DeliveREE
Energising Change

Guidance Document

Development of the Project Implementation Unit and Protocols and Procedures

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Codema
Dublin's Energy Agency

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Executive Summary

This research aims to build upon Codema's existing resources and learn from other EU projects to create a structured approach to project delivery. This is expected to accelerate the formation of large-scale projects by standardising the project development process (speed), aggregating projects of various types and sizes (scale), and encouraging the use of private financing (capital). The Market Assessment Findings summarises the research process behind this document and presents the key findings. This involves:

- A Desktop Review of previous publications (project, reports, websites, etc.) completed in the focus area.
- Interviews with 14 EPC experts and stakeholders from a range of disciplines across Ireland and Europe.
- A Discussion of Market Assessment Findings, which identifies solutions to common needs, constraints and market barriers, as well as tools, templates, contracts and procedures developed to address the key areas.
- A Gap Analysis which presents a clear roadmap for the development of the Project Implementation Unit (PIU).

The market assessment has been divided into the six key procedural areas; communication, technical, risk, procurement, finance and legal. Key actions have been highlighted in each area which, along with the gap analysis, will guide the creation of the procedures and protocols for the PIU.

KEY FINDINGS

Finance and legal

The key finding from this research is that leveraging private finance is essential to developing the Energy Efficiency market Ireland. Client financing is often not an option due to limited budget allocations, ESCO financing is generally not considered feasible due to balance sheet concerns and the crowdfunding is suitable for smaller, often single technology projects that are not appropriate for aggregation. While grant financing will be useful to establish the market and encourage ESCO participation (which is underdeveloped, as confirmed by the interview process), government funding alone will not be sufficient to cover the cost of the extensive energy upgrades required in the public sector. Many previous projects have used a mixture of funding sources to finance the capital investments, and the DeliveREE project is inspired by the finance model on the PM4PM project run by GOLEA in Slovenia, which achieved a funding split of 51% ESCO, 9% Municipality and 40% Cohesion fund.

A potential solution to engage the finance market is secondary financing (sale of future receivables, forfeiting, cession etc.). These arrangements typically work by a financial institution or facility buying the rights to future revenues that the ESCO (seller) will receive from the EPC client. They are useful to enable market growth by clearing the balance sheet of the ESCO, allowing it to compete on new projects. If the financing is structured well, full technical risk remains with the ESCO and the financing institution takes on the credit risk of the client. The refinancing market is well established in some areas in Europe, such as in the Czech Republic, where several commercial banks offer refinancing for public sector projects. Spain, Belgium, Austria and Italy also have established refinancing solutions and the Latvian Baltic Energy Efficiency Facility (LABEEF) scheme in Latvia has been successful. A common cited weakness of refinancing schemes is high transaction costs, however European schemes such as LABEEF both prove to maintain relatively competitive prices due to standardisation of contracts and processes.

Aggregation and standardisation are also key to obtaining private financing. Aggregation and standardisation are addressed in the DeliveREE structure, through standardised processes and contract structures.

Risk

Another key element to EE financing is risk sharing. The SUNShiNE project in Latvia concluded that financial risk should lie with the client or financial institutions, and not ESCOs, which as SMEs do not have the resources to take on these risks. Client credit risk is a key consideration for investors, however the Energy Efficiency Financial Institutions Group (EEFIG) Underwriting Toolkit highlights that because operating expenses are paid before debt service, EE Clients are less likely to default than with a standard loan. Banks also required due diligence in areas where they lack expertise, leading to financing being withheld or priced high to include unknowns. This was one of the key factors that led to the establishment of LABEEF.

ESCO credit risk is also an important consideration, however if a project is designed well, it will minimise risk to the financial institution in the case of ESCO bankruptcy, allowing another ESCO to take over and continue providing the services.

The allocation of technical risk is also central to the performance-based contracting development process. A generally accepted benefit of this type of contract is that the risk lies with those best placed to deal with it. For example, the technical risk lies with the ESCO because they are the technical expert. However, if too much risk is allocated to the ESCO, the ESCO will increase the risk premium and consequently the overall cost of the project. It is the role of the facilitator to ensure that risk is allocated appropriately. Similarly, financial partners will avoid taking on too much performance risk. However, the majority of risk-related tools available for EE projects approach risk from the point of view of the investor. Approaching risk from an investor's position can be useful to ensure projects are bankable, however the DeliveREE risk assessment processes should ensure the client is represented and ensure an appropriate balance of risk is maintained.

Risk will be addressed as much as possible through the consideration of risk allocations and incorporation of risk mitigation into the contract, however further risk mitigation, such as a first loss structure or energy savings insurance may be required to attract investment.

Technical

Many EE projects are small and are currently performed ad-hoc in response to maintenance needs. However, an analysis conducted recently by BPIE found that deep renovation should reach 3% per year as soon as possible, and that by 2030, 70% of the renovations taking place should be deep. This contrasts with the current deep energy renovation rate of 0.2%. This suggests the need for DeliveREE to deliver holistic and deep energy retrofits with longer contract lengths, as there is usually a relationship between the level of ambition (which in the case of Energy Efficiency corresponds to depth of renovation) and the contract duration.

Aggregation is useful for EE projects to allow diversification and to reduce financial due diligence costs. Technical considerations for aggregation include investor disinterest in aggregated projects with low overall value and the challenges of aggregating projects between municipalities. Projects within the same municipality or projects between different municipalities but with identical technologies or contract models are generally preferred.

Measurement and Verification is inherent in the structure of performance-based contracting. IPMVP is the most widely recognised protocol used for measurement and verification, and M&V is usually performed by the EPC provider.

Communication

Among the projects researched and interviewees is a general lack of shared understanding of performance-based contracts. There are many variations of EPC which leads to confusion among

stakeholders when discussing EPC and this is reinforced by performance contracts often being sold solely as a finance mechanism. In addition, stakeholders often perceive EPC projects as complex and expensive compared to traditional contracting methods. The risk share, works and services responsibilities differ dramatically between different performance contracting models. While performance contracts often place maintenance responsibility of existing and new equipment on the ESCO, some contract models place this responsibility on the client. The DeliveREE PIU will need to provide clear communication around the contract structure and development process, as well as remain flexible to accommodate different project requirements and financing mechanisms.

The market analysis and interview process revealed few EE or performance-based contracting-specific communication tools and strategies. However, communication is critical to the success of a project, and should be considered throughout each stage of the project. Previous European projects emphasise the importance of creating awareness and understanding of performance-based contracts and their benefits amongst all stakeholders, especially client top management. Interviewees including Factor 4 and GOLEA also emphasised the importance of an independent facilitator to build trust between the ESCO, financers and Client. The market assessment also confirmed that it is important to establish good communication practices and contract management at the beginning of the contract management phase to ensure problems that might arise down the line were not overlooked.

Procurement

Outcome-based procurement, including competitive procedure with negotiations (CPN) and competitive dialogue (CD) procedures are most commonly used in performance contracting, as the client can indicate outcomes rather than specify solutions in advance. Amongst the interviewees, open procedure was used in cases where there were barriers to outcome-based procurement such as unfamiliarity and length of procurement process, or where the contract was predominantly for works. The DeliveREE project will need to develop templates and processes to ensure the procurement process is standardised and aligns with procurement guidelines.

CONCLUSION

Energy efficient retrofits in Ireland are not yet occurring at the speed or scale necessary to meet government targets. Performance contracts which include deep renovations and avoid lock in of poor performance are an effective way to increase EE and renewables and reduce CO2 emissions. The DeliveREE project will help to demystify performance contracting in Ireland and encourage ESCOs and financiers to enter the market by providing clear communication on the project structure and development process and a pipeline of aggregated and standardised project offerings. It is clear however that additional support, especially in regard to financing, will be key to the sustainability and longevity of performance contracting in Ireland's public sector.

Contents

1 Introduction

1.1 BACKGROUND

The Irish Government's Climate Action Plan 2021 has set ambitious targets for the public sector to achieve a 50% Energy Efficiency (EE) improvement, a 51% CO2 reduction and 50% renewable heat by 2030. Ireland's Long Term Renovation Strategy also sets out a target of retrofitting all public buildings to BER to B by 2030.

While new builds achieve high standards through adherence to the latest building regulations, energy efficient retrofits in Ireland are happening ad hoc, and the EE and greenhouse gas emissions savings are not happening at the speed or scale necessary to meet government targets.

Performance-based contracts are an effective method to implement EE upgrades. While they are not a new idea, they have not taken a meaningful foothold in the Irish market and are still the exception rather than the norm. Codema has been involved in two past H2020 projects, EESI2020 and GuarantEE, which focused on developing the Energy Performance Contracting (EPC) market and the promotion of the role of project facilitator. As part of EESI2020, Codema facilitated its first EPC project with DCC (contract signed in 2016), achieving savings of 38%. This was followed by the GuarantEE project, during which the consortium facilitated 35 EPC projects involving 650 individual buildings across a broad range of EE measures and building types. This proved the versatility of EPC and its strength in terms of project aggregation and facilitating the involvement of private investors in EE projects.

This research aims to build upon Codema's existing resources and learn from other EU projects to create a structured approach to project delivery. This is expected to accelerate the formation of large-scale projects by standardising the project development process (speed), aggregating projects of various types and sizes (scale), and encouraging the use of private financing (capital). DeliveREE will create a Project Implementation Unit (PIU), which will be tested on a pipeline of projects across a range of facilities in Dublin's four municipalities.

1.2 PURPOSE OF THIS DOCUMENT

Section 2 of this document proposes solutions to the key barriers to effective action on energy efficiency within the public sector can be summarised as follows:

- **Lack of scale:** The majority of public buildings are small, with varying paybacks on EE projects. Aggregation is required to attract large ESCOs and financial institutions to reduce due diligence costs, however this is difficult for the municipalities due to lack of understanding of the market and the different timelines and development paths required.
- **Lack of standardisation:** Lack of standardisation and quality assurance in project development and documentation leads to expensive due diligence for financiers and high costs of entering competition for ESCOs. Performance-based contracting projects are taking too long to get over the line, typically with a development timeline of over 2 years.
- **Limited project and finance offerings:** There are only a handful of project offerings, leading to a small number of active players in the ESCo market in Ireland. Due to the lack of project offerings as well as the scale and standardisation barriers, there are no accessible finance solutions for Clients and ESCOs to leverage private finance. Due to the finance gap, ESCOs are unable to easily offload projects from their balance sheet.
- **Lack of shared understanding:** There is a lack of shared understanding of how performance-based contracts work. Performance contracts are often perceived as complex and expensive compared to traditional methods and EE is not a core competency for municipalities. Smaller

projects are generally financed through grants and municipal funds or completed under maintenance agreements.

- **Level of ambition:** EE retrofits are usually small and ad-hoc, performed in response to maintenance requirements. A coordinated, holistic, and long-term approach to energy upgrades is required in order to meet current government targets.

The Market Assessment Findings (Section 3) summarises the research process behind this document and presents the key findings. This involves:

- A **Desktop Review** (Section 3.1), which reviews previous publications (project, reports, websites, etc.) completed in the focus area.
- **Interviews** (Section 3.2) which build upon the desktop review to identify commonly shared needs and constraints by interviewing project partners and people involved in similar projects
- A discussion of **Market Assessment Findings** (Section 3.3), which identifies solutions to common needs, constraints and market barriers, as well as tools, templates, contracts and procedures that have been developed to address the key areas of communications, technical assessment, risk analysis, legal analysis, financial analysis and public procurement and formulates key actions for the development of the PIU.
- A **Gap Analysis** (Section 3.4) which presents a clear roadmap for the development of the PIU, identifying the areas where suitable existing tools, templates, contracts, etc. exist and where gaps need to be addressed through the creation of new tools and processes.

Finally, the key Conclusions of this document are discussed in Section 4.

2 Addressing the key barriers

The research and interview process provided greater clarity on the existing market barriers (as defined in Section 1.1). This section summarises the key areas for development to address these barriers.

2.1 SCALE

As discussed in the Introduction, aggregation is necessary to attract ESCOs and financiers to EE projects. While aggregation may not be required in every project,[1] it is important to reduce ESCO bidding costs[2] and enable low-cost project finance at scale by reducing financial due diligence costs. The Financing Energy Efficiency through Private Investment (F-PI) project found that more than half of potential investors (including investment funds, banking entities, a renting entity, and a crowdfunding entity) surveyed required a minimum project size of €500,000, while three required a minimum project size of €2 million.[3]

The market assessment (Section 3) investigated different methods and attempts at aggregation in similar European projects and found that the approach should remain flexible and account for local considerations, while ensuring balance is maintained by mixing projects with different levels of profitability.

2.2 STANDARDISATION

Lack of standardisation was identified as a key barrier to EE projects as it leads to expensive due diligence for financiers and high costs of entering competition for ESCOs. In the absence of standardised processes, performance-based contracting projects have longer development timelines.

There are three elements to standardisation; use of similar measures for technical standardisation, use of standardised project development processes, and standardisation of financial assets in the contract to allow portfolio evaluation.[4] While technical standardisation is not relevant to DeliveREE due to the requirement for deep retrofit and therefore customised solutions (see Section 3.3.5.3), underwriting and quality assurance tools such as the Investor Confidence Project EU and QualitEE may be incorporated into the DeliveREE structure to address the lack standardised processes and financial assets. This will allow for increased trust from private investors, increase the likelihood of obtaining financing and ensure lower transaction costs.

2.3 PROJECT AND FINANCE OFFERINGS

This is a 'chicken-or-the-egg' problem, where a lack of project offerings means that few financing solutions are required, while a lack of financing solutions impedes project development.

The DeliveREE PIU will address the project offering gap by delivering a pipeline of pilot projects which will provide proof of concept. This pipeline will introduce greater certainty, encouraging ESCOs and financers alike to enter the market. The PIU will initially be tested on a project pipeline of 141 facilities to prove its effectiveness, however ultimately, this model aims to be replicable across the public sector in Ireland and enable the implementation of energy efficiency upgrades on a national scale to help achieve Ireland's public sector climate targets. This expansion of the PIU will require a more consistent and scalable approach to financing.

[1] Interview with GoParity (See Appendix 3- Interview Report)
[2] Interview with Centrica (See Appendix 3- Interview Report)
[3] Financing Energy Efficiency Using Private Investments, "Bundling Procedure," 2021. [Online]. Available: https://cordis.europa.eu/project/id/846085/results. [Accessed 13 12 2021].
[4] Energy Efficiency Financial Institutions Group, "EEFIG Underwriting Toolkit: Value and risk appraisal for energy efficiency financing," 2017. [Online] Available: https://www.unepfi.org/wordpress/wp-content/uploads/2017/06/EEFIG_Underwriting_Toolkit_June_2017.pdf. [Accessed 13 12 2021].

This research has established that leveraging private finance is essential to developing the EE market. Client financing is often not an option due to limited budget allocations, ESCO financing is generally not considered feasible due to balance sheet concerns and citizen financing is generally used for ad-hoc or smaller projects. While grant financing will be useful to establish the market and encourage ESCO participation (which is underdeveloped, as confirmed by the interview process)[5], government funding alone will not be sufficient to cover the cost of the extensive energy upgrades required in the public sector. Although financing solutions are being developed in the residential sector, with a government supported Residential Low-cost Loan Scheme soon to be launched, there is no equivalent mechanism for the public sector.

The DeliveREE structure will be developed in a way that will enable private financing as much as possible. As explained further in Section 3.3.5, aggregation, standardisation, and risk sharing have been identified as the key enablers for obtaining financing. Aggregation and standardisation will be addressed in the DeliveREE structure, which will develop a method to aggregate projects with standardised processes and contracts. Risk sharing will also be addressed as much as possible, through the consideration of risk balances throughout the project, and in the contract clauses. Additionally, NTMA indicated that a pipeline, pilot projects and proof of concept would help to demystify perceived risk and obtain reference data to encourage private investment in the market. However, this research has found that further risk mitigation is required to enable private investment. A dedicated funding structure would likely be advantageous to remove risk and lower the cost of capital.[6] This may be portfolio based and include energy savings insurance or a first loss structure to reduce risk.

2.4 SHARED UNDERSTANDING

As highlighted in the Introduction, the market assessment has confirmed there is a lack of shared understanding of performance-based contracts. Stakeholders often perceive the projects as complex and expensive compared to traditional methods, and this is reinforced by performance contracts often being sold solely as a finance mechanism. In reality, the financing structure is just one of the benefits, and the other benefits such as improved risk sharing, ongoing maintenance and performance guarantees are often not well communicated. There are also multiple variables within the project development, procurement process, contract structure and contract management phase which mean that the stakeholders may approach the project with different ideas of what is or what should be involved. This research has revealed that all of these variables depend on the project specifics and client needs, as well as other factors such as regional markets and regulatory environments. The DeliveREE PIU will need to provide clear communication around the project structure and development process, as well as remain flexible to accommodate different project requirements and financing mechanisms.

The 'Contract Cheat Sheet' table below summarises the differences between a standard works contract and a performance contract. It explains how each term is treated in the respective contracts, and a more detailed version is available in Appendix 1.

