (OBR)<sup>11</sup> and Metered Energy Efficiency Transaction Structure (MEETS)<sup>12 13</sup> are the other variations of business model to facilitate energy efficiency upgrades.

Outcome-based models replicate service delivery approaches from other domains, such as telecoms. Telephone and internet are services that a consumer can acquire through a contract with a telephone service provider. The *Heat-as-a-Service* model is the most common model of this category<sup>14</sup>.

Chauffage model (Comfort Contracting) is an example of outcome-based business model. The main focus of Chauffage model is managing and optimizing operational conditions of buildings, for example number of warm hours for a building rather than kWh consumed for heating. The aim of

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<sup>9</sup> R. Agrawal and L. De Tommasi. (2022), SmartSPIN D2.2. [Report on Market Status and Revenue Stream Mapping](#).

<sup>10</sup> IMT Institute for Market Transformation. Managed Energy Service Agreements (MESAs). Retrieved at: [https://www.imt.org/wp-content/uploads/2018/02/MESA\\_Primer.pdf](https://www.imt.org/wp-content/uploads/2018/02/MESA_Primer.pdf)

<sup>11</sup> IMT Institute for Market Transformation. On-Bill Financing and On-Bill Repayment Primer. Retrieved at: <https://www.imt.org/resources/on-bill-financing-and-on-bill-repayment-primer/>

<sup>12</sup> Alliance, E. E., Rodenhizer, D., Light, S. C., & Reichmuth, H. (2016). Metered Energy Efficiency Transaction Structure in Ultra-Efficient New Construction: Pay-For-Performance at the Bullitt Center in Seattle, WA.

<sup>13</sup> Unlocking Deep Efficiency in Commercial Buildings. The Metered Energy Efficiency Transaction Structure. Retrieved at: [https://www.meetscoalition.org/wp-content/uploads/docs\\_public/MEETS-Pilot-Interim-Report-Web-May-2016-rev-12-16-Public.pdf](https://www.meetscoalition.org/wp-content/uploads/docs_public/MEETS-Pilot-Interim-Report-Web-May-2016-rev-12-16-Public.pdf)

<sup>14</sup> Britton, J., Minas, A. M., Marques, A. C., & Pourmirza, Z. (2021). Exploring the potential of heat as a service in decarbonization: Evidence needs and research gaps. *Energy Sources, Part B: Economics, Planning, and Policy*, 16(11-12), 999-1015.







service provider is to maintain efficient day-to-day operation of building's energy system by monitoring and improving the performance of these systems.

The main difference between output purchase agreement and asset based leasing model lies in the type of monthly payments to be paid by customers. In a leasing contract, customers pay a fixed monthly fee for the "lease" in return for the system's use, while in the output purchase agreement customers pay a fixed price per kWh for the power generated.

More details about all these business model can be found in [D2.1](#).

### 3 REQUIREMENTS OF KEY STAKEHOLDERS FOR ENERGY EFFICIENCY IN THE COMMERCIAL SECTOR

In WP2, SmartSPIN team also organized one to one interview with the stakeholders of SmartSPIN to collect their perspectives on best practices for setting up contractual agreements for energy efficiency retrofits, challenges that are specific or amplified in the commercial building sector, and innovations that are needed for boosting investment in energy efficiency. The interview was organized in two phases. Following six interviewees were in phase one -

- (1) City of Dublin Energy Management Agency Limited (CODEMA) – CODEMA is Dublin's Energy Agency. It aims at accelerating Dublin's low-carbon transition to mitigate the effects of climate change and improve the lives of citizens.
- (2) FACTOR 4 BVBA (FACTOR4) – FACTOR4 is an ESCO and EPC facilitator specialized in realizing comfort, energy efficiency and renewable energy in existing non-residential buildings, industrial plants and apartment buildings.
- (3) Carbon Minded (CARBON MINDED) – CARBON MINDED is an energy and carbon consultancy working with both public and private sector organizations to deliver sustainable solutions.
- (4) ANESE. ANESE is the National Association of ESCOs in Spain and counts more than 120 members specialized in energy services, technologies and investments.
- (5) Klépierre S.A. (KLEPIERRE) – Klépierre is a real estate investment trust focusing on shopping centers assets, which are owned and managed by the company. The headquarters are in France and the company's activity is well established in 16 European countries (Belgium, France, Scandinavian countries, Germany, Netherlands, Poland, Greece, Portugal, and Spain).
- (6) MEETS Accelerator Coalition (MEETS AC) – MEETS AC is an organization that aims at promoting the MEETS model.

