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White Paper

PRODUCT-AS-A-SERVICE AND CIRCULARITY

DEVELOPING CONTRACT GUIDELINES FOR BUILDINGS IN EUROPE

Circular Buildings Coalition Blueprint Project

A blueprint project supported by CIRCULAR BUILDINGS COALITION

BASE

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About BASE
The Basel Agency for Sustainable Energy (BASE) is a Swiss not-for-profit foundation and Specialised Partner of the United Nations Environment. The expertise and mission of BASE is in developing innovative, actionable financial strategies and market-driven solutions to unlock investment in climate change solutions. BASE builds bridges between sectors and actors at the nexus between climate solutions, finance and international development. The actionable solutions that the foundation designs, develops and implements seek to be disruptive, self-sustaining and replicable.

About the global SET Alliance
The SET Alliance serves as a multi-stakeholder community of experts dedicated to furthering servitisation across sectors around the world. The focus of the Alliance is accelerating the use of service-based models for clean and energy-efficient technologies. The SET Alliance builds on the work completed by the Cooling-as-a-Service (CaaS) and the Efficiency-as-a-Service (EaaS) initiatives, both led by BASE since 2018 and 2020, with the support of the Clean Cooling Collaborative and the European Commission, respectively. The Alliance is made up of the secretariat (BASE), an esteemed steering committee (Kaer, Energy Partners Refrigeration, Atmosphere, Advanced Services Group, Aston Business School and Oxford University) comprising non-governmental organisations, private sector entities and academic institutions, and the Alliance's supporting members and outreach partners.

Acknowledgements: Circular Buildings Coalition
The circular buildings coalition is an initiative by Metabolic, Circle Economy, the World Business Council for Sustainable Development, the World Green Building Council, the Ellen MacArthur Foundation and Arup to accelerate the transition to a circular economy in the built environment. The coalition is funding the creation of this Blueprint Project.

DESCRIPTORS

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EXECUTIVE SUMMARY

The relevance of understanding and addressing environmental impacts, along with incorporating circularity, has significantly increased for businesses and financiers in the buildings and construction industry. These entities are confronted with various factors, including a changing regulatory landscape, shifting consumer demands, resource scarcity, rising costs, environmental concerns, supply-chain resilience and the pursuit of efficiency and sustainability goals.

Accelerating the integration of circular principles in the built environment can not only hasten decarbonisation but also enhance resource productivity, asset utilisation and overall value, providing social, environmental and economic benefits.

In the context of the built environment, Product-as-a-Service (PaaS) business models shift customer ownership to value-based consumption of products and systems. PaaS is particularly suited to the 'services layer' of buildings, covering mechanical, electrical and plumbing systems like lighting, cooling and heating, and it is a growing trend globally.

While PaaS is often recognised as a 'circular' business model, because ownership remains with dedicated providers, circularity and environmental impact reduction are not inherent; they require intentional design and adoption of specific practices. However, it remains unclear how best to transition to more circular PaaS models and there is still a lack of understanding of how circularity fits into PaaS contracts.

To tackle this challenge, the BASE foundation and the global Servitisation for Energy Transition (SET) Alliance are proposing the development of guidelines and contractual clauses. These resources aim to help stakeholders better understand and incorporate circular practices into PaaS contracts, focusing specifically on the services layer of buildings.

Developing the necessary capabilities and ecosystem to enhance the circularity of PaaS models is understood as an ongoing process requiring support. The main goal of this solution is to accelerate the shift towards more circular PaaS models used in the services layer of European building projects. This requires PaaS providers, customers and financiers — the key stakeholders involved in the model — to have a comprehensive understanding of circularity in relation to PaaS models and contract development.

This white paper details the feasibility study undertaken to assess existing PaaS offerings and contractual clauses, and reveals insights from engagement with key stakeholders. Through this analysis it was determined that the development of contract guidelines for PaaS can improve clarity among stakeholders, contribute to consensus-building and serve as a foundational tool for training, awareness, and potential benchmarking initiatives for PaaS offerings and their circular impacts.

Furthermore, it is envisaged that collaborative development of the guidelines with industry can stimulate further interest in the adoption of PaaS models for European building projects. The importance of capturing different stakeholder needs is also discussed, as are the risks and challenges associated with this solution.

Who should read this white paper?

This report is designed to support stakeholders interested in understanding and accelerating circular economy practices in building projects, focusing on PaaS models for equipment used in the services layer of buildings. The proposed solution of PaaS contract guidelines is especially relevant for:

- *Existing PaaS providers of equipment used in the services layer of buildings seeking to enhance circular practices and the reduction of environmental impacts.*

- *Established businesses or start-ups exploring the use of PaaS models for clean and energy-efficient technologies in buildings.*

- *Existing or potential customers of PaaS for equipment used in the services layer of buildings (e.g. building owners or real-estate developers) interested in enhancing circularity.*

- *Investors and financial institutions looking for a deeper understanding of PaaS business models and circularity and with an interest or experience in investing in PaaS projects.*

- *Policy makers and regulatory bodies aiming to promote the reduction of environmental impacts and accelerate circular business practices within the built environment.*

- *The wider business and research community with an interest in the implementation and development of PaaS as a circular business model.*

1. SOLUTION OVERVIEW

1.1 Introduction

Product-as-a-Service (PaaS) business models are recognised as an important solution for accelerating the circularity of buildings.[1] The PaaS business model is particularly well suited to the 'services' layer of buildings (see Figure 1), encompassing various mechanical, electrical and plumbing equipment, including smart energy systems, lighting, cooling and heating.

The use of PaaS for the services layer of buildings, for example 'Cooling-as-a-Service' or 'Lighting-as-a-Service', represents a growing trend globally. Under PaaS contracts, ownership and responsibility for systems remains with dedicated PaaS providers rather than customers. The shift in ownership and responsibility for products and systems is said to incentivise the capture of circular value, for example by using long-lasting and more efficient equipment to reduce maintenance and replacement costs and thus maximise value.

However, ensuring the reduction of environmental impacts and alignment with circular economy principles requires PaaS models to be intentionally designed with these practices in mind.[2] It remains unclear to what extent such aspects are currently taken into consideration, as this analysis is largely missing from prior work.
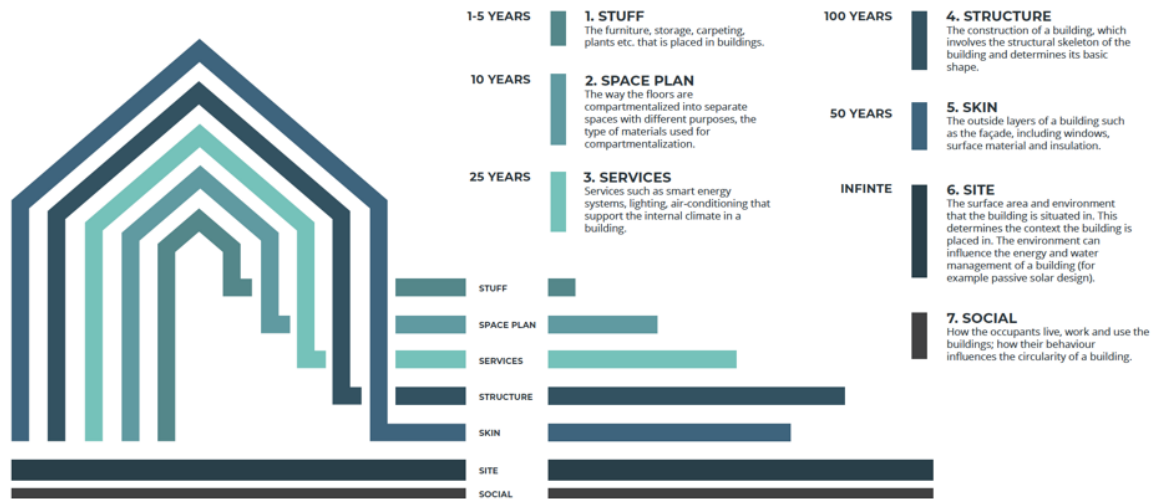
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Figure 1: The six material layers and seventh social layer of a building. Figure from WBCSD report: Scaling the circular built environment — pathways for business and government.[3]

Several useful resources discuss the actions needed to accelerate PaaS adoption more broadly,[4] as well as mapping critical challenges, risks and blind spots related to the use of the model and value chains.[5]

A wider body of literature also reflects on closely related concepts of 'advanced services' or 'product-service-systems (PSS), and highlights the real-world challenges of delivering services, including best practices for contract development.[6]

The potential of the model to reduce the environmental impacts of the cooling sector and to tackle access to cooling and gaps in cold chains has also been extensively explored.[7] For real-estate projects, the circular buildings Toolkit translates circular economy principles into a set of strategies and actions including the use of PaaS as an action aligned with maximising the value of a building and its components over time, as well as optimising the potential for value retention and value recovery.[8]

What is yet to be developed, however, are guidelines to support PaaS contract development that facilitate clarity and understanding around aspects of circularity. It is therefore an appropriate moment to reflect on existing PaaS offerings and to begin to evaluate how effectively they contribute to circularity, in order to identify steps that can be taken and potential opportunities to strengthen the circularity of these models.

BASE and the SET Alliance are proposing the development of such guidelines to assist stakeholders in better understanding and integrating circular practices into PaaS contracts. These guidelines focus on contract development for PaaS relating to the services layer of buildings, which is well suited to this model and capturing circular value (see Table 1).

