

REAL ESTATE COMPANIES AND CIRCULAR BUSINESS MODELS

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ABSTRACT

Background and aim. Many Real Estate Companies (RECs) develop, rent out and manage their buildings as landlords. However, as the buildings are used by their tenants, landlords do not have much opportunity or incentive to optimize the use and thereby reduce the need for space. On the contrary, to secure their investment, they have strong incentives for long-term rental contracts and expand their building portfolio, while commercial tenants have incentives for flexibility in their lease contracts. Besides RECs' commercial interests, they also meet increasing expectations from the public and potential tenants to behave in an ethical and sustainable way. This paper investigates how RECs balance these dilemmas and develop their business models.

Methods and Data. The paper is based on interviews with six RECs in Denmark.

Findings. The business models vary a lot and so does the focus on sustainability. The purely profit driven RECs lack incentives to become more sustainable. Legislation is the main drivers for these companies. State owned and ethical driven investors and administrator companies owned by pension funds have clear strategies towards being more sustainable. A new administrator company had recently been established by a pension fund particularly to meet the increased sustainability challenges with a strong focus on circularity.

Theoretical / Practical / Societal implications. The paper adds to the growing literature on circular buildings with particular focus on management of the use and operational phase. It can give RECs inspiration to develop circular business models.

KEYWORDS: Real estate, investors, administrators, circular, business models

1. INTRODUCTION

It has become a mantra that "*the most sustainable buildings are those that are not built*". However, it is just as important to take care of existing buildings and extend their lifespan and relevance to the purpose they serve; preferably keeping the use value and embodied CO₂ infinitely through repurposing and sufficient maintenance.

The Real Estate (RE) sector has a major role in changing the Built Environment (BE) to become more sustainable. The sector consists of many different types of both private and public organisations. In this paper we apply the roles and responsibilities described by Jeppesen, (2024) for Property Management: Portfolio Management, Asset Management, Property Administration, Renting-out, Building Client, Operation Management, and Caretakers. Real Estate Companies (RECs) can cover one or more of

these roles with many interdependencies between companies, which often changes due to out- and insourcing. This makes the sector very complex.

The most important circular actions for existing buildings are to prolong the lifetime and increase the intensity of use as shown in section 2. Renting-out secures a steady income to the RECs and the building owners, which creates clear incentives to develop and maintain buildings to ensure a long lifetime. On the other hand, RECs, who are renting-out do not have much opportunity or incentive to optimize the use and thereby reduce the need for space of their tenants. Contrarily, to secure their investment, they have strong incentives for long-term rental contracts and to expand their building portfolio, while commercial tenants have incentives for flexibility in their lease contracts.

Besides RECs' commercial interests, they also meet increasing expectations from the public and potential tenants to behave in an ethical and sustainable way. This paper investigates how RECs balance these dilemmas and potentially develop circular business models within Real Estate and Facilities Management (REFM). The paper is based on an interview survey among RECs in Denmark. The paper starts with a literature review of Circular Economy (CE) in general and in relation to the BE and REFM, and sustainable business models. After the literature review follows sections on methods and data, findings, and discussion and conclusions.

2. LITERATURE

2.1 ACCELERATING THE CIRCULAR ECONOMY IN EUROPE

The European Environment Agency – EEA - has recently published a report on how the circular economy can generally be accelerated in Europe (EEA, 2023). The report has the following main messages:

- 100% circularity is impossible, so it is crucial to prioritize the reduction of resource consumption and move towards a less material-intensive economy
- Maximizing the usability of existing products requires a significantly greater intensity of use per product and much longer life
- Success of a circular economy depends heavily on returning significant quantities of high-quality secondary raw materials to productive use

REFM has a significant role to play, especially in relation to the first two points considering the fact, that construction and buildings account for the largest share of environmental burdens. Figure 1 shows a model for circularity from the report, and here the use phase is the most important as indicated by the sizes of the circles.

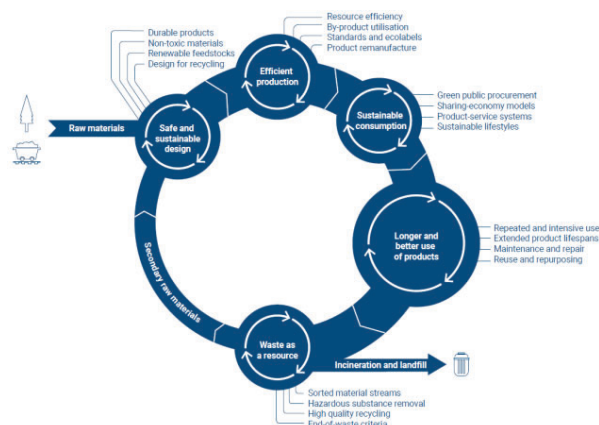


Figure 1: Model of circularity (EEA, 2023)

The second bullet point in the EEA report stresses the two most important circular actions for existing buildings of

intensification the use of buildings and prolonging lifetime. Both actions lead to a reduced demand for new buildings. Demand management in general leading to a reduced need for space is similarly important.