And following four interviewees were in phase two -

- (7) REGENERA LEVANTE SL (REGENERA) – REGENERA is an Energy Service Company established in 2007 that offers services for Engineering and Energy Assistance, Industrial work and installations, Maintenance, Energy Services, and R&D – Regenera Digital.
- (8) SERCO Limited (SERCO) – SERCO established in 1929 as Serco Group Plc's and became Serco Limited on 1987. SERCO provides essential service to the public sectors like defense,







transport, justice, immigration, healthcare and other citizen services across their four operating regions UK & Europe, North America, Asia Pacific and Middle East.

- (9) Smart M Power – Smart M Power is a very specialized ESCO in Ireland. It specializes in managing and intelligently automate power-matching transactions on a local level.
- (10) An anonymous interviewee from the European Commission

The main insights gained from these interviews include:

- The combination of operational data collection and monitoring, advanced measurement and verification, and performance guarantees is a promising route towards business models that level the playing field between energy efficiency improvements and distributed renewable energy deployments.
- Green leasing is an important foundation for tenant-landlord agreements that allows the transactional structures required by the different business models for energy efficiency in commercial rented buildings.
- On-bill repayment and “put it on the bill” strategies are considered important by third party investors and financial institutions when evaluating the trustworthiness of energy efficiency investments.
- The role of EPC facilitator could be really vital in creating EPC market for commercial rented sector. The EPC facilitator would be mainly responsible for promotion and communication activities in the EPC market.
- The EPC facilitators can play an important role to liaise between customers (landlord and tenant), EPC service providers and other actors in the business model.
- The current EPC contracts in Ireland offered by Sustainable Energy Authority of Ireland (SEAI) template is focused of maintenance of installed equipment and do not accommodate case of rented buildings. Hence, there is need of new contract template considering rented building scenario and to reflect the owner’s outlook.
- A well designed and structured M&V plans should be the foundation of all EPC contracts, as M&V plan is a key discussion point of an EPC agreement between and ESCOs and Building Owners.
- One contact covering all the aspects of energy system upgrades (i.e. maintenance, equipment installation, equipment operation and equipment replacement) is more attractive for customers rather than separate contracts for individual small works and several supplementary services contracts.
- Policy enforcement can trigger EPC market and uptake of energy efficiency actions in the commercial rented sector.
- The EPC contract and energy efficiency offers should be designed in a way to make it attractive and beneficial for both landlords and tenants.
- Third party financing offering would be most suitable option for implementation of EPC contracts in a rented commercial sector, where financing entity will manage the transaction between grid and landlord/tenants of the rented commercial buildings for example EPC contract for roof top solar PV installation.
- Instead of energy management offerings, outsourced Energy Service offerings would be more attractive to the customers, as energy service offering is about selling services rather than just talking about energy. Energy efficiency should be offered as a transactable output.





- For the commercial rented sector the energy efficiency service offerings and contracts and proposed business model should be tailored to fulfill the requirement of individual situation on case to case basis, as there is general solution that would work for every single case.
- Integrating Demand Response (DR) elements in the ESCO projects can foster and open up the market and the business cases.
- EPC contract should be as transparent and easy to understand as possible, all the technical terms in the contract should be ‘translated’ into more generic terms. Client should be provided information about setting baseline consumption and how the savings are estimated the against the set baseline consumption.
- From the client’s perspective, EPC contracts taking care of everything from energy monitoring to energy management would be most attractive for them, where ESCOs will undertake all the responsibility and make the whole thing easier for them by taking away all the energy management hassle.
- Non energy benefits (for example, increased value of the building, thermal comfort of occupants, improved productivity of the employees etc.) should be quantified in a manner to incentivize landlords and tenants.
- Synergies and collaboration between all the actors involved in an EPC contract will help the market growth and facilitate the dialogue between different market sectors.
- Reduced energy bills is the main focus for many clients/tenants apart from their strategic goal of reducing carbon emission and improving sustainability.
- To improve the uptake of energy efficiency actions leading to decarbonization of grid should be incentivized in some way.
- Renewable energy based offerings are more attractive as they produce long-term reliable cash-flows from a stable, asset-based investment.
- In terms of energy efficiency interventions landlords are mainly concern about payback period. A shorter payback period (up to three years) is considered to be more attractive than longer payback period.
- Landlords finds it difficult to find the energy contract offering good and stable prices throughout the year irrespective of season. Also they find it challenging to explain the energy price variation due to the seasonal changes.
- Even after installation of sub meters, some landlords find it difficult to measure the individual consumption due to changes in the systems setting needed to accommodate the seasonal variations. As a result each tenant is charged as per the occupied area. So an energy efficiency intervention or system upgrades to resolve this issue would be interesting to the landlords so as to enable them to charge the tenants as per their actual consumption.