The proposed guidelines will focus on supporting contract development for PaaS models in the context of European building projects, providing a tool for stakeholders to better understand how to enhance circularity within PaaS contracts and identify opportunities for further value creation and retention. Through identifying ways to embed circularity, these guidelines also seek to increase the interest and uptake of the PaaS model.

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		Longevity and Stability	Outcome Focused	Operational Performance	Material Recovery
		Lifespan with reasonable investment period (30-50 Yrs) High volume-to-value ratio	Ability to monitor direct impact of performance High rate of obsolescence	Use phase consumes resources (energy, water, materials) Requires regular maintenance and repair	Potential residual value Does not compromise functional completeness
Stuff	M–H	Medium	High	Mid-High	Mid-High
Space Plan	M	Mid-High	Mid-High	Low	Medium
Services	H	High	High	High	High
Structure	M	Mid-High	Low	Medium	Mid-High
Skin	M–H	High	Low-Medium	Mid-High	Mid-High
Site	L	Low	Low	Low	Low

Table 1: The suitability of PaaS for different building layers, where the services layer is assessed as highly suitable, according to the CBC report Towards a circular economy in the built environment: overcoming market, finance and ownership challenges. Other initiatives have focused on PaaS for layers such as 'skin' and 'stuff'.[9]

As an initial stage of developing this solution, BASE and the SET Alliance conducted an in-depth exploration of existing PaaS models and an analysis of which aspects of circularity are, or could be, embedded into PaaS contracts. The objective was to assess the feasibility of creating guidelines. This was undertaken through stakeholder discussions, the review of standardised contract clauses and the overall contract development process. Detailed insights and outcomes of this exploration are presented in Section 2 of this paper.

1.2 PaaS and Circularity

PaaS is often discussed as a circular business model, and this contributes to the increase in attention and recognition it is receiving as an alternative business model for different products and systems. For example, the EU has recognised PaaS for its potential significant contribution to circularity for selected economic activities under the EU Taxonomy reporting requirements for the Circular Economy.[10]

But how can circularity be considered in the context of PaaS models? To better understand the opportunities for enhancing circular PaaS models for equipment used in the services layer of buildings, we refer to the 'value hill' circular business strategy tool.[11]

The value hill is designed to provide companies with an understanding of their position as a business in a circular economy context, and to support the development of future strategies to enhance circularity (see Figure 2).
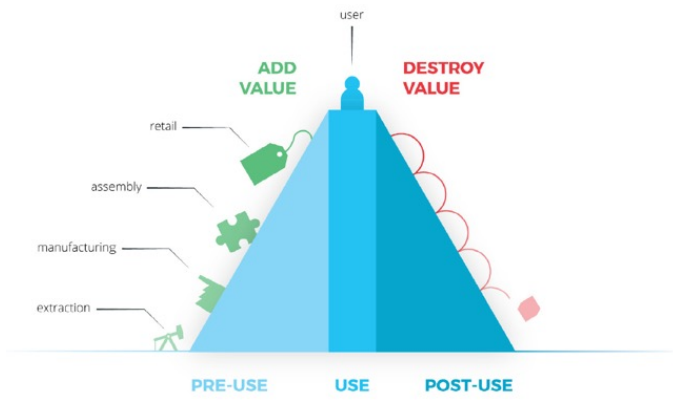
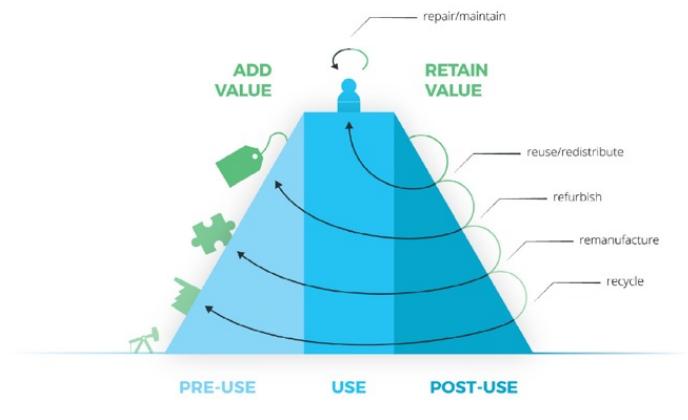**LINEAR BUSINESS MODELS**   **CIRCULAR BUSINESS MODELS**

Figure 2: The left-hand side represents the value hill of the linear economy, in which the use phase is shortened and potential value is lost and destroyed; on the right, the value hill integrates circular economy principles and practices of optimising use and retaining value. Taken from 'Master Circular Business with the Value Hill' developed by the Sustainable Finance Lab, Circle Economy, Nuovalente, TU Delft and Het Groene Brein.

Linear business models (left panel of Figure 2) for equipment used in the services layer of buildings involve an uphill 'pre-use' phase of value creation, including material and resource extraction, manufacturing, assembly and retail, followed by a 'use' phase, in which equipment is operated and maintained.

Finally, equipment enters a 'post-use' phase, in which value is destroyed as equipment is discarded at the end of its determined useful life. Many building projects (and resulting equipment used in the services layer) continue to adhere to linear contractual frameworks, placing a strong emphasis on project deliverables and timelines while prioritising cost over value.

This traditional approach often adopts a 'take-make-dispose' mentality, focusing on immediate project completion rather than long-term value creation across the different building layers. This results in contracts designed around fixed terms and specifications, with limited attention to material sourcing, waste management and environmental impacts.

In contrast, in circular business models (right panel of Figure 2), the use phase is extended through maintenance and repair practices, and activities in the post-use phase redistribute value (shown by the arrows) back to the use or pre-use phase through activities such as the reuse or redistribution of equipment, refurbishing, remanufacturing or recycling. The value hill helps to identify possible circular practices for the services layer of buildings, and the activities involved in adding value (pre-use) and retaining value (post-use) and the associated challenges and opportunities. It is also useful when considering partnerships and collaborations involved in the value chains of different technologies.

Some of the main ways in which PaaS can enhance circularity across the pre-use, use and post-use phases, relating to adding, optimising and retaining value, are summarised in Table 2.
Enhancing the circularity of PaaS models for the services layer of buildings is best understood as an ongoing process, which requires PaaS providers to develop particular capabilities related to a wider ecosystem of businesses and actors. These relate, for example, to expertise in circular product design, reverse logistics, remanufacturing or the recovery of materials and components, which may require strategic partnerships and collaboration.

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How can PaaS enhance circularity?

Add value	Optimise use	Retain value
· Product design takes into consideration different aspects such as modularity, component recovery, easier disassembly, quality standards and ease of maintenance.	· Data-driven optimisation of equipment can be used to reduce energy consumption, and improve resource efficiency (e.g. water used for cooling). · Data-driven repair and maintenance and real-time monitoring can minimise unplanned downtime and prevent damage to equipment.	· Ability to reuse, repurpose or redistribute assets, parts or materials can avoid the occurrence of underutilised or stranded assets. · Managing product end-of-life for value retention strategies beyond disposal or recycling, such as component and material recovery, refurbishing and remanufacturing. This can reduce resource consumption.

Table 2: How can PaaS models enhance circularity? Each column relates to capabilities linked to phases of the value hill (add value, optimise use, retain value).

The use of PaaS models has been shown to enhance energy efficiency for both lighting[12] and cooling equipment,[13] contributing to optimised use.

However, ownership retention by PaaS providers could also generate incentives for circular design strategies (uphill phase), where, for example, effective modular design could reduce material use, foster ease of repair and maintenance, and facilitate improved recyclability of components.

It is unclear whether this is part of current PaaS models and embedded into contracts. Table 3 provides an example comparison of linear and circular practices in the context of cooling equipment.

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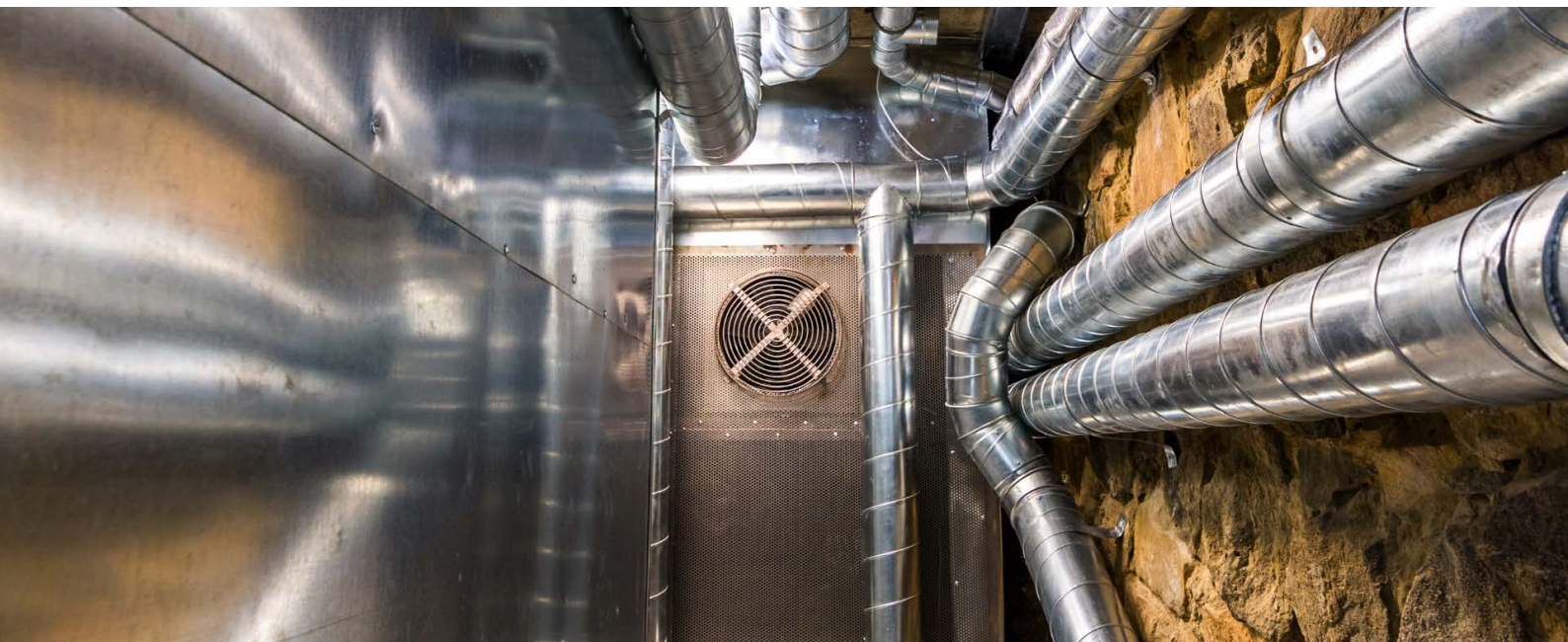
Cooling Equipment