In relation to waste, many R models have been developed, e.g. 3R with reduce, reuse and recycle. The report contains a 9R model as shown in Figure 2. This is divided into Before use, During use and After use, and as many as four of the nine measures relate to the use phase.

In a REFM context, they can be termed: Long-life use and maintenance, Recycle and share, Repair, and Renovate and transform. Like much other literature on CE, the starting point is manufactured products. Therefore, intensification of use through space optimization is missing in Figure 2 even though it is included in Figure 1.

The EEA report highlights that the circular economy deals with more than waste management. It's more about keeping the value of materials high and making sure they last longer and designing unnecessary material out of the economy. This requires new business models and a transition from ownership models to service-based solutions.

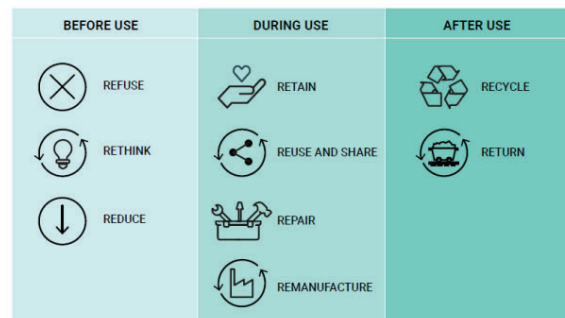


Figure 2: Actions for increased circularity (EEA, 2023)

Although the EEA report does not specifically address REFM, it highlights the importance of the use phase. FM can contribute to a more sustainable future by integrating both environmental and social factors (Jensen and Nielsen, 2024).

2.2 CE DEFINITIONS AND PRINCIPLES

Bocken et al. (2021a) claim that Circularity is the new normal and states: “Circular solutions are **not inherently sustainable** – unless designed to be so”. And many previous definitions of Circularity have the same relative relationship between circularity and sustainability. But with the release of the new ISO 59000 family this relative relationship has changed. According to ISO 59004 (2024): “Circular economy is an economic system that uses a systemic approach to maintain a circular flow of resources, by recovering, retaining or adding to their value, while contributing to sustainable development”.

Thus, a CE system must at least contribute to a sustainable development to be compliant with the ISO 59004 definition.

Previous definitions for CE have described principles for CE. Apart from a slight variation in semantics, the most dominant definitions have evolved around the four main principles *Narrow*, *Slow*, *Close* and *Regenerate*, see Figure 3.

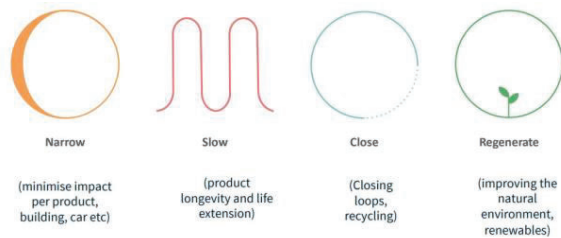


Figure 3: Four common CE Principles (Bocken et al., 2016; 2021b)

ISO 59004 (2024) introduces 6 principles of CE:

- **Systems Thinking:** Adopts a long-term perspective and considers impacts on environmental, social, and economic systems
- **Value Creation:** Restores, preserves, or adds value through effective solutions
- **Value Sharing:** Distributes value fairly among stakeholders to promote collaboration and social equity
- **Resource Management:** Sustainable management of resources to ensure their availability for future generations
- **Resource Traceability:** Maintains data to track resources through value chains
- **Ecosystem Resilience:** Protects and regenerates ecosystems and biodiversity

The four ISO 59004 principles, *Value Creation*, *Value sharing*, *Resource Management* and *Ecosystem Resilience* have many similarities to the previously described principles *Narrow*, *Slow*, *Close* and *Regenerate*. But the two remaining ISO 59004 principles, *Systems Thinking* and *Resource Traceability* address the need for a strategic approach and data generation to enable a business model for CE that both include a strategic and systemic approach to CE and documents improvement. *System Thinking* and *Resource traceability* can also be described as principles that are general to any circular action, to ensure that such actions are compliant with a defined circular strategy and to ensure that any action taken to elevate circular value creation can be documented.

2.3 BE, REFM AND CIRCULARITY

Where circularity in the built environment has traditionally been defined as reduction of waste and reuse of building materials, circularity in FM and building operations spans over several of the circular principles.

This includes not only life extension through maintenance, renovation and transformation and more intensive use through space optimization but also sharing economy and service-based solutions, which can optimize resource utilization and reduce environmental impacts. By integrating these broader principles, REFM can contribute significantly to a more sustainable and circular future.

