Smart energy services to solve the **SP**lit **IN**centive problem in the commercial rented sector

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D6.2 – REPORT ON BEST PRACTICE FOR ESCOS

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101033744.

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List of Abbreviations

Abbreviation	Meaning
BEMS	Building Energy Management System
BEP	Building Energy Performance
BMS	Building management system
C-PACE	Commercial Property Assessed Clean Energy Financing
CSR	Corporate social responsibility
EEaS	Energy Efficiency as a Service
EPC	Energy Performance Contract
ESCO	Energy Service Companies
ESG	Environmental, Social, and Governance
EU	European Union
LS	Lawler Sustainability
M&V	Measurement and Verification
SaaS	Smart Energy as a Service
SES	Smart Energy Services
SMEs	Small and Medium Enterprises

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EXECUTIVE SUMMARY

The SmartSPIN Model is created on the output-based model with delivered energy savings at the heart of the proposition. The project concept suggests an ESCO or energy efficiency provider as a delivery partner, initial assessments would point strongly towards the ESCO as being a key factor in the market.

To address the split-incentive issue, the following is recommended:

- Introduce mechanisms for collaboration between landlord and tenant in the tenancy agreements:
  - Move towards agreements that facilitate building upgrade works.
  - Introduce collaborative environmental targets.
- Prioritize low-cost actions e.g.: energy audit to identify cost-effective upgrades, focus on the range of fast payback measures.
- Develop transparent business models which facilitate deep renovation beyond lease contractual timelines, enticing tenants proportionate to their tenancy duration.
- Develop a matrix of business models for varying building designs & landlord/tenant scenarios building off the SmartSPIN concept to look at scenarios which may differ.
- Cost recovery clause on a green lease for sharing the cost of capital expenses.
- Optimize the integrated building design for construction.
- Offset up-front costs of capital-intensive projects through utility incentives, then spread the balance through options like on-bill financing, C-PACE, or EPCs.

Based on the research and learnings to date from Work Packages 2, 3 & 4 and also the practical experiences of WP5 and its associated pilot site learnings, this practical guidance will hopefully encourage key stakeholders to embrace the SmartSPIN model.

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1 INTRODUCTION

The private commercial property sector represents a large untapped market where retrofit, decarbonisation with, integration of renewables and demand response technology are going to be inevitably a growing requirement. It is also a sector where due to the split incentive there is risk of delayed or stagnated progress unless the split incentive can be successfully solved.In the projects work through WP2, & 4 much has been developed by way of business model options, developing a service definition and associated contractual templates and then using energy data to help with M&V automation. All this work has been a great support to developing the SmartSPIN concept (illustrated in Figure 1) into a workable market business model. It is, however, WP5 where practical challenges and learnings are presented that some of the less obvious but nonetheless 'real world' challenges were encountered.

The objectives of WP6 - Business model definition and development of SmartSPIN toolkit included the definition of the SmartSPIN business model for the deployment of smart energy services in the commercial rented sector by ESCOs and energy suppliers based on the results achieved in the previous WPs, and to validate it by gathering opinions and feedback from the stakeholders.

Moreover, in WP6 a toolkit for key stakeholders was developed. The toolkit presents the key features of the business model in a way that is immediate to understand. Task 6.2, titled "Best practice guides for stakeholders", reviewed the successes and challenges for implementing the SmartSPIN service in WPs 3, 4 and 5 at the demonstration sites in Spain, Ireland and Greece and extracted the key learning points to develop two best practice guides, one for ESCOs and one for landlords and tenants.

Having reviewed the successes and challenges for implementing the SmartSPIN service, this deliverable D6.2 then presents a guide for ESCOs to help them firstly assess the suitability of the SmartSPIN approach and then presenting specific guidance once the SmartSPIN Model is entered into contractually. This is important in the overall context of WP6 and in the presentation of a new business model that adequate time is taken to provide best practice guidance for key stakeholders.