Linear business model	Circular PaaS model
Typically oversized based on peak demand	Designed for optimal efficiency and scalability
Disposal at end of life, limited recycling	Emphasis on potential reuse, repurposing, refurbishing, and remanufacturing of components or parts
Traditional disposal and destruction of refrigerants and components	Emphasis on recycling or reclamation/use of natural refrigerant systems and material recovery
Limited user involvement	Service-oriented and enhanced user experience with continuous optimisation and support
Fixed or declining energy efficiency levels over equipment lifecycle	Fixed or increasing energy efficiency levels over the contract duration
Limited upgradability, need for complete replacement	Modular design for easy upgrades and integration of new technologies
Limited customisation options, standardised designs	Flexible and customisable to meet specific user requirements
Limited data connectivity, may lack smart features	Incorporates IoT capabilities for data monitoring, analysis, and remote management
Often operates as a standalone system	Can be designed for integration and interoperability with other technologies that may also be offered as-a-service (e.g., waste-heat recovery)

Table 3: Linear business models for cooling compared to circular PaaS business models involving practices related to adding value, optimising use and retaining value, based on market research conducted by BASE and the SET Alliance and a review of the literature.

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1.3 Impact objectives

The impact of this solution is to contribute to the realisation of the potential of PaaS models to accelerate the circularity of buildings, by embedding circular practices related to adding value, optimising use and retaining value as outlined in Table 2: 'How can PaaS enhance circularity?'. With the increasing adoption of PaaS models within the services layer of buildings, it is crucial to evaluate how existing solutions contribute to fostering a more circular built environment and to identify opportunities to strengthen efforts. This solution seeks to enable PaaS providers, financiers and customers to grasp the potential these models hold in advancing circularity, and to identify opportunities and challenges.

As circular economy principles and the reporting of environmental impacts become more embedded into regulatory frameworks, businesses that proactively adopt and advocate circular practices within their PaaS models are likely to be better equipped to comply with future regulations. Guidelines for contract development should improve clarity and comprehension among diverse stakeholders. The development process for the guidelines presents a significant opportunity to build consensus regarding the current state and trajectory of PaaS models in relation to circularity, allowing for the exchange of best practices.

Moreover, these guidelines can serve as a foundational tool for training and development, enhancing awareness about the challenges and opportunities inherent in alternative business models to accelerate a more circular built environment. In addition, such guidelines can potentially serve as the basis for further initiatives centred on benchmarking and evaluating the circularity of PaaS offerings.

1.4 Supporting PaaS development: The role of BASE

The BASE foundation is a non-profit organisation with over 22 years of experience in developing innovative business models and financing mechanisms to unlock investments in climate-driven solutions. Recognising the model's potential to accelerate decarbonisation, several projects are dedicated to accelerating PaaS models for clean and energy-efficient technologies by tackling market barriers slowing the uptake of more efficient technologies.

The Cooling-as-a-Service (CaaS) initiative sought to test the model for space cooling and refrigeration systems at different scales, focusing primarily on emerging markets. The EU Horizon 2020 Efficiency-as-a-Service (EaaS) project focused on promoting the deployment and adoption of the model in Spain, Belgium and the Netherlands, conducting capacity-building activities with local consortium partners.

In 2023, the Servetia initiative was launched to develop the use of the model in the Swiss buildings sector. In each case, the development of strategic resources and materials such as standardised contracts, risk mitigation guidelines and price modelling tools are a central activity supporting the deployment and adoption of PaaS.

Given the growing number of PaaS offerings focused on the services layer of buildings, and the work of BASE and other organisations to accelerate the deployment and adoption of the model, there is an established and engaged network of organisations and practitioners across research and practice. The process of guideline creation for PaaS contracts presents an important opportunity to engage strategically with industry stakeholders, associations and decision-makers to promote the wider adoption of PaaS within building projects in order to accelerate circularity and reduce environmental impacts.

Collaboration with legal experts and industry practitioners will be key to ensuring that the guidelines created are practical, legally sound, and applicable to selected contexts and building types.

Facilitating collaboration among a diverse group of stakeholders in the building, circularity and servitisation sectors has the potential to stimulate new thinking and ideas regarding PaaS models, and contributes to the broader discourse on ownership and responsibility for products and systems in buildings to enhance circularity.
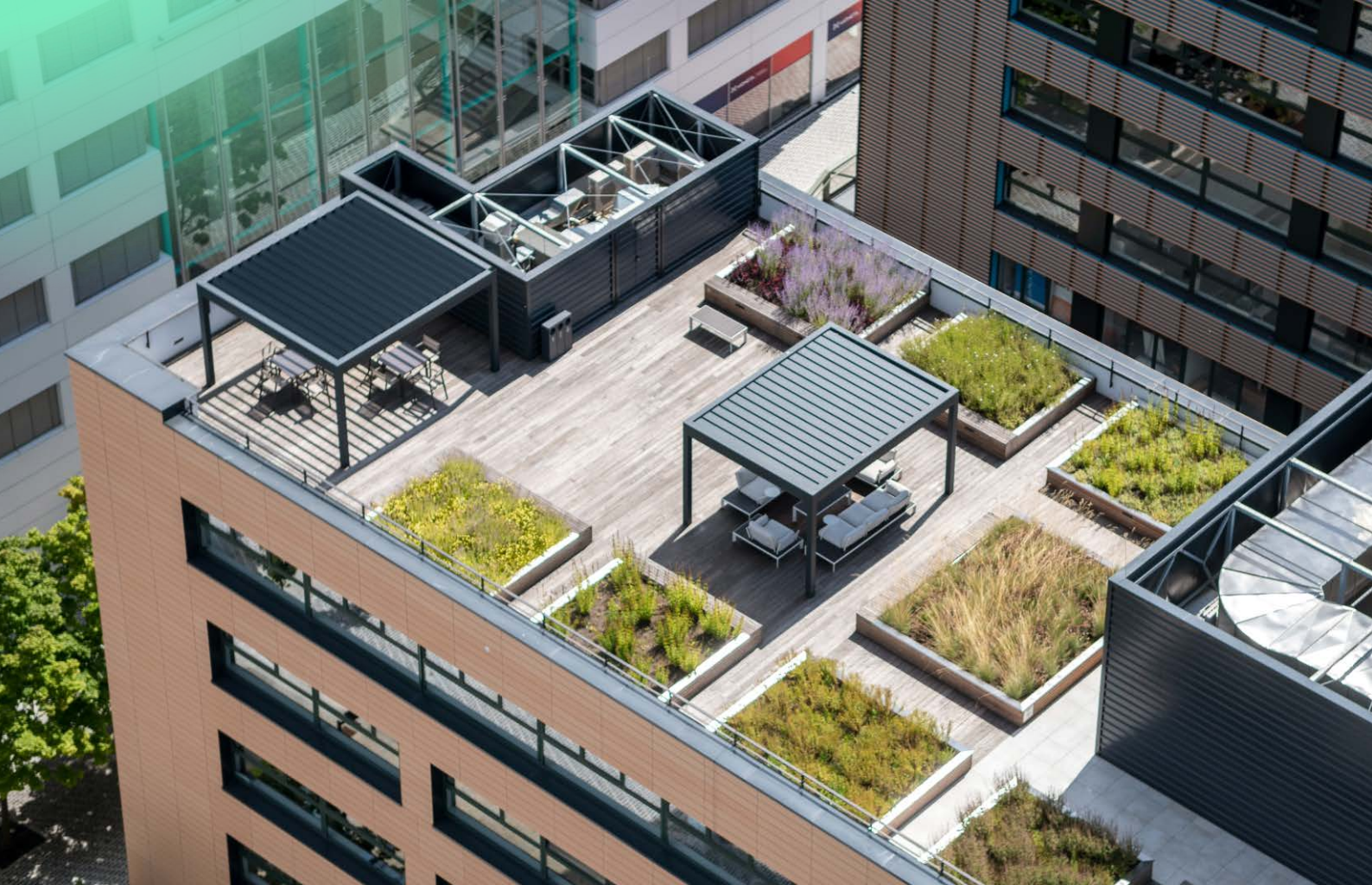
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2. FEASIBILITY ANALYSIS

2.1 Methodology

In the first stage of developing this solution, BASE and the SET Alliance identified the following key questions:

1. *What are some of the key characteristics of current PaaS contracts and offerings for the services layer of buildings relating to circularity?*
2. *What are some of the challenges and opportunities associated with integrating circular practices into PaaS?*
3. *To what extent are aspects of circularity embedded into PaaS Contracts?*

To answer these questions, in-depth discussions were conducted with three main stakeholder groups:
- **Technology providers** currently deploying or considering PaaS models for the services layer of buildings. These included both manufacturing and non-manufacturing providers of different technological systems.
- **Actors involved in the building project chain,** including mechanical, electrical and plumbing (MEP) consultants and architects, to better understand the opportunity space and decision-making process for PaaS models with regards to the services layer of buildings, as well as current processes and thinking surrounding circularity.
- **Members of the wider research community** dedicated to advanced services and product-service systems to gain feedback and assess resonance in other contexts.