#### 4 PROPOSED MARKET OFFERING DEVELOPED IN WP3

Work Package 3 of SmartSPIN is about developing contractual service definition by preparing a set of guidelines to address the split incentive issues and defining the transactions between landlord, tenant and ESCOs. To start developing the contractual service definition SmartSPIN team proposed a few methodologies to automate the transactions for various business model for energy efficiency. Automated transaction brings enhanced transparency and trust between the actors of the business model. Pre-defined rules which trigger the transaction are mutually agreed, well documented and





visible to all the participants of the business model. Also, the information used to automate the transaction is also visible to all the participants of the business model. Frequency of the transaction (Daily/Weekly/Monthly) can be mutually agreed between the participants as per their need. D3.2 presents some examples of automated transactions that could be applicable in the business models presented in D2.1 for example asset-based business model and output-based business model. The automation of transaction is completed using a private network's distributed ledger which uses blockchain technology to distribute the copies of transactions among all the participants. Although this is fundamentally different from permissionless and public blockchains such as Bitcoin or Ethereum. These Private networks are invitation-only; a central entity assigns roles to participants and allows them to transact on the network. Furthermore, they do not need incentives for participants and, as a result, they do not need cryptocurrencies.

Some contractual options have been analysed that might be used to address the split incentive issue in the proposed SmartSPIN solution -

1. Green Lease – Green lease has been identified as an effective tool to address the split incentive issues in the commercial rented sector. The Green lease is a standard commercial lease with some additional clauses related to the sustainable operation of the building<sup>15</sup>, e.g., improvement of energy and/or environmental performance of the building by both owner and tenant. The focus of a green lease is improved arrangement of financial incentive and sustainability objectives between the owner and the occupier. Green lease is becoming more popular in the commercial rented sector as sustainability becomes a corporate priority. The clauses addressing the split incentive issue can be tailored to the need of individual building and can vary significantly between various property owners and tenants. Green lease provides value beyond energy saving to both owner and occupier, it helps with improved tenant engagement and mutual trust between property owner and tenant. Tenant engagement could be considered as soft energy intervention and is critical for obtaining immediate energy efficiency gains.
2. On-Bill Financing – On-bill financing is a contractual option where a utility or private finance provider offers necessary funding required for implementing energy saving measures. The funded amount is repaid through additional payment on the existing utility bills with low-zero to interest rate. There are many types of on-bill financing options due to the differing utility and regulatory structures among states. Most on bill financing options require bill neutrality, to ensure the repayments are equal to or less than the amount saved from the energy efficiency upgrades and removes barrier of upfront investment requirement. The contract can be structured to fulfil the needs of different markets and individual users. However, utilities are sometime reluctant to act as financing entity to fund the energy efficiency upgrades and it could be complicated to set up.
3. MEETS – In MEETS contract, the owners sign an 'Energy Lease' with energy efficiency financier to provide 100% funding for the energy efficiency upgrades and is called 'Energy Tenant'. Energy tenant undertakes the full responsibility and manages all the risk associated to the implantation of upgrades. Building owner pays for the energy consumed (based on metered consumption) and energy saved while the building tenant enjoys the hard and soft benefits of the energy efficiency upgrades. Energy tenant pays rent to building owner for using the building to implement energy efficiency upgrades. The electricity supplier ensures that building owner does not pay more than their usual energy bill (as before the energy