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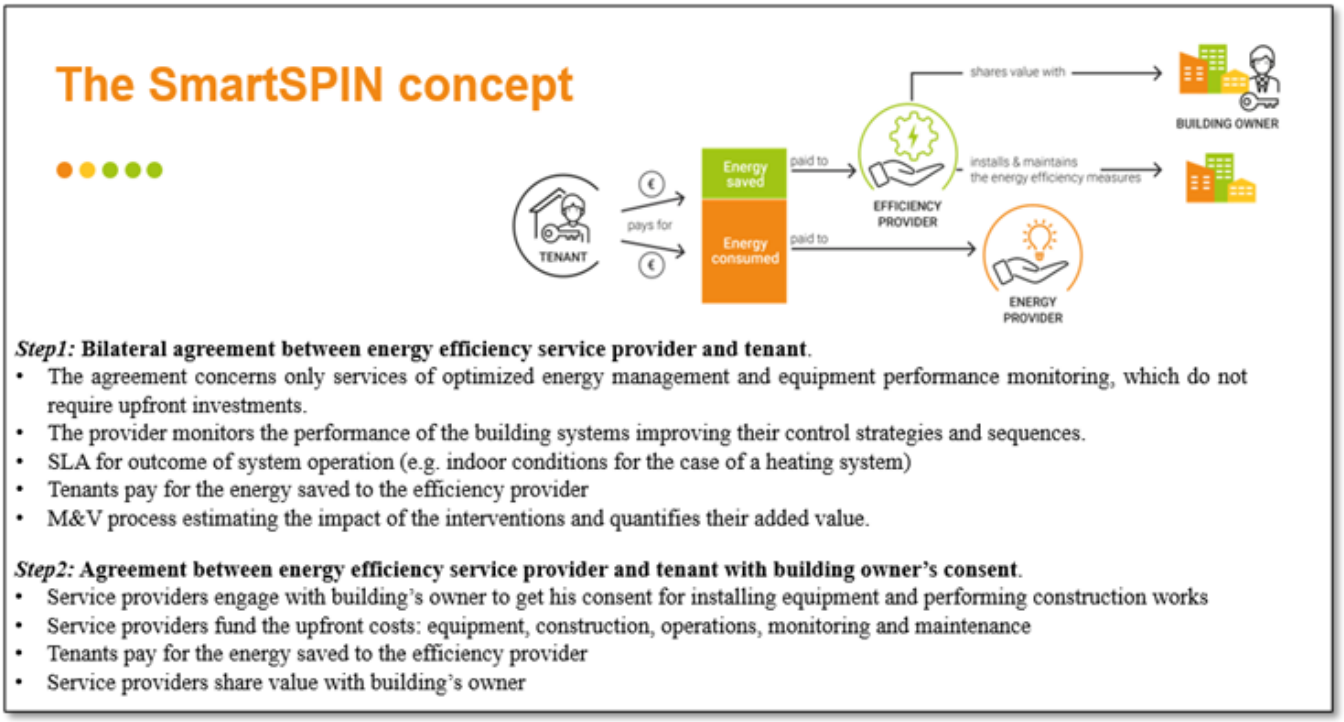

Figure 1 The SmartSPIN concept

2 REVIEWING SUCCESSES AND CHALLENGES FOR IMPLEMENTING THE SMARTSPIN SERVICE

2.1 WORK PACKAGE 3 – CONTRACTUAL SERVICE DEFINITION

The ESCO model aims to improve building sustainability credentials and operational performance in buildings with:

1) high commercial opportunity,
2) sustainability ambition,
3) good financial covenants.

This insight is found to be a necessary requirement to implement the Smart SPIN business model.

A successful approach to overcoming misaligned incentives between tenants and owners should consider splitting costs and benefits in a balanced way. A share of energy cost savings should be allowed to be used for investment repayments. This means that tenants could be subject to a repayment fee on their utility bills, landlords should also take part of the investment cost given the property's value increase because of the energy efficiency upgrade.

This task identified that the EPC/Performance based approach is least developed in Greece. Maintenance contracts are mainly operated on an annual basis whereas Spain enters longer-term contracts, which could be an inhibitor as shorter-term contracts are likely more favourable.

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2.2 WORK PACKAGE 4 – DATA ANALYTICS FOR ENERGY MANAGEMENT

The objective is to use data from buildings through an ESCO low cost/ no cost intervention to support SES. These services include:

- Automate Measurement & Verification (M&V) for the Smart SPIN business model, to better estimate savings achieved by energy efficiency interventions. Thanks to better M&V approaches, the benefits can be better split between landlord/tenants and the process will be more trusted by them. This service has been properly developed and would be deemed a success.
- Platform-agnostic algorithms for:
    - *Building performance diagnosis* – this has been developed, and a web-tool is available. It is a success because the tool allows for an energy diagnostic of the building, identifying which energy and cost streams have the most interest for the SmartSPIN business model. This is where focus should be for improving the building as it will be more cost-effective.
    - *Automating baseline establishment* – like the explanation for the M&V well established baselines allow for clearer business models.
    - *Predicting short- and longer-term energy-efficiency and flexibility opportunities* – forecasting models were developed that predict energy consumption with 24h ahead. This is considered a success as the model will allow to better plan the energy consumption optimizing energy cost from the grid, use of renewable energy etc.