All discussions were designed in a semi-structured format focused on decision-making regarding equipment and systems for the services layer of buildings, and on understanding capabilities related to PaaS and the value hill (adding value, optimising the use of equipment and retaining value), as well as key characteristics of PaaS contracts and the process of contract development.

2.2 Findings: PaaS, a growing trend

PaaS models have gained significant traction for energy-intensive systems such as cooling, heating, lighting and compressed air, as well as energy storage technologies, given their potential to optimise energy use, and to improve energy efficiency and system performance. Examples include Johnson Control's holistic building solution of 'net-zero as a service',[14] whilst manufacturers Danfoss[15] and Carrier[16] both have Cooling-as-a-Service solutions. A growing number of PaaS models for the services layer of buildings are being developed around the world, predominantly in commercial and industrial buildings. This reflects a growing trend in outsourcing the management and optimisation of performance, energy and resource efficiency of equipment used in buildings in order to meet sustainability targets, comply with new regulations and manage energy price risk. In some cases, it also reflects customers' preferences to secure state-of-the-art systems without upfront capital investment, enabling them to focus on core business activities.

The adoption of PaaS models within the heating, ventilation and air conditioning (HVAC) industry, for example, has been found to tackle some of the industry's main challenges and offer customers increased resilience.[17] Businesses and wider society are gaining more awareness of the risks associated with continuing 'linear' practices or the 'take-make-waste' approach,[18] against the backdrop of climate change, net-zero targets and sustainable development goals, as well as events such as the Covid-19 pandemic and Russia-Ukraine war, which have disrupted supply chains. These factors, among others, are shaping opportunities and benefits in recognising and preserving the value of resources.

Under PaaS contracts, customers typically pay a fee covering usage and performance, and a dedicated provider is responsible for managing equipment and undertaking maintenance and repairs. For equipment used in the services layer of buildings, PaaS contracts typically last 7-15 years, thus requiring longer-term partnerships between providers and customers.

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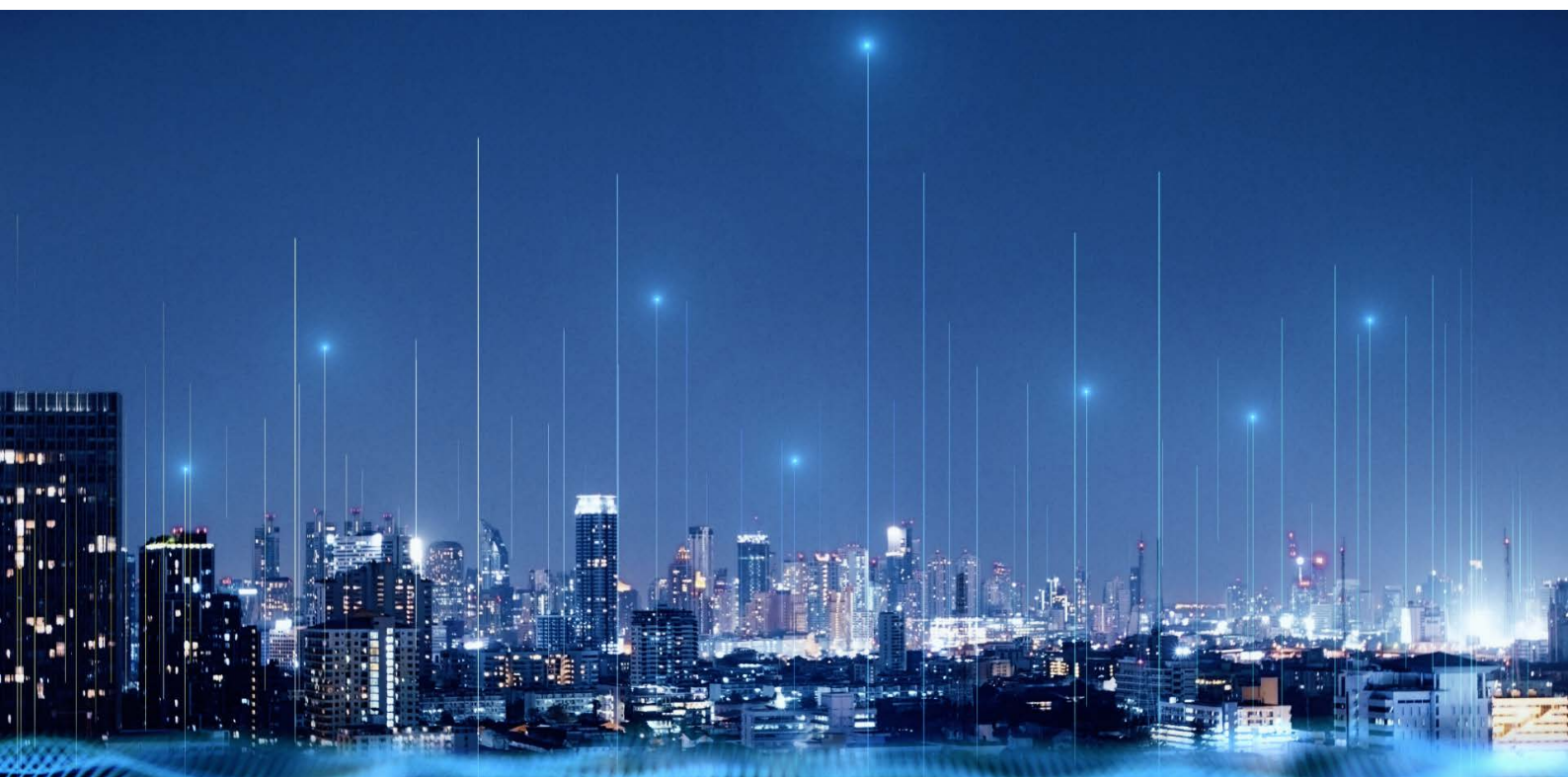
This is according to BASE market research involving systems with an investment greater than €150,000. Because ownership and responsibility for product life cycles remains with dedicated PaaS providers, this incentivises the use of long-lasting and efficient equipment to reduce maintenance and replacement costs, and to optimise the use of such equipment. The wider use of circular PaaS models featuring the aspects related to adding and retaining value listed in Table 2 would encourage, for example, the alteration of product design to take into consideration the feasibility and ease of recovering components and materials for refurbishing or remanufacturing.

But how are PaaS models enhancing circularity? A useful distinction can be made between the barriers to deploying or adopting PaaS models more generally, and the barriers to enhancing the circularity of buildings and reducing environmental impacts through such models.

The reduction of certain environmental impacts during the use phase of equipment can be achieved through the integration of performance targets into PaaS contracts (e.g. energy efficiency improvements). Providers are also incentivised to reduce their own costs, which in turn can reduce energy and wider resource consumption. The integration of additional systems such as waste-heat recovery or solar PV can also reduce and optimise resource consumption during the use phase of buildings. However, as the value hill illustrates, circularity concerns a much broader set of behaviours and practices relating to adding and retaining value.

Currently there are no standard assessment criteria to understand the circularity of PaaS models currently used in the services layer of buildings, and a lack of supporting guidance to validate the circularity of PaaS models. What is often discussed is a set of claims surrounding the model, which encourage and incentivise a process of undertaking certain practices as outlined in Table 2. It is also clear that different factors can be seen to affect the capability (in particular of the PaaS provider) to transition towards more circular PaaS models. These include aspects such as infrastructure type, technology considerations and expertise. In addition, the development or adoption of circular practices linked to value retention (e.g. remanufacturing) must be carefully evaluated in relation to the environmental impacts of such practices.

