Improving the energy performance of state buildings

Deliverable 4:
Practices to improve state building sustainability performance

Technical Support Instrument

Supporting reforms in 27 Member States

Funded by
the European Union

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The project is funded by the European Union via the Technical Support Instrument, managed by the European Commission Directorate-General for Structural Reform Support (DG REFORM).

This report has been delivered in December 2024 under the EC Contract No. REFORM/2021/OP/0006. It has been produced as part of the project “Improving the sustainability performance of state buildings”.

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List of acronyms

BPR	Building Renovation Passport
DG REFORM	Directorate-General for Structural Reform Support
DIE	Direction de l'immobilier de l'Etat *(Directorate for State Property)*
DNSH	Do No Significant Harm
EC	European Commission
EE1st	Energy Efficiency First
EED	Energy Efficiency Directive
EPC	Energy Performance Certificate
EPC	Energy Performance Contract
EU	European Union
FTE	Full-time equivalent
KPI	Key performance indicator
LCA	Life-cycle analysis
MS	Member State
RVB	Rijksvastgoedbedrijf *(Central Government Real Estate Agency)*

About the work

This report was prepared as part of the technical support project *"Improving the Energy Performance of State Buildings"*. The objective of this work is to conduct a comprehensive review and benchmark study of public bodies responsible for central government real estate, hereafter referred to as "public body/bodies," and their renovation status across Europe. The work aims to support the Directorate for State Property (DIE) in France and the Central Government Real Estate Agency (RVB) in the Netherlands in their endeavour to improve the sustainability performance of their state buildings. This project is funded by the European Union (EU) via the Technical Support Instrument, managed by the European Commission (EC) Directorate General for Structural Reform Support (DG REFORM).

To establish a foundational understanding of state building portfolio management across the EU, a first benchmarking of 20 countries, mainly composed of PuRE-net members, was developed. In a second phase, a deeper analysis revealed replicable practices and valuable lessons learned from 6 countries, selected out of the first 20 (see Figure 1, **teal** countries).

NOTE: RVB and DIE are the lead beneficiaries of this project. In the context of EU Technical Support Instrument (TSI) projects under DG Reform, a beneficiary is a public authority or institution that receives targeted technical support to design and implement policy.

NOTE: The list of European organisations for public real estate agencies and ministries, available at Pure Net. All highlighted countries are members of Pure-Net, except Portugal, Spain and the UK.