Kyrö (2020) investigates, how the real estate sector can transition to circular economy. The main result is the identification of four different approaches to RE management shown in the two-by-two matrix in Figure 4.

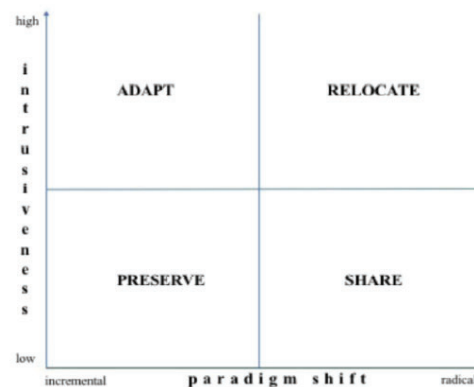


Figure 4: RE approaches to CE (Kyrö, 2020)

A paper by Jensen and Nielsen (2024) develops the topic of Circular FM from the perspective of an in-house FM-organization and presents a case study of how FM can create added value by optimization of a property portfolio, existing buildings and workplaces. It partly builds on The Value Building, see Figure 5.

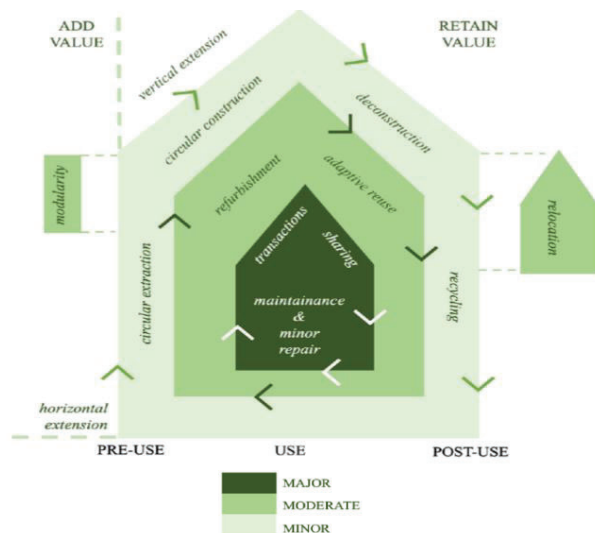


Figure 5: The Value Building (Kyrö and Lundgren, 2023)

The Value Building is like the 9R model shown in Figure 2 divided in: Before use, During use, and After use with During use being the most important. It includes what Kyrö and Lundgren (2023), call 12 “Circular Building Categories in the Built Environment”. We will for simplicity call them actions like Jensen and Nielsen (2024), who also added the action ‘space optimization’ during use. This is a subdiscipline in FM called Space Management and includes more than the action *sharing* in the Value Building. There is a clear difference between an RE owner and landlord perspective and the user organization perspective of FM. When a company itself owns and uses a building, there is a difference between a long-term owner perspective and a short-term user perspective. But this is reinforced, when the building is owned and rented out by an external part. This is what creates the Landlord-tenant dilemma, which has been widely discussed in connection with energy renovation (e.g. Åstmarsson et al., 2013). From the above it becomes obvious that the same dilemma applies to Space Management.

Space Management (SM) is essential from a circularity perspective of intensifying use and supports the circular principle “Narrow” as described in Konietzko et al. (2020) and Bocken et al. (2016). It is also compliant with the ISO 59004 principle of *Value Creation* by ensuring that built space provides as much value to the organization as possible. By optimizing the use of space, SM is essential in “narrowing” and rightsizing the amount of space to support the user needs. Thereby not only the resources spent on the producing physical buildings are reduced, but also the recurring resources spent on energy, maintenance and services related to that space. This is often overlooked in various models of CE - as mentioned also in relation to Figure 2, while it is included in Figure 1 from the same EEA report. RE owners and lessors have opposite economic interests and incentives to increase the amount of space to be rented out as mentioned in the introduction section. This is one of the dilemmas that form the background for this study.

The Value Building includes *transaction*. Kyrö and Lundgren (2023) writes on this: “variations that would be considered circular in this context include more flexibility in lease agreements and shorter-term, even pay-per-use access. The servitization of spaces and space-as-a-service business models have also gained foothold in recent years.” Thus, *transaction* and renting-out space is not a circular action in itself, but it can include circular actions.

The Danish Facilities Management association (DFM) made a study in 2022 on the sustainable practice among RECs on the private rental housing market in Denmark (Rasmussen & Bøytler, 2022; Rasmussen et al., 2023). Among the conclusions were that sustainability by many owners is regarded as a necessity for the long-term profitability of property investments.

This is supported by a recent research paper, which concludes, that “*ESG achievements of the real estate industry has significant impact on investor decision-making. As the concept of global sustainability continues to grow, real estate investors will prioritize evaluating how buildings perform regarding environmental stewardship, societal contribution, and corporate governance when choosing investment projects.*” (Liu, 2024).