2.3 Findings: PaaS contract development

Delivering PaaS involves various stakeholders, including the provider, the customer, financiers, delivery partners or sub-suppliers such as installers, and requires contracts between these parties (see Figure 4).
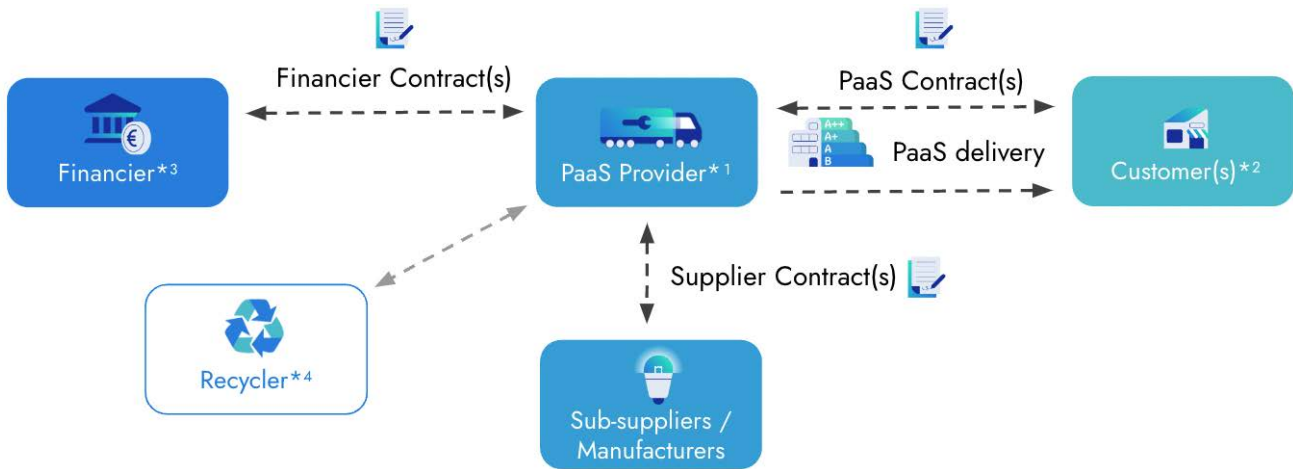
[1] **The PaaS provider can be a buyer of a system or a manufacturer. In both cases they often depend on sub-suppliers for key components.**

[2] **The Customer can be a unique customer for the whole duration of a PaaS contract, or may change during the contract duration, or at contract end. In all scenarios, the PaaS provider is responsible for the asset, to repurpose it or decommission it if applicable.**

[3] **The financier and the PaaS Provider contract need to allow for flexibility clauses for the PaaS provider to deploy CE principles.**

[4] **Partnerships may be formed with other entities such as decommissioning and recyclers (MoUs, LoIs or Agreements may apply).**

Figure 4: Illustration of main stakeholders involved in PaaS provision and contracts and relationships relevant to service delivery and embedding circularity.

For providers to deliver PaaS to customers, several steps need to be considered, including the development of an offering and contract, the contracting stage, the execution of the contract, and longer-term management (see Figure 5). The contracting stage can be further broken down into steps relating to identifying and defining the project opportunity, developing a proposal and negotiating terms before handing over to a delivery team. This stage can be thought of as the sales and purchase process, in which different outcomes and expectations are aligned and agreed upon in a written contract. The PaaS contract represents the value proposition in written form.

1. **The development of an offering and contract**
   a) Financing structure
   b) Customer readiness
   c) Provider readiness
   d) Network readiness (delivery partners or sub-suppliers such as installers)
   e) Partnership readiness
2. **The contracting stage (between the PaaS provider and the customer)**
   a) Identify and screen opportunities
   b) Proposal development
   c) Negotiate terms
   d) Hand-off to delivery team
3. **Execution and delivery of contracts**
4. **Longer term management**

Figure 5: Stages of PaaS delivery including the contracting stage, adapted from Handbook for Advanced Services Contracts.

The contract between a PaaS provider and a customer acts as a legal agreement and provides the different parties involved with an understanding of their respective preferences, responsibilities and risk positions. When it comes to scaling and accelerating PaaS models for services in buildings, guidelines can support providers, customers and financiers in understanding and considering circular aspects.

Under the CaaS and EaaS initiatives, standardised contracts have been developed, as well as accompanying material to support the development of solutions and implementation of projects. However, as yet there is no overarching guidance on contract development for PaaS models regarding the services layer of buildings that contextualises solutions in relation to circular-economy principles and practices. With respect to circularity, an early distinction was drawn between PaaS providers that are also the system manufacturers, and non-OEM (Original Equipment Manufacturer) providers, as these represent different constellations of practices and value chains.

As manufacturers are responsible for the value creation process, it is assumed they are better positioned to inform aspects such as product design using data collected from PaaS operations. In general, capabilities and services vary greatly by provider, technology type and overall strategy and thinking in relation to circularity and the reduction of environmental impacts. Whilst in principle there are clear potential circular elements of PaaS models, in practice it is not evident to what extent this potential is realised. For example, it is unclear to what extent system performance data under PaaS contracts can inform product, system and building design or the pre-use phase of different systems.

Similarly, given the emerging nature of the PaaS trend for the services layer of buildings, there are few examples of contract renewals or end-of-contract decision-making to examine. It is therefore unclear what the intended value retention measures in the post-use phase are, leaving uncertainty surrounding the end-of-contract options and overlap with the technical end of life of equipment. This is important in the context of PaaS contract development, in which provider flexibility can be built in to keep different options open. Manufacturers developing refurbishing and remanufacturing capabilities in parallel to PaaS offerings could explore the integration of these services within PaaS.

Given that the average length of contracts ranges from 7 to 15 years (in some cases up to 20 years), there is inherent uncertainty related to how capabilities or markets may change — for example, the current versus future capabilities for refurbishing or remanufacturing. This is discussed in the Handbook for Contract Development, which states: "Contracts must now contain the ability to adapt to the emergence of change. In addition to operational delivery of the value proposition, contracts thus coordinate the effort of buyer and sellers to adapt together."[19] Considering the elements relating to enhancing value retention capabilities is especially relevant should more PaaS models be developed, for example to deliver heating services to the residential market, a key issue in the European building context.

2.4 Findings: Key aspects for PaaS Contract Guidelines

PaaS is an important emerging business model for the building sector and there is an opportunity to develop further understanding and guidance for customers, providers and financiers to further align and embed elements of circularity. Through engagement with different stakeholders across the PaaS ecosystem and the building sector more broadly, guidelines can support and unlock contract development and thinking around circularity for existing and future PaaS models and solutions.
The guidelines can provide a framework to understand which contractual clauses within PaaS contracts and practices relate to elements of circularity, as well as pointing out important considerations and opportunities.

From the stakeholder discussions, it was noted that contracts and related clauses between different entities beyond the PaaS provider and customer, and the partnerships such contracts represent, are of relevance to the transition towards more circular PaaS models, because they set the boundary conditions for service delivery.

As shown in Figure 4, contracts apply between (1) customers and PaaS providers, (2) PaaS providers and financiers (when applicable), and often (3) PaaS providers and sub-suppliers (e.g. equipment manufacturers, component suppliers and installers). Therefore, considerations for circularity and the reduction of environmental impacts were considered across these three contract types. Figure 4 also depicts agreements between PaaS providers and recyclers or decommissioning entities. This was not included in the analysis as it is likely that considerations will be similar to contracts applying between PaaS providers and sub-suppliers.

For each of the three contract types, the analysis shown below in Tables 4, 5 and 6 provides a description of key contract areas, related clauses, importance in relation to circularity and the reduction of environmental impacts, and provides insights. The information is derived from stakeholder discussions as well as a review of the standardised PaaS contracts developed under BASE-led initiatives. The second phase of this project aims to develop guidance surrounding these key areas, highlighting examples and best practices, as well as identifying the need for new clauses and potential partnerships.