[5] Interviews with NTMA and Lawler Sustainability (See Appendix 3- Interview Report)
[6] Interview with NTMA (See Appendix 3- Interview Report)

Table 1 Contract Cheat Sheet

EPC related term		Standard Works Contract	EnPC
General Terms			
Contract elements	Works	Works only	Included
	Services/Supply	Not included	5-20 years
	Performance Guarantee	Not included	Included
Project complexity	Single technology/low complexity	Used for	Suitable for
	Deep Retrofit		
Distribution of performance risk	Client holds risk	Client holds most to all risk	Client holds minimal risk
	Contractor holds risk	Contractor holds minimal risk	Contractor holds most to all risk
Balance sheet status	On	Mostly on	Depends on Client appetite, contract structure, etc
	Off	Cannot be off balance sheet	
Project Funding	Client	Up to 100%	Up to 100%
	Government Grants	Up to 50%*	Up to 30%*
	Third Party Finance	Not applicable	Up to 100%
Works			
Design and specifications development	Standard	Client develops design pre-procurement	Not suitable for contract/procurement type
	Outcome-based	Not suitable for contract/procurement type	Client specifies outcome, not design
New Equipment ownership	Client owned	In a typical works contract, the Client owns the equipment installed	With compensation to contractor for early termination
Maintenance of existing Equipment	Client	Existing equipment not considered in a standard works contract	Depends on contract - not relevant in ESCs, client or contractor in EPCs
	Contractor		
Testing, Commissioning and Defects responsibilities	Contractor	Contractor tests and commissions, low accountability for defects post-handover	Contractor tests and commissions, incentivised to correct defects throughout supply/service period
Services and Supply			
Services	Throughout contract period	Services not included in contract	5-20 years
Maintenance Responsibilities	New equipment	Services not included in contract	Contractor to maintain & replace
	Existing equipment		Maintenance depends on contract; Client pays for replacement
Handover/re-commissioning responsibilities	Contractor	Services not included in contract	Contractor to perform full re-commissioning and hand over fully operational system
Guarantee, Payment, and Financing			
Capital investment	Client	Client pays full works sum	Varied payment structures Including 100% Contractor funded, Client contributing to capital investment and Client paying a fixed monthly service/maintenance fee
	Contractor	Contractor does not contribute to capital	
Performance related payments	Supply	No measurement of savings	ESC- monthly payments based on supply
	Service		EPC- six monthly payments based on guaranteed/shared savings
Savings/Consumption quantification	Supply	No measurement of savings/supply	ESC- Measured supply
	Savings		EPC- Measurement and Verification (IPMVP)
Baseline	Required	No measurement of savings	EPC- Required for Measurement and Verification
Energy Price	Fixed	No performance guarantee	No adjustments to price except for fuel inflation adjustment (in ESC)
Miscellaneous			
Variations and material changes	Change in energy consumption	Not applicable- payments not dependent on performance	Triggered if variation/material change to building results in >20% change in energy consumption
Value Engineering	Written value engineering proposal	Not applicable- value engineering propositions occur during tender	Contractor may give the Client a written value engineering proposal
Suspension and termination	Contractor	Contractor has no suspension or termination rights	Contractor may suspend (and subsequently terminate) the contract for non-payment
	Client	Client has various suspension and termination rights	Client has various suspension and termination rights

*Pathfinder grant normally 30-50%

2.5 LEVEL OF AMBITION

Many EE projects are small, and are currently performed ad-hoc in response to maintenance needs. The DeliveREE structure will need to require the implementation of holistic and deep retrofits in order to meet the current government targets.

In performance-based contracts there is usually a relationship between the level of ambition (which in the case of Building Energy Efficiency corresponds to depth of renovation) and the contract duration. While the benchmark for deep renovation varies across Europe, Ireland refers to a minimum level for all major renovations to achieve a Building Energy Rating (BER) of B. BPIE defines deep renovation as '*a process capturing, in one or, when not possible, a few steps (maximum number to be defined), the full potential of a building to reduce its energy demand, based on its typology and climatic zone.*'[7] It suggests the delivery approach should consider the key building elements, and where they cannot be completed in one step, carefully plan renovation steps to avoid lock-in. The facilitators of the RenoWatt project consider that 'holistic approach through deep renovation is the one and only way to achieve long term goals'.[8] An analysis conducted recently by BPIE found that deep renovation should reach 3% per year as soon as possible, and that by 2030, 70% of the renovations taking place should be deep. This contrasts with the current deep energy renovation rate of 0.2%.[2]

Deep retrofits which include building envelope upgrades are usually only profitable in the long term (i.e. more than 20 years). The figure below outlines the approximate contract lengths according to depth of retrofit. Most current models analysed by CITYnvest operate in Perimeter 1 of the figure, with shallow retrofit and contract lengths up to 15 years. A 2019 survey by QualitEE also indicates that retrofits tend to have short contract lengths- 50% of respondents were involved in projects with contract lengths between 5 and 10 years.[9] Perimeters 2 and 4 are gaining attention however they mainly rely on Separate Contractor Based (SCB) methodology in which different parties deal with different steps of the process and different technologies, which requires a Program Delivery Unit (PDU) to act as an integrator and project manager.[10] The PM4PM and SUNShiNE projects also advocate for projects with longer payback periods and which include building fabric upgrades, and usually have respective contract periods of 15 and 20 years.

The DeliveREE project should aim to deliver holistic and deep energy retrofits which enable public entities to meet government targets and avoid lock in of poor performance.

[7] Buildings Performance Institute Europe, "Deep Renovation: Shifting from Exception to Standard Practice in EU Policy," 2021.
[8] RenoWatt, Interviewee, *RENOWATT: A one-stop-shop approach to renovate public buildings through EPCs.* [Interview]. 5 July 2021. [Online] Available: https://www.youtube.com/watch?v=NfsIZhTGHEg. [Accessed 13 12 2021].
[9] QualitEE, "Market Research: EES Market," 2021. [Online]. Available: https://qualitee.eu/graph-data/ees-market/epc/26/what-is-the-most-common-duration-of-the-energy-performance-contracts-you-are-involved-in/2019. [Accessed 6 December 2021].
[10] CITYnvest, "Increasing capacities in Cities for innovating financing in energy efficiency," 2015.

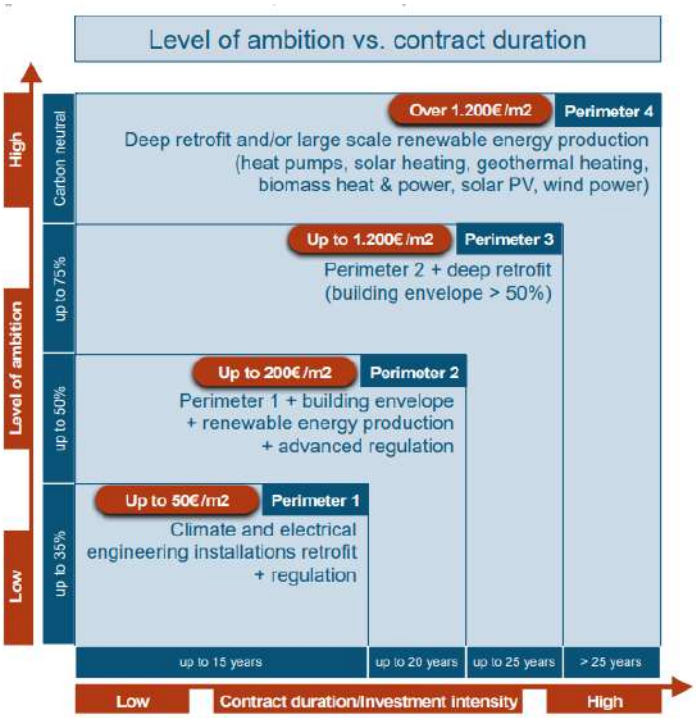

Figure 1 Level of Ambition vs Contract Duration (Source: CITYnvest)[10]

3 Market Assessment Findings

The market assessment involved two elements: a desktop review and interview process. Summaries of the desktop review and interview process are provided in Section 3.1 and 3.2 respectively, and the findings from the market assessment are discussed in further detail in Section 3.3. The gap analysis in Section 3.4 provides a clear roadmap to inform the creation of the PIU.

3.1 DESKTOP REVIEW

A desktop review of previous publications (projects, reports, websites, etc.) in the focus area has been conducted to identify useful tools, templates, contracts, and procedures that have been developed in these areas and assess whether they can be applied and adapted to the DeliveREE project.

The research process revealed several EES projects which provide valuable learnings for the development of the DeliveREE project implementation structure. Common themes included the lack of tools or methods for aggregation, lack of focus on communication and need for standardisation, aggregation and quality assurance and risk management to encourage private investment. While none of these projects provide a completely replicable solution for DeliveREE, they offer useful learnings. Table 1 below provides a brief introduction to the projects which will be discussed in more detail in Section 3.4. More information can be found in Appendix 2- Desktop Review.

Table 2 Summary of Desktop Review

Project(s)	Summary
BAPAURA	This project supported the development of municipal level one stop shops in the Auvergne Rhône-Alpes Region in France for EE investments in public buildings and has provided learnings in the areas of financing, aggregation and communication.
BundleUp; BundleUp NEXT	BundleUP aimed to find model contracts and financing solutions to accelerate the implementation of EE and renewable energy projects with five energy agencies in Portugal. BundleUP NEXT built on the learnings from BundleUp to focus on financing, scale, and bureaucracy barriers with all of Portugal's energy agencies. These projects have provided interesting learnings in terms of financing, communication, and aggregation.
CITYnvest; RenoWatt	CITYnvest supports and replicates innovative financing models for EE upgrades in public buildings across Europe. The CITYnvest project published a One-Stop-Shop toolkit which provides valuable learnings in all areas of project development, especially communication and aggregation. The project has also provided an analysis and comparison of several PIUs. RenoWatt was a pilot project in Wallonia, Belgium, which provided facilitation services for EPC projects, including aggregating demand by pooling buildings, and providing legal and procurement advice.
Energy Efficiency Financial Institutions Group (EEFIG)	EEFIG identifies barriers to the long-term financing for EES and proposes policy and market solutions to them. EEFIG has published an underwriting toolkit which has been useful to inform the research into value and risk appraisal for EE financing.
EESI2020	EESI2020 aimed to facilitate the development of EPC implementation schemes in nine major European cities and regions, as well as promote the role of project facilitator and provide support for EPC facilitators.
EOL; PM4PM	PM4PM implemented €45 million of EE investments across 23 municipalities in Slovenia. EOL was a similar Slovenian project which retrofitted 76 public buildings using EPCs. These projects are an example of the use of a similar funding structure to what DeliveREE aims to achieve.
European Fund for Strategic Investments (EFSI)	EFSI (now InvestEU) has loan and GuarantEE products which can help cover the performance and credit risks in an EPC. These resources can be used to support EPC providers (ESCOs) in securing funding supporting forfeiting contracts.

Financing Energy Efficiency using Private Investments (F-PI)	The F-PI project aims to promote the development of private investments in energy efficiency, sustainable mobility, and self-consumption by providing technical assistance to both financiers and project developers/promoters and designing standardised processes to create and analyse portfolios. It has provided useful learnings in the area of aggregation.
FinEERGo-Dom; SUNShiNE; Accelerate SUNShiNE	SUNShiNE focused on deep renovation of multifamily buildings in Latvia, and Accelerate SUNShiNE was a similar project which built upon the learnings of SUNShiNE. Both projects are interesting to DeliveREE as they use the LABEEF model to finance the projects through forfeiting. FinEERGo-Dom builds on the progress of LABEEF and aims to replicate it across six countries in the EU, using the SUNShiNE web platform.
GuarantEE	GuarantEE aimed to foster the use of Energy Performance Contracting in the private and public sectors across Europe by developing innovative solutions for rented facilities, making EPCs more flexible and supporting pilot projects with experience facilitators, and provides useful learnings for DeliveREE in the legal aspects of project development.
Investor Confidence Project Europe (ICPEU)	The Investor Confidence Project (ICPEU) aims to reduce transaction costs of EE projects by assembling existing standards and practices into a transparent process that promotes efficient markets by increasing confidence in EE outcomes and supports best practices standards, tools and methodologies which already exist in the market, adaptable to different project complexities. The ICPEU is a useful guide for the development of the DeliveREE structure in considering quality assurance and best practice in the industry.
Multiple Benefits of Energy Efficiency (M-BENEFITS)	The M-BENEFITS project aims to encourage the inclusion of the multiple benefits of energy efficiency in the investment decisions of organisations. It provides useful best-practice examples and tools and training on how to address decision makers.
Private Finance for Energy Efficiency (PF4EE)	The PF4EE (now InvestEU) instrument aims to 'address the limited access to adequate and affordable commercial financing for EE investments'. It has two core objectives: to make EE lending more sustainable within European financial institutions, and to increase the availability of debt financing.
ProDeSA	ProDeSA focused on EE and renewable energy investments in seven municipalities in Athens, Greece. It aims to showcase bundling of projects to achieve size, reasonable payback, and diversification of risk. Although EPC is still in its early stages in Greece, it provides useful learnings in terms of aggregation and communication.
QualitEE	The QualitEE project aims to use quality assessment criteria and quality assurance schemes to improve trust in service providers and hence increase investment in EES. The QualitEE project has published technical, financial and procurement criteria which are useful to inform the development of the DeliveREE structure.
REFINE	The REFINE project aims to enhance the refinanceability of EES projects and amplify the use of refinancing schemes. It also aims to reduce the transaction costs of refinancing schemes through standardisation and provides guidance to market facilitators for the assessment of the refinanceability of EES projects.
Streetlight EPC	The Streetlight EPC project created demand and supply for EPC projects in 9 regions across Europe, including Carlow and Kilkenny County in Ireland. It mainly focused on street lighting due to its lower complexity, using it as a testing ground to develop EPC facilitation services. This project provides useful technical information specific to the public lighting stream.
Sustainable Energy Authority of Ireland (SEAI)	SEAI is Ireland's national government body for sustainable energy. It has developed the National Energy Services Framework (NESF) to support the non-domestic EE market in Ireland. The framework defines a pathway through which EE projects and energy contracting processes are developed and provides sample contracts and other guides and documentation. SEAI have also published the Community Energy Resource Toolkits, which provides

	practical guidance to support project development and delivery of community energy projects.
TransparENSE	The TransparENSE project developed the Code of Conduct for EPC. It defines critical values and principles that signatories pledge to adhere to.
Triple-A	The Triple-A project aims to make EE investments more transparent, predictable, and attractive for investors and project developers. It seeks to overcome the challenge of identifying which investments can be considered Triple-A from the pre-selection stages of a project and is useful to inform the risk assessment stage of the project development process.

3.2 INTERVIEWS

The aim of the interview process was to build upon the research conducted during the market review to inform the development of the Project Implementation Unit. Fourteen experts identified during the desktop review including financiers, ESCOs and facilitators were contacted in order to discuss critical needs and constraints in the EE market. The interviews confirmed much of the learnings in the desktop review. Although each project provided a unique perspective on the EE and performance contracting market, there were several common themes identified, such as preference for outcome-based procurement, difficulty with aggregation, lack of focus on communication and need for financing solutions.

These interviews were conducted as informal chats over video call and are summarised in the table below and recorded in more detail in Appendix 3- Interview Report. Findings from the interviews are also incorporated into the Key Learnings discussion in Section 3.4.

Table 3 Summary of Interviews

Organisation; Related projects	Summary
ADEME BAPAURA	A key learning from this interview was that the use of simple financial metrics like ROI simplified the projects too much and were not beneficial for communicating the benefits of EPCs to municipalities. This project did not succeed with inter-municipal aggregation, which was a common theme amongst interviewees.
Carbon and Energy Fund	The Carbon and Energy Fund plays a facilitator role for larger projects (mainly hospitals). From their perspective, the Irish market is still underdeveloped and there is a reluctance to spearhead EPC within Ireland. There still seems to be a mixed understanding of what is involved in EPC.
Centrica	Centrica suggested the key barriers they have encountered as an ESCO to participating in projects are aggregation, uncertainty, and high up-front investment costs. They suggested that the tendering process could be structured differently to encourage participation by allowing unsuccessful ESCOs to recover upfront investments.
Energy Centre Bratislava (ECB) GuarantEE	This project provided an interesting perspective on off balance sheet contracts, stating that the mandatory use of a Eurostat approved off balance sheet contract has dried up the Slovakian EPC market. In the Slovakian public sector EPCs remain more of a works contact, with maintenance the responsibility of the client. The ESCO market in Slovenia is dominated by smaller ESCOs, as larger ESCOs have exited the market.
Euditi and CRES ProDeSA	EPC is still in its early stages in Greece, and PRoDeSA aimed to establish a working model for facilitation of EPC projects. This project provided learnings from its identification of key challenges, including convincing public bodies not to go with a business-as-usual approach, building trust and confidence among municipalities and persuading the public sector that private financing is beneficial.
Factor 4	Factor 4 provides an interesting perspective on maintenance; it uses residual value to define what building elements an ESCO must maintain- this incentivises

	long term investment while enabling the use of a short-term contract. Factor 4 were previously a strong advocate for off balance sheet financing however their recent contracts do not rely on off balance sheet as public projects are 100% funded by the local governments due to a unique debt structure.
Funding For Future FinEERGo-Dom; SUNShiNE; Accelerate SUNShiNE	This project provides an example of forfeiting, through LABEEF, which is used for financing in the FinEERGo-Dom and SUNShiNE projects. Although this structure is currently only used in multi-family buildings, it is amenable for use in public buildings. The biggest challenges in these projects were convincing policy makers of the solution, aligning stakeholders and creating scale of investment to attract large institutional investors.
GOLEA PM4PM	GOLEA emphasised the importance of establishing effective contract supervision and communication at the beginning of a contract to avoid issues arising later on. GOLEA also highlighted that the small ESCO market in Slovenia has impeded the competitive procedure as many projects had just one tenderer and therefore there were not real negotiations between the ESCO and the Client.
GoParity BundleUp; BundleUp NEXT	The BundleUP project found that communication with top management was very important. They built trust with municipalities through the technical departments, and relied on the municipal staff to begin conversations with top management before bringing lawyers in.
Graz Energy agency BEAM-Graz; GuarantEE; Multiple Benefits of Energy Efficiency	The Graz Energy Agency provided an interesting perspective; demand for EPCs in Austria has dwindled recently due to various problems arising during the project development process. Although EPCs are more than just a financing mechanism, EPCs are often chosen by clients due to lack of funding, and clients may not actually be demanding long term maintenance contracts. There is an issue in Austria with 'Desktop ESCOs' which present a risk to Financial Institutions (FIs) as they can declare bankruptcy if something goes wrong and there is no securitisation for the FIs. Graz Energy Agency was also involved in the development of the Multiple Benefits of Energy Efficiency project, which provides useful learnings for communication, and how to address top management.
Josef Stefan Institut EOL; PM4PM	The Josef Stefan Institut (JSI) are involved in the EOL and PM4PM projects as well as other EPCs in Slovenia. They are interested in setting up a revolving fund to finance upgrades, where there are two separate contracts (for works and services), and the ESCO retains the service contract while the works contract is sold to the Special Purpose Vehicle (SPV). There has not been any success with aggregation in Slovenia between municipalities or by technology type and have had the most success with bottom-up aggregation.
Lawler Sustainability DeliveREE Advisory Board	Lawler Sustainability are an ESCO that have been involved in several Irish EPCs. They identified the main constraint to delivering more projects as their balance sheet and suggested that the market will be very constrained if new financing solutions are not created.
NTMA DeliveREE Advisory Board	The NTMA highlighted obstacles to the EPC market, including uneducated clients, high perceived risk, and various financing issues. Key solutions identified to scaling up the market included creation of a pipeline, demonstrating EPCs with pilot projects and proving the concept. Additionally, it was discussed that a dedicated funding structure would be useful to reduce risk and lower the cost of capital.
Tyndall Institute SmartSPIN	The SmartSPIN project aims to address the split incentive problem in the commercial rented sector. The SmartSPIN project has just begun and focuses on EPC technology and business models for commercial rented buildings which may not be directly relevant to DeliveREE.