Although the services exist and have been implemented into a platform, it is a challenge to integrate the processes mentioned into smart contracts. The algorithms and models developed could not be fully understood by stakeholders, e.g. energy forecasting is a useful tool, but facility managers based the control of the building on their know-how. Changes of paradigm are complicated, implementing cutting-edge technologies or even well-known technologies fully proved is a slow process.

2.3 WORK PACKAGE 5 – DEMONSTRATION AND VALIDATION OF THE PROPOSED SERVICE

Within WP5 it was the intent to validate the SmartSPIN concept. There were some practical challenges that were encountered in achieving expected progress. LS as ESCO operators are in the process of verifying to the Landlord and tenant where savings can be achieved. We have identified a suitable type of building with a client that has a progressive ESG agenda. Currently, they have sub metering on site to allow measurement for Energy efficiency. The client is keen on the concept but is concerned about potential level of operational disruption.

2.3.1 Irish Pilot Site

In terms of successes in this site LS successfully mobilised both landlord (Irish Life) and tenants to engage with each other and allow the installation of a 'Whole Building' control system which allowed harmonisation of landlord heat producing equipment with tenants heating and cooling systems through a new BEMS system that integrates with the tenancies viewing their heating and cooling system and adjusting the landlords in unison and also providing air quality monitoring to allow adjustment of landlord fresh air supply plant.

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This prevents energy wastage as landlord equipment does not fight against tenants heating / cooling equipment.

The project also has a performance-based contract signed to ensure monitoring and optimisation of this new system reaches the proposed energy reduction threshold.

LS consultative based approach to ESCO has addressed the initial barriers that would inhibit the Landlord from engaging with Energy efficient projects.

In terms of ESCO challenges on this site the following were noteworthy:

- Lease agreements similar to many are 'all in' with landlord heat to tenancies included and therefore no incentive to reduce consumption.
- The concept of Energy Performance Contracting and awareness of it as a model is very low. The relationships of letting agents representing both building owner and tenants and the conservative nature and established norms took considerable time to explain and give reassurance.
- The market turbulence currently in the commercial office sector post COVID with work from home and downsizing by technology companies meant that making progress was very slow in promoting the concept.
- The lack of precedence and successful reference sites to give confidence also resulted in slow decision making.
- The immaturity of the Energy Performance Market and complexity of landlord / tenant mix is likely to mean that there will be a reluctance by ESCO's and their financing partners to advance.
- Transparency in sharing of data between stakeholders when identifying energy savings. There needs to be a data management plan and Intellectual property management plan to safeguard all stakeholders.
- Evaluation and monitoring of performance indicators needs to be defined between all stakeholders.
- Landlord/tenant ESG alignment in relation to their financial/contractual arrangement.
- During our time working on the site on this project the building owner progressed LED upgrades and AHU Upgrades as part of their own capital investment programme so the Smart SPIN model would need to move much quicker to avoid overlapping programmes between general maintenance and engineering retrofit.

2.3.2 Spanish Pilot Site

At the Madrid pilot sites (2), the ownership (Klepierre) and management team effectively facilitated the implementation of a smart metering infrastructure in collaboration with tenants.

This system enabled real-time tracking of both electric and thermal energy consumption through the Smarkia Energy Management Platform

A future Energy Billing model was agreed where tenants were charged on actual energy consumption rather than floor area. The success was based on promoting tenant engagement through gamified energy efficiency measures.

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Several challenges arose during the project, including:

- Organizational Circumstances: In large organizations, internal processes and approvals are generally slow in adapting to and integrating changes, particularly in post-COVID circumstances.
- Market Conditions: Economic difficulties and shifting dynamics in the retail sector delayed decision-making and affected implementation timelines.
- Technology Integration: Synchronizing the new smart meters with existing systems posed technical challenges, requiring tailored solutions to address compatibility issues.
- Energy Performance Contracting Awareness: As in other pilot sites, the concept of Energy Performance Contracting was unfamiliar to many stakeholders, necessitating extensive education and trust-building efforts.
- Alignment of Stakeholders: Coordinating the efforts of landlords, tenants, and external service providers involved complex negotiations and collaboration, often causing delays in decision-making.
- Personnel Turnover: Changes in key representatives and technical teams led to repeated efforts, which slowed the overall progress of the project.

2.3.3 Greek Pilot Site

With regards to the Greek pilot site, both the owner and the building operational management team showed immediate interest in the application of the SmartSPIN solution within the two buildings' premises. From an **ESCO** point of view, the application of the suggested interventions, in collaboration with the tenants, they were more than supportive and willing to facilitate the installation of the related energy monitoring infrastructure that would allow the upgrade of their facilities.