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<sup>1515</sup> <https://www.igbc.ie/resources/introduction-green-leases/>





efficiency interventions). The electricity supplier signs a long-term Power Purchase Agreement (PPA) with energy tenant for the energy saved at a mutually agreed price. The energy saved is calculated through a dynamic baseline counter compliant with International Performance Measurement and Verification Protocol (IPMVP) and enterprise standards. The building tenant pays operational charges to the building owner to cover the charges paid as efficiency service by building owner and hence overcoming the split incentive issue. MEETS allows a fair benefit distribution between all the involved parties, however the complex contractual arrangement might discourage the uptake of MEETS.

More detailed analysis of above said contractual arrangement can be found in D3.3.

## 5 FINDINGS OF WORK PACKAGE 2

Energy Efficiency as a Service is the most general model that is applicable to the SmartSPIN service. EEaaS model covers the following aspects: Energy management, Maintenance, Total guarantee of the equipment installed by ESCO, improvement works, improvement of energy efficiency. The EEaaS model proposed by SmartSPIN differs on the classic one because it applies to rented commercial units and considers the three actors: tenant, landlord and ESCO, whereas the classic EEaaS considers only an ESCO and its client. Similarly, Energy Performance Contracting refers to a bipartite agreement between an ESCO and its client; the current contractual templates are not sufficient to cope with the rented case and need to be modified to consider a tripartite agreement between tenant, landlord and ESCO. Engagement with the tenant is especially required in the cases where the landlord just owns the space occupied by the tenant but does not control everything; the tenant owns equipment that can be upgraded and part of the heating/cooling system (e.g., fan-coils and other equipment). Moreover, an ESCO can recommend simple no-cost or low-cost energy efficiency measures to a tenant which do not require works.

The SmartSPIN contract will be a tripartite agreement between the landlord, tenant and ESCO. A standard EPC is a bipartite agreement between an ESCO and its client that is divided in the following parts: 1. The Works, 2. The Services, 3. Measurement, Verification, Guarantee & Payment, 4. Miscellaneous. Requirements for a tripartite SmartSPIN EPC contract are the following:

1. With respect to the Works, both the tenant and the landlord may be clients of ESCO.
2. The ESCO will provide the energy efficiency services to the clients since the day following the Acceptance Date until the expiry of the Guarantee Period. In addition, an ESCO might also provide energy supply services<sup>16</sup> to the Client from the Connection Date to the End Date. The client receiving the energy efficiency and/or energy supply services may be either the tenant or the landlord.
3. The tripartite EPC's contractual Guarantee Period may comprise two distinct Guarantee Periods, the first one beginning with Tenant's works and the second one with Landlord's works, which are characterised by different Energy Savings guarantees.
4. The baseline energy consumption used to calculate energy savings must be adjusted when performing works agreed with one of the Clients of the ESCO (either Tenant or Landlord).

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<sup>16</sup> This requires a Local Energy Supply Contract.





5. The ESCO is responsible for measuring or calculating the Energy Savings and asks the Client to approve them for each Reconciliation Period (typically 6 or 12 months) during a Guarantee Period. Within five days after the end of each Reconciliation Period the ESCO will send a measurement and verification report to the Client (either Tenant or Landlord of the Rented Premises<sup>17</sup>) detailing the Energy Savings for each energy type achieved at the Rented Premises during the current Reconciliation Period together with an invoice for payment.
6. The client of the energy efficiency service will pay to the ESCO the amount due for the energy efficiency service in accordance with the terms of the EPC. The split-incentive issue arises when the client of the ESCO that pays the energy bills is the tenant. In fact, if the tenant pays the monthly energy bill, then the energy savings will be obtained by the tenant and the landlord might lose interest in the works for implementing energy efficiency measures.
7. During the second Guarantee Period the landlord is engaged with the ESCO and the ESCO will share part of the energy savings with the landlord. This way, the split incentive issue can be overcome. The business model adopted can be either the shared savings model or the guaranteed savings model<sup>18</sup>. Some EPCs (like the one established by SEAI in Ireland) combine guaranteed savings with shared savings, that means that guaranteed savings are normally applied, but if the savings are higher than a certain threshold (called Shared Savings Threshold) then the ESCO will share, e.g., the 50% of the savings exceeding the threshold with the Client.