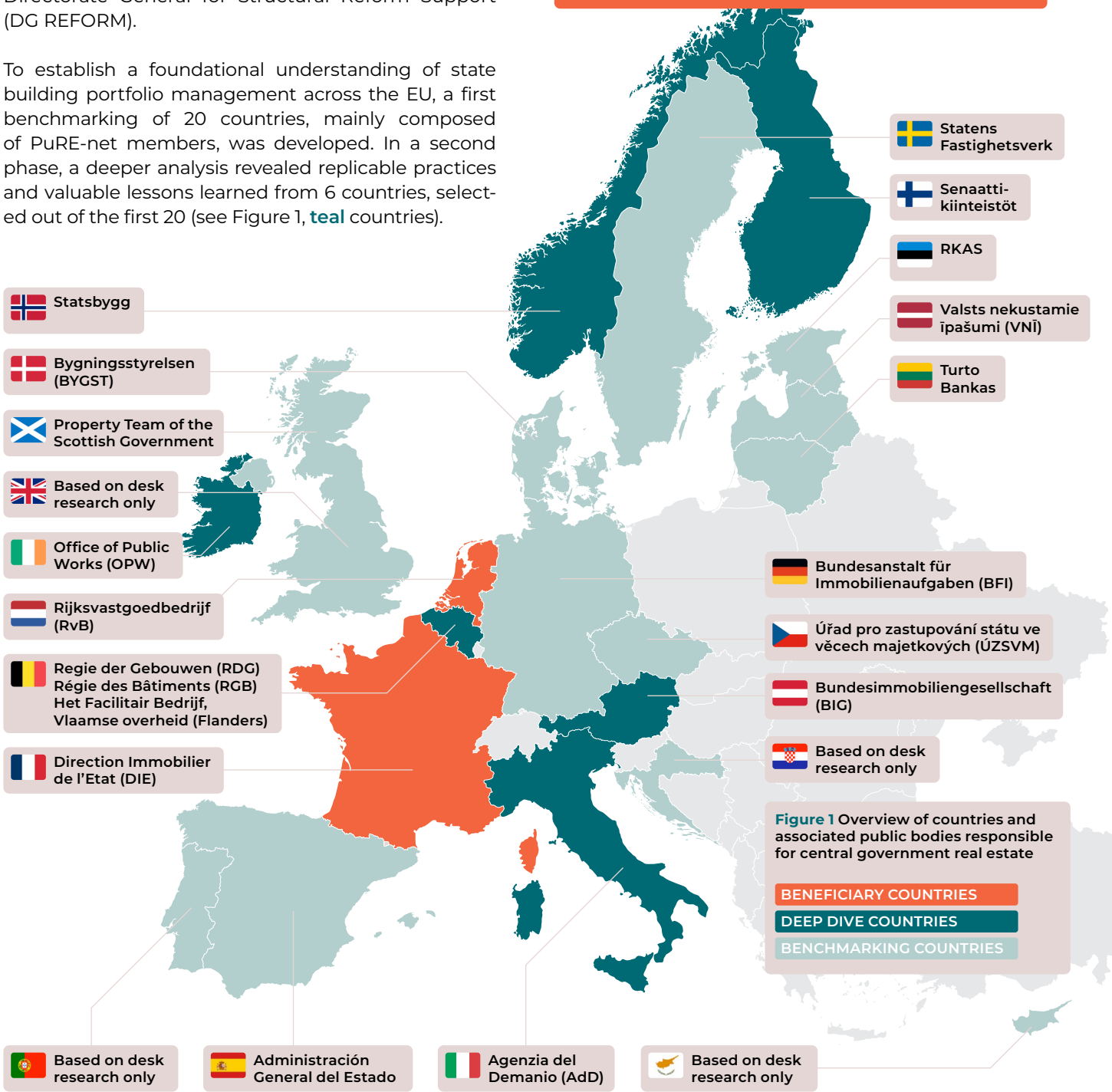


Figure 1 Overview of countries and associated public bodies responsible for central government real estate

Den Haag: Skyline vanaf het dak van het Ministerie van Financiën
Beeld: RVB/Corné Bastiaansen

About the publication

This publication is a resource for practitioners in the public body agencies responsible for enhancing the sustainability performance of their building portfolios. The primary objective of this publication is to present an overview of the challenges faced and the approaches taken by practitioners in six countries to advance the sustainability performance of their building portfolios.

This report includes the challenges, interlinkages, and strategies driving EU state building sustainability and energy efficiency efforts amid the European Green Deal and more specifically its ambitious climate goals. The report includes the following sections:

- A summary of the **state building portfolio landscape** and context across the surveyed Member States (MSs).
- An outline of the **diverse responsibilities** held by public bodies managing central government real estate.
- **Key considerations** for ensuring sustainable operation and renovation of state-owned buildings. This section includes key takeaways from the research conducted throughout the project, informing these considerations.
- **Case studies** highlighting various approaches adopted by Member States to address key challenges and considerations.

National experts were consulted to conduct country-specific analyses using a standardised methodology that took into consideration distinct national contexts. The methods included interviews with national state building managers and other stakeholders, desk research on state building policies, and an analysis of documents provided by interviewees. Data collection was iterative, incorporating feedback from the different reports.

State building portfolios across countries

Key message: State real estate portfolios across Europe differ significantly in composition and management, complicating direct comparisons. While many Member States have adopted central agencies to oversee government real estate, the structure and responsibilities of these agencies vary widely due to national approaches and unique policy environments. This diversity underscores the need for tailored strategies in assessment and policymaking, ensuring that solutions align with each country's specific institutional framework.

Variation in national portfolio landscapes

The building portfolios of the selected government real estate bodies differ in size, number, type, institutional context, and function of building, which affects comparability and the transferability of best practices. The number of employees and buildings portfolios (in number of buildings and surface area) are presented in Table 1.