2.4 CIRCULAR BUSINESS MODELS

A business model (BM) describes what value a business provides to its customers, how it creates the value, and how it generates income. There are many definitions and models of BMs. The four block model (FBBM) by Christensen et al. (2016) is one of the simplest models and proven to be useful for research purposes (Berg et al., 2021). The FBBM framework includes Priorities divided in Value proposition and Profit formula, and Capabilities divided in Resources and Processes as shown in Figure 6. The authors behind the model stress that the interrelationships and balance between the four blocks are essential. The value proposition is the most important element.



Figure 6: A simplified version of the FBBM framework (Berg et al., 2021; based on Christensen et al., 2016).

Estarrona et al., (2019) investigate new business models being developed in asset provision and management through servitization of space and a social push towards CE. Jensen and Nielsen (2024) review the literature on CE and the BE and shows that it often refers to business models (Baniya, 2023; Kyrö, 2020; Lundgren et al., 2023; Murano et al., 2020).

The paper by Baniya (2023) has CE and FM in the title and uses the term Circular FM. It is a literature review and focuses on environmental sustainability for facility service providers on the three scopes: Procurement, building use, and end of life, which also resembles the

division in Before, During and After use in Figure 2 and 4. The paper finds that subtle changes in the core facility function, such as in products' purchase approach, delivery of ongoing maintenance and refurbishment of building assets, and end-of-life management, possess the potential to enable circularity. The paper primarily has an operational environmental focus, while Jensen and Nielsen (2024) have a more strategic focus on buildings and space use from the perspective of an in-house FM-organisation and impacts on holistic sustainability.

3. METHODS AND DATA

This paper presents an explorative study. The overall research question for the paper is: *How can Real Estate Companies (RECs) balance different dilemmas and become more sustainable by adapting circular strategies and business models?*

The empirically study is based on interviews with six RECs in Denmark selected to present maximum variation and the interviewees being managers on senior levels. The selection of interviewees took as starting point the same as used by Rasmussen and Bøytler (2002), which included six carefully selected interviewees from different types of RECs in Denmark. Two of the people were still in the same company and willing to be interviewed, while the other four had either changed company or did not respond. Instead, other interviewees were recruited to cover different types of companies.

The interviews were conducted in late 2024 and early 2025. They lasted approx. one hour. Some interviews were done online and others by physical meetings. The interviewees received a short project description beforehand. Interviews were recorded with consent and written minutes summarizing the interviews were sent to the interviewees for comments and acceptance. The list of the interviewees is shown in Table 1.

Table 1: Interviews

| Inter-viewee | Function | Company | Date |
|--------------|---------------------------|----------------------|------------|
| 1 | Technical Manager | Østervold (EØ) | 02-12-2024 |
| 2 | Technical Director | Newsec (NS) | 10-12-2024 |
| 3 | Senior Strategic Procurer | Heimstaden (HS) | 10-12-2024 |
| 4 | Head of Sustainability | Freja Ejendomme (FE) | 10-12-2024 |
| 5 | Head of ESG | ATP Ejendomme (AE) | 09-01-2025 |

| | | | |
|---------|---------------------|--------------------|------------|
| 6 and 7 | CEO and Head of ESG | PKA Ejendomme (PE) | 09-01-2025 |
|---------|---------------------|--------------------|------------|

Both private, institutional and public RECs are represented, and they cover all the main business types among RECs with a variation in types of facilities as well. The last interview had two interviewees.

The development of a professional market for property investments is a relative recent phenomenon in Denmark. According to the chief economist in the Danish Property Association it did not evolve before the 1970s (Larsen, 2010). Property development is defined it as *“Transformation of a site from one condition to another in such a way that it creates added value in itself or another form of return”* (Leikvam and Olsson, 2022 – translated from Norwegian).

Property Management can be divided in: Portfolio Management (PM), Asset Management (AM), Property Administration (PA), Renting-out (RO), Building Client (BC), Operation Management (OM), and Caretakers (CT) (Jeppesen, 2024). Table 2 shows a categorisation of the six companies according to this classification.

Table 2: The companies' property management activities

| | FE | HS | EØ | PE | AE | NS |
|----|----|----|----|----|----|----|
| PM | x | x | x | | | |
| AM | | x | x | x | x | x |
| PA | | x | x | x | x | x |
| RO | | x | x | x | x | x |
| BC | | x | x | x | x | x |
| OM | | x | x | x | x | x |
| CT | | x | x | x | x | x |

4. FINDINGS

The BMs of the RECs are analysed using the FBBM framework in section 4.1. For processes the actions regarded as circular are identified. The positioning of the companies in relation to being Investors/developers or Managers and have an active or passive customer relationship is analysed in section 4.2.