The smart meters that have been installed in almost every electrical board enabled real-time measurement of electric energy consumption and live monitoring through the Eunice APP - a mobile application for energy monitoring and management -, as well as through the respective web portal.

Moreover, smart plugs were shared among the tenants to manage remotely, seamlessly and efficiently the preferred electrical loads to achieve energy savings and schedule their operation. In addition, the EV charger, which was installed at the building's parking site, motivated some of the tenants to use electric vehicles more often, as some of the companies/tenants proceeded in the purchase of Electric Vehicles for their corporate fleet.

Last but not least, following the trends in the energy market and real estate in Greece, as well as the positive results derived by the successful application of the SmartSPIN Project in the building of I4G, the I4G Company proceeded with further investing on additional energy related upgrades and infrastructure, mainly consist of improved and advanced insulation materials.

The efficiency improvements, which are expected to be finalized by the end of 2024, concern both building complexes (I4G and Euro consultants SA), with the investment reaching approximately a total of EUR 160.000 allowing the transformation of the two buildings' Energy Efficiency Class from D to B.

Moreover, the installation of Solar-PV Canopies, including more EV Chargers and batteries for storage within the parking area of the buildings, is being examined by the building owner and operation management team.

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All abovementioned energy related improvements in the buildings' infrastructure arebelieved to further showcase and complement the advantages of the already installed and operational metering and monitoring equipment, and more importantly, the SmartSPIN's application and model adoption.

3 SMARTSPIN FEASIBILITY ASSESSMENT

3.1 ASSESSING THE EXISTING MARKET

An important area to focus on for an ESCO when deciding on the feasibility of the SmartSPIN model are the following:

- *Is there a market?* – Quantitatively assessing the size of the possible market will allow for an insight into the opportunity available.
- *Umbrella Organisation* – Identifying the large players in the market will provide clarification on the potential ease to market for an ESCO.
- *Competitor analysis* – Identifying the strengths and weaknesses of competitors in the market can allow an ESCO to possibly identify where they will flourish in the market i.e. is there a specific sector that an ESCO is best suited for based on their own strengths.

A key learning point identified for an ESCO within WP3 identified that tenants with strong sustainability/ESG building agendas should increase the likelihood of a contract being awarded for the SmartSPIN business model.

It was found that there is appetite to progress building and engineering system upgrades, the technical solutions are well developed. However, the pathway to executions has some challenges. From an ESCO perspective, this market is only developing across the EU which can lead to a slow uptake of the SmartSPIN model and significant time requirement to educate clients before a project commences. This could result in the stagnation of the SmartSPIN model adoption. The complexity of the recommended landlord/tenant relationship may encourage more single building ownership dynamic than landlord/tenant dynamic.

ESCO also faces project finance difficulties, the complexity of risk around vacant tenancies, potential disruption to revenue streams, contracts and risk between additional parties all lead to unfavorability.

3.2 SERVICE/PRODUCT VIABILITY

Other key components to consider for an ESCO when implementing the SmartSPIN toolkit:

- *Design, construct, maintain & operate* – to deliver SaaS the ESCO should consider these components, and the relevant competencies required within their organisation to achieve these components. A template of scenarios and cost sharing could be developed to help with early discussions
- *Provide gap analysis* – An ESCO needs to understand what services they need to offer within their organisation to have competencies for the SaaS for the SmartSPIN business model to be delivered. Assessing the internal management of the organisation is important here, this

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will allow the ESCO to decide what they must do to have competent people for project delivery.
- *Maintenance responsibilities* – Clearly outline the responsibilities of both landlords and tenants regarding property maintenance, repairs, and improvements.

A key learning point from WP4 found that data-driven algorithms and models are a useful tool to increase trust between ESCO & landlord/tenant as the ESCO has the opportunity to prove their worth to the clients with accurate M&V approaches. With accurate processes the ESCO can reduce the uncertainty of the contract and offer better deals e.g., an ESCO thinks they can reduce the bill by 'X' % but the M&V processes are not accurate, therefore they offer a reduced savings percentage on the contract (X-Y) %, with improved M&V processes the difference between 'X' and 'Y' can be reduced and thus can improve the benefits of the acknowledged savings from the M&V process.

Data-driven algorithms can also lead to exploitation of flexibility services of buildings, through participation in demand response programs or shifting consumption away from peak times using dynamic pricing, creating additional revenues that can further reduce payback time.