4 Discussion of Market Assessment Findings

The market assessment has been divided into the six key procedural areas: communication, technical, risk, procurement, finance and legal. Key actions have been highlighted in each area which, along with the gap analysis, will guide the creation of the procedures and protocols for the PIU.

4.1 COMMUNICATION

Summary

- There was a **lack of relevant communication tools** identified from the review of previous energy efficiency projects. Most projects did not place an emphasis on structuring or monitoring communication
- Previous projects emphasise the importance of getting the **top management** on board at early stages of the project
- It is important for good **communication to be maintained into the contract management** phase to ensure that problems do not arise down the line

Actions

- ➢ *Develop a structured approach to communication at all levels throughout the complete project lifecycle*

The market analysis and interview process revealed few EE or performance-based contracting-specific communication tools and strategies. This research has therefore focused on learnings published by EE projects and communication tools which suggest that although there are few communication tools available for performance-based contracts, communication is critical to the success of a project, and should be considered throughout each stage of the project.

Previous European projects emphasise the importance of creating awareness and understanding of performance-based contracts amongst all stakeholders. The BundleUp NEXT project cites lack of awareness in top management about the economic benefits and co-benefits of sustainable energy investments as a key constraint.[11] Similarly, the CITYnvest pilot projects emphasised that it is important to secure political commitment at the highest level of the public authority.[12] CITYnvest also found that it is crucial to ensure all stakeholders at the public authority completely understand the process before tendering decisions, to reassure local authorities of the relevance of performance-based contracts and the envisioned outcome, and ensure all stakeholders are informed throughout the process. The guides published by the Multiple Benefits of Energy Efficiency project provide useful tips for communicating with top management and highlighting the benefits of EE projects beyond just energy and maintenance savings. Further, several interviewees including Factor 4 and GOLEA emphasised the importance of an independent facilitator to build trust between the ESCO, financers and Client.

In the absence of performance-based contracting-specific tools, elements of the ISO50001: 2018 Energy Management System may be a valuable tool to guide the creation of communication procedures and protocols. Despite not being specific to performance contracts, it is related to energy management and efficiency, and the principles may be adapted for use in DeliveREE. Additional consideration will be needed for the specific requirements of the five project streams. This is where tools such as the Carbon Trust's Stakeholder Engagement in Heat Networks and the UK BRE National Solar Centre's Community engagement practice guidance for solar farms may be useful.

In addition to effective communication during the project development phase, effective communication should be maintained throughout beyond the contract signing into the contract management phase. The market assessment confirmed that although there are few contract management communication

[11] M. Nina, "BundleUp NEXT," 06 2021. [Online]. Available: https://cinea.ec.europa.eu/system/files/2021-06/2_BundleUp%20NEXT_final.pptx. [Accessed 13 12 2021].
[12] CITYnvest, "How to launch ambitious energy retrofitting projects in your region?". [Online]. Available: http://www.citynvest.eu/sites/default/files/library-documents/Brochure%20Citynvest_pilot%20projects%20results_RenoWatt%20model.pdf. [Accessed 13 12 2021].

tools available for performance-based contracts, it is important to establish good communication practices and contract management at the beginning of the contract management phase to ensure problems that might arise down the line were not overlooked.[13] Although not communication specific, the QualitEE project's Guidelines of European Technical Quality Criteria for Energy Efficiency Projects can be used to determine what protocols are required in the post-contract phase.

Finally, communication is also required to maintain those savings beyond the end of the contract. The RenoWatt project emphasises the need for local authorities to be trained to maintain energy savings once the EPC finishes.[14]

4.2 TECHNICAL

Summary

- There are a number of stream specific resources may be adapted for use in the DeliveREE process
- There are various methods of aggregation used in EE projects. Aggregation between municipalities faces many challenges, while aggregation of sites with the same functionality is usually the easiest process
- IPMVP is the main tool used for Measurement and Verification in EE projects

Actions

- ➢ *Incorporate stream specific learnings to create customised tools for PIU*

The research process revealed some useful performance contracting related project identification tools, however the majority of the performance contracting related technical tools identified were related to specific Energy Conservation Measures (ECMs), and therefore are not directly relevant to the project development process. However, there were various stream specific technical tools identified to inform the feasibility assessments. The market assessment also revealed valuable learnings regarding aggregation and confirmed Codema's current approach to Measurement and Verification (M&V).

4.2.1 Project Identification

The first step in the DeliveREE structure requires pre-assessment to identify relevant projects. A useful tool for this is the EPC pre-assessment tool published by GuarantEE. This tool is formatted as a quiz for the building owner to assess whether the project is suitable for an EPC. Additionally, the Streetlight EPC had a useful questionnaire to pre-assess street lighting projects.

4.2.2 Stream Specific Resources

The market assessment revealed relevant resources for each of the five project streams (building energy efficiency, renewable energy, district heating, low carbon transport and public lighting). For building energy efficiency, auditing standards including ISO50002:2015 and EN16247:2012 are useful to inform the technical feasibility assessment process and audit requirements. QualitEE also provides assessment criteria for the high-level analysis of energy flows, and SEAI has published an Energy Audit Handbook which describes the Irish Energy Auditing process. For renewable energy projects, the main existing resources relevant to Ireland are SEAI's Community Energy Resource Toolkits, which provide an overview of the project development process for community-scale wind and energy projects. Codema has experience in district heating, having been a project partner in Ireland's first large-scale district heating network, the Tallaght District Heating Scheme, and have developed a Guide to District Heating in Ireland in collaboration with IrBEA which will help inform the District Heating technical feasibility process. There were no Irish-specific resources identified for low carbon transport, however the UKEVSE and Western Power Distribution has produced a guide on Electric Vehicle charging for local authorities which will be useful to inform the development of the low carbon transport project

[13] Interview with GOLEA (See Appendix 3- Interview Report)
[14] RenoWatt, Interviewee, *RENOWATT: A one-stop-shop approach to renovate public buildings through EPCs.* [Interview]. 5 July 2021. [Online] Available: https://www.youtube.com/watch?v=NfsiZhTGHEg. [Accessed 13 12 2021].

stream. The Streetlight EPC project provides some useful tools to inform the development of the streetlight, including a quick check guide for street lighting.

4.2.3 Aggregation

Aggregation is important to increase the scale of investment and diversification of EE projects to improve access to financing, as discussed further in the 3.3.5 Finance.

There were two main levels of aggregation identified during the research process;

- aggregation between municipalities
- aggregation within the same municipality

Within these two main levels of aggregation, the following strategies were considered:

- aggregation by technology solution
- aggregation of sites with different functionalities with
- aggregation of sites with similar functionalities

Several projects had difficulty with aggregation between municipalities. The PM4PM project found that it was difficult to aggregate projects by technology type between municipalities, as each municipality has to perform individual procedures in terms of public procurement and the timing and specific local factors impede this process.[15] Additionally, the PM4PM encountered issues with aggregating the tender process between municipalities even when the contracts were separate.[16] The BundleUP projects also initially aimed to bundle between municipalities, however this route was not taken in the end as the municipalities did not want to take on the default risk of the other municipalities in the project.[17] Similarly in the ProDeSA project, it was not possible to aggregate projects across municipalities due to institutional barriers; the mayors wanted control over the projects.[18] In contrast, the RenoWatt project managed to combine buildings from various municipalities, including combining large and small municipalities.[19]

In terms of aggregation by technology type, the BAPAURA project managed to deliver technology specific projects within municipalities.[20] The ProDeSA project also faced obstacles bundling different technology types, due to Greek legislation which allocates funding according to asset type.[21]

The RenoWatt project identified two methods of pooling buildings: mixing buildings of all different kinds or gathering buildings by equivalent function. The RenoWatt One Stop Shop chose the latter option as it requires a limited diversity of competencies from the ESCO.[22]

The F-PI project also found that financial entities would not fund projects which were led by multiple ESCOs as they would have to assess the work of each ESCO individually.[23]

[15] Interview with Josef Stefan Institut (See Appendix 3- Interview Report)
[16] Interview with Golea (See Appendix 3- Interview Report)
[17] Interview with GoParity (See Appendix 3- Interview Report)
[18] Interview with Euditi and CRES (See Appendix 3- Interview Report)
[19] RenoWatt, Interviewee, *RENOWATT: A one-stop-shop approach to renovate public buildings through EPCs.* [Interview]. 5 July 2021. [Online] Available: https://www.youtube.com/watch?v=NfsiZhTGHEg. [Accessed 13 12 2021].
[20] Interview with ADEME (See Appendix 3- Interview Report)
[21] Interview with Euditi and CRES (See Appendix 3- Interview Report)
[22] CITYnvest, "A guide for the launch of a One Stop Shop on energy retrofitting: Based on RenoWatt's experience in Liège". [Online]. Available: https://www.ccre.org/img/uploads/piecesjointe/filename/CITYnvest_A_guide_for_the_launch_of_a_One_Stop_Shop_on_energy_retrofitting_EN.pdf. [Accessed 13 12 2021].
[23] Financing Energy Efficiency Using Private Investments, "Bundling Procedure," 2021. [Online]. Available: https://cordis.europa.eu/project/id/846085/results. [Accessed 13 12 2021].

The F-PI research found that projects within the same municipality, or projects between different municipalities but with identical technologies or contract models were preferred. The criteria that were considered important to create balanced portfolios and ensure diversified risk included the following:

- Preference of the ESCO as to what type of financial institution they dealt with
- Project technology
- Business model of the project
- Complexity of the project
- Investment size of the project

The RenoWatt approach to bundling includes five steps. The first step is to create an energy 'cadaster' which gathers building data. A more detailed sheet is then completed for each building, and 'quick scan' audits are done to evaluate possible upgrade measures. This is followed by an estimate of the financial returns of the investments and buildings are selected to move forward in the process and distributed in pools based on competencies. Finally, a technical inventory of each building is created. This whole process took around 16 months.

Other bundling considerations include fixing deadlines and obligations and contractual liabilities of the parties in the agreement, and that 'low hanging fruits' are bundled with more profitable projects to interest ESCOs.

4.2.4 Measurement and Verification

Measurement and Verification is inherent in the structure of performance-based contracting. IPMVP is the most widely recognised protocol used for measurement and verification. In the majority of EPCs (73%) in a survey by QualitEE, the M&V was performed by the EPC provider.[24]

4.3 RISK

Summary

- Risk should be allocated with the party in the best position to deal with it, as **over-allocation of risk on ESCOs or financial partners leads to risk premiums**
- **Risk allocation should be used to shape the final contract**
- Risk tools relating to EE projects usually approach risk from the **point of view of the investor**. These can be useful to ensure a project is able to attract financing, however an **objective position should be maintained** to ensure the client is represented during assessment of risks.

Actions

- ➢ *Build on existing risk tools to embed risk assessment throughout the project development, procurement, and contract management processes*

The allocation of risk is central to the performance-based contracting development process. A generally accepted benefit of this type of contract is that the risk lies with those best placed to deal with it. For example, the technical risk lies with the ESCO because they are the technical expert. However, if too much risk is allocated to the ESCO, the ESCO will increase the risk premium and consequently the overall cost of the project. It is the role of the facilitator to ensure that risk is allocated appropriately. Similarly, financial partners will avoid taking on too much performance risk. The risk discussions with the Clients should therefore be used to inform the risk allocations in the final contract.

The majority of risk-related tools available for EE projects approach risk from the point of view of the investor. The Triple-A project has developed a tool to assess the risks of a project according to

[24] QualitEE, "Market Research: EES Market," 2021. [Online]. Available: https://qualitee.eu/graph-data/ees-market/epc/37/who-typically-delivers-the-energy-savings-performance-analysis-in-the-epc-projects-you-are-involved-with/2019. [Accessed 13 12 2021].

quantitative criteria. Projects are first checked for EU Taxonomy compliance, and then evaluated according to their perceived risk profile.[25] The risk assessment considers all investment characteristics and is used to pre-screen investments at the project identification stage. The EEFIG Underwriting Toolkit contains a Value and Risk Appraisal section, which describes the types of risks to be considered for the financial underwriting process. Similarly, the QualitEE Quality Criteria for Financing of Energy Efficiency Projects approaches an EE project from an investor's perspective to ensure financing risks are mitigated. It is a useful document to inform risk assessment as well as the financial pre-assessment process. Additionally, the EEFIG Underwriting Toolkit notes the importance of a sensitivity analysis for risk assessment. The risk analysis should identify input factors where changes will have the biggest effect on the expected financial return.[26]The outcome of the sensitivity assessment can be useful to inform decisions to request additional information or perform additional monitoring, for example.

Approaching risk from an investor's position can be useful to ensure projects are bankable, however it is important for the facilitator to ensure the client is represented and ensure an appropriate balance of risk is maintained. The SEAI NESF Risk Management Guide is a useful tool to inform risk assessment as it takes client risk considerations into account and provides an overview of the risk management process and example risks.

4.4 PROCUREMENT

Summary

- **Restricted procedures** (competitive procedure with negotiations and competitive dialogue) are **most commonly** used in performance contracts as they allow **outcome-based procurement**, where the client indicates outcomes rather than solutions
- Several projects interviewed emphasised the importance of performance contracts containing both **works and services** elements.

Actions

- ***Develop standardised procurement processes which aligns with procurement guidelines***

4.4.1 Procurement Procedures

There are several procurement procedures used in performance-based contracts, including open procedure, and restricted procedures, which include competitive procedure with negotiations and competitive dialogue. The competitive procedure with negotiations (CPN) and competitive dialogue (CD) procedures are most commonly used, as the client can indicate outcomes rather than specify solutions in advance.[27] Amongst the interviewees, outcome-based procurement was the most popular, and open procedure was used in cases where there were barriers to outcome-based procurement such as unfamiliarity and length of procurement process, or where the contract was predominantly for works.

The OJEU states that CD is useful in cases where contracting authorities are 'unable to define the means of satisfying their needs or assessing what the market can offer in terms of technical, financial, or legal solutions'.[28] CPN requires tenderers to submit a bid based on unified procurement conditions (ie. for the same solution), while CD allows tenderers to submit different solutions. CPN permits flexibility while being a less demanding process than CD. CD is usually costlier due to higher levels of

[25] Triple-A, "Enhancing at an Early Stage the nvestment Value Chain of Energy Efficiency Projects," 2021.[Online]. Available: https://www.aaa-h2020.eu/sites/default/files/reports/D4.2%20Final%20Standardised%20Triple-A%20Tools.pdf. [Accessed 13 12 2021]
[26] Energy Efficiency Financial Institutions Group, "EEFIG Underwriting Toolkit: Value and risk appraisal for energy efficiency financing," 2017. [Online] Available: https://www.unepfi.org/wordpress/wp-content/uploads/2017/06/EEFIG_Underwriting_Toolkit_June_2017.pdf. [Accessed 13 12 2021].
[27] Accelerate SUNShiNE, "Guidelines for procurement of energy effiicency project with energy performance contracting". [Online]. Available: https://sharex.lv/wp-content/uploads/D2_5_EPC_procurementGuidelines.pdf. [Accessed 13 12 2021]
[28] Directive 2014/25/EU of the European Parliament and of the COouncil of 26 February 2014. [Online]. Available: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0025&rid=2. [Accessed 13 12 2021].

administration, and so is usually reserved for larger contracts. CD can only use the most economically advantageous tender as the basis for the award.[29] Codema has experience with CD, having used it successfully in five projects to date.

4.4.2 Procurement Process

Any Local Authority contract for services over €139,000, and therefore likely all of the DeliveREE projects, will be subject to the EU public procurement process.[30] The EU Directive 2014/25/EU lays out the rules for procurement of any contract above this threshold. Ireland's Office of Government Procurement's Public Procurement Guidelines for Goods and Services also provides procurement guidance, outlining the best practice application of public procurement rules in Ireland, including competitive Dialogue, and providing a checklist for all the steps involved.

In addition to EU and national regulations, the QualitEE Procurement Handbook for Energy Efficiency Services details the steps involved in the Competitive Dialogue process in specific case studies from Slovenia and France, which can be used to guide procurement activities. Under the 2014 procurement directives, all contracts must be awarded by the contracting authorities based on most economically advantageous tender (MEAT).

Codema has already developed a number of internal templates for the tender process, including a pre-qualification questionnaire, an Invitation to Tender Template, Invitation to participate in competitive dialogue and descriptive document, and an evaluation scoresheet which were based on the SEAI National Energy Services Framework. These will be reviewed and updated according to EU and Irish procurement legislation and learnings from other projects. Additionally, a standardised procurement process will be important to enable quality assurance and access to financing. Section 3.3.5.3 provides a more detailed discussion of the importance of standardisation.

4.5 FINANCE

Summary

- Financing of EE projects is a **key area for development**
- There are **various financing options** including ESCO financing, citizen financing, grants, and sale of future receivables, and these can be blended in different ratios
- **Aggregation, standardisation, and risk sharing are key enablers** for reducing transaction costs and obtaining financing
- Standardisation can be achieved through standardisation of technical measures, processes, or financial assets. The Investor Confidence Project EU and QualitEE have both developed tools to increase the standardisation of EE projects
- Risk should be mitigated within the project development process as much as possible, however mechanisms such as energy savings insurance and first loss structures exist to further reduce risk and enable private financing

Actions

- ➢ *Design project delivery process and contract that is flexible to different forms of financing*
- ➢ *Ensure aggregation, standardisation and risk mitigation are integrated into the process to attract private financing*
- ➢ *Develop a long term, scalable, dedicated funding structure to leverage private financing*

The projects explored in the desktop review and interviews use a diverse range of financing mechanisms to fund EE projects. Common models include ESCO financing, via equity or bank loans with/without secondary financing, municipality funding, citizen funding and public grants. Many projects

[29] European Commission, "Public Procurement Guidance for Practitioners," 2015. [Online]. Available: https://ec.europa.eu/regional_policy/sources/docgener/informat/2014/guidance_public_proc_en.pdf. [Accessed 13 12 2021].
[30] OJEU, "EU Procurement Thresholds," [Online]. Available: https://www.ojeu.eu/thresholds.aspx. [Accessed 13 12 2021].

used a mixture of funding sources to finance the capital investments. The DeliveREE project is inspired by the finance model on the PM4PM project run by GOLEA in Slovenia, which achieved a funding split of 51% ESCO, 9% Municipality and 40% Cohesion fund. A key objective of DeliveREE is that the project development process should be flexible and amenable to different sources of financing.