4.1 BUSINESS MODELS

The BMs of the companies, as interpreted by the authors, are shown as basic BMs in Table 3 and with recent developments in the BMs in Table 4. The basic BMs in Table 3 shows how the RECs traditionally have operated to be economic and social sustainable (profitable or viable), while Table 4 shows how the BMs have developed in recent years partly with the aim to become more environmentally sustainable. Table 5 shows how the processes in the last row of Table 4 can be interpreted in relation to sustainability and circularity. In the following each company is described with ownership, business

types and activities related to sustainability and circularity.

Newsec (NS) is an investor-owned Sweden-based limited company (A/S) and a large international property administrator for different investors. Their approach to office buildings is to rent them out fitted to the need of their new tenants. They have two inhouse architects to help new tenants to develop the space plans and interior design. When a contract has been signed and the tenants move in, it is up to them, how they use the space.

The circular actions of NS include the basic maintenance and occasionally renovation and modernization to improve energy performance, market value and keep up building condition. Earlier the pension funds were not interested in investing in energy improvements, because the reduction in energy consumption would only benefit the tenants (Landlord-tenant dilemma), but this is changing, because sustainability has become a competitive parameter. NS also aim at increasing reuse of building materials and have in their project departments standards descriptions including for instance reuse of kitchens and floors.

It has become a trend, that one must find new ways to utilize buildings and accommodate new user needs. Earlier, the landlord could determine the conditions, but now they need to be much more user focussed. Thus, NS is involved in developing new offerings in collaboration with investors, for instance the office hotel concept Union developed together with the pension fund PFA. Office hotels increase flexibility for customers to adapt to changes and optimize their space utilization. On multi-tenants building NS have quarterly customer meetings.

NS experiences that some customers demand sustainability certifications like DGNB and BREEAM in Use. Some international investors set higher requirements on sustainability reporting than Danish investors. NS established an ESG department 10-12 years ago, which now has approx. 12 staff in Denmark, mostly engineers, and it is still expanding and does ESG reporting.

PKA Ejendomme (PE) is a limited company (A/S) and was established in 2023 as a subsidiary of the pension fund PKA and is fully owned by the mother company. They are like NS a specialized property administration company, but only with property directly owned by the mother company in Denmark. Before establishing the new subsidiary PKA had outsourced almost all of their property management except portfolio management to NS and another administration company. The reason for establishing PE was that the increasing requirement for integrated sustainability necessitates a change process, and an outsourcing strategy is not suitable in this situation.

Thus, PE focus on managing sustainable and up-to-date buildings. Their strategy is to own and hold with the aim to secure the PKA members' pensions for the next 40 years. PE has developed a business model, which to a much higher degree incorporates sustainability in their everyday practice in contrast to the more traditional approach with sustainability as an add-on in various projects. The philosophy is to have all value-adding activities in-house, and only rent administration is still fully outsourced.

PE's headquarters is established in an existing building near Copenhagen. They had LCA calculations made when they planned the refurbishment and the move to this new location and were surprised how much the embedded CO₂ in furniture counts. Thus, they planned the refurbishment, so that they removed as few building components like wall surfaces and reused as much of building components and furniture as possible. They have worked a lot with colours to trick the eyes. They use similar principles in the property they manage. Building materials should stay on the cadastre as far as possible. PE also collects building components like doors, separating walls and light fittings and have them stored at their building contractors.

PE market office spaces fitted out generically and with information about number of workplaces, so they can be taken into use without rebuilding. If customers want changes in interior layout and design, they will have to pay for that themselves. PE aim to get close relationships with their customers to know their needs for space and facilities and their development plans to retain them as long as possible; particularly when a lease contract is close to termination. If a customer needs more space, they will not have to pay for moving out of their existing facilities, if they have a larger lease in another building. PE do not have office hotels, but they have several multi-user office buildings.

PKA was the first in Denmark to have a new building for renting-out housing certified by the Nordic Swan label in 2016. They also work with the building certification labels DGNB and LEED. PE plan to have their whole building portfolio certified with the new Nordic Swan label for building operation. Sustainability reporting is done by the individual pension funds in PKA.

ATP Ejendomme (AE) is a limited company (A/S) and is a fully owned subsidiary of the state-owned pension fund ATP. They are like PE specialized in property administration with property directly owned by the mother company in Denmark. AE has a sustainability strategy that focuses on reducing the CO₂ footprint in their buildings and construction projects. Their buildings must comply with the applicable CO₂ limit values and be flexible and adaptable to future needs. Circularity is part of their strategy, especially in relation to reducing the CO₂ footprint of materials for new construction. They do CO₂

accounting and have an overview of consumption data. However, they do not yet do specific reporting on how large a proportion of sustainable materials they use.