3.3 FINANCIAL VIABILITY

A key final area of focus before endeavouring on implementation of the SmartSPIN toolkit is assessing the financial viability of a project:

- *Internal financial requirements* – What liquidity is required within the ESCO to ensure the successful delivery of SaaS. ESCO should be prepared for anomalies within the timeframe of the contract where savings may not be as high as modelled. In this scenario an ESCO may be left with less of a payout than expected in certain months of the year.
- *External financial requirements* – Important consideration for an ESCO when financing projects. ESCO should choose a lender that is understanding of the SaaS model and willing to offer enticing interest rates.
- *Clear lease terms* – Ensure that lease agreements have well-defined terms, including rental amounts, lease duration and any renewal options.
- *Exit clauses* – Clearly define conditions for lease termination, including notice periods, penalties and any circumstances allowing early termination.
- *Compliance with Laws and Regulations* – Ensure that the lease adheres to all relevant local, state, and federal laws and regulations governing landlord-tenant relationships.
- *Confidentiality* – Include provisions to protect sensitive information shared between the parties during the course of the lease agreement.
- *Subleasing and assignment* – Specify conditions under which subleasing or assigning the lease is allowed and the process involved.

It was found that tenancy agreements never originally considered energy efficiency and landlord/tenant collaboration to reduce overall BEP. This leads to an additional amount of consideration within agreements. Where the SmartSPIN concept is to be considered, ESCO would need to ensure protection from the risk of payment defaults, and the tenancy agreement would have to consider this.

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Traditional forms of leases do not set the ground for energy efficiency investments. In the commercial sector, green leases can bridge these differences by splitting costs and benefits between the parties in such a way that both parties can benefit from an energy retrofit. Despite their potential, green leases are not currently widely used in Europe. Sharing green lease guidelines can increase awareness among key interest groups.

4 ENTRY TO MARKET & PROJECT SELECTION

4.1 KEY CONSIDERATIONS FOR ESCOS FOR SELECTING PROJECTS IMPLEMENTING THE SMARTSPIN BUSINESS MODEL

Some key considerations for ESCOs when selecting projects to implement the SmartSPIN business model are related to:

- Securing projects: existing customers, public procurement, private sector
- Customer attributes
- Building attributes
- Finance landscape

These key considerations are further expanded in the following sections.

4.2 CUSTOMER ATTRIBUTES

Certain criteria to look out for when selecting potential customers:

- *What is their budget?* – This will allow an ESCO to clarify if a customer is capable of self-financing the project, from this an EPC could be introduced.
- *Energy Monitoring experience* – The level of understanding from a customer in the field of energy monitoring will be an important criterion to consider informing the simplicity of implementing the SmartSPIN model.
- *Interrelationship* – Here is also an important criterion to consider for an ESCO as the willingness of a customer to work alongside the ESCO will be necessary when implementing a project with a new business model. The relationship between the customer and ESCO is important here but also the relationship between the customer and tenant, as mutual agreement will be paramount when implementing new services in a project.

Characteristics to look out for in customers during project selection may include the following as identified in previous Work Packages as key learning points for an ESCO:

- Tenant with a strong sustainability/ESG building agenda.
- Tenant where operating costs are significant.
- Tenant who values lower operational costs
- Tenant lenient towards operational disruption

Tenants with these types of characteristics should enhance the likelihood of a contract being secured, and these types of tenants should be targeted as priority.

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Both landlord & tenant need to be motivated to mobilise, each must see value. An overall decarbonisation strategy needs to be developed so that investment in upgrades has context within an overall strategy

4.3 BUILDING ATTRIBUTES

Important aspects of the building for LS to consider when implementing the SmartSPIN model:

- *Does the building have a large energy footprint?* – if this is the case, SES becomes a more viable solution to introduce as a cheap retrofit for a project. Where good savings opportunities can be demonstrated.
- *Support from tenants* – Are the tenants supportive of energy & ESG building improvements is an important consideration for the project, the less frictions in agreement can greatly enhance project delivery.
- *Is the building owner financially strong?* – This can allow for potential overhead costs that may arise during project delivery.

A learning point form previous work packages found that Landlord's & their agents are likely to have to take the lead and possibly have the most to lose through asset value risk, for the initial SmartSPIN concept being successful.

4.4 FINANCE ATTRIBUTES

- *Payment structures* – Establish a transparent rent payment structure, detailing due dates, acceptable payment methods, and consequences for late payments.

When financing such a project, an ESCO such consider lenders who will understand & support the landlord/tenant landscape. The lender should provide below market interest rates. Finance likely to be a curtailing factor and innovative solutions needed for this.

An alternative interaction proposed a more practical approach including project execution structure and project financing. This includes a sinking fund for ongoing maintenance, which provides a financial reserve to ensure building maintenance & periodic capital investment is put in place. This alternative has been noted as potentially a better mechanism to facilitate building investments.