## 6 RECOMMENDATIONS

N.	Recommendation	Why	Barriers Removed	Supporting Evidence
1	Determine the key features of the SmartSPIN service and how these are deployed including whether an EPC will be used or another contractual agreement (this depend on the specific feature and on the country)	SmartSPIN service definition (D3.4) will list the key features of the service definition and state the conditions under which each feature should be deployed	Ambiguity related to deployment of SmartSPIN features in different countries	CODEMA interview. D2.2 and D2.3 reviews.
2	If a smart energy service is delivered by means of an EPC consider the involvement of an EPC facilitator when engaging with landlord and tenants	Facilitators can help to sell more SmartSPIN services and deliver all the features in the various countries	High complexity of EPC implementation	Scientific Literature. CODEMA interview. SEAI activities and training for EPC facilitators in Ireland.
3	Consider the Energy as a Service (EaaS)	The EaaS model is a comprehensive	Reduced cost effectiveness of	ANESE interview. Technical literature.

<sup>17</sup> In SmartSPIN it is assumed that the Tenant will normally pay for the ESCO service, we do this assumption unless differently specified.

<sup>18</sup> These models were reviewed in D2.2 and adapted to the rented commercial facilities.







	<p>model to deploy the SmartSPIN service provided that EaaS applies to the features delivered to a specific client and it is verified as the most cost-effective solution.</p>	<p>Energy Contract including 5 benefits:</p> <ol style="list-style-type: none"> <li>1. Energy management</li> <li>2. Maintenance</li> <li>3. Total guarantee of the equipment</li> <li>4. Improvement works</li> <li>5. Improvement of energy efficiency</li> </ol> <p>EaaS might be the best solution for rented buildings.</p>	<p>uncoordinated contractual solutions for energy management, maintenance, equipment guarantees, improvement works, Improvement of energy efficiency.</p>	
4	<p>Include in the service definition the Measurement and Verification approach used to determine the energy savings. Standardise the M&amp;V process applicable to the features of the SmartSPIN service. Ensure that there are no measurement errors.</p>	<p>Clients subscribing the SmartSPIN service must be well informed about the M&amp;V process and fully trust it in order to avoid disputes on the actual energy savings achieved. Fear of measurement errors were reported in one of the interviews conducted in WP2 (Klepierre)</p>	<p>Lack of information about M&amp;V and lack of trust in ESCOs</p>	<p>Klepierre interview. Technical literature.</p>
5	<p>Develop a service that requires the engagement of both landlord and tenants. Determine which features of the SmartSPIN service involve only landlord and which ones only tenants and which ones both of them.</p>	<p>SmartSPIN aims to thoroughly exploit all the opportunities to improve energy efficiency in the commercial rented sector such that the energy and non-energy benefits are maximised for all the parties involved.</p>	<p>Simplification of the rented scenario that may lead to incomplete exploitation of the potential for energy efficiency improvements in a commercial building.</p>	<p>ANESE interview. Technical literature.</p>
6	<p>Determine which features of the SmartSPIN service are best delivered using an EPC and which ones are best delivered using PPAs, leasing, EaaS.</p>	<p>EPC may be more complex and difficult for users to understand contract clauses. Signing an EPC requires a lot of time, approximately 9 months, because of the different actors involved and their different expertise.</p>	<p>Difficulties in getting an EPC agreed by the potential clients of the commercial sector.</p>	<p>ANESE interview. Technical Literature.</p>
7	<p>Consider as features of the SmartSPIN service: energy</p>	<p>A combination of several features in one SmartSPIN</p>	<p>Potential lack of coordination between different energy</p>	<p>ANESE interview. Scientific literature.</p>