Regardless of the financing model, a common thread throughout the projects was that financing was a key challenge and area for development. In a 2019 survey by QualitEE of the EPC market, 56% of respondents said it was either difficult (44%), very difficult (11%) or impossible (1%) to obtain viable finance.[31] Key barriers identified to financing include lack of integrated approach, aggregation of projects, standardisation, and risk and insurance. This is reflected on the project side in EE projects such as BundleUp NEXT, which noted that complexity in applying for finance, dispersion of financial mechanisms, lack of an integrated financing approach, high-interest rates, transaction costs, long amortization periods and credit risks, or their perception were among the barriers to financing.[32] A key learning from the PM4PM project was that it is important to have financial sources and work directly with a financial partner.[33] The REFINE project points out that EE investments are cumbersome because they are typically small, complex and cash flow is generated from cost savings rather than sales.

4.5.1 Financing Types

Savings, Debt and Equity

The Client or ESCO can invest their own funds or savings into a project. Financing can also take the form of debt financing, which is where investors lend money to Clients or ESCOs in exchange for repayment plus interest. The most common debt financing product is a loan directly to the Client or ESCO. Finally, equity financing is where investors lend money in exchange for a stake in the project.

The Client can provide up to 100% of the funding for a project, however this is often not possible due to lack of capital, budget allocations and balance sheet issues. ESCOs can also provide up to 100% funding and will typically come mainly from debt financing. The CITYnvest project found that this model of financing is often under exploited.[34] However, a common drawback to this type of financing is that the ESCOs have limited capacity to access finance and provide upfront capital due to balance sheet limitations and it is therefore rarely used in practice.

Government Financial Support

The Climate Action Fund provides assistance and financial support to projects which will help Ireland achieve its climate and energy targets. The fund will provide at least €500 million in government funding until 2027. SEAI provides financial support to public bodies to improve their energy performance and reach their targets in non-domestic buildings. Additionally, the Energy Efficiency Obligation Scheme (EEOS) run by SEAI provides financial support for eligible EE upgrades in the form of direct monetary contributions, low interest loans, discounts on materials or reduced energy prices. Obligated parties (energy suppliers or distributors) can work with local authorities to implement these measures.

[31] QualitEE, "Market Research: EES Market," 2021. [Online]. Available: https://qualitee.eu/graph-data/ees-finance/epc/55/overall-do-you-consider-that-obtaining-viable-finance-for-a-project-is/2019. [Accessed 13 12 2021].
[32] M. Nina, "BundleUp NEXT," 06 2021. [Online]. Available: https://cinea.ec.europa.eu/system/files/2021-06/2_BundleUp%20NEXT_final.pptx. [Accessed 13 12 2021].
[33] European Investment Bank, "ELENA Completed Project Factsheet," 1 12 2020. [Online]. Available: https://www.eib.org/attachments/documents/elena-project-factsheet-pm4pm.pdf. [Accessed 13 12 2021].
[34] CITYnvest, "Increasing capacities in Cities for innovating financing in energy efficiency," 12 2015. [Online]. Available: http://www.citynvest.eu/sites/default/files/library-documents/20151202_WP2_Final_Report-V1.5.PDF. [Accessed 13 12 2021].

Citizen Financing

Citizen financing can be divided into two categories; community energy finance (usually a community using a cooperative structure) and crowdfunding (aggregation of small investors using the internet).[35] These instruments are bottom-up and offer a potentially low-cost source of funding. The BundleUP project found that crowdfunding was useful in smaller, often single technology projects that were not suitable for aggregation.[36]

Secondary Financing

Secondary financing, or sale of future receivables, includes factoring, forfeiting and cession. These arrangements typically work by a financial institution or facility buying the rights to future revenues that the ESCO (seller) will receive from the EPC client.[37] They are useful to enable market growth by clearing the balance sheet of the ESCO, allowing it to compete on new projects. If the model is well established, full technical risk remains with the ESCO and the financing institution takes on the credit risk of the client.[38] If the arrangement contains a 'no recourse clause', it will impact the Client's balance sheet and an off-balance contract may be required.[39]

The refinancing market is well established in some areas in Europe, such as in the Czech Republic, where several commercial banks offer refinancing for public sector projects. Spain, Belgium, Austria and Italy also have established refinancing solutions. The REFINE project found it has high potential across Europe, however, the Irish market is not yet developed in this area. Existing barriers to the market include the market being too small, the sluggishness of public administration and the lack of European or national GuarantEE funds, among others.[39] A common cited weakness of refinancing schemes is high transaction costs, however the Czech scheme and LABEEF both prove to maintain relatively competitive prices due to standardisation of contracts and processes.[39]

In the Czech case, the agreement for sale of future receivables is usually signed between the ESCO and Financing Institution before the procurement procedure, providing a set discount rate that the ESCO can work with for the tender preparation. This discount rate is usually lower for public sector EPC clients. In the Czech case, the margin included in the discount rate over a period of 10 years is between 1-1.5% per annum and can be as low as 0.15% per annum.[39]

The LABEEF fund, which is used in the SUNShiNE and Accelerate SUNShiNE projects, is a forfeiting structure which finances building renovations through a Special Purpose Vehicle (SPV). ESCOs can receive capital from a commercial bank with a two-year maturity at under 5% interest rate. Upon successful project completion and a period of measurement and verification, the LABEEF fund will provide long term financing to the building owner based on the payment risk of the owner. The LABEEF fund has so far not had any owners default on payments.[39]

The LABEEF scheme is funded by both private and public capital, as well as a first loss contribution from the European Bank for Reconstruction and Development (ERBD) and Funding for Future (F3). Building Energy Efficiency Funds (BEEFs) are now being established in countries across Europe. The success factors leading to the creation of the LABEEF fund include that the owners do not have to take on a loan, the owners trust the fund due to good communication, early involvement of many

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[35] Energy Effiicency Financial Institutions Group, "Energy Efficiency – the first fuel for the EU Economy," 2 2015. [Online]. Available: https://www.unepfi.org/fileadmin/documents/EnergyEfficiency-Buildings_Industry_SMEs.pdf. [Accessed 13 12 2021].

[36] Interview with GoParity (See Appendix 3- Interview Report)

[37] FI-Compass, "European Structural and Investment Funds (ESIF) in Energy Performance Contracting (EPC)," [Online]. Available: https://www.fi-compass.eu/sites/default/files/publications/European%20Structural%20and%20Investment%20Funds%20%28ESIF%29%20and%20Energy%20Performance%20Contracting%20%28EPC%29_0.pdf. [Accessed 13 12 2021].

[38] K. Leutgöb, "Refinancing of Energy Effiicency Services," 9 3 2021. [Online]. Available: https://refineproject.eu/wp-content/uploads/2021/03/Refinancing-of-Energy-Efficiency-Services.pdf. [Accessed 13 12 2021].

[39] REFINE, "D2.4 Refinancing Market Assessment Report," 3 2 2021. [Online]. Available: https://refineproject.eu/wp-content/uploads/2021/03/REFINE-D2.4-Refinancing-Market-Assessment-Report.pdf. [Accessed 13 12 2021].

stakeholders, consideration of international best practice examples and it is a market-based instrument that will eventually be independent from public funds.[40]

4.5.2 Aggregation

The scale of EE projects is often cited as a key barrier to financing. Aggregation is important to allow diversification and to ensure benefits outweigh financial due diligence costs. The F-PI project found that more than half of potential investors (including investment funds, banking entities, a renting entity, and a crowdfunding entity) surveyed required a minimum project size of €500,000, while three required a minimum project size of €2 million.[41]. It also found that project portfolios only make sense if they are ready to be procured around the same time. The BundleUP project found that while aggregation is a solution to the problem of scale, in some cases smaller projects were also able to be financed on their own through crowdlending. [42] For further discussion on the technical aspects of aggregation, see Section 3.3.2.

4.5.3 Standardisation and quality assurance

Standardisation of projects is key to successful implementation of projects and reducing transaction costs. Standardisation has three elements according to EEFIG[43]:

- Technical standardisation, where the use of similar measures simplifies assessment of investments by financial institutions;
- Standardised processes, during the project development process to increase reliability of energy saving cash flows and ease of measurement and verification (ranges from agreed use of technical standards such as ISO50002 to standardised technical or legal documentation or joint procurement processes); and
- Standardisation of financial assets, meaning contract clauses describing financial assets have to fit a similar framework in order to facilitate portfolio evaluation of risks and returns associated to groups of projects

Although technical standardisation may be profitable for financial institutions, it should not be considered for DeliveREE as it often results in poor outcomes for the client because it does not allow a holistic and deep retrofit approaches to be taken to EE upgrades.

Underwriting and quality assurance tools such as the Investor Confidence Project EU and QualitEE have been developed to address lack of standardised processes and financial assets. Contract standardisation is also viewed as an important trigger to refinancing.[44] During the interviews, Funding for Future emphasised the need for standardised processes and contract structures to enable more private investment in EES. The Investor Confidence Project EU aims to reduce transaction costs by assembling existing standards and practices into a transparent process. The process involves protocols and associated quality assurance methods at each stage of the project development process. The QualitEE project also seeks to reassure investors of the quality of a project and support them in decision making. The project found that traceable quality was a driving factor in EES market growth and reliable and verifiable quality criteria are useful for financing EES projects.[45] The criteria include financial checks and example contract clauses to ensure the projects remain adaptable to financing

[40] Korinna Jörling and Moritz Schäfer, "LABEEF in Latvia: study," 5 12 2018. [Online]. Available: https://www.euki.de/wp-content/uploads/2019/09/20181205_LV_LABEEF_Study.pdf. [Accessed 13 12 2021].
[41] Financing Energy Efficiency Using Private Investments, "Bundling Procedure," 2021. [Online]. Available: https://cordis.europa.eu/project/id/846085/results. [Accessed 13 12 2021].
[42] Interview with GoParity (See Appendix 3- Interview Report)
[43] Energy Efficiency Financial Institutions Group, "Energy Efficiency – the first fuel for the EU Economy," 2 2015. [Online]. Available: https://www.unepfi.org/fileadmin/documents/EnergyEfficiency-Buildings_Industry_SMEs.pdf. [Accessed 13 12 2021].
[44] REFINE, "D2.4 Refinancing Market Assessment Report," 3 2 2021. [Online]. Available: https://refineproject.eu/wp-content/uploads/2021/03/REFINE-D2.4-Refinancing-Market-Assessment-Report.pdf. [Accessed 13 12 2021].
[45] QualitEE, "Driving Investment in Energy Efficiency Services Through Quality Assurance," 15 12 2020. [Online]. Available: http://www.efiees.eu/wp-content/uploads/2021/02/QualitEE_D1.3g_Final-Publishable-Report_20201215_FINAL.pdf. [Accessed 13 12 2021].

schemes. The QualitEE criteria have been incorporated into national quality assurance schemes in the participating counties, however there is no certification scheme in Ireland- this may be an area for development in the future.

Standardisation is key to the LABEEF structure to ensure lower transaction costs.[46] It has therefore created a set of Investment Guidelines which operate around three main pillars; technical and other objective criteria, the manner in which a project is prepared and designed, and the legal documentation supporting the process. The guidelines are reviewed annually to ensure conformance with the Investor Confidence Project and TransparENSE. The LABEEF structure allows improved evaluation, allocation and mitigation of risks, as well as assurance to the banks that the project has received proper due diligence. The fund also acts as a backstop in case of the ESCO failing to deliver savings.

4.5.4 Risk and Insurance

Client credit risk is a key consideration for investors, and it is often only considered towards the end of the due diligence process.[47] The EEFIG Underwriting Toolkit highlights that because operating expenses are paid before debt service, EE Clients are less likely to default than with a standard loan. Therefore, '*for some energy efficiency arrangements, the analysis needs simply to confirm that the building will be solvent long enough to discharge operating or debt service payments, a lower bar than other kinds of credit analysis.*'[48] However the lender should take into consideration that by accounting for the impact of savings they are implicitly taking on performance risk and energy price risk, therefore a good understanding of these risks is important.

In the case of sale of receivables, ESCO credit risk is also an important consideration. However, if the project is designed well, it will minimise risk to the financial institution in the case of ESCO bankruptcy, as another ESCO can take over and continue providing the services. Sale of receivables arrangements differ in regard to their risk management mechanisms, and requirements can include, on the client side, an invoice signed by the client, title on equipment as collateral, a third-party guarantor, a bank guarantee and Client equity, and on the ESCO side, guarantee of savings in contract, a bank guarantee, property collateral, third party guarantor and equity. [49]

An additional method to increase the likelihood of securing third party funding and decrease the cost of the funding is energy savings insurance.[50] These schemes insure the company if the promised savings are not achieved due to technical risks or take on the credit risk of the project, however there is not currently an established energy savings insurance market in Ireland.

First loss structures are another mechanism which can be used to enable private investment in public projects. EFSI, which has been succeeded by InvestEU, provided first-loss or initial junior investment loans and guarantees which can enable forfeiting loans by reducing the exposure of the forfeiter against its exposure to the EPC client's credit risk and the ESCO's performance risk.[51] The Latvian LABEEF fund is set up in this way. PF4EE (also succeeded by InvestEU) was another example of a first loss instrument. The program had two key components: a risk sharing facility and an expert support facility.[52] The Risk Sharing Element mitigated the partner financial institution's credit risk, covering up to

[45] Accelerate SUNShiNE, "Guidelines for procurement of energy efficiency project with energy performance contracting". [Online]. Available: https://sharex.lv/wp-content/uploads/D2_5_EPC_procurementGuidelines.pdf. [Accessed 13 12 2021]
[47] LIFE Programme, "LAUNCH + PROPEL H2020: Standardising energy efficiency projects to access secondary markets," 5 7 2021. [Online]. Available: https://www.youtube.com/watch?v=CwP4XLdIOwI. [Accessed 3 12 2021].
[48] Energy Efficiency Financial Institutions Group, "EEFIG Underwriting Toolkit: Value and risk appraisal for energy efficiency financing," 2017. [Online] Available: https://www.unepfi.org/wordpress/wp-content/uploads/2017/06/EEFIG_Underwriting_Toolkit_June_2017.pdf. [Accessed 13 12 2021].
[49] REFINE, "Case Studies on Existing Refinancing Instruments for Energy Efficiency Services," 30 11 2020. [Online]. Available: https://refineproject.eu/wp-content/uploads/2021/03/D2.1_Case_Studies_REFINE_2021-11-30_PUBLIC.pdf. [Accessed 13 12 2021].
[50] Accelerate SUNShiNE, "Guidelines for procurement of energy efficiency project with energy performance contracting". [Online]. Available: https://sharex.lv/wp-content/uploads/D2_5_EPC_procurementGuidelines.pdf. [Accessed 13 12 2021]
[51] FI-Compass, "European Structural and Investment Funds (ESIF) in Energy Performance Contracting (EPC)," [Online]. Available: https://www.fi-compass.eu/sites/default/files/publications/European%20Structural%20and%20Investment%20Funds%20%28ESIF%29%20and%20Energy%20Performance%20Contracting%20%28EPC%29_0.pdf. [Accessed 13 12 2021].
[52] PF4EE, "Why PF4EE," 2019. [Online]. Available: https://pf4ee.eib.org/about. [Accessed 13 12 2021].

80% of losses from individual loans and 25% across a portfolio. EIB provided these loans to financial intermediaries to be on-lent for financing of EE investments. The Expert Support Facility provided partner financial institutions with consultancy services to improve their understanding of the EES market and aid in the development of loans and assessment of financing requests. There are not currently any financial intermediaries participating in this scheme in Ireland.

The SUNShiNE project in Latvia concluded that the financial risk should lie with the client or financial institutions, and not ESCOs, which as SMEs do not have the resources to take on these risks.[53] The project also found that commercial banks required due diligence to be performed at a project level. Smaller projects did not hold enough value for banks unless they could be standardised and aggregated. Banks also required due diligence in areas where they lack expertise, leading to financing being withheld or priced high to include unknowns. The project therefore led to the creation of the Latvian Building Energy Efficiency Facility (LABEEF), as discussed in Section 4.5.1- Secondary Financing.

4.6 LEGAL

Summary

- National and EU climate targets reinforce the need for strategic planning of long-term energy infrastructure
- There is a lack of clarity on contract models

Actions

- ➢ *Ensure targets are met and lock-in of poor performance is avoided*
- ➢ *Ensure contract is comprehensive and clearly defines roles and responsibilities while maintaining flexibility of financing options*

4.6.1 Relevant Directives, Policies and Regulations

Irelands Climate Action Plan 2021 requires the public sector to achieve a 50% Energy Efficiency (EE) improvement, a 51% CO2 reduction and 50% renewable heat by 2030. The EU Energy Efficiency Directive (Directive 2012/27/EU) establishes a framework of measures to promote energy efficiency within the EU and ensure the target of reducing greenhouse gas emissions by at least 55% by 2030 is met. Recent updates to the directive include a binding EU energy efficiency target of 39% by 2030, renovation of at least 3% of public buildings every year to Nearly Zero-Energy Buildings (NZEB), increased use of private funding in energy efficiency projects and a stronger exemplary role of the public sector. The EU Energy Performance Buildings Directive (Directive 2010/31/EU) also aims to promote energy efficiency in the building sector by promoting policies to help achieve a highly energy efficient and decarbonised building stock by 2050, a stable environment for investment decisions and enable consumers and businesses to make more informed decisions to save energy and money. These policies should be kept in mind through the decision-making process and development of solutions to avoid lock in and encourage long term strategic planning of energy infrastructure.