AE try to create transparency and demand sustainability from their tenants, but the demand for data is primarily driven by their own needs. They make clear demands on their business partners to comply with sustainability and ethical standards. Their partners also expect transparency and sustainability in their projects, and society has an increasing expectation that they operate sustainably and ethically. The financial sector is also very aware of sustainability standards and expects them to live up to them.

One of AE's biggest challenges is to balance the need for flexibility in buildings with sustainability requirements and financial considerations. They work with flexibility and sustainability in both existing buildings and new projects and try to keep buildings relevant to users over time. New construction must comply with high sustainability standards and be flexible enough to be adapted to changing needs. AE are considering conversion options from office to housing, especially based on the experiences from the corona pandemic, where housing unlike commercial building was not subject to lockdown. They plan to increase the proportion of residential properties in their portfolio and reduce the number of offices and shopping centres. This is part of their risk management strategy.

AE report in accordance with EU Taxonomy, and from 2025 they are subject to CSRD as part of the ATP Group. Specifically for properties, they follow the new industry standard Real ESG. They use and recognize the international certification standards DGNB, LEED and BREEAM.

Østervold (EØ - Ejendomsselskabet Østervold) is a small family-owned limited company (A/S), which invests in and manage existing buildings in Denmark. The company has no defined sustainability policy and is not yet covered by EU's ESG reporting, but they are preparing to report. EØ invest in buildings to hold and manage them to prolong building lifetime. They have established office hotels in provincial towns to increase their offerings, reduce redundancy and meet market demand.

Heimstaden (HS) is a large investor-owned Sweden-based limited company (A/S) and is an investor and administrator specialized in housing, HS maintain, renovate and modernize buildings to raise the energy labels and rent, and they have changed their policy from replacing faulty fridges to repair if possible. ESG-reporting has started in a Danish environmental unit with two people, and they have an ESG department at the headquarters in Sweden.

Freja Ejendomme (FE) is a state-owned limited company (A/S) with the purpose of developing redundant public property to be sold for new use and thereby create a maximum surplus for the public. They develop the property to have an approved local plan before selling. FE priorities architectural value and has a strict sustainability policy, which they are measured on. FE are at the moment working on including sustainability requirements in sales conditions. For instance, they rejected a bidder, when they became aware that the potential buyer wanted to demolish the buildings to build new.

4.2 POSITIONING OF THE COMPANIES

The case companies vary according to company type and customer relationships. Another differentiation of the companies is whether they are specialized in specific facilities or are more diverse. The case companies span:

- The investor and developing company Freja Ejendomme, which take over all kinds of redundant state property to sell off to private investors for new use, and has a passive relationship with customers,
- Investor and managing companies Østervold, who only invest in existing buildings to hold and with a passive relationship to customers except for office hotels, and Heimstaden, who both invest in new and existing buildings with a specialization in housing with relationships to representatives of tenants and private housing associations,
- Property administration companies Newsec, who administrates for different investors, and ATP Ejendomme and PKA Ejendomme, who only administrate property owned by their mother companies - a state and private pension funds, respectively, and with an increasingly closer relationships with their tenants.

Table 3: Basic Business Models of the Companies

| Company BM block | NS: Newsec | PE: PKA Ejendomme | AE: ATP Ejendomme | EØ: Østervold | HS: Heimstaden | FE: Freja Ejendomme |
|-------------------------|--|--|---|---|--|---|
| Value proportion | Rent-out housing estates and commercial prop. for various private investors and for private housing associations in Northern Europe. | Rent-out prop. owned by the mother company and manage the prop. strategically and develop close relations to their tenants in DK | Rent-out prop. owned by the mother company and manage prop. in Denmark. | Rent-out carefully selected housing estates and commercial buildings in central locations based on investments in existing buildings to hold in DK. | Rent-out housing owned by the company in Northern Europe. | Develop and sell redundant public facilities. |
| Profit formula | Income from prop. adm. and mgmt. Expands by taking on more properties from investors and associations. | Income from prop. mgmt. Develops according to the mother company's portfolio. | Income from prop. mgmt. Develops according to the mother company's portfolio. | Income from prop. mgmt. Develops according to the company's own portfolio. | Income from prop. mgmt. Develops by building new and procuring existing property portfolios. | Create max. surplus for the public. |
| Resources | In-house staff for prop. mgmt. and technical experts for mgmt. of M&O services. Marketing staff to increase market share. | In-house staff with technical experts for mgmt. of M&O services. Rental adm. is outsourced. | In-house mgmt. staff with technical experts for mgmt. of M&O services. | In-house staff to procure new and manage existing prop. and technical experts for mgmt. of M&O services. | In-house mgmt. staff to administrate existing prop. and technical experts for mgmt. of M&O services. | In-house staff to develop projects. Building consultants assist in developing projects. |
| Processes | Adm., mgmt. and M&O. | Adm., mgmt. and M&O. | Adm., mgmt. and M&O. | Adm., mgmt. and M&O. | Adm., mgmt. and M&O. | Project development. |