	management, changing the electricity supplier, equipment installation/RES (solar PV installations) or replacement and operation and maintenance (O&M) services	service will likely enable to maximise the benefits for landlords, tenants and ESCOs.	efficiency interventions	
8	The SmartSPIN service should improve tenants' efficiency (not only the energy efficiency of the whole commercial building)	If tenants pay less energy fees, they might be able to pay a larger rent to the building owner.	Split-incentive between landlord and tenants	Klepierre interview. Technical literature.
9	Issue energy consumption invoices to the tenants based on the readings of the meters	Meters are often not used in all cases and the payments of the tenants are proportional to the sqm.	Inaccurate billing of energy consumption of tenants.	Klepierre interview.
10	Determine a tariff for the electricity, gas consumption and water used by the tenants which is independent of the season.	Billing of tenants' consumptions must be fair and reflect their own utilisation of electricity, natural gas and water. Differences in the energy prices during the different seasons of the year are difficult to explain to the tenants.	Unclear/unfair tariff applied to tenants.	Klepierre interview.
11	The SmartSPIN service and its deployment must be tailored to the specific relationship between landlord and tenant distinguishing the cases where 1. The landlord controls everything and 2. The landlord just owns the space.	If the landlord is in control of everything, the ESCO should better engage with landlord. If tenants are allow to install their own equipment the ESCO will engage with them.	Uncertainty regarding how an ESCO should engage with landlord/tenant	CARBON-MINDED interview. Klepierre interview.
12	Determine the revenue stream model that best suits the SmartSPIN service among those ones shown in D2.2, considering the	Revenue streams must satisfy the expectation of the parties for the actual deployment of the service.	Uncertainty regarding the revenue streams associated with the SmartSPIN service.	D2.2, scientific literature on business models for ESCO services.







	specificities of the country where the service is going to be deployed			
13	Consider feed-in tariff and Dynamic tariff structures in service definition if relevant with the country where the SmartSPIN service is going to be deployed in future.	Feed-in tariff and dynamic tariff will strengthen the business case for the SmartSPIN service.	Assumptions of no feed-in tariff and standard flat rate for electricity or day/night rate	CARBON-MINDED interview. D2.2 and D2.3. Technical literature.
14	The SmartSPIN service must provide a full package of measures including energy management activities, installing the equipment and sensors, monitoring energy, giving advice on the energy consumption, monitoring the project's implementation and performance.	The SmartSPIN service is expected to advance the state-of-the-art of the ESCO services in order to be more attractive for the commercial rented sector.	Lack of information about ESCO services and lack of trust in ESCOs.	CARBON-MINDED interview. D2.2 and D2.3. Technical literature.
15	Consider the contractual arrangements allowing to deliver high energy efficiency for a wide range of project sizes.	Increase the opportunities to deliver high energy savings for all the clients aiming at achieving that regardless of their size.	Only clients of certain sizes may obtain rewards from energy efficiency interventions.	SmartSPIN is not tied to a specific type of EPC but will develop its own contractual template to implement the SmartSPIN service.
16	Develop a service that can delivered to Energy Communities (ECs) including commercial rented units and that may allow energy communities to operate as ESCOs. Consider that ECs might purchase energy collectively.	The number of energy communities is increasing in several EU countries (Ireland is one of them) and the split-incentive issue has not been addressed within energy communities yet.	Lack of knowledge about business models that can solve the split incentive issue in energy communities	Interview with MEGA. Interview with Regenera-Levante.
17	Consider using multiple contracts for the deployment of the SmartSPIN service (such as contract for installing smart metering, a contract for obtaining energy	The engagement with landlords and tenants will be simplified if they are introduced gradually to the SmartSPIN service.	Lack of trust in ESCO services. Conviction that ESCO services are complicated to understand, and their benefits unclear	Interview with MEGA