4.6.2 Contract Development

A key learning from the CITYnvest pilot projects was that to avoid mistakes, legal dispositions and functional specifications should be clearly determined.[54]The Graz Energy Agency mentioned during their interview that they ran into several unforeseen legal problems, which emphasises the importance that must be placed on legal due diligence in order to avoid contractual disputes.

The GuarantEE project notes that limited flexibility of EPC contract models can inhibit market growth. The critical issues in relation to public buildings include a preference for shorter contracts, termination

[53] Accelerate SUNShiNE, "Making Deep Renovation the Standard," [Online]. Available: https://sharex.lv/wp-content/uploads/D8.6_AccelerateSunshine_FinalReport-EN.pdf. [Accessed 13 12 2021].
[54] CITYnvest, "How to launch ambitious energy retrofitting projects in your region?". [Online]. Available: http://www.citynvest.eu/sites/default/files/library-documents/Brochure%20Citynvest_pilot%20projects%20results_RenoWatt%20model.pdf. [Accessed 13 12 2021].

for convenience, simplified M&V.[55] The QualitEE project recommends the inclusion of several clauses including, among others, ownership transfer, handling of energy price risks, insurances and exit regulations. The SUNShiNE project also has EPC+ contract templates for several EU countries (excluding Ireland), which may be used to inform additional contract clauses. Additionally, the European Commission's 'Buying Social: A guide to Taking Account of Social Considerations in Public Procurement' may be useful to incorporate social considerations in the contract and procurement process.

SEAI has published a modifiable EPC template contract which combines work and services into a single contract. It includes four standard parts which are static and cover the works, services, measurement, verification, guarantee and payment, and other miscellaneous items such as variations, tax, force majeure and severability. This contract has already been successfully used by Codema in several EPC projects. The contract schedules are flexible and will determine how the practicalities of the contract, including GuarantEE and shared savings thresholds, baseline and measurement and verification of savings, the investment grade audit, works and services schedule and design documents.

The term Energy Performance Contracting is defined in the EU Energy Efficiency Directive as '*a contractual arrangement between the beneficiary and the provider of an EE improvement measure, verified and monitored during the whole term of the contract, where investments (work, supply or service) in that measure are paid for in relation to a contractually agreed level of EE improvement or other agreed energy performance criterion, such as financial savings*'.[56] However, there are many different interpretations of this throughout Europe, and therefore a lack of cohesion and shared understanding of what is involved in performance contracting.

The works and services responsibilities differ dramatically between different performance contracting models. While performance contracts often place maintenance responsibility of existing and new equipment on the ESCO, some contract models place this responsibility on the client.[55] For example, in projects facilitated by Energy Centre Bratislava, the ESCO designs and installs new equipment and trains the Client's facilities maintenance team on the operation and maintenance.[57] However, interviewees such as Funding for Future, Factor 4 and Graz Energy Agency emphasised the importance of performance contracts to include both works and services.

Factor 4 takes an interesting approach to maintenance responsibilities, using residual value to define asset maintenance states and placing the responsibility on the ESCO to deliver a minimum residual value to the owner at the end of the contract. This incentivises long term investment and good maintenance but allows the use of shorter-term contracts. On the other hand, the Josef Stefan Institut consider that residual value is too complex, and most maintenance investments can be predicted in the contract, while expecting unforeseen investments.

[55] GuarantEE, "Pilot Project Report (Deliverable D5.1)," Codema, 2019. [Online]. Available: https://www.codema.ie/images/uploads/docs/GuarantEE_WP5.1_Pilot_Project_report.pdf. [Accessed 13 12 2021].
[56] Directive 2014/25/EU of the European Parliament and of the COouncil of 26 February 2014. [Online]. Available: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0025&rid=2. [Accessed 13 12 2021].
[57] Interview with ECB (See Appendix 3- Interview Report)

5 Gap Analysis

A gap analysis was performed to analyse how the tools and processes that were identified during the market assessment can be adapted for use in the DeliveREE structure and identify the gaps which need to be addressed. The table below provides a summary of the main actions resulting from the gap analysis, which is presented in Appendix 4- Detailed Gap Analysis.

Table 4 Gap Analysis

Project Stage	Main Actions	Lead Partner, Participating partner	Identified Tools
Stage 0 Project Identification	Pre-assessment tool to be incorporated into DeliveREE process	Codema	• GuarantEE EPC Pre-assessment tool
	Creation of communication strategy to bridge gap between project identification process and DeliveREE PIU	Codema, Local Authorities	• ISO50001:2018
	Project Identification tool needs to be developed to be specific to DeliveREE Process	Codema	• Internal Project Identification and Initial Appraisal template
Stage 1 Project Stream Identification	Internal tool to be developed to categorise projects into different streams	Codema	*No tools identified*
Stage 2 Standardisation	Create tool for internal communications tracking and initial stakeholder analysis	Codema	• Internal Project Management Plan Template
	Use stream-specific resources to inform creation of feasibility study requirements and pre-procurement technical viability assessment	Codema	• *Building Energy Efficiency*: ISO50002: 2015, EN 16247:2012, QualitEE Technical Quality Criteria, SEAI Audit Handbook • *Renewable Energy*: SEAI's Community Energy Resource Toolkit • *District Heating*: Codema and IrBEA's Guide to District Heating in Ireland • *Low Carbon Transport*: UKEVSE and WPD EV charging guide • *Public Lighting*: Streetlight EPC Quick Check guide
	Create standard checks and processes for financial, risk, procurement and legal	Codema	• EEFIG Underwriting Toolkit • SEAI Risk Management Guide and Financial Analysis tool • Triple A assess tool • Internal Risk Assessment Tool, Financial Analysis tool • EU Taxonomy Criteria • ICP IREE Certification

Project Stage	Main Actions	Lead Partner, Participating partner	Identified Tools
Stage 3 Aggregation	Combine tools to create a Detailed Appraisal template to inform the Client's decision-making process	Codema	• ISO50001:2018 • Carbon Trust Stakeholder Engagement in Heat Networks • MBEE Tips and solutions for effective communication
	Create tool to aggregate projects based on learnings from market assessment including market capability and financial metrics	Codema	• RenoWatt/ CITYnvest A guide for the launch of a One Stop Shop on Energy Retrofitting
	Update internal financial analysis tool with considerations from other identified tools	Codema	• SEAI EPC Financial Analysis tool • MBEE Identification and Evaluation Tools
Stage 4 Procurement and Financing Protocols	Find a long term, scalable financing solution to leverage private investment for the Irish market and develop associated contractual arrangements	Codema, Philip Lee, SDCL, Resourceful Futures	• QualitEE Financing Quality Criteria • REFINE Refinancing of Energy Efficiency Services • Eurostat and EIB A guide to the statistical treatment of EPCs • EEFIG DEEP database
	Incorporate additional communication, technical, legal, risk and financial considerations into procurement process from guidelines such as QualitEE	Codema	• QualitEE Technical and Financing Quality Criteria, Procurement Handbook • EEFIG Underwriting Toolkit • Triple-A Assign tool • REFINE Refinancing of Energy Efficiency Services
	Create standardised procurement protocols using Irish Government and EU regulations	Codema, Philip Lee, SDCL, Resourceful Futures	• Office of Government Procurement (Ireland) Public Procurement Guidelines and Checklist • QualitEE Procurement Handbook • EESI2020 Standard EPC Documents- III. Public Tender • Internal Tender documents • TransparENSE European Code of Conduct for EPCs • ICP IREE Certification
	Update contract based on learnings from identified tools and ensure it mitigates risk and remains flexible to financing options	Codema, Philip Lee, SDCL, Resourceful Futures	• SEAI/NESF Sample Energy Performance Contract, EPC Contract Guidance and EPC+ Contract Templates • Internal Tender documents • QualitEE Financial Quality Criteria • SUNShiNE EPC+ Contract Templates
Stage 5 Contract Management and M&V	Use tools to inform contract management procedures, including record keeping and communications, financial and legal checks	Codema	• QualitEE Technical and Financial Quality Criteria and Procurement Handbook • OECD Tool: Checklist for record keeping • EEFIG Underwriting Toolkit- Post-financing Section

Project Stage	Main Actions	Lead Partner, Participating partner	Identified Tools
	Adapt existing M&V processes to be specific to DeliveREE	Codema	• IPMVP Core Concepts • Internal Monthly Payment Calculation Template

6 Conclusion

Energy efficient retrofits in Ireland are not yet occurring at the speed or scale necessary to meet government targets. Performance contracts which include deep renovations and avoid lock in of poor performance are an effective way to increase EE and renewables and reduce CO_2 emissions. However, they are not yet well established in Ireland due to several barriers.

This report builds on the learnings of similar projects to provide a clear roadmap for the creation of the PIU. This involves improved communications throughout the project development process, development of customised technical tools and incorporation of comprehensive assessment and mitigation of risks at all stages of the project. Clearly defined contract roles and responsibilities, standardisation of procurement processes and contract, aggregation, and risk mitigation are also key outcomes of the PIU.

The DeliveREE project will help to demystify performance contracting in Ireland and encourage ESCOs and financiers to enter the market by providing clear communication on the project structure and development process and a pipeline of aggregated and standardised project offerings. It is clear however that additional support, especially regarding financing, will be key to the sustainability and longevity of performance contracting in Ireland's public sector.

Appendix 1– Detailed Contract Cheat Sheet

EPC related term	Description	Standard Works Contract	Energy Performance Related Payment	Energy Supply Contract	Energy Performance Contract
		e.g. PW-CF5 and PW-CF6	e.g. PW-CF5 or PW-CF6 with performance related payment schedule	NESF ESC (with modifications)	NESF EPC (with modifications)
General Terms					
Contract elements	There are many variations of contracts that can be used to complete energy efficiency, renewable energy or low carbon projects. This table compares the Standard Works Contract with three common performance contract structures. Standard and performance contracts include works (including commissioning and warranty). Performance contracts include additional performance elements, which range from the Client withholding percentage of final payment until a short (~1 year) measurement and verification period is complete and agreed conditions satisfied in an EPRP, to a Design, Build, Operate and Maintain arrangement in ESCs/EPCs where the contractor provides services/supply for a period of 5-20 years, and payment is linked to measured and verified outputs as defined in the contract	Works only	Works + short Measurement & Verification period	Works + Services/Supply (5-20 years)	
Project complexity	The project complexity refers to the technology and/or depth of retrofit involved in a project. If a project involves a single technology and/or a shallow retrofit, it may be considered less complex than a project which involves multiple technologies and/or deep retrofit. Deep retrofit is a process capturing the full potential of a building to reduce its energy demand, based on its typology and climatic zone, and require a focus on contractually defined, measured and verified, outputs.	Single technology to deep retrofit	Single technology or low complexity multiple technology	Single metered output E.g. biomass boilers, PV systems, district heating	Low complexity multiple technology to deep retrofit
Distribution of performance risk	Performance risk refers to the potential that the works or service will not deliver the expected value. The distribution of performance risk ranges from Client developing the specification and therefore holding the full performance risk in a standard works contract to and the contractor developing the specification and relying on payments linked to the output of the installation and therefore holding full performance risk in an EPC.	Client holds risk	Client holds design risk, Contractor holds quality and commissioning risk	Contractor holds risk	
Balance sheet status	The treatment of the contract as on or off-balance sheet is important when considering funding and financing options. If contracts are on-balance sheet then the full cost of the project must be accounted for in year 1 of the project according to accountancy rules. This can cause issues for public sector bodies, especially for large projects, however may not always be a concern for smaller projects. Traditional contracts are on balance sheet as there is no mechanism or third party financiers to recover investment costs. Off-balance sheet contracts allow for the contactor (contractor) or a private finance company to take the project on to	Always on balance sheet		On or off balance sheet	

	their books, however there are strict Eurostat rules governing if a contract can be on or off-balance sheet.		
Project Funding	Funding refers to the money provided by an organisation (contractor or Client) or government to complete an energy efficiency project. In performance contracts, financing via the contractor and third parties is made possible due to the project cashflow generated by the measured and verifiable project outputs (electricity generation, heat generation, energy savings, etc.)	Client and/or Government grants	Client, Governments grants, and/or Third party finance
Works			
Design and specifications development	In a standard procurement process, the client will develop a design pre-procurement and hire a contractor to implement this design with the aim of achieving some desired outcome. Any changes during construction or if the design fails to achieve the desired outcome it is normally at the expense of the client, however in EPRPs the contractor will share the build and performance risk to a fixed amount agreed in the contract and will receive a bonus for better than expected performance. In an outcome based procurement process, the Client will specify the desired outcomes, rather than a design, and the contractor will develop and submit a design during the procurement process to achieve these outcomes. This is critical for the transfer of design and performance risk to the contractor- who must correct failures at their own expense.	Standard procurement process	Outcome based procurement
New Equipment ownership	New Equipment refers to the goods, materials and equipment to be installed by the contractor as part of the works. In a standard works contract, new Equipment becomes the property of the Client as soon as they are either delivered to the site (if owned by contractor), incorporated into the works or when the employer makes a payment for them. However, in a performance contract, new Equipment may remain the property of the contractor for the duration of the contract or may become the property for the client from day one of the contract depending on the contract structure. Under the National Energy Services Framework template contracts New Equipment is in the ownership of the client from day 1 of the contract with a compensation mechanism for the contractor should the contract be terminated early	Client owned	Client owned (with compensation mechanism for contractor for early termination)
Maintenance of existing Equipment	Existing equipment is energy related equipment owned by the Client and installed at the Premises prior to the new Contract. This is not relevant in standard works contracts as there is no maintenance agreement and is generally not relevant to ESCs as the supply is usually provided by isolated new equipment. In EPCs, maintenance of Existing equipment may or may not be included in the contract. If included, the contractor may be responsible for maintenance but not repair as this is generally too big a risk for the contractor to accept. If excluded, there is the possibility for conflict between the contractor and the contractor maintaining the existing equipment as the performance of the existing equipment may impact the overall energy savings potential. The Eurostat of balance sheet rules exclude maintenance of existing equipment from the contract.	N/A	Generally not applicable	Client or contractor (depending on contract)

Testing, Commissioning and Defects responsibilities	Testing and commissioning is an important step completed at the end of works and before the service phase and involves a suitably qualified and experienced personnel completing all necessary documents, commissioning and tests of the installed equipment before it goes into operation. In all contracts, testing and commissioning is performed prior to handover by the contractor. However, in a standard contract, if any issues arise post-handover, it is difficult to hold the contractor responsible and repairs are usually at the Client's expense. The responsibility of the contractor is extended in an EPRP, where the withheld/bonus payment are incentivised to correct defects during the whole measurement and verification period. In an ESC/EPC, the contractor has even further incentive to correct poor performance or defects in the works/equipment due to the monthly service payments being directly impacted.	**Contractor** tests and commissions, **low accountability for defects post-handover**	**Contractor** tests and commissions, additionally incentivised to correct defects **throughout M&V period**	**Contractor** tests and commissions, incentivised to correct defects **throughout supply/service period**
Services and Supply				
Services	Services refers to the services (operations and maintenance, replacement, and repair) provided by the contractor during the guarantee period. Services are not included in standard works contracts or EPRPs. In ESCs, services related to the supply, including procurement of fuel, O&M of supply equipment, provision of energy supply are provided from the connection date/acceptance date until the end date of the contract. In EPCs, services related to the energy savings, including emergency response and repair, routine monitoring, securing of continuous operation, preventative maintenance of energy system, ensuring of energy efficient operation, documentation or proof and corrective action are provided from the acceptance date until the end of the guarantee period.	**N/A- Services not included** in contract	N/A- No specific 'services period', only a short M&V period to confirm measures are working as designed.	Services provided **throughout contract period** (5-20 years)
Maintenance Responsibilities	The maintenance responsibilities are allocated to the contractor and/or the Client depending on the type of contract and services provided. Maintenance is not included in standard works or EPRP contracts. In ESCs and EPCs, the contractor responsible for all operations and maintenance of new energy equipment and may also be responsible for existing energy equipment. The contractor responsible for routine maintenance at its own expense and shall carry out the maintenance during the specified maintenance days. The contractor shall replace any new equipment at own expense upon expiry of its life cycle or failure during the contract term, however contractor to be reimbursed for the repair of existing equipment if included in contract.			New equipment: **Contractor** to **maintain & replace** Existing equipment: **Maintenance depends on contract, Client pays for replacement**
Handover/re-commissioning	Handover refers to the handover of equipment upon expiry of the contract. This is not relevant for standard works or EPRPs as there is no services period. In ESCs and EPCs, the contractor must hand over the system at end of the contract in a fully operational condition with normal wear and tear. It shall carry out full re-commissioning before handover.			Contractor to perform **full re-commissioning** and hand over **fully operational system**
Guarantee, Payment and Financing				