Contract: PaaS Provider and Customer

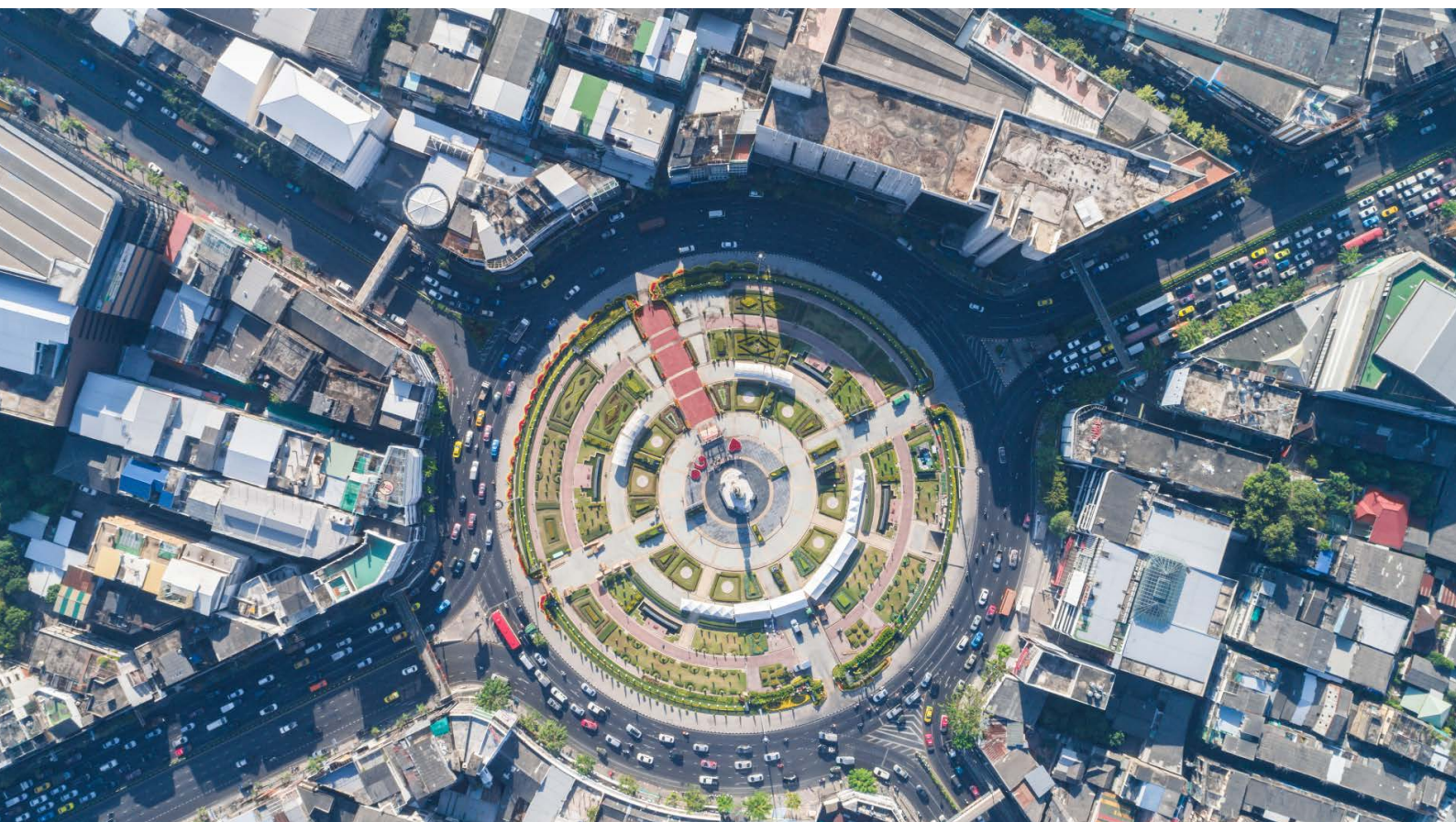| Area	Description of clauses	Importance	Comments
Targets / Key Performance Indicators	The KPIs in a contract may include the following elements: · Energy efficiency targets · Performance regarding faults, system downtime or reduced performance · Optimised maintenance schedules	High	*The attainment of predefined key performance indicators (KPIs) aligns with the strategic commercial objectives of the PaaS provider.* *Furthermore, exceeding performance metrics including but not limited to energy or resource efficiency within the contractual framework serves as a pivotal means to enhance the provider's overall profitability.* *Notably, the optimisation of inspection and maintenance operations plays a crucial role in extending the life cycle of equipment. This, in turn, contributes to an improvement in the total cost of ownership (TCO) of assets and to their circularity.*

Area	Description of clauses	Importance	Comments
Data Security and Privacy	Enabling the provider to access critical data on usage and performance allows for the optimisation of performance and life-cycle extension of the equipment. It is also important to consider: · Data security and use of data (to inform product design and/or optimise performance) · Access to the building and plant · Compliance with privacy regulations (GDPR) and the responsible use of customer data	High	*Gaining access to critical data enables a PaaS provider not only to optimise the usage of the system but also to improve the design of systems and components for life cycle extension or value retention. The potential for data-sharing by non-OEM providers, particularly with manufacturers, may further contribute to advancements in design and hence circularity.*
Ownership	· To qualify as a PaaS model, whereby the customer does not own equipment and is not responsible for performance risks, the contract must clearly define ownership and responsibility throughout the contract duration · Responsibility for the design of systems must be clearly defined, enhancing traceability and accountability	High	*In cases where compliance with IFRS16 lease accounting standards is required, contracts undergo assessment to determine if they are off-balance (and not an embedded lease). It is crucial for the contract to be properly designed to ensure the asset remains contractually under the ownership of the solution provider, who is then incentivised to maximise value. This can be seen to indirectly benefit circularity.*

Pricing	· Under PaaS there are different pricing models such as:
	
	  - Fixed pricing
	  - Fixed + variable
	  - Monthly or annual billing
	
	· It is important that the pricing structure complies with IFRS16 regulations for the contract to be considered off-balance
		Medium	*The pricing mechanism employed in a contract significantly contributes to its attractiveness to the end customer. This pricing strategy, in turn, has an indirect influence on circularity, as it establishes a framework aligning incentives between the provider and the customer. Moreover, the pricing structure and schedule must be defined to ensure that the asset remains off-balance from the customer's perspective (IFRS 16 previously outlined) and ensuring the PaaS provider is incentivised to optimise life-cycle and resource utilisation.*

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Area	Description of clauses	Importance	Comments
Contract length	· Contract duration needs to be defined in the contract; depending on the local context and sector there may be specific conditions qualifying service contract duration	Medium	*Longer contracts suggest sustained relationships between a provider and customer and consideration of upgradability, durability and repairability as well as end-of-life management. Longer contract periods may also incentivise the design of products with longer lifespans. However, the contract length combined with the pricing schedule to the end customer need to ensure that the offer is not considered an embedded lease, whereby the asset belongs to the customer at the end of the contract; this could limit the incentives for the provider to maximise the asset life cycle. Please note that depending on the country of implementation, and the customer and technology in question, shorter contract lengths may be required or requested. Shorter contracts versus the asset value can yield higher risks for the provider and financier, which must be properly hedged within the contract.*
'Take-Back' and end of contract/ end of life	· End-of-contract responsibilities include the process of removing or returning products at the end of their contract duration · The contract should incorporate provisions for both extension and early termination, thereby fostering adaptability and mitigating the risk of inappropriate disposal. This strategic approach not only aligns with environmental regulations but also ensures a comprehensive and flexible framework that accounts for potential changes in circumstances	High	*This is highly relevant to value-retention practices and capabilities.* *An underlying assumption is that the PaaS provider is best positioned (with its partners and wider ecosystem) to know how to handle equipment at the end of a contract and at the end of its technical life.*

Area	Description of clauses	Importance	Comments
Standards on materials, energy efficiency and regulatory compliance	· Specifying adherence to energy efficiency standards or relevant environmental regulations related to the use of different materials supporting the reduction of environmental impacts (e.g. phase-out of refrigerant gases) · Enabling PaaS providers to update practices in response to changes in regulations	Medium	*Including these clauses in the contract ensures transparency for the customer on the quality of the asset. To increase the likelihood of setting a benchmark that encourages cutting-edge deployment, it is crucial to have clauses that highlight the compliance of deployed products with best-in-class standards (e.g. energy efficiency). This approach supports the deployment of high-quality products, ultimately contributing to favourable life-cycle characteristics. However, this type of clause is particularly significant for contracts between PaaS providers and sub-suppliers.*
Continuous improvement and innovation	· Encouraging continuous innovation and performance improvements, for example in energy or resource efficiency and service improvements	High	*Innovation clauses can address the integration of emerging technologies or improvements in energy efficiency. This adaptability ensures the continuing technological competitiveness of the PaaS offering and minimises the risk of premature obsolescence. The provider is best positioned to deploy innovations, upgrades and design modifications on the deployed assets in order to maximise not only their performance but also their life cycle.*
Inflation	· A specific clause should transparently outline how inflation will affect the pricing of the PaaS offering to the end customer	Low	*Inflation-related clauses can provide cost predictability for both the PaaS provider and the customer over the contract's duration. This stability in pricing allows for better long-term planning and budgeting, which can indirectly support strategies to enhance circularity. It enables businesses to allocate resources more effectively, potentially investing in circular practices and the reduction of environmental impacts.*

Area	Description of clauses	Importance	Comments
Dispute resolution mechanisms	· Establish mechanisms for resolving disputes related to practices and performance · Include provisions for efficient mediation or arbitration to address issues	Low	*The existence of a fair and effective dispute resolution mechanism can incentivise parties to maintain long-term relationships, and foster transparency and accountability. This may provide a more conducive environment for collaborative efforts in areas such as in product optimisation. There is therefore an indirect link to circularity. The resolution of disputes may involve ensuring compliance with circular economy standards and principles, or regulatory compliance. This includes resolving disagreements related to product labelling, eco-certifications, or claims about the recyclability and sustainability of the service or product.*

Table 4: Analysis of key areas for contract development between a provider and customer considering circularity and the reduction of environmental impacts.

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Contract type - PaaS Provider and Financier

Area	Description of clauses	Importance	Comments
Financial incentives	· Financial incentives for the provider to adopt circular practices, such as reduced fees or reduced interest rates on debt for extended service contracts, for products reused, returned and/ or successfully recycled	High	*Financial incentives could be tied to increased product durability, enhanced recyclability, or reduced environmental impact. This could take the form of reduced interest rates on debt when targets are met. Financial incentives could also be linked to successful environmental impact audits or green certifications. Achieving recognised circularity certifications can result in financial bonuses, motivating the PaaS provider to adhere to and demonstrate compliance with circular economy standards.*
Adherence to green classification schemes and regulations such as EU Taxonomy	· Reporting obligations tied to frameworks such as the EU Taxonomy may prompt PaaS providers to identify circular business opportunities within their operations. This could involve exploring innovations, partnerships or strategies that contribute to a more circular and sustainable approach in line with regulatory expectations	High	*Under the EU Taxonomy, activities are assessed in relation to their alignment with environmental sustainability in the context of the European Green Deal.* *Certain PaaS activities can be classified as making a significant contribution to the transition to a circular economy, whilst ensuring they 'do no significant harm' to other environmental objectives. Such a clause places emphasis on accountability and transparency.*
Asset flexibility and innovation	· Within existing contracts, allowing for the provider financed to innovate on the product contracted to enhance its life cycle and performance. The latter should apply and be adopted as per the financial structure and mechanisms agreed upon between the financier and the provider	High	*It is important that the contractual agreement between the financier and the solution provider facilitates the integration of modifications and innovations within the deployed solution, without compromising the terms of the contractual arrangement with the financier.* *The absence of this provision could diminish the provider's motivation to implement beneficial modifications essential for optimising the asset life cycle of the deployed solution.*

Area	Description of clauses	Importance	Comments
Dispute Resolution Mechanisms	· Establishing mechanisms for resolving disputes related to circularity practices and performance between the provider and the financier · Including provisions for mediation or arbitration to address issues efficiently	Low	*Similar to the contract between the provider and the customer, these clauses ensure the existence of fair and effective dispute resolution mechanisms that incentivise parties to maintain long-term relationships and foster transparency and accountability.*

Table 5: Analysis of key areas for contract development between a financier and provider considering circularity and the reduction of environmental impacts.