	consumption data etc)			
18	Deliver the SmartSPIN service using a Performance Guarantee model	Several Landlords are not aware of the Performance Guarantee business model and are afraid of economic risks associated with renovation and installation of energy efficiency measures.	Lack of knowledge about ESCO business models.	Interview with SERCO
19	The SmartSPIN service must be based on a tripartite agreement between tenant, landlord and ESCO.	If the contractual agreement will be only established between landlord and ESCO then it is very likely that engagement of tenant will be modest.	Current contractual templates (e.g., EPC templates) enable to establish an agreement between ESCO and its client therefore are not suitable for the deployment of the SmartSPIN service.	Interview with SERCO. SEAI EPC available at: <a href="https://www.seai.ie/business-and-public-sector/business-grants-and-supports/energy-contracting/">https://www.seai.ie/business-and-public-sector/business-grants-and-supports/energy-contracting/</a>
20	The SmartSPIN service should protect tenants from an increase of rent which is not compensated by their higher energy efficiency. Non-energy benefits should be delivered to tenants (such as improved comfort).	Tenants must be incentivized in agreeing to implement the SmartSPIN service. The service implementation cannot be fully successful if based only on a landlord's decision.	The service is not attractive for tenants (and that will limit its uptake).	Interview with SERCO.
21	The SmartSPIN service should make use of forecasts of electricity market price and provide forecasts of energy savings and carbon emissions.	Currently many ESCOs are implementing software platforms including forecasting services. This is considered a necessary innovation to deliver a smart service and gain the trust of the clients.	Lack of accuracy in energy savings and carbon emissions predictions.	Interview with Regenera Levante. D2.2 and technical literature.
22	The SmartSPIN service should be made compatible with innovative financing mechanisms including the schemes mentioned by the EU Directives (revolving funds, guarantees, and	Lack of adequate financing mechanisms might discourage the acceptance of the SmartSPIN service.	Lack of adequate financing mechanisms. Inadequate policies. Lack of knowledge about bank's requirements for financing.	Interview with Regenera Levante. Confidential interview.



	insurance schemes). Crowdfunding <sup>19</sup> can be used to finance energy efficiency measures by members of energy communities.			
23	The SmartSPIN service should include features related to demand-response, energy storage and energy flexibility to be competitive with new energy services that will conquer the market after 2024.	A forthcoming new version of the EU Energy Efficiency Directive will define the concept of expanded energy services and the offer of ESCOs will become aligned with that (2024 and beyond).	Lack of regulatory support for novel energy services based on demand response, energy storage and smart controls.	Confidential interview. Literature review.

## 7 CONCLUSION

The SmartSPIN service will comprise several features: energy management, change of the electricity supplier, equipment or renewable energy source installation (e.g., solar PV installations) or replacement, installation of sensors, energy monitoring, O&M services, providing advice on how to reduce energy consumption, etc. These features will be delivered ensuring benefits for all the involved parties. The SmartSPIN service will have to be delivered in a manner which will consider the existing relationship between landlord and tenant. If the landlord owns all the equipment installed in the rented unit, the ESCO could engage with landlord only. However, if tenants are allowed to install their own equipment and actually own some parts that can be replaced with more energy efficient counterparts, then the ESCO will engage with them as well. This is the most general case that must be addressed by the SmartSPIN service.

Green leasing is the main framework for both landlords and tenants to collaborate for achieving the common objective of improving energy efficiency and reducing CO<sub>2</sub> emissions, and it can be considered as the first step toward overcoming the split-incentive issue.

It is recommended that the SmartSPIN service be normally delivered as EaaS which will include five major benefits:

- Energy Management;
- Maintenance;
- Total guarantee of the equipment;
- Improvement works;
- Improvement of energy efficiency.

<sup>19</sup> Crowdfunding is a bottom-up microfinance practice where a group of people contribute with their resources to support the development of a common project.





Exceptions may apply for specific cases and obviously the service must be flexible to cover also the cases where not all the mentioned benefits apply. The service must include a trusted and standardised M&V approach to determine the energy savings applicable to the various features of the SmartSPIN service. The M&V process must address all the concerns in relation to the possibility of measurement errors. The lack of a trusted M&V process may become a barrier to the deployment of the energy efficiency service.

The SmartSPIN service should include – where applicable – a dynamic tariff for the electricity, gas consumption and water used by the tenants, which is fair, easy to understand and independent of the season.

Although the SmartSPIN service will be delivered by means of a specific contractual agreement, which will be finalized during the project, it is expected that the performance guarantee is normally the preferred way to deliver energy savings. Energy Performance Contracting (without excluding for specific cases other options, such as green leases, on-bill financing, power purchase agreements, etc.) is the standardized contractual form to deliver energy savings with performance guarantee. Moreover, an EPC could be adapted to the rented scenario of the commercial sector, becoming (in the most general case) a tripartite agreement between landlord, tenant and ESCO instead of a bipartite agreement between ESCO and its client.