Capital investment	The capital investment refers to fixed, up-front investment for the works. In a standard works contract, the Client pays works sums to the contractor in instalments. In an EPRP, the Client withholds a percentage of the sum dependent on guaranteed performance. The Capital investment in ESCs and EPCs depends on the project and investment required- the contractor may provide 100% of the capital upfront (this is usually the case for off balance sheet contracts) and recover via supply/service payments, or the client may opt to contribute a fixed sum towards the capital cost in order to reduce the contract term. There is also the possibility for the client to pay the contractor a fixed monthly service/maintenance fee, independent of performance, this may be necessary for project with third party finance.	**Client** to pay **works sum**	**Client** to pay **works sum** with **percentage withheld** (dependent on performance)	**Varied payment structures** May be 100% Contractor funded or the Client may contribute to capital investment and the Client may also pay a fixed monthly service/maintenance fee	
Performance related payments	The performance related payments differ for each contract but in general refer to any payment or settlement for tied to the performance of the equipment under the agreement. There are no performance related payments in a standard works contract as there is no measurement of savings. In EPRPs, an additional schedule requires the Client to withhold a certain percentage of the works sum during a short measurement period. This is adjusted in a gain-share arrangement according to performance. In ESCs, the measurement continues throughout the supply period and monthly payments are made from the Client to the contractor based on measured energy supplied. If certain standards are not met, failed service credits are deducted. In EPCs, payments are made after each M&V period (6 months) throughout the services period based on guaranteed and shared energy savings as reported by the contractor and verified by the Client.	N/A- **No measurement** of savings	One-off **Gain-share** performance related payment	Monthly **supply** payments + failed service credits	Six-monthly **service** payments based on guaranteed and shared energy savings
Savings/Consumption quantification	Savings or consumption quantification refers to the measurement of energy savings or consumption generated by the energy related equipment. It is important to note that it is only possible to measure energy consumption or savings in kilo-watthours (kWh). For Energy Supply Contracting this is via a meter (heat or electricity). For Energy Performance Contracting this is via the agreed Measurement and Verification protocol which sets a standard for comparing metered energy consumption before and after the works are completed (for this reason it is important that all values are agreed in kWhs where possible and then converted to Euros). The International Performance Measurement and Verification Protocol (IPMVP) is the most widely accepted and used M&V Protocol.		**One-off** measurement and verification of **savings (kWh)** based on IPMVP	**Monthly** measurement of **supply (kWh)** + monitoring of guaranteed standards of performance	**Six-monthly measurement and verification** of **savings (kWh)** based on **IPMVP**
Baseline	The Baseline refers to the baseline energy consumption as defined in the tender documentation. The Baseline should be established in accordance with the M&V protocol and is usually 1-3 years of average annual energy consumption. Baseline is not required in ESCs as the supply is not measured against a baseline.		**May be required**	N/A	**Required**
Energy Price	This relates to how energy prices are determined throughout the contract. This is important because it may affect the contractor payments depending on the contract structure and if savings are expressed in Euros and not kWhs. Energy prices are not relevant to EPRPs as the gain share limits use fixed unit prices, and the measurement period is too short for inflation to be considered relevant. In ESCs and EPCs, the supply price should also be fixed and decoupled from the energy market. However, if the contractor is responsible for fuel supply in an ESC		N/A	**Fixed supply price** + inflation price adjustment for fuel	**Fixed energy unit cost**

	or an EPC has a long guarantee period, then an inflation price adjustment mechanism may be necessary.				
Miscellaneous					
Variations and material changes	Material changes include any change to the premises that could be expected to increase/decrease annual energy consumption by a significant degree (at least 20%) after adjustments for climatic variations. In ESCs and EPCs, the Client shall notify the contractor of any material change and the contractor will be required to submit a variation estimate quantifying the impact of the proposed change. Changes to payment amounts can then be made, if necessary, according to the mechanism set out in the contract	N/A		Triggered if variation/material change to building results in >20% change in energy consumption	
Value Engineering	Value engineering allows for continued improvement and value to the client and contractor throughout the guarantee or service period. If the contractor or Client spots a value engineering opportunity they may give the Client a proposal to implement the opportunity.	N/A- value engineering proposed during tender negotiations		**Contractor** may give the Client a **written value engineering proposal**	
Suspension and termination	The contract will have a number of clauses that deal with the ability of each party to terminate the contract, as well as the responsibilities and payments in each case. In both ESCs and EPCs, the Client is entitled to suspend contract on written notice to contractor and the contractor is entitled to terminate if the Client fails to pay after written demand from the Client. Either party may terminate if the suspension lasts more than 6 months. The Client can terminate if contractor fails to achieve Substantial completion by Target Completion Date, if contractor commits any material breach of the terms or if the contractor becomes bankrupt. Additionally, in an EPC the Client can terminate if the contractor fails to achieve Guarantee for a total of 12 months or more within any 18 month period. The contract contains compensation clauses in the event of termination.	**Client** may terminate on written notice due to substantial breach or various other reasons		**Contractor** may suspend (and subsequently terminate) the contract for non-payment **Client** has various suspension and termination rights	

Appendix 2– Desktop Review

SIMILAR EPC PROJECTS

Project Title	Project Summary	Funding Source	Project Types	Key Project Indicators	Procurement Procedure	Finance Model
BAPAURA	The BAPAURA project is led by the French regional energy agency ADEME, and is supporting EE investments in public buildings. It is providing department level services in the Auvergne Rhône-Alpes Region to develop nine 'one-stop shop' project development assistance services. The project is mobilising local service providers, SMEs and financial institutions and introducing innovative financing.	Horizon 2020	Building energy efficiency	Expected Investment: €23.6M (115 projects) CO_2-e avoided: 1400t	Various	Municipal funds and (up to 80%) grant funding
BundleUp / BundleUp NEXT	The BundleUp project is led by Ponto Energia, which is a consortium of eight entities led by Ageneal, Almada's energy agency. It aimed to find model contracts and financing solutions to accelerate implementation of EE and renewable energy projects. The main objective was to facilitate the execution of projects that would not otherwise be financed due to scale limitations or lack of market appetite. The project hosts a platform which connects project promoters (energy agencies or building owners) to specialists (ESCOs who are registered on the platform) and investors. BundleUp Next is a follow up project to BundleUp, which focuses on overcoming financing, scale and bureaucracy barriers. This project will be available to the whole of Portugal, and includes central admin, local authorities, private social care and SMEs.	Horizon 2020	Most of the projects funded are renewable energy (Solar PV) and public lighting.	BundleUp Investment: €41 (62 projects) Energy Savings: 44 GWh/y CO_2-e avoided:18 kt/y Renewable generation: 3.4 MW BundleUp Next (Expected figures) Initial investment: €49M (56 projects) Savings: 45.4 GWh/y	Unknown	The project uses three financing models: loans (banks, collaborative financing), shared savings (PPA, performance contracts) and renting or leasing (operational rental of EE equipment).

Project Title	Project Summary	Funding Source	Project Types	Key Project Indicators	Procurement Procedure	Finance Model
				Renewable generation: 16.1 GWh CO_2-e avoided: 9 kt/y		
CITYnvest / RenoWatt	CITYnvest focuses on the support and replication of successful innovative financing models for EE upgrades in public buildings. It analyses and compares projects with innovative financing models across Europe. Based on data from these projects it develops guidance materials for financing of EE renovations of public buildings. They have also conducted pilot projects and large-scale capacity building programmes. RenoWatt is a one-stop-shop led by GRE-Liège for public buildings in Wallonia, Belgium. The RenoWatt service includes implementation support for Energy Performance Contracts, aggregation of demand by pooling buildings together, public procurement, legal advice, assessment of technical clauses and specifications, and helping to select and negotiate with ESCOs.	Horizon 2020/ ELENA EIB/ Belgian Walloon Region	Building energy efficiency	RenoWatt: Investment: €176-225M (expected €70-104M) Energy savings: 59GWh Renewable generation:3.38GWh CO_2-e avoided: 17 kt	Competitive Procedure with negotiation. Competitive dialogue was not appropriate since it is longer and time consuming and therefore costly	100% Debt financing (15, 20 or 30 years)
EESI2020	The European Energy Service Initiative (EESI2020) project was led by the Berlin Energy Agency and aimed to facilitate the development of EPC implementation schemes in nine major European cities and regions. The project promoted the role of EPC facilitators and provided training materials for EPC facilitators.	Intelligent Energy Europe Programme	Building Energy efficiency, renewable energy	Investment: €26M (27 projects) Cost Savings: 30% emissions CO_2-e avoided: 16 kt /y	Various	Various
EOL; PM4PM	PM4PM was led by the GOLEA Goriška local energy agency and implemented €45 million of investment projects and for 23 municipalities.	EIB ELENA	Building energy efficiency, public lighting, low carbon transport	PM4PM: €45 million of investment	Two stage negotiated process	PM4PM achieving a funding share of 51% ESCO, 9% Municipality and

Project Title	Project Summary	Funding Source	Project Types	Key Project Indicators	Procurement Procedure	Finance Model
	EOL was led by the City of Ljubljana and launched two tenders for EPCs to retrofit 76 public buildings, including deep retrofits using the ESCO model. In addition, more than 170 smaller EE investments were implemented.		and district heating	projects and for 23 municipalities EOL: Investment: €33M Energy Savings: 114 GWh/y Renewable generation: 0.25 GWh/y CO_2-e Avoided: 8864 t/y		40% Cohesion fund.
FinEERGo-Dom	The FinEERGo-Dom project builds on the progress of the LABEEF financial scheme deployed in Latvia. It aims to refine and implement guaranteed financing schemes for deep energy retrofits across six countries in the EU. It will use the SUNShiNE platform to standardise and document the process.	Horizon 2020	Building energy efficiency	Investment: €340M Energy Savings: 160 GWh/y	Procedure with negotiations	ESCO financing, forfeiting through BEEFs
GuarantEE	The GuarantEE Project was led by the Berlin Energy Agency and aimed to foster the use of Energy Performance Contracting in the private and public sectors across Europe. It did this by developing innovative EPC solutions for rented facilities, making EPCs more flexible to better serve private sector clients and supporting EPC pilot projects with experienced facilitators.	Horizon 2020	Building energy efficiency	Investment: €190M Energy Savings: 724 GWh CO_2-e avoided: 48 kt/y	Various	Various
ProDeSA	ProDeSA is a H2020 funded project coordinated by the Alimos Municipality focusing on EE and renewables investments in seven municipalities in Athens, Greece. ProDeSA is a showcase project that will focus on optimal bundling of	Horizon 2020	Building energy efficiency, renewable energy and public lighting	Investment: €20.24M (116 buildings) Energy savings (expected): 50.4 GWh/y	Open procedure for building energy efficiency; Mixed	Multiple: 37% public grant, 42% EPC, 21% equity 100% EPC 24% public grant,

Project Title	Project Summary	Funding Source	Project Types	Key Project Indicators	Procurement Procedure	Finance Model
	projects to achieve size, reasonable payback and diversification of risk.				contract of supply and services for street lighting	76% EPC 100% debt financing, EPC with 10-year GuarantEE of energy savings 70% equity, 30% EPC
Streetlight EPC	The Streetlight-EPC project created demand and supply for EPC projects by setting up 9 regional facilitation services. It aimed to develop EPC capabilities using street lighting, due to its lower technical and economic complexity.	Intelligent Energy Europe	Public Lighting, Building Energy efficiency	9 regions, 99 projects Energy savings: 28 GWh/y	Various	Various
SUNShiNE / Accelerate SUNShiNE/ LABEEF	The Save your bUildiNg by SavINg Energy (SUNShiNE) project focused on deep renovation of multifamily buildings. The subsequent project, Accelerate SUNShiNE, also focused on the renovation of municipal public buildings (mostly schools and kindergartens). LABEEF was created to enable financing of EPCs. The ESCO finances renovation measures through a commercial bank and has a contract with the building owner. Following the monitoring and verification of these measures to ensure their effectiveness, LABEEF forfeits the EPC contract and collects the EPC receivables going forward. This transfers the financing risk from the ESCO to LABEEF, while the execution risk stays with the ESCO. LABEEF also aims to address other challenges including long refinancing timeframes, information deficits to the client and complex legal aspects (contracting models, energy regulations, electricity taxes).	Horizon 2020	Building energy efficiency (including building envelope, space heating, domestic hot water, and ventilation upgrades)	SUNShiNE: Investment: €3.6 (8 projects) Energy savings: 2.5 GWh/y Accelerate SUNShiNE: Investment: €41M Energy savings: 6.7 GWh/y	Procedure with negotiations	100% ESCO (Financing to RenESCO was provided by local commercial banks (60%) in combination with third party guaranteed loan (40% from the Dutch Housing Institute based on project cash flows., forfeiting arrangement through LABEEF)

OTHER RELEVANT PROJECTS AND RESOURCES

Project Title	Funding Source	Project Focus Area(s)	Project Summary
Energy Efficiency Financial Institutions Group (EEFIG) Underwriting Toolkit	European Commission Directorate-General for Energy and UNEP FI	Financing	EEFIG creates an 'open dialogue and work platform for public and private financial institutions, industry representatives and sector experts to identify the barriers to the long-term financing for EE and propose policy and market solutions to them'.[58] EEFIG has published an underwriting toolkit for value and risk appraisal for EE financing. The toolkit helps financial institutions evaluate value and risks and provides a common framework for EE projects to attract external capital and foster a common language between financial institutions, project owners and project developers. It details types of risks and mitigation measures and provides a pre-financing due diligence checklist.
European Fund for Strategic Investments (EFSI)	European Regional Development Fund (ERDF)	Financing	EFSI has loan and GuarantEE products which can help cover the performance and credit risks in an EPC. These resources can be used to support EPC providers (ESCOs) in securing funding supporting forfeiting contracts.
Financing Energy Efficiency using Private Investments (F-PI)	Horizon 2020	Financing	The F-PI project aims to promote and speed up the development of private investments in energy efficiency, sustainable mobility and self-consumption. It provides technical assistance to financiers and investors, designing standardised processes to create and analyse project portfolios. It aims to increase confidence and encourage contact between project promoters and investors and aid project developers and promoters to find funding. The project aims to trigger €30 million in investments in sustainable energy through planned actions and proper procedures.
Investor Confidence Project Europe (ICPEU)	Horizon 2020	Financing	The Investor Confidence Project Europe (ICPEU) defines a clear roadmap from retrofit opportunity to reliable Investor Ready Energy Efficiency™. ICPEU reduces transaction costs by assembling existing standards and practices into a transparent process that promotes efficient markets by increasing confidence in EE outcomes and supports best practices standards, tools and methodologies already exist in the market, adaptable to different project complexities. The ICPEU has a guide for project development which details the protocols and associated quality assurance methods at the following stages of the project development process: Baseline,

[58] Energy Efficiency Financial Institutions Group, "EEFIG Underwriting Toolkit: Value and risk appraisal for energy efficiency financing," 2017. [Online] Available: https://www.unepfi.org/wordpress/wp-content/uploads/2017/06/EEFIG_Underwriting_Toolkit_June_2017.pdf. [Accessed 13 12 2021].

			Savings calculation, Design, Construction and Verification, Operations, Maintenance and Monitoring and Measurement and Verification (M&V).
Multiple Benefits of Energy Efficiency (M-BENEFITS)	Horizon 2020	Communicatio n	The Multiple Benefits of Energy Efficiency project aims to include the multiple benefits of energy efficiency in investment decisions of companies to increase the deployment of cost-effective energy savings potentials. It provides best-practice examples, tools and training on the importance of multiple benefits for investment decisions in companies, thereby addressing all relevant decision makers.
Private Finance for Energy Efficiency (PF4EE)	European Investment Bank (EIB) and European Commission	Financing	The PF4EE instrument aims to 'address the limited access to adequate and affordable commercial financing for EE investments'.[59] The instrument has two core objectives: make EE lending more sustainable within European financial institutions, and to increase the availability of debt financing to EE efficiency investments. It does this by creating a risk sharing facility, together with long term financing from the EIB (EIB Loan for Energy Efficiency) and provides expert support services for the Financial Intermediaries. It currently has not been implemented in Ireland.
QualitEE	Horizon 2020	Quality; Technical; Financing; Procurement	The Quality certification frameworks for Energy Efficiency services to scale up responsible investment in the building sector (QualitEE) project was led by E7 Energy Innovation and Engineering in Austria and involves 12 partner organisations across Europe. It aims to use quality assessment criteria and quality assurance schemes to improve trust in service providers and hence increase investment in EES. In total, €33 million euros has been invested in 28 pilot projects in various EES which tested the quality criteria and assurance procedures, resulting in savings of 33 GWh/year of primary energy savings. The QualitEE project has published technical, financial and procurement criteria that may be useful tools to inform the DeliverEE structure.
REFINE	Horizon 2020	Financing	The REFINE project is led by E7 Energy Innovation and Engineering in Austria. The objectives of the project are to enhance the refinanceability of EES projects and amplify the use of refinancing schemes in EES business practice. It also aims to reduce the transaction costs of refinancing schemes through standardisation. The project offers guidance to market facilitators for the assessment of the refinanceability of EES projects.
Sustainable Energy Authority Ireland (SEAI)	Irish government al body	Technical; Procurement	SEAI developed the National Energy Services Framework (NESF) to support the non-domestic energy efficiency market in Ireland. The framework defines a pathway through which energy efficiency projects and energy contracting processes are developed, and provides sample contracts and other guides and documentation. SEAI have also published the Community Energy Resource Toolkits, which provides practical guidance to support project development and delivery of community energy projects.

[59] European Investment Bank, "Private Finance for Energy Efficiency (PF4EE)" [Online]. Available: https://www.eib.org/en/products/mandates-partnerships/pf4ee/index.htm. [Accessed 13 12 2021].

TransparENSE	Intelligent Energy Europe Programme	Quality	The TransparENSE project developed the Code of Conduct for EPC. It defines critical values and principles that signatories pledge to adhere to, however it is a voluntary scheme.
Triple-A	Horizon 2020	Financing; Risk	The Triple-A project aims to make EE investments more transparent, predictable and attractive for investors and project developers. It seeks to overcome the challenge of identifying which investments can be considered Triple-A from the pre-selection stages of a project. The scheme focuses on answering the following questions with corresponding tools: ● How to assess financing instruments and risks at an early stage? ○ Assess tool: Member states risk profiles and mitigation policies ● How to agree on Triple-A investments, based on key performance indicators? ○ Agree tool: Standardised triple-A tools, efficient benchmarks ● How to assign the identified investment ideas with possible financing schemes? ○ Assign tool: In-country demonstrations, replicability and overall exploitation The tool has been adapted to several EU states, however does not yet include Ireland.

Appendix 3– Interview Reports

INTERVIEW 1: ADEME

Project	BAPAURA
Organisation	ADEME
Interviewee	Marie Jeanmougin
Summary	The BAPAURA project aim at creating local one stop shops. They collaborate with nine local partners, each of which cover a small part of the region. The objective of the project is the investment of €23 Million in EE upgrades. The BAPAURA project creates a toolbox and coordinates training for partners (local energy agencies). The tools are created in response to partner needs, and knowledge is shared between partners however there is no standardised project development process. The projects are typically deep refurbishment projects (aim for at least 30% energy savings) which focus on EE and include EPCs.