Table 4: Developments in Business Models of the Companies

| Company BM block | NS: Newsec | PE: PKA Ejendomme | AE: ATP Ejendomme | EØ: Østervold | HS: Heimstaden | FE: Freja Ejendomme |
|-------------------------|--|---|--|---|--|--|
| Value proportion | Modernize investor-owned prop. Change from seeing investors as their customers to stronger focus on the tenants. New developments with investors, for instance office hotel concept. | Daughter company started in 2023 based on insourcing major parts of mgmt. and services with particular focus on value-creating services. Nordic Swan label, DGNB and BREEAM certifications. | DGNB, LEED and BREEAM certifications. | Establish office hotels to develop their offerings to reduce redundancy and meet market demand. | Normally own to hold but the need to free capital has forced them to sell flats to be individual owner-occupied. | |
| Profit formula | Income from projects to increase rent from modernization and changing | Occasionally modernization projects to increase rent income. | Consider conversion from offices to housing. Part of risk strategy to increase the | Occasionally expanding portfolio and increasing rent from modernization | Occasionally modernization projects to increase rent income. | Five assessments criteria: Economic added value, Environmental |

| | | | | | | |
|--|---|--|--|---|--|--|
| | offices to housing and offering additional services in office hotels. | | proportion of housing and reduce commercial property. | and offering additional services in office hotels. | | sustainability, Culture and city life, Architectural quality, Special societal considerations. |
| Resources | ESG department with approx. 12 people. | Sustainability reporting done by each pension funds in PKA. | | Preparing for ESG. | ESG-reporting by a small Danish environmental unit. | |
| Processes: Sustainability / Circularity | Maintain, renovate and modernize to keep up building condition. Office hotels increase flexibility for customers. Customers demand sustainability certifications. | Sustainable og up-to-date property. Offer standard offices. Re-use, e.g. of kitchens. Modernize buildings to improve energy labels and sustainability certification of buildings | Sustainability strategy that focuses on reducing the CO ₂ footprint in buildings and construction projects and circularity of materials for new construction. | Invest to hold. Office hotels increase flexibility for customers and their possibilities to optimize space. | Modernize buildings to improve energy labels. Change from replacing fridges to repair if possible. | Sustainability requirements are being implemented in sales conditions. Climate and environment is one out of five areas in CSR-policy. |

Tabel 5: Interpretation of Sustainability / Circularity processes

| Company | Sustainability/Circularity processes included in last row of Table 4 | Interpretation of actions |
|----------------------------|--|---|
| NS: Newsec | Maintain, renovate and modernize Office hotels increase flexibility for customers Customers demand sustainability certifications | Prolongs lifetime of buildings Increases intensity of use and reduces the need for space Ensures sustainable quality and potentially prolong lifetime |
| PE: PKA Ejendomme | Focus on sustainable and up-to-date property Offer standard offices Re-use, e.g. of kitchens Modernize buildings to improve energy labels and sustainability certification of buildings | Ensures sustainable quality and potentially prolongs lifetime Reduces need for bespoke adaptations of buildings and demand for building materials Prolongs lifetime of components Reduces energy and CO ₂ as well as potentially prolong lifetime |
| AE: ATP Ejendomme | Sustainability strategy that focuses on: <ul style="list-style-type: none"> Reducing the CO₂ footprint in buildings and construction projects Circularity of materials for new construction. | Reduces CO ₂ Prolongs lifetime of building materials |
| EØ: Østervold | Invest in buildings to hold Office hotels increase flexibility for customers and their possibilities to optimize space | Potentially prolongs lifetime of buildings Increases intensity of use and reduces the need for space |
| HS: Heimstaden | Modernize buildings to improve energy labels. Change from replacing fridges to repair if possible | Reduces energy and CO ₂ as well as potentially prolong lifetime Potentially prolongs lifetime of equipment |
| FE: Freja Ejendomme | Sustainability requirements are being implemented in sales condition Climate and environments is one out of five areas in CSR-policy | Reduces energy and CO ₂ as well as potentially prolong lifetime Reduces energy and CO ₂ |

5. DISCUSSION

5.1 SUSTAINABILITY AND CIRCULAR PROCESSES

The sustainability and circular processes in Table 5 shows that the following processes are used in typical situations.