5 OTHER ESCO CONSIDERATIONS

5.1 LIST OF OTHER ESCO CONSIDERATIONS FOR THE ADOPTION AND IMPLEMENTATION OF THE SMARTSPIN MODEL

- *Dispute resolution* – Include a mechanism for resolving disputes, such as mediation or arbitration, to streamline conflict resolution processes.
- *Insurance requirements* – Specify insurance obligations for both parties, covering property damage, liability, and any other relevant aspects.
- *Accessibility and use restrictions* – Clearly permissible uses of the property and any restrictions, especially if there are common areas or shared facilities.

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- *Renovation and alteration guidelines* – Establish guidelines for property alterations or renovations, outlining procedures, approvals, and who bears associated costs.
- *Environmental responsibilities* – Address environmental considerations, such as waste disposal and environmental compliance, to ensure sustainable practices.
- *Default and remedies* – Clearly outline actions and penalties in case of default by either party, including procedures for resolving breaches and potential consequences.
- *Security deposits* – Clearly state the amount of any security deposit required, conditions for its return, and permissible deductions.
- *Notices* – Establish protocols for providing official notices, including the acceptable methods and required timeframe.

5.2 ESCO GUIDANCE FOR THE ADOPTION AND IMPLEMENTATION OF THE SMARTSPIN MODEL

It is likely that ESCOs entering this market may already be active in the single owner/occupier scenario. Therefore, some of the guidance will already be best practice for works that they undertake with an owner occupier.

It is also worth noting that as we see greater encouragement for energy performance contracting within EU directives and member state legislation, we are likely to see new entrants emerge into this market. There is a recognition that this is an important part of the capacity building that needs to take place in order to create a supply chain of sufficient scale to decarbonize at the rate required to meet our climate change ambition.

In that context, it is worthwhile taking some time to look at the type of companies existing now that hopefully in the future will consider providing Eco services. So, where shallow retrofit (substantially re-engineering of building) takes place, it is likely that existing building services consultants, mechanical and electrical contractors and facility management Contractors will be best positioned, to adjust and participate in the Eco market.

Where deep retrofit is undertaken then it is likely this will be led by a building contractor who will bring in engineering expertise.

In considering entering this market from the perspective of engineering retrofits there are three key phases involving design, implementation and maintenance/ system optimization. These tend not to exist within a single organization currently and therefore partnering or internal capacity building will be needed.

Another important consideration regarding where projects are to be funded is the financial model that the ESCO will use. This should not be underestimated and should be considered at an early stage to avoid abortive work and resourcing.

In breaking down this guidance into distinct stages we are going to utilize the project stages relevant to the model.

Step 1 – Project viability assessment

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Step 2– Project proposal stage

step 3 – Project design and implementation.

Step 4 – Project optimisation and monitoring.

5.3 STEP 1 - PROJECT VIABILITY ASSESSMENT

In terms of the specific landlord/tenant landscape and the potential to use the SmartSPIN model the following key guidance should be considered:

Customer profile and Landlord Tenant Interaction

1. Who is championing the ESCO model and is there precedent for its use?
2. How good is the landlord/tenant relationship and do any collaborative forums exist currently between both parties.
3. Is there currently a sinking fund model being used for maintenance and upgrades and is this fund in credit currently?
4. Currently how strong are ESG agenda amongst Landlord and Tenants
5. Will tenants consent to share energy data?
6. What level of operational disruption will a tenant accept
7. Are there property agents or management companies that are representing the building owner or tenants? This can add complexity and prolongation.

Site Selection & Profiling

1. What type of building is being considered? Ideally SmartSPIN model will require high energy use and long run hours.
2. What level of interdependency is there between landlord and tenant power and heat systems?
3. SmartSPINmodel is premised on initial targeting of low-cost/no-cost initiatives – do these exist on site?
4. Is there sub-metering on site to allow measurement of energy efficiency?
5. Carry out high-level sense check that energy performance contract model will fit the site. Heat pump projects struggle to support an EPC approach and are likely to require subvention to ensure viability.
6. Are there multiple FM contractors across the Landlord/Tenant areas? The ESCO will likely displace these and therefore understanding the current arrangements is important.

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7. Are there any site contracts in place covering energy related plant such as CHP, Generators, Heat supply contracts that need to be considered in the structuring of a potential EPC?

Financial

1. What is the financial strength of a building owner as this will be an important factor in overall project financing?
2. Will the building owner consider incurring debt or entering a building upgrade financing loan?
3. What is the financial strength of a building owner as this will be an important factor in overall project financing?
4. Will the owner indemnify the tenants financial risk?
5. Will the building owner consider incurring debt or entering a building upgrade financing loan?
6. Will tenants consider contributing as a minimum avoided cost of energy and carbon?
7. Are tenants` business profile deemed to be secure or could tenant erosion put project viability at risk.
8. Will the ESCO finance partner consider landlord only or both landlord tenant?