Key Learnings	• Financing
	  ○ Project funding is split between municipalities and grant funding- it is difficult to have private investment in the public sector in France
	  ○ Project has created an excel tool for financial analysis of EE and another tool to analyse the impact of financing on municipal budgets
	  ○ Big projects will always have big investment, long return on investment- municipality stakeholders need to be reassured about their debt
	  ○ BAPAURA have abandoned the use of ROI, as it is always very long on deep refurbishment projects and it usually leads to projects being simplified
	• Aggregation
	  ○ Private consultancies often don't want to bother with smaller municipalities
	  ○ Aggregation depends on the municipalities. None of the BAPAURA projects have been bundled but BAPAURA have released a bundling guide
	• Communication
	  ○ A lot of the municipalities are not driven by energy efficiency
	  ○ Projects are usually generated by the municipalities, advice sought from BAPAURA for facilitation

INTERVIEW 2: GOPARITY

Project	BundleUp; BundleUp NEXT
Organisation	GoParity
Interviewee	Manuel Nina
Summary	The BundleUP project started in 2018, and supported five energy agencies which covered approximately 20% of the Portuguese population. The energy agencies were responsible for providing support and guidance to local public and private EE clients. The BundleUp NEXT project began in September 2021 and operates at a national level, covering all of Portugal's energy agencies. It facilitates EE projects, including around 4-5 public lighting EPC projects worth over €10 million. So far there have been approximately €44million of contracted projects, of which there were around 45 smaller projects around €2 million in total (€50-100k each). The BundleUp projects train the municipalities on how to deliver EPC projects, including legal and communication aspects. In the beginning, the projects were mostly grant funded, but once it was established that there was market readiness the grant funding ended. The projects are now funded with a mix of municipality funds and crowd lending.

Key Learnings	• Communication
	  ○ It is important to instil confidence in municipal top management
	  ○ Built trust from bottom up- technical departments of municipalities talked to technical people from Energy Agencies, then brought the lawyers in once trust was established
	• Financing
	  ○ Crowd funding loans are adjusted to savings that buildings can have- can lend to any EU country
	• Aggregation
	  ○ Idea at beginning was to bundle into packages and get funding, but then began to realise that small projects could be crowdfunded (ie. Not all projects had to be aggregated)
	  ○ Tried to do trans municipal EPCs as it would make sense to bundle projects together, but there was a solidarity clause causing all other municipalities to pay if one municipality defaulted, so the municipalities rejected this idea as they did not want to take on that risk

INTERVIEW 3: FACTOR 4

Project	N/A
Organisation	Factor 4
Interviewee	Johan Coolen

Key Learnings	• EPC Market
	  ○ From the Belgian perspective, it is difficult to convince municipalities of neutrality coming from a private organisation- this is where being a not-for-profit facilitator is an advantage
	• Maintenance
	  ○ Residual value concept incentivises long term investments but uses short term contract
	  ○ ESCOs cant afford to do poor maintenance as it will affect the residual value
	  ○ Use Ci/sfB code for building components to define what ESCo has to maintain, score maintenance quality of each element at beginning and end of project to calculate residual value
	• Procurement
	  ○ Factor 4 use competitive procedure with negotiation as it is relatively quick- best case around 5-7 months in total
	• Financing
	  ○ Factor 4 projects use 100% public funds- Belgian local governments are not restricted by debt but by capacity to pay back debt- projects are bankable as long as savings cover debt payments (off balance sheet financing not required)
	  ○ Factor 4 uses malus instead of penalties for ESCOs not meeting targets- penalties apply when the ESCO has breached the contract

INTERVIEW 4: FUNDING FOR FUTURE

Project	SUNShiNE; Accelerate SUNShiNE; FinEERGo-DOM
Organisation	Funding For Future
Interviewee	Nicholas Stancioff, Lasma Zaikovska
Summary	The LABEEF model began as a way to enable EE in Latvia, and now has partners in 10 countries. The objective is to take projects off the balance sheet of SMEs and separate business and financial risks. The projects Accelerate SUNShiNE and FinEERGo-DOM use

	the LABEEF fund to develop holistic, deep renovation projects, making sure buildings are safe, healthy and comfortable for residents. In a BEEF forfeiting arrangement, the ESCO funds the construction, and the guaranteed payments are then forfeited to the BEEF following a period where the ESCO proves savings. The projects use the Sunshine web-based platform, which ultimately aims to be a tool to connect stakeholders, ESCOs and financiers throughout the project development process.

Key Learnings	• Financing
	  ○ Financers want standardised projects
	  ○ Finance is still too expensive for the risk that they're taking
	  ○ Projects currently don't move without subsidy- there is a 50% grant contribution
	• Standardisation
	  ○ For standardisation process there are requirements ESCO needs to meet (e.g. financial viability, expertise) and requirements for building (e.g. not too much debt)
	• Contract structure
	  ○ Maintenance company can be contractually distinct from ESCO in some cases (triparty agreement), other cases they are the same
	  ○ Energy measures and service should be in the same contract
	• Risk
	  ○ Standard utility default risk rather than credit risk
	• Procurement
	  ○ Outcome based procurement is key
	• Legal
	  ○ Model has seen no significant legal disputes so far
	• Key challenges:
	  ○ Convincing policy makers of the solution
	  ○ Aligning stakeholders (government, local government, business)
	  ○ Create scale of investment to attract large institutional investors

INTERVIEW 5: ENERGY CENTRE BRATISLAVA

Project	N/A
Organisation	Energy Centre Bratislava

Interviewee	Marcel Lauko
Summary	Energy Centre Bratislava (ECB) acts as a private project facilitator for EPCs in Slovakia, within the private and public sectors.

Key Learnings	• Slovakian EPC Market
	  ○ Mandatory use of Eurostat approved contract has slowed market down
	• Procurement
	  ○ Use open procedure, have used competitive dialogue in past for more complicated projects
	  ○ Maintenance usually the responsibility of the client, although ESCO companies are quite interested in maintenance and operation- usually in a separate contract
	  ○ In public sector it is still more of a works contract; private sector incorporates service to a greater extent
	• EPC Facilitation process
	  ○ Identification of possible project, might have assistance from ESCOs
	  ○ Then simplified energy audit usually done by consultant
	  ○ Propose framework for identified measures- some are obligatory, some up to ESCO, some areas that are barred (e.g. due to legal, technical limitations)
	  ○ Open procedure procurement- ESCO companies propose solutions, price, level of savings. Evaluated as a ratio of cost and guaranteed savings (weighted ratio- 55-60% for savings, 40-45% for costs). Client specifies minimum level of savings.
	  ○ Initial technical analysis is fairly detailed but ESCOs also visit buildings and do their own analysis. If they identify wrong information, they may open negotiation with client abut errors
	• ESCO market
	  ○ ESCOs in Slovakia are usually dedicated ESCOs- small organisations, act as system integrators, engineering professionals who focus on optimisation
	  ○ Larger ESCOs exited market in Central Europe- it may be more effective for these ESCOs to be subcontractors
	  ○ In recent years facilities management companies are more active in area
	• Communication

	○ Changing personnel- Haven't had problem with changing personnel in past ○ Contract management- ESCO in charge of communication with building management. ECB's involvement usually ends after contract signing due to lack of client interest in M&V process ● Aggregation ○ No experience with bundling between municipalities- difficult when there are different sized buildings because savings from one can be used for another ○ They have bundled projects within same municipality ○ No rules for bundling- just an economic assessment ○ For Bratislava city, there were 100 buildings- took one from top, one from bottom in terms of profitability/expected savings- worked well for some municipalities but not in Bratislava for other reasons

INTERVIEW 6: JOSEF STEFAN INSTITUT

Project	PM4PM, EOL
Organisation	Josef Stefan Institut
Interviewee	Damir Stancic
Summary	The Josef Stefan Institut has been involved in the facilitation of several EPC projects in Slovenia, including the PM4PM and EOL projects. These projects target deep renovations and are usually around 15 years.
Key Learnings	● Aggregation ○ Haven't succeeded to aggregate between municipalities or by technology type (this is difficult when targeting deep renovation) ○ More important to focus on building holistically, combine buildings rather than technology ○ Have most success with bottom up aggregation ● Maintenance ○ Predict maintenance investments in contract- residual value is too tricky ● Financing ○ Trying to set up revolving fund/SPV ▪ Insurance company invests, ESCO performs works, have an additional contract for services and sell the works contract to SPV, ESCO retain service contract

	○ Interested by LABEEF model but don't know how to implement it for public/private sector, need a large amount of money ○ Confirmed at EU level that blending private and public money is the only way to reach targets ● Communication ○ no real challenges in contract management so far, ESCO obliged to perform training

INTERVIEW 7: EUDITI AND CRES

Project	ProDeSA
Organisation	Euditi, CRES
Interviewee	Eva Athanaskou, Argyro Giakoumi
Summary	The ProDeSA project is coordinated by the City of Alimos with collaboration from other organisations including Euditi (private company) and CRES (Greek Energy Agency). There were seven participating municipalities in the project, five of which implemented projects and two of which were observers who produced a replication plan. The project aimed to demonstrate and establish a working model for facilitation for EPCs projects in Greece.
Key Learnings	● Key challenges: ○ Difficult to convince public administration not to do business as usual approach- national programmes have been tried in the past and have not been very successful ○ Building trust and confidence among municipalities ○ Persuading public sector that the private financing is beneficial- not only because it multiplies the output of their money but also secures savings and CO2 emissions reduction ○ Coming out of the financial crisis all buildings were underheated- so savings were small ● Aggregation ○ Bundling across municipalities wasn't possible because the mayors wanted to have a say in every step of the project, especially tenders (i.e. institutional barriers) ○ Bundled buildings within municipality ● Procurement

	○ Open procedure- couldn't use competitive dialogue procedure because of unfamiliarity, length of procurement process, and all municipalities wanted to have final say about interventions ● Financing ○ Needed public grants in order for interventions to be viable ○ Mix of funding splits in different projects due to different circumstances

INTERVIEW 8: GOLEA

Project	PM4PM
Organisation	GOLEA
Interviewee	Irena Pavliha
Summary	The GOLEA project developed €45 million worth of EE investments in the Primorska region in western Slovenia.
Key Learnings	● Aggregation ○ Larger municipalities (ie less project partners) is likely beneficial to reduce aggregation problems ○ All tenders were made separately in the end- tried to aggregate between municipalities but had problems with a municipality withdrawing, and the project became too small for the subsidy ○ No rules about aggregation within municipalities- just aggregated whatever happened to be available at the time (main aim was to reach the investment target) ● Financing ○ Grant money was crucial because municipalities made grant funded projects a priority ○ In the end some projects had a funding split of 51% ESCo, 49% grants, 1% municipality ● ESCO Market ○ ESCO market wasn't fully developed so didn't have real negotiations- in many cases had just one ESCO and had to take what they offered ● Contract Management ○ Important for municipalities to be on top of contracts, but also to have an independent entity like GOLEA ○ It is important to establish good supervision and communication in the first few years of the contract, will

	have less work down the line- important to envisage how the contract will play out from the very beginning ● Other ○ Many municipalities did shallow works and locked in poor performance which was a problem ○ Carbon targets- GOLEA used carbon footprint as a basis for evaluating bids in a district heating project- encouraged local ESCOs

INTERVIEW 9: GRAZ ENERGY AGENCY

Project	BEAM-Graz; GuarantEE
Organisation	Graz Energy Agency
Interviewee	Reinhard Ungerbock
Summary	Since BEAM Graz, the demand for EPCs in Austria has dwindled. There were multiple projects in Austria which encountered different problems and clients are now reluctant to take them on.
Key Learnings	● EPC Marketing ○ Although you can try to sell EPC as a works and services contract, in RU's experience, most clients choose EPC due to lack of financing ○ Not selling it as a finance tool but as a method to integrate private financing in public contracts ○ Client may not be demanding long term benefits/maintenance contracts ● Procurement ○ Stop ESCOs from just going for low hanging fruit by introducing mandatory measures ○ Use competitive procedure with negotiation, output specifications ○ Negotiate technical measures as well as figures during negotiation process ● Financing ○ Use 100% ESCO financing (sometimes client contributes), then forfeiting ○ 'Desktop ESCOs' present risk because they can declare bankruptcy If something goes wrong, and FIs don't have securitisation ▪ There aren't any FIs that will take on performance risk ▪ This isn't a problem if there is no forfeiting ● Communication

	○ Communication important, have to deal with demands of client, in this case a detailed analysis of client useful to see what are his real problems ○ Multiple benefits of energy efficiency- dealt with industry, how to prepare investment decision- address top management and if they are convinced, need technical partners ○ Energy manager in industry are quite weak- only responsible for energy and infrastructure – need strong support from top management- same for EPC

INTERVIEW 10: TYNDALL INSTITUTE

Project	SmartSPIN
Organisation	Tyndall Institute
Interviewee	Luciano De Tommasi; Ruchi Agrawal
Summary	The SmartSPIN project aims to address the split incentive problem in the commercial rented sector. It aims to develop an automated M&V approach and a business model for EE projects within the commercial rented sector and test contractual templates in pilot sites in Ireland, Spain and Greece.
Key Learnings	● SmartSPIN project has just begun and focuses on technology side and business models for the commercial rented sector- may not be directly relevant to DeliveREE but will be useful to follow learnings and developments throughout project

INTERVIEW 11: NTMA

Project	N/A
Organisation	NTMA
Interviewee	Louise Mulcahy
Summary	The National Treasury Management Agency (NTMA) encompasses the NTMA and the National Development Finance Agency (NDFA), which focuses primarily on Public Private Partnerships (PPPs) but also financial advisory to general infrastructure projects. The NTMA is currently reviewing EPCs with SEAI.
Key Learnings	● Irish EPC market ○ Very developmental, hasn't been sustained ○ Few ESCOs in market ● EPC Obstacles ○ Uneducated clients

	○ High perceived risk ○ Cash flows are not actually revenue ○ Assets cannot be secured ○ Regulatory issues around forfeiting ○ High cost of capital because combination of project risk and entity risk ○ Energy savings insurance market dried up ● Scaling up the market ○ Need pipeline, pilots and proof of concept ▪ Need to demystify perceived risk ▪ Need to get reference data ○ Need facilitators ○ Challenge will be smaller end of market, need aggregation and standardisation ○ Need a dedicated funding structure to take out some of the risk, lower the cost of capital ▪ Needs to be portfolio based ▪ Maybe first loss structure/insurance ○ Can start on balance sheet, get the ball rolling with public funds, but will need off balance sheet for larger projects ▪ Need to make sure funding fuels the ESCO market ○ None of these barriers are new, just need to figure out how to get around them. Plenty of capital out there- just need to access it ○ Need enough investment from ESCOs that they will not walk away from a project if it goes badly

INTERVIEW 12: CARBON AND ENERGY FUND

Project	N/A
Organisation	Carbon and Energy Fund
Interviewee	Edel Wyse
Summary	The Carbon and Energy Fund act as a facilitator for large projects (mainly hospital) across the UK and Ireland.
Key Learnings	● Irish market ○ Lack of confidence in Ireland about EPC ○ still seems to be mixed understanding of EPC ● Procurement ○ Outcome based procurement- seen good innovations from this

	○ Pre-procure a framework of contractors, Mini-competition before go out to tender ● Contract structure ○ Typically 15 to 20 year contracts- allows whole lifecycle of equipment to be transferred to contractor ○ Most organisations they deal with in Ireland with want to keep contracts off balance sheet ○ Continued investment during services period ● Communication ○ Do need a champion- always recommend that SRO has a seat on the board and is engaged ○ Helpful to have a paper trail- record everything ● Maintenance ○ Arranged on a contract-by-contract basis ○ Has to be a very clear demarcation point ○ ESCOs work very well together with clients ● Finance ○ EPC is not just a financial tool, performance aspect can include carbon savings as well ○ Nearly all projects in Ireland are off balance sheet ○ Offer 3 options- members can fund themselves, ESCOs can introduce funding, CEF finds funder that is willing to support ESCO ○ If project is being externally funded, it is important to bring in financers early on

INTERVIEW 13: LAWLER SUSTAINABILITY

Project	N/A
Organisation	Lawler Sustainability
Interviewee	Daniel Ring
Summary	Lawler Sustainability are an ESCO that have been involved in a number of Irish public sector EPC projects. They are also part of the advisory board.
Key Learnings	● Uncertain at the moment due to financing- will be very constrained if financing doesn't come on board ● If Lawler Sustainability cannot offload projects from their balance sheet they are curtailed in what they can deliver ● Private clients have finance but this market will probably dry up too if other financing mechanisms aren't leveraged

	• Not many ESCOs coming into the space- some have actually left. Likely players to enter market will be blended SMEs • EPC projects attractive to Lawler Sustainability as it gives business huge resilience, early lens on tech, legislation, etc. • See investors triggering market • Investor led approach may be possible, but aggregation will still be required • Almost need to frame EPCs as PPPs- people are familiar with these • Phased installation could be possible- depends on organisational agenda to determine direction • EPC model brought Lawler Sustainability more into maintenance sector • Lawler Sustainability never felt the need for energy savings insurance, but think it might become important

INTERVIEW 14: CENTRICA

Project	N/A
Organisation	Centrica
Interviewee	Brendan Marren
Summary	Centrica have been involved in a number of EPC projects including currently the recently awarded Tallaght University Hospital EPC project.