Contract type - PaaS Provider and (Sub-)Supplier

Area	Description of clauses	Importance	Comments
Standards on materials and regulatory compliance	· Product specifications clearly outlining the standards of the materials, composition of components (materials embedded), component efficiencies and durations	High	*Explicitly specifying standards that align with the highest industry benchmarks is instrumental in ensuring the delivery of a product characterised by superior quality and an extended life cycle. This, in effect, can substantially enhance the circularity potential of the products selected.*
Design	· Component design ensuring modularity and ease of inspection, maintenance, repair or disassembly	High	*The modular design of components or equipment can optimise maintenance and repair activities and reduce the need to replace larger components. This in turn reduces material dependence and retains value.*
Reporting and transparency	· Supply-chain transparency to outline environmental practices, material sourcing and manufacturing processes	High	*This provides assurance to the PaaS provider on the manufacturing processes of the acquired components. Transparency is crucial for assessing and improving circularity and reducing environmental impacts linked to the supply chain.*
Performance and quality assurance	· KPIs to ensure a component life cycle and performance. This could include metrics for material recyclability rates, product longevity or the percentage of components that can be remanufactured.	High	*This ensures relevant KPIs are met to enhance component or equipment life cycle and performance of the overall PaaS solution deployed.*

Area	Description of clauses	Importance	Comments
Continuous improvement and innovation	· Allowing for product improvements between the supplier and the buyer (PaaS provider) · Allowing for favourable commercial terms · Allowing for and encouraging data sharing to drive innovation in product performance · Addressing ownership of any innovative practices or technologies developed collaboratively related to circular practices and the reduction of environmental impacts, and establishing fair intellectual-property-sharing agreements	High	*Terms allow for the provider to share relevant information with its partners to continuously improve systems and component design towards extended life cycles and improved performance to optimise use, and to explore further practices related to adding and retaining value which may be mutually beneficial.*
Dispute resolution mechanisms	· Establishing mechanisms for resolving disputes between the PaaS provider and supplier related to practices and performance · Including provisions for mediation or arbitration to address issues efficiently	Low	*The existence of fair and effective dispute resolution mechanisms incentivise parties to maintain long-term relationships and foster transparency and accountability.*

Table 6: Analysis of key areas for contract development between provider and (sub-)supplier considering circularity and the reduction of environmental impacts.

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2.5 Findings: Unique stakeholder needs

Multiple specialists within the relevant stakeholder companies (customer, PaaS provider, financier) are involved in the development of PaaS offerings. The value proposition is often written by marketeers and operations specialists, the contract is written by lawyers (with knowledge of local and international regulations), service delivery is undertaken by engineers and technicians (or partners), and engagement is typically governed by a firm's risk-management processes. Financiers are involved in completing due diligence on a firm and its business operations, while the customers are procuring a solution under an innovative scope of supply.

All stakeholders apply existing operations and incentives to PaaS as a business approach, which often does not meet their standard selection criteria. To design the most impactful PaaS contract guidelines, it is important that the unique needs of the stakeholders outlined below are carefully considered.

Customer procurement departments
Agents have targets to purchase systems at specific prices, often negotiating sales prices down to tight margins for providers who then rely on service-level contracts (for maintenance and supply of spare parts) to make up for their margins. When procurement teams are presented with PaaS contracts, they are often unable to match these with their current guidelines, practices and KPIs, (even more so when it comes to assessing circular aspects). This is in part due to financial considerations of the PaaS model, which represents a switch from capital expenditure to operational costs. Customers should consider total cost of ownership as well as other direct and indirect costs, such as the training and time required to up-skill workers on managing new systems and operations when making financial comparisons between the traditional purchasing alternative and PaaS. This is a limited view of the overall potential benefits associated with PaaS models, such as the reduction of environmental impacts and contribution to sustainability goals through improved resource efficiency.

Provider sales teams
Incentives and key performance indicators of sales teams within provider organisations are traditionally based on the quantity of equipment sold and its purchase price. PaaS requires a firm to invest internally in a shift in incentives and bonus terms that promote service-level contracts.

Financiers
Financiers vary in terms of their profiles and risk appetites. The contracts, metrics and processes of large financial institutions are not designed for investments in PaaS and circular practices. However, it is key for PaaS providers to onboard financiers when looking to unlock commercial debt for project opportunities and circular building projects. This is also the role of non-governmental organisations and consultancies to raise awareness amongst financiers. There are ongoing initiatives engaging financiers to adopt taxonomies for investing in climate and environmental objectives, including the transition to a circular economy; this is essential given the classification of PaaS under the EU taxonomy as one of the approaches to contributing to circularity. Nonetheless, challenges persist; there is a lack of clarity surrounding the residual value of PaaS contracts and secondary markets of these systems (cooling, heating, compressed air, batteries and storage systems), which is also linked to accounting rules (e.g. depreciation); therefore, promoting circularity is key to developing secondary markets and improving the visibility of asset residual values. Specific leasing financiers in Europe are focusing more attention on investing in PaaS contracts, often stemming from experience in manufacturing or IT PaaS products, coupled with an increasing interest in investing in clean and energy-efficient solutions to grow their presence on the market in relation to the energy transition or to tackling climate change more broadly. More importantly, with the rise of energy prices and political pressure, financiers acknowledge investment in energy efficiency and smart energy systems as a growing market in which their presence yields attractive economic returns.

The process of developing guidelines will therefore include discussions with entities that are involved in active PaaS contracts, financiers that are involved in recapitalisation of assets and customers that have signed such contracts to properly evaluate the terms and conditions that can be embedded for circularity in a feasible stepwise approach, embedding the most important and acceptable ones first, and growing circularity impact from there onwards.

2.6 Risk mitigation plan

A robust risk mitigation plan is indispensable to developing this solution and ensuring the guidelines are adopted by the market. A well-structured risk mitigation plan ensures that potential obstacles to the adoption of circularity guidelines by the market are proactively identified and effectively navigated. This approach not only safeguards the success of the project but also strengthens the project's ability to influence and drive the adoption of circular practices in PaaS models for equipment used in the services layer of buildings. By addressing uncertainties head-on, the risk mitigation plan contributes to the resilience and long-term impact of the guidelines in the market.

Two primary risk areas have been identified, the first relating to the creation and implementation of the guidelines to accelerate the circularity of PaaS models (project-related risks), and the second to the wider adoption of PaaS and the lack of market engagement by key stakeholders, including providers, customers, financiers and policy makers (market risks). Tables 7 and 8 below outline these risks and proposed mitigation measures.
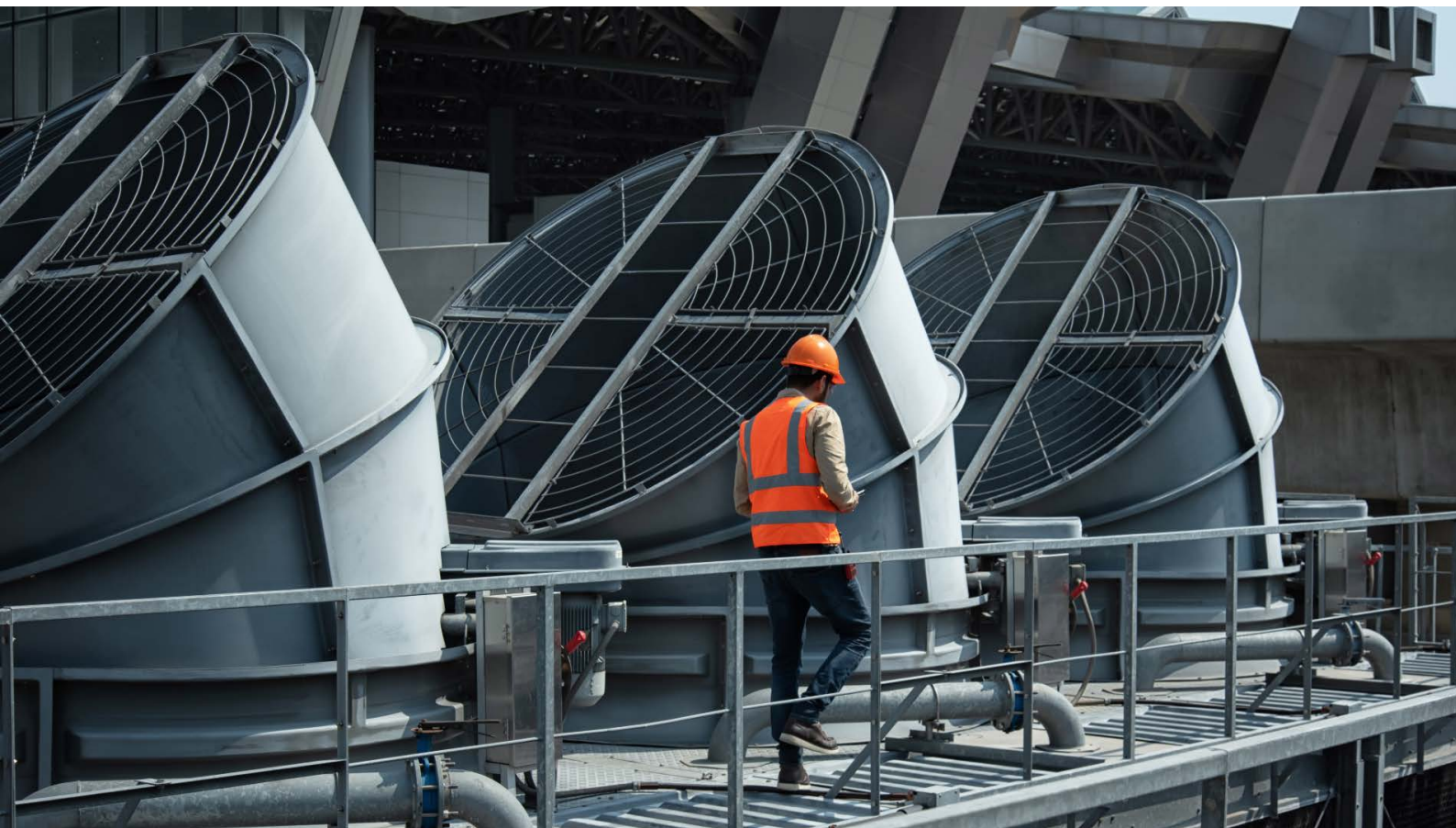
Project-Related Risks