What will be the likely cost of preparing a bid?

It is suggested that the above considerations be taken from an ESCO internal project viability assessment so that at an early stage a decision to advance to proposal stage can be made.

It should be recognized that the cost of putting together a proposal can be significant and therefore technical, organizational and economic environmental considerations should be fully assessed to protect this investment

5.4 STEP 2 - PROJECT PROPOSAL

Project proposals are often facilitated by a specialist appointed by the building owner. Some key considerations at this stage of the project would be the following:

1. At proposal stage, there is usually a release of information in the form of technical files which help greatly in the formulation of proposals. The quality of this information needs to be assessed at an early stage and where there are material gaps this need to be noted. So, record drawings of existing systems and their associated specification, maintenance reports and an asset register. In addition, 12 months energy consumption figures would be regarded as base information.
2. A detailed site assessment, then needs to be embarked upon drawing on contracting and technology experts to fully assess site opportunities.
3. Another important element of site assessment is to capture legacy problems within the existing systems which may ultimately affect predicted system performances post retrofit. So, for example, there could be leaks on hydraulic systems, valves that are passing, motorized

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controls that are not operating and Air systems with significant leakage. It is important at this proposal stage to capture and note as many of these issues as possible. This exercise is important for ESCO to avoid additional costs or delays during implementation phase or energy or systems underperformance during operational phase.

4. At this stage also it is important to determine Site restrictions associated with upgrade works and whether building is to be vacated or whether you are working in an occupied building.

5. Having carried out the energy use analysis and assessed technology upgrades. It is then possible to obtain market costings for works and formulate a commercial proposal. As with all such proposals it is very important to outline your assumptions and in particular note all Site legacy issues that you have become aware of.

5.5 STEP 3 - PROJECT DESIGN & IMPLEMENTATION

The development of the proposal outline design into a details design and its implementation in terms of re-engineering of existing building services and the integration of renewable technology and demand response functionality for the building is a very important project stage.

1. Firstly, before advancing to detail design and scope definition it is important that there is a user requirement/contract scope document agreed with building owner or agents and where relevant with tenants. This should confirm all new works and their scope and also address any legacy problem remediation or additional scope introduced by client or tenant. At this stage it is also important that Site conditions are clearly agreed in terms of access and vacant possession or working in alive environment.
2. It is important that design completion and procurement is undertaken and completed soon after the scope has been agreed.
3. Once project Implementation commences it is important that clear procedures for communication with building owner, their tenants and any appointed agents are in place.
4. Once installation is completed, then the importance within performance-based contracts of rigorous commissioning with particular care to share and central systems taking place. Also, careful validation of avoided energy, renewable power and demand side revenues and clarity across Landlord and tenancies if proportional apportionment through metering is intended. This should be helped by access for all stakeholders to reporting dashboard.

5.6 STEP 4 - PROJECT OPTIMISATION & MONITORING

Once the project reaches commission stage, then it enters into the service phase. This involves ongoing monitoring and measurement, optimisation of systems, review and introduction of additional relevant initiatives and generating monitoring and verification reports to allow invoicing of revenue from site initiatives.

So, some important points to guidance for this phase:

1. The M & V process becomes very important and having internal competency to generate accurate report structures and allow easy auditing by third-party facilitator or building owners and tenants directly.

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2. Carry out early technical and metering checks to ensure that calculated savings and revenue are being delivered on the ground. Audit each initiative and where there are deviances quickly troubleshoot these areas.
3. Seek to establish landlord and tenant and reporting forums where there is clear understanding of individual and collective benefits and also an understanding of how behavioural impacts can significantly affect the contract success
4. This part of the contract encompasses ongoing maintenance and repair. Consideration needs to be given here to the role of the. ESCO. So, the ESCO could work with incumbent FM contractors and carry out optimisation and MV with the incumbents reporting and managed by the ESCO. Alternatively, the ESCO could take on the FM companies' role also and displayed them in the building. Particular relationships within tenancies, landlord areas, there management agents all need to be carefully navigated in reaching an improved regime that will fit with the SmartSPIN concept.
5. It should be noted that use of energy performance contracting has in most cases brought significant cost savings to the facility management expenditure however the introduction of this changed regime can present 'people' challenges.