Key Learnings	• Aggregation would be crucial to project attractiveness- a larger project would provide a more feasible margin to work with
	• Uncertainty, e.g. clients cancelling projects will damage trust with ESCOs- ESCOs need confidence to put in work without any upfront payment
	• Investment costs are very high
	  ○ Not sure if there is a better way to do this- because ESCO should be taking on technical risk, but this requires a lot of upfront work
	  ○ Could be some kind of mechanism that pays back losing tenderers, or target pricing (NEC)
	  ○ Internally within the ESCO there is not a shortage of projects so the traditional projects are likely to win out
	• Financing has become easier in the last few year- rates have decreased

	• ESCOs don't want to do a job that locks in bad investments • ESCO market in Ireland is small- only a handful of players

Appendix 4– Detailed Gap Analysis

Project Stage	Tool Owner	Tool	Project Stream(s)	Current State	Gap Description	Recommendations
Procedural Area: Communication						
Stage 0: Project Identification	GuarantEE	EPC Pre-assessment tool	Building Energy Efficiency	Quiz to pre-assess if a building is suitable for an EPC project	Not incorporated with DeliveREE process, only for Building Energy Efficiency	Ensure these processes are captured in Stage 0 Protocol
	ISO	ISO50001:2018	All	Applied in Local Authorities to identify energy upgrade opportunities	Communication gap between Local Authority project identification process and DeliveREE PIU	
	Internal	Project Identification and Initial Appraisal template	All	Internal project management template to document project justification, scope, time management, budget, resources, risks and documentation	Not specific to DeliveREE process	Create Project Initial Appraisal specific to DeliveREE process
Stage 1: Project Stream Identification	N/A	N/A	N/A	N/A	N/A	Develop decision making tree for categorising projects into the different project streams. Tool to be combined for all key procedural areas
Stage 2: Standardisation	Internal	Project Management Plan template	All	Internal project management template to document project justification, scope, time management, budget, resources, risks and documentation	Not a tool for internal communications tracking	Use tools from Project Management Plan to inform creation of an internal tool for communication tracking and stakeholder analysis
Stage 3: Aggregation	ISO50001:2018	Section 7	All	Details the requirements for resources, competence, awareness, communication, and documented information for an Energy Management System (EnMS)	Subject matter relates to Energy Management Systems (EnMS), not specific to project development stage, not in protocol/checklist form	Create Project Detailed Appraisal that is specific to DeliveREE process using identified tools/resources as a basis. Adapt guide to be EPC specific and cover all project streams Stakeholder engagement should

Project Stage	Tool Owner	Tool	Project Stream(s)	Current State	Gap Description	Recommendations
	Carbon Trust	Stakeholder Engagement in Heat Networks	District Heating	Describes stakeholder engagement at each stage of a district heating project	Guide is not EPC specific and does not cover all project streams	cover identification of and alignment with client needs/motivations, communication with building management communication of benefits of EPC to senior management, record keeping, engagement outside project partners
	Multiple Benefits of Energy Efficiency	Tips and solutions for effective communication to decision-makers	All	Describes communication tips for engaging with clients about the multiple benefits of energy efficiency	Tips- Not a comprehensive communication guide	
	Internal	Project Management Plan template	All	Internal project management template to document project justification, scope, time management, budget, resources, risks and documentation	Not specific to DeliveREE process	
Stage 4: Procurement and Financing Protocols	QualitEE	Guidelines of European Technical Quality Criteria for Energy Efficiency Projects; QC 6, 8	All	Assesses whether communication channels and tools have been adequately set up and adhered to, information about the project and EE measures is distributed to users	May not account for all project types, not specific to DeliveREE process	Create checklist using QualitEE technical guidelines as a starting point, accounting for all project types and the DeliveREE project delivery structure
	N/A	N/A	N/A	N/A	N/A	Update Communication Procedure to include engagement with Client procurement and financing departments and signalling and explanation of EnPC to market
Stage 5: Contract Management and M&V	QualitEE	Guidelines of European Technical Quality Criteria for Energy Efficiency Projects; QC 6, 8	All	Assesses whether communication channels and tools have been adequately set up and adhered to, information about the project and EE measures is distributed to users	Communication quality criteria rather than communication plan	Update Communication Procedure to be relevant to EPC project implementation, using QualitEE criteria to inform process. Consider all communications channels. Create record keeping tool to record all decisions, maintenance reports, etc.

Project Stage	Tool Owner	Tool	Project Stream(s)	Current State	Gap Description	Recommendations
	OECD	Tool: Checklist for record keeping	All	Describes what records should be kept during traditional procurement process	For open procedure	Use tool to inform development of record keeping checklist for competitive dialogue procedure
Technical						
Stage 0: Project Identification	Internal	Project identification and initial appraisal		Pre-assessment of project suitability	Does not assess all project types	Create tool that pre-analyses all project types Incorporate tool into procedure to ensure all relevant information is collected
Stage 1: Project Stream Identification	N/A	N/A	N/A	N/A	N/A	Develop decision making tree for categorising projects into the different project streams. Tool to be combined for all key procedural areas
Stage 2: Standardisation	International Standards Organisation	ISO50002: 2015	Building Energy Efficiency	International standard for energy auditing		Tools to inform requirements for Pathway to Net Zero audits. Use standards and directives to ensure that the relevant data collection and analysis has been conducted to feed into investment grade audit, inform development of the technical pre-assessment
	CEN/CENELEC	EN 16247:2012		European Standard for energy auditing		
	QualitEE	Guidelines of European Technical Quality Criteria for Energy Efficiency Projects; QC 1 Adequate Analysis		Assessment criteria for high level analysis of energy flows	Provides outline of required analysis (does not go into detail)	
	SEAI	Energy Audit Handbook		Describes Irish Energy Auditing process	Only additional guidance	
	Internal	Checklist, investment grade audit tender brief		Checklist for audit requirements, investment grade audit tender brief	Does not include pathway to zero requirements	
	SEAI	Community Energy Resource Toolkits	Renewable Energy	Explains grid connection process, onshore wind development process, general planning process and solar PV development process	Not specific to DeliveREE process- need criteria for feasibility studies and technical assessment	Tools to be inform creation of feasibility study requirements and technical assessment

Project Stage	Tool Owner	Tool	Project Stream(s)	Current State	Gap Description	Recommendations
				for community scale renewable energy projects		
	Codema, IrBEA	A Guide to District Heating in Ireland	District Heating	Explains DH benefits, barriers, design, etc	Not specific to DeliveREE process- need criteria for feasibility studies and technical assessment	Create District Heating technical pre-assessment protocol.
	UKEVSE, Western Power Distribution	A guide on electric vehicle charging and DNO engagement for local authorities	Low Carbon Transport	Explains design considerations for electric vehicle charging	Not specific to Ireland, not specific to DeliveREE- - need criteria for feasibility studies and technical assessment	Create Low Carbon Transport technical pre-assessment protocol.
	Streetlight EPC	Quick check street lighting: Guide	Public lighting	Specific technical considerations for street lighting projects	Not completed technical checklist	Create Public Lighting technical pre-assessment protocol.
Stage 3: Aggregation	RenoWatt/ CITYnvest	A guide for the launch of a One Stop Shop on Energy Retrofitting	Building Energy Efficiency	High level methodology for aggregation	Lacks detailed aggregation procedures	Create tool to group projects based on market capability and financial metrics
Stage 4: Procurement and Financing Protocols	QualitEE	Guidelines of European Technical Quality Criteria for Energy Efficiency Projects: QC 2-5, 7	Building Energy Efficiency	Designed to assess quality of implementation of energy efficiency measures, whether requirements for guaranteed savings are met, M&V process and calculations, value retention and maintenance, compliance with user comfort requirements	Not specific to DeliveREE. May be missing relevant checks and specific to Building Energy Efficiency	Create checklist for technical representative of PIU procurement team, considering all project types. This should result in definition of scope/technical boundaries which can be used to create an output specification.
	ICP	Project Development Specification		Contains protocol and checklist for relevant documentation to be included in tender by ESCo specific for Tertiary buildings of different sizes	Not specific to DeliveREE. Only includes Building Energy Efficiency	

Project Stage	Tool Owner	Tool	Project Stream(s)	Current State	Gap Description	Recommendations
Stage 5: Contract Management and M&V	QualitEE	Guidelines of European Technical Quality Criteria for Energy Efficiency Projects; QC 2-5, 7	Building Energy Efficiency	Designed to assess quality of implementation of energy efficiency measures, whether requirements for guaranteed savings are met, M&V process and calculations, value retention and maintenance, compliance with user comfort requirements	Not relevant to all project types	Create contract management and M&V technical checklist relevant to all project types, including: - M&V oversight - Repair - Updating of asset register - Monthly Payment Calculation Template to be specific to DeliveREE process
	Internal	Monthly Payment Calculation Template	All	Excel template which is formulated to calculate the monthly balancing payments during the guarantee period	Template not specific to DeliveREE process	
	IPMVP	IPMVP Core Concepts	All	Internationally recognised M&V process	Not adapted to DeliveREE	
Risk						
Stage 0: Project Identification	N/A	N/A	N/A	N/A	N/A	Ensure Risks are captured in Technical pre-assessment tool
Stage 1: Project Stream Identification	N/A	N/A	N/A	N/A	N/A	Develop decision making tree for categorising projects into the different project streams. Tool to be combined for all key procedural areas
Stage 2: Standardisation	Internal	Risk assessment tool	All	Describes and allocates project risks	Does not have a comprehensive list of project risks	Expand and develop internal risk tool to include EEFIG, SEAI and Triple A considerations
	EEFIG	EEFIG Underwriting Toolkit	All	Describes types of risks to be considered for the financial underwriting process	Risks are specific to underwriting process	
	SEAI	Risk Management Guide	All	Describes risk management process, risk registers and risk categories	May not consider all financial risks	
	Triple-A	Assess tool	All	Assesses investment risks according to quantitative criteria	Quantitative tool specific to Triple-A process	

Project Stage	Tool Owner	Tool	Project Stream(s)	Current State	Gap Description	Recommendations
Stage 3: Aggregation	N/A	N/A	N/A	N/A	N/A	Update risk assessment tool to consider aggregation of projects
Stage 4: Procurement and Financing Protocols	QualitEE	Quality Criteria for Financing of Energy Efficiency Projects QC 1-5		Quality criteria for assessing financing risks	Only considers financing risks	Update risk assessment tool to consider procurement and financing
Stage 5: Contract Management and M&V	N/A	N/A	N/A	N/A	N/A	Update risk assessment tool to consider project implementation process
Procurement						
Stage 0: Project Identification	N/A	N/A	N/A	N/A	N/A	Ensure procurement considerations are captured in Technical pre-assessment tool
Stage 1: Project Stream Identification	N/A	N/A	N/A	N/A	N/A	Develop decision making tree for categorising projects into the different project streams. Tool to be combined for all key procedural areas
Stage 2: Standardisation	N/A	N/A	N/A	N/A	N/A	Create procedure to identify most suitable procurement approach for each project
Stage 3: Aggregation	N/A	N/A	N/A	N/A	N/A	Update procedure to identify most suitable procurement approach for each lot Add aggregation checklist, including assessment of suitability of contract consortiums
Stage 4: Procurement and Financing Protocols	Office of Government Procurement (Ireland)	Public Procurement Guidelines for Goods and Services	All	Guidelines for best practice and consistent application of public procurement rules in Ireland (including competitive dialogue)	Not specific to performance based contracting	Create procurement assessment checklist, adapting existing resources to be DeliveREE-specific
	Office of Government	Public Procurement Checklist	All	Checklist for public procurement process	Not specific to performance based contracting	

Project Stage	Tool Owner	Tool	Project Stream(s)	Current State	Gap Description	Recommendations
	Procurement (Ireland)					
	QualitEE	Procurement Handbook for Energy Efficiency Services	Building Energy Efficiency	Details steps of competitive dialogue procurement procedures for Slovenia and France	Not specific to Ireland, mainly focuses on competitive procedure with negotiation	
	EESI2020	Standard EPC Documents- III. Public Tender	Building Energy Efficiency	Describes qualitative and quantitative tender assessment criteria, essentials of a tender dossier	Created in 2011; may not up to date with latest innovative projects Not in depth	
	REFINE	Refinancing of Energy Efficiency Services	All	Conceptual template of refinancing schemes and refinancing sample contract	Only relevant to projects that include refinancing	
	SEAI/NESF	Sample Energy Performance Contract	All	Modifiable EPC template contract with sections and schedules	May contain gaps compared to European best practice contracts	
	SEAI/NESF	EPC Contract Guidance	All	Guidance on how to use the sample Energy Performance Contract		
	SUNShiNE	EPC+ Contract templates	All	Modifiable EPC template contract with sections and schedules for several EU countries (excl. Ireland)	Not specific to Ireland	
	Internal	Tender document templates (PQQ, ITT ITPCD, etc)	Building Energy Efficiency	EPC/competitive dialogue procurement templates used in previous EnPC	Not specific to DeliveREE process, may contain areas for improvement	
	TransparENSE	European Code of Conduct for Energy Performance Contracting	All	Qualitative guidelines for conduct in Energy Performance Contracts	Qualitative conduct guidelines only- no procedures or processes	
Stage 5: Contract Management and M&V	N/A	N/A	N/A	N/A	N/A	N/A- Procurement procedures not required after contract signing
Finance						

Project Stage	Tool Owner	Tool	Project Stream(s)	Current State	Gap Description	Recommendations
Stage 0: Project Identification	N/A	N/A	N/A	N/A	N/A	Ensure financing considerations are captured in Technical pre-assessment tool
Stage 1: Project Stream Identification	N/A	N/A	N/A	N/A	N/A	Develop decision making tree for categorising projects into the different project streams. Tool to be combined for all key procedural areas
Stage 2: Standardisation	SEAI	EPC Financial Analysis tool	All	Tool for comparing financials of traditional contract vs EPC	Tool currently includes traditional contract evaluation	Create comprehensive financial analysis checklist, incorporating each project type
	EEFIG	EEFIG Underwriting Toolkit	All	Describes materials to be prepared in the acquisition or refinance of an existing building Describes types of risks to be considered for the financial underwriting process	Not specific to DeliveREE financing process	
	Triple-A	Assess and Agree tools	All	Assesses investment risks according to quantitative criteria	Currently only for member states of the project (which does not include Ireland) Not specific to DeliveREE process	
	ICP	IREE Certification	Building Energy Efficiency	Describes required procedures and project documentation for certification	Standalone process not yet incorporated in DeliveREE.	
Stage 3: Aggregation	SEAI	EPC Financial Analysis tool	All	Tool for comparing financials of traditional contract vs EPC	Tool currently includes traditional contract evaluation	
	Multiple Benefits of Energy Efficiency	MBs Identification and Evaluation Tools	All	Provides guidance on the communication and evaluation of the multiple benefits of energy efficiency	Not specific to DeliveREE, evaluation of multiple benefits to be adapted	Add multiple benefits analysis to detailed appraisal
Stage 4: Procurement	EEFIG	EEFIG Underwriting Toolkit- Value and Risk Appraisal Section	All	Describes types of risks to be considered for the financial underwriting process	Does not consider all quality assurance aspects	Create pre-contractual financing quality assurance checklist including due diligence checks on ESCo's

Project Stage	Tool Owner	Tool	Project Stream(s)	Current State	Gap Description	Recommendations
and Financing Protocols	Triple-A	Assign tool	All	Matches projects that have passed the first two tools with possible financing schemes	Not specific to DeliveREE, rigid Triple-A structure	ability to fund projects and Find a long term, scalable financing solution for the Irish market and develop associated contractual arrangements
	QualitEE	Quality Criteria for Financing of Energy Efficiency Projects QC 1-5	All	Describes the verification process of the M&V plan and cash flow calculations, risk sharing and savings incentives, exit strategies and contract termination, value and ownership of equipment, non energy benefits	Not comprehensive for financial quality assurance	
	REFINE	Refinancing of Energy Efficiency Services	All	Financial risk rating scheme	Only for refinancing services	
	ICP	IREE Certification	Building Energy Efficiency	Quality assurance of procedures and project documentation	Not specific to DeliveREE structure, does not include all project types	
	Eurostat and EIB	A guide to the statistical treatment of Energy Performance Contracts	All	Guidance on how to treat contract as on/off balance sheet according to contract structure	Only guide to on/off balance sheet, does not consider any other financial requirements	
	EEFIG	DEEP database	All	Open source database for energy efficiency investments performance monitoring and benchmarking	Only benchmarking tool, not many Irish projects to compare with	
Stage 5: Contract Management and M&V	EEFIG	EEFIG Underwriting Toolkit- Post-financing Section	All	Describes the required documentation to provide to the investor post financing	Does not consider all quality assurance aspects	Create post-contractual financing quality assurance checklist to follow on from pre-contractual checklist
	ICP	IREE Certification	Building Energy Efficiency	Procedures to ensure quality implementation	Not specific to DeliveREE structure, does not include all project types	
	QualitEE	Quality Criteria for Financing of Energy Efficiency Projects QC 1-5	All	Describes post-contractual quality assurance checks	Not comprehensive for financial quality assurance	
Legal						

Project Stage	Tool Owner	Tool	Project Stream(s)	Current State	Gap Description	Recommendations
Stage 0: Project Identification	N/A	N/A	N/A	N/A	N/A	Ensure legal considerations are captured in Technical pre-assessment tool
Stage 1: Project Stream Identification	N/A	N/A	N/A	N/A	N/A	Develop decision making tree for categorising projects into the different project streams. Tool to be combined for all key procedural areas
Stage 2: Standardisation	EU	Taxonomy Criteria	N/A	Assesses EU Taxonomy compliance	N/A	Develop contract selection procedure- combine with procurement procedure Ensure legal considerations are captured in standardisation process, e.g. EU Taxonomy compliance
Stage 3: Aggregation	N/A	N/A	N/A	N/A	N/A	Update contract selection procedure with relevant legal aggregation considerations
Stage 4: Procurement and Financing Protocols	QualitEE	Guidelines of European Technical Quality Criteria for Energy Efficiency Projects; QC 9	Building Energy Efficiency	Assesses whether relevant regulatory considerations are included in the contract	Only considers regulatory considerations, developed for Building Energy Efficiency measures	Create legal pre-contractual checklist, incorporating relevant QualitEE guidelines and Eurostat considerations
	QualitEE	Quality Criteria for Financing of Energy Efficiency Projects QC 3, 4	Building Energy Efficiency	Describes quality criteria for exit strategies and contract termination, value and ownership of equipment	Only considers the legal aspects from a financing quality assurance point of view, developed for Building Energy Efficiency measures	
	Eurostat and EIB	A guide to the statistical treatment of Energy Performance Contracts	All	Guidance on how to treat contract as on/off balance sheet according to contract structure	Only considers the on/off balance sheet issue	

Project Stage	Tool Owner	Tool	Project Stream(s)	Current State	Gap Description	Recommendations
Stage 5: Contract Management and M&V	QualitEE	Guidelines of European Technical Quality Criteria for Energy Efficiency Projects; QC 9	Building Energy Efficiency	Assesses whether relevant regulatory considerations are included in the contract	Only considers regulatory considerations, developed for Building Energy Efficiency measures	Create legal post-contractual checklist, incorporating relevant QualitEE guidelines
	QualitEE	Quality Criteria for Financing of Energy Efficiency Projects QC 3, 4	Building Energy Efficiency	Describes quality criteria for exit strategies and contract termination, value and ownership of equipment	Only considers the legal aspects from a financing quality assurance point of view, developed for Building Energy Efficiency measures	

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