For operation of existing buildings:

- Maintain, renovate and modernize
- Focus on up-to date property
- Repair rather than replacing e.g. fridges
- Invest in buildings to hold
- Sustainability certification

For development of existing buildings

- Establish office hotels
- Reuse of e.g. kitchens
- Modernize to improve energy label
- Transform from offices to housing

For transactions:

- Offer standard offices
- Sustainability requirement in sales conditions

For new building projects:

- Circularity of materials
- Sustainability certifications

The effects of the sustainability and circularity actions are:

- Reduce energy consumption and CO₂ emissions
- Prolong the lifetime of buildings
- Increase intensity of use
- Reduce the need for space
- Ensure sustainable quality

5.2 CIRCULAR ACTIONS AND ISO 59004 PRINCIPLES

The circular actions in the use phase included in the Value Building, see Figure 5, and in Jensen & Nielsen (2024) are:

- Transactions
- Sharing
- Space optimization
- Maintenance and minor repairs
- Refurbishment
- Adaptive reuse

These identified circular actions have a close relation to the ISO 59004 defined principles. They do however not correspond 1:1 to the ISO 59004 defined principles but have significant elements of overlapping. Table 6 shows a comparison of the six circular actions and the ISO 59004 principles.

Table 6: Comparison of circular actions and ISO 59004 principles

| Circular Actions | ISO 59004 principles |
|-------------------------------|-----------------------|
| Transactions | System thinking |
| Space optimization | Value creation |
| Sharing | Value sharing |
| Maintenance and minor repairs | Resource management |
| Refurbishment | Resource traceability |
| Adaptive reuse | Ecosystem resilience |

As an example, *Transaction* can be described as an action that relates to *System thinking*, *value creation* and *resource management*. However, *Transaction* can be described as less related to *Value Sharing*. In the other direction the *System Thinking* and *Resource traceability* principles are relevant to all circular actions whereas the remaining principles have a varying degree of relationships to the Circular actions. It is therefore important to distinguish between the circular actions and the ISO 59004 defined principles.

5.3 CIRCULAR ACTIONS IN RELATION TO FINDINGS

Renting-out is a basic aspect of a **transaction**-based BM applied by RECs. Transactions are not circular as such, but can potentially include circular actions, which both can ensure continuous use and long lifetime due to the economic incentives. The BM gives clear incentives to prolong the economic lifetime of buildings and can secure the necessary funds to keep up the technical lifetime and the functional lifetime.

Renting-out can also be seen as a part of **sequential sharing** of space and thereby secure a basic intensity of use. It also includes **maintenance and minor repairs** as a basic circular action part of professional operation management. The BM of RECs also includes incentives to **refurbishment** and renovation to improve energy labels and modernize to increase rent. These actions improve buildings' technical lifetime. Changing market conditions leading to redundancies also gives incentives to **adaptive reuse**, for instance from office to housing, and providing elements of **simultaneous sharing** in office hotels and co-working spaces. Thereby the functional lifetime of buildings can be prolonged.

The serviced-office model includes sharing as an aspect, which provides more **intensive use of space**.

Whether a customer/user-focused model leads to more sustainability or circularity very much depends on the investors and the tenants. Newsec, who serve various investors, experience that particularly some foreign investors set high sustainability requirements, and they also experience a demand for sustainability certifications from some investors. They do not experience that most potential or actual tenants have high demands for

sustainability aspects except for energy consumption and cost.

6. CONCLUSION

The study shows that the focus on sustainability and the business models among RECs varies to a high degree. The public investor and developer company Freja Ejendomme is probably not a typical representative for investors/developers by having a high focus on sustainability and not being purely profit-driven. In general, RECs lack incentives to put strong efforts on sustainability and circularity. Public regulation is the main driver.

State owned and ethical driven investors and administrator companies owned by pension funds have clear strategies towards being more sustainable. A new administrator company PKA Ejendomme has recently been established by a pension fund particularly to meet the increased sustainability challenges with a strong focus on circularity. Among administrators there is a strong trend towards being more customer focused.

Investors can diversify their investments away from growth in building volume towards a circular business model that addresses an increased sustainable market demand. When they do build new, they can develop as sustainably as possible as shown for instance by the public pension fund ATP and their administrator ATP Ejendomme. They can also base their business model on securing a long lifetime of buildings by proper maintenance and by refurbishing buildings they own or buy and adapting them to changing market needs, e.g. by changing offices to housing and creating more shared facilities.

The focus on circularity in the building industry is mostly to reuse building materials. It is important to change the focus towards sustaining whole buildings and preserving the embedded CO₂. The Value Building includes relocation as a circular action in the after-use phase. This involves moving whole buildings to new locations, where they are needed and/or more secure. Rising sea levels and increase in monster-rain, earth-slides and flooding will force some buildings to be either demolished – accidentally or intentionally – or moved. Moving buildings is a well-known practice, for instance of historical buildings by open air museum operators, but it needs to be developed into a more general practice for buildings in use and considered, when designing new buildings.

The paper adds to the growing literature on circular buildings with particular focus on management of the use and operational phase. Most research on circular buildings has until now mostly focused on the design phase. The paper can give RECs inspiration to develop circular business models.

The study focuses on a limited number of Danish RECs but many of them operate in Northern Europe and for international investors, so the results have a certain degree of generality and particular the circular activities and the identified models are regarded as general.

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