CONCLUSIONS

Successes of implementing the SmartSPIN Service in WP4

The objective of WP4 was to use the data from buildings to offer better services for tenants/landlords to support SES.
These services include:

- Automated Measurement Verification (M&V) for the SmartSPIN business model, to better estimate savings achieved by energy efficiency interventions. Thanks to better M&V approaches, the benefits can be better split between landlord/tenants and the process will be more trusted by them. This service has been properly developed in WP4, therefore would be a success.
- Platform-agnostic algorithms for:
    - (i) building performance diagnosis: it has been developed, and a web-tool is available. It is a success because the tools allow to perform an energy diagnostic of the building, identifying which energy and cost streams have the most interest for the SmarSPIN business model (this is, where you should focus to improve your building as it will be more cost-effective).
    - (ii) automating baseline establishment: similar to the explanation for the M&V. Well-established baselines allow for clearer business models.
    - (iii) predicting short- and long-term energy-efficiency and flexibility opportunities. Also, a success, we have been able to develop forecasting models that predict energy consumption with 24h ahead. These models allow to better plan our energy consumption, optimizing energy cost from the grid, use of renewables, etc.

Challenges of implementing the SmartSPIN Service in WP4

Although the services exist and have been implemented into a platform, it is a challenge to integrate the above-mentioned processes into smart-contracts. The algorithms and models developed could not be fully understood by stakeholders.
For example, energy forecasting is an useful tool, but facility managers based the control of the building on their know-how. Change of paradigm is complicated (we have experienced this already in many projects additional to SmartSPIN). Implementing cutting-edge technologies or even well-known technologies fully proved is a slow process.

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Key learning points

Data-driven algorithms and models are a useful tool to increase trust between ESCO, landlord and tenants as the ESCO has the opportunity to prove their worth to the clients with accurate M&V approaches. With accurate processes the ESCO can also reduce the uncertainty of the contract and offer better deals. For example, an ESCO thinks they can reduce 10% of the bill but the M&V process are not accurate, so the ESCO could not prove to the user that the savings are achieved at 10%, so it would offer on the contract 5% savings. With better M&V approaches, it could go to 7 or 8% by contract.

Also, if we have precise M&V methods that can accurately calculate the savings thanks to the intervention, we can better split incentive/revenues/benefits between landlord and tenant, for example, we reduce the bill by 20%, but this reduction is due to

- 10% warmer winter on the given period
- 10% directly linked to the intervention;
  The tenant and landlord can know that 10% is thanks to the intervention so they can share the benefits)

Data-driven algorithms can also lead to exploit flexibility services of buildings through participation in demand response programs or shifting consumption away from peak times using dynamic pricing, creating additional revenues that can further reduce payback time.

When operating as an Energy Service Company (ESCO) in the rented commercial sector where split incentives exist (meaning landlords pay for energy improvements but tenants benefit from reduced energy bills), here are some key guidance points:

1. Engage All Stakeholders: Facilitate open communication and collaboration between landlords, tenants, and any other relevant parties (property managers, facility managers, etc.). Ensure everyone understands the benefits of energy efficiency improvements

2. Identify Shared Savings Opportunities: Explore options for sharing the costs and benefits of energy upgrades. This might involve negotiating lease terms that reflect shared savings or implementing shared savings agreements where feasible.

3. Offer Performance Contracts: Propose performance-based contracts where the ESCO guarantees a certain level of energy savings. This shifts the risk away from the landlord and provides assurance to tenants regarding the effectiveness of the improvements.

4. Focus on Quick Payback Projects: Prioritize energy efficiency measures with short payback periods to appeal to landlords who may be hesitant due to lease turnover or short-term ownership plans.

5. Educate Tenants on Benefits: Communicate directly with tenants about the advantages of energy-efficient upgrades, such as improved comfort, lower operating costs, and potentially enhanced lease terms.

6. Leverage Financing Options Assist: landlords in accessing financing mechanisms specifically tailored for energy efficiency projects. This could include loans, grants, utility incentives, or other financial tools.

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7. Utilize Submetering and Data Analytics: Implement submetering to accurately measure energy use by tenants. Use data analytics to identify opportunities for efficiency improvements and to demonstrate the impact of upgrades.

8. Adapt Solutions to Lease Structures: Tailor energy efficiency solutions to fit different lease structures (e.g., gross leases, triple net leases) and ensure they align with the financial responsibilities of both landlords and tenants.

9. Provide Long-term Monitoring and Support: Offer ongoing monitoring and support to ensure continued energy savings. This can include maintenance services, periodic energy audits, and performance reviews.

10. Stay Informed on Regulations: Keep abreast of local regulations and incentives related to energy efficiency. This knowledge can help identify additional financial incentives or compliance requirements that could benefit both landlords and tenants.

By following these guidelines, ESCOs can navigate the complexities of split incentives in the rented commercial sector more effectively, fostering partnerships that lead to mutually beneficial energy efficiency improvements.

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