Description of risk	Proposed risk-mitigation measures
Inadequate trust of key market stakeholders in PaaS models (medium)	**Engagement with PaaS:** Implementing and enhancing circular practices within PaaS models requires involving several stakeholders from the supply chain and understanding how to align incentives. Due to the complexities of PaaS models, a key part of the market engagement concerns fostering trust and highlighting the value of implementing PaaS. BASE will therefore continuously share know-how on the definition and implementation of PaaS models, plus case studies, with its network. The case studies will demonstrate the economic, social and environmental benefits of PaaS, and how the model is designed, highlighting success stories of practices related to circularity. This will involve engaging with PaaS providers regarding their circular economy strategies and analysing their practices. Furthermore, BASE will link the work of the blueprint project with parallel activities related to capacity building to support companies in transitioning to PaaS models.

Description of risk	Proposed risk-mitigation measures
Inadequate trust of key market stakeholders in clauses and practices – questioning quality and depth of outcomes (low)	**Quality of clauses:** Due to the real and perceived complexities of PaaS models, a key aspect of developing clauses is to design them in such a way that the contract is robust yet not overly complex, and compliant with local regulations and laws. To manage this challenge, financiers, providers, manufacturers, clients and legal professionals will be involved in the early stages of creating the guidelines and embedding circular practices. Certain clauses and related practices present various levels of difficulty in implementation, as well as associated costs and risks. It will be important to clarify the responsibilities of each stakeholder in successfully implementing these clauses. For example, adapting product design processes will likely involve additional investment.
Limited diffusion and outreach across Europe (low)	**Diffusion:** Strategic and targeted outreach is key to ensuring uptake and knowledge sharing surrounding the developed guidelines, and interest in enhancing circular practices and uptake of the clauses designed. Activities such as targeted workshops and webinar events included in the second phase will be designed to reach a broad audience of relevant stakeholders. BASE and its partners have an established Europe-wide network, which includes organisations such as the World Green Building Council (WGBC), the United Nations Environment Programme Finance Initiative (UNEP FI), Cool Coalition, Advanced Services Group, and relevant academic institutions. Engaging with the wider network of the CBC will be crucial to gain insights and connections from actors within the building project landscape, such as MEP consultants, project developers and architects. It will also be important to engage with additional accounting and legal experts, financiers, potential customers and providers as well as public-sector actors. The marketing and communications strategy will include key messages across several channels and websites (for example, those of the global SET alliance, CaaS, EaaS, Servetia and BASE).

Description of risk	Proposed risk-mitigation measures
Continuous improvement and implementation of the guidelines (medium)	**Scaling:** The stakeholders engaged in the development of the guidelines will be requested to sign a collaboration agreement confirming their interest and commitment to improving the guidelines and exploring implementation. Within the European context, countries or cities lacking a policy landscape conducive to enhancing circularity will present more challenging transition pathways towards more circular PaaS models. Whilst a deeper understanding of selected country- and technology-specific challenges will be part of the guideline creation process, proposed or anticipated changes in policy and regulations in areas such as resource use and material flows may affect stakeholder dynamics. The guidelines must be adaptable to these changing dynamics.

Table 7: Overview of risks and mitigation plan for creating guidelines for PaaS contracts (level of risk indicated in brackets).

Market Risks

Description of risk	Proposed risk-mitigation measures
Inadequate access to information on markets (medium)	**Market engagement:** Thorough analysis relies on access to information on markets and critical operations. This is not always available and depends both on the study of relevant literature and on interactions with market stakeholders. In this initial stage, a thorough literature analysis has already been undertaken, and a network of PaaS providers, financiers and customers have been informed of the project and have been requested to engage in the development of the guidelines. The project team will expand the number and types of stakeholders involved to include associations and other networks of experts, to gather market intelligence on current activities and challenges, as well as to explore possibilities for implementation. In addition, the team will connect with architects, lawyers, policy makers and public-sector actors linked to building projects. It is crucial to continuously find companies that are implementing (or are interested in implementing) PaaS models to raise awareness of circularity considerations.
Economic crisis would reduce engagement (low)	**Market engagement:** Previous experience has shown that during financial crises, enterprises focus their attention on projects that reduce costs. This can make PaaS more attractive to potential customers given that the model avoids the need for capital expenditure and offers the potential to reduce operational expenses. This is important when capital is restrained or facing uncertainty relating to aspects such as future energy prices or inflation. BASE's current activities in Cooling-as-a-Service and Efficiency-as-a-Service initiatives have yielded an accelerated demand in PaaS models across industries and geographies (for small and medium-sized enterprises as well as large manufacturers), and a growing interest from financiers to invest in these projects, as they represent a well-managed risk investment opportunity while driving decarbonisation.

Table 8: Overview of market risks linked to engagement with PaaS models (level of risk indicated in brackets).

3. DIFFUSION

3.1 Phase two objectives

In the initial phase of this project, key insights have been derived from engagement with selected stakeholders, including PaaS providers, actors relating to the decision-making process for building projects and the services layer of buildings, and the wider research community and industry experts focused on servitisation.

These learnings will be used to inform the process design for phase two of this solution: the proposed creation of the guidelines, and related activities for strategic diffusion and effective dissemination practices.

Strategic diffusion and dissemination efforts will play a pivotal role in the collaborative development of contract guidelines for PaaS. Co-created with industry experts, these guidelines will be shared to raise awareness, foster collaboration and facilitate the adoption of circular practices in the services layer of buildings.

The overarching objectives of diffusion in this context are threefold: firstly, to increase awareness among diverse stakeholders, including businesses, financiers, consumers and the research community, regarding the challenges, opportunities and best practices associated with transitioning to circular PaaS models; secondly, to stimulate collaborative thinking around circular practices for PaaS models, involving in-

dustry experts in the co-creation of the guidelines to ensure buy-in and relevance; and thirdly, to support the adoption of more circular practices within PaaS by providing practical assistance to businesses, for example in complying with existing and emerging regulations pertaining to the circular economy (e.g. EU Taxonomy).

3.2 Integration

By leveraging the networks of the SET Alliance and BASE as well as established communication channels, information can be shared across newsletters, social media and direct communication methods to keep stakeholders informed about progress, events and opportunities for participation. Actively participating in industry conferences, seminars and events connected to the network can showcase the guidelines and maximise visibility and engagement.

The identification of the most important events will be agreed on with the stakeholders involved as events evolve over time. The presentation of the guidelines at key events will provide a platform for feedback and discussion. Calls to action will be incorporated in all communications, encouraging stakeholders to actively engage in the co-creation process and explore the circularity of PaaS practices for the services layer of buildings.

3.3 Launching the guidelines

The guidelines will be released as a report, accompanied by an interactive webinar event. The report will be supported by additional content such as articles to ensure accessibility for a diverse audience. Both technical and non-technical language will be employed to cater to different stakeholders.

3.4 Monitoring and Feedback

To ensure ongoing refinement and improvement of the guidelines, clear feedback mechanisms, such as surveys and dedicated contact points, will be established to gather input from stakeholders. Regular reviews of feedback will inform adjustments to the guidelines and communication strategies.

Key performance indicators will be implemented to measure the reach and impact of dissemination efforts, tracking engagement levels and participation in events to assess effectiveness.

3.5 Call to Action

As we conclude this white paper on enhancing the circularity of PaaS models used in the services layer of buildings we would like to extend a formal invitation for your participation and active contribution.

The second phase of developing this solution proposes incorporating critical industry know-how within the design of the PaaS contractual guidelines for equipment used in the services layer of buildings for projects in Europe. For those interested in engaging with this transformative effort or looking for further insights, please connect with the BASE and SET Alliance team.

Your participation will play a pivotal role in shaping the trajectory of circularity and environmental impacts of PaaS business models.

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