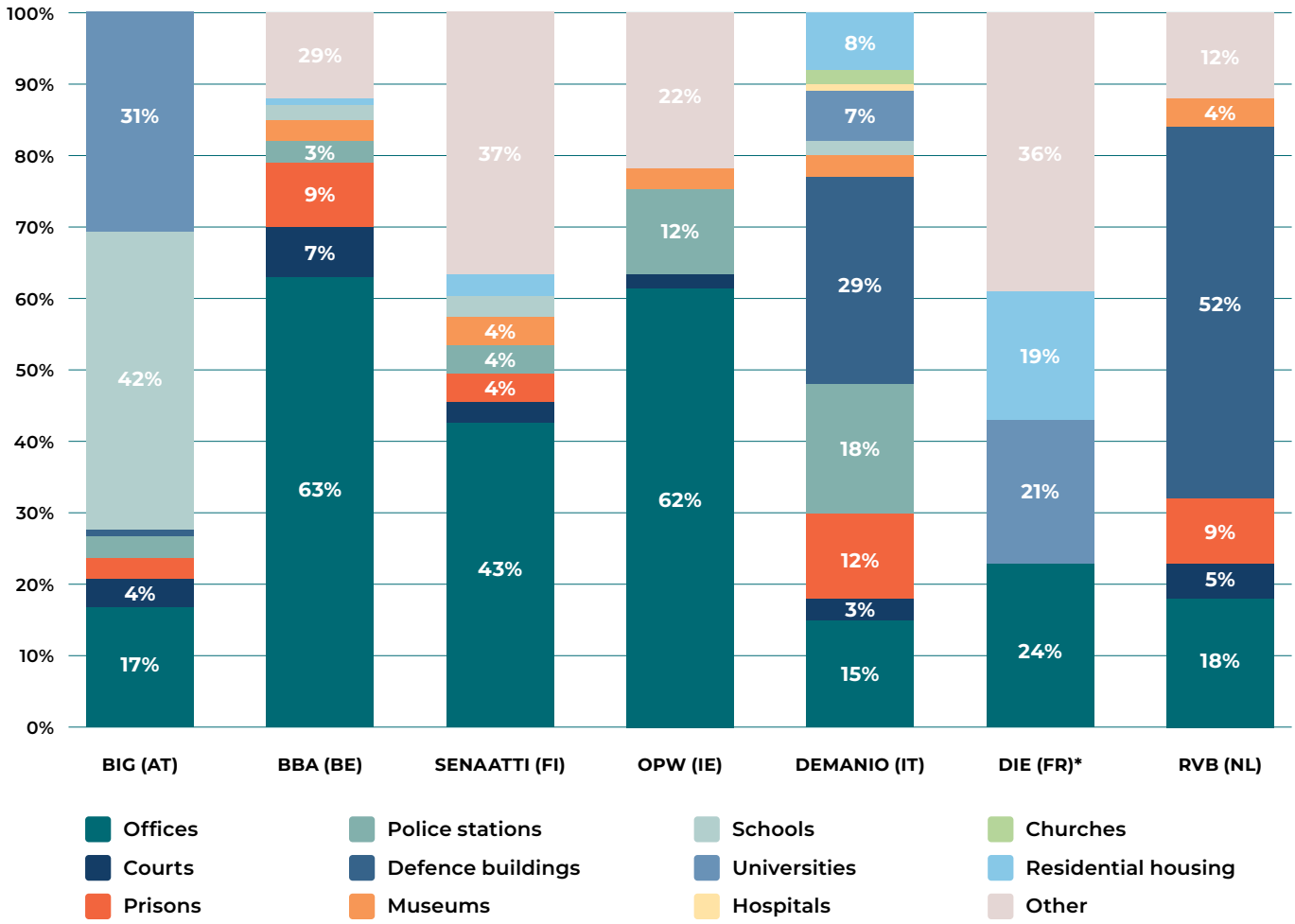
Table 1 Table 1 Public bodies' portfolio and employees

	OPW (IE)	SENAATTI (FI)	BIG (AT)	DEMANIO (IT)	STATSBYGG (NO)	BBA (BE)	DIE (FR)	RVB (NL)
No. of employees (FTE)*	2 244	126	1 165	1.063	850	839	~12 000	2 900
Number of Buildings under management	1 747	8.600	1 651	31 099	1 811	2 138	194 456	~ 12 000
Surface (million m2)	1.5	5.9	7.25	43.9	2.7	6.9	95.9	12

***Note:** DIE directly employs 123 agents but it is not the only public body in charge of managing the building stock, the entire network of occupant organisations (i.e. the administrations) is also involved and composed of around 12 000 agents. **RVB** and **DIE** employees in this category also manage respectively 900 km2 and 40 000 km2 of ground property.*

The portfolio composition of buildings differs significantly among agencies. Most agencies manage office, justice, and cultural buildings, although Austria manages cultural properties separately. Certain agencies extend their scope to schools, universities, and residential housing, while Italy's *Agenzia del Demanio* includes defence, hospitals, religious buildings, and unique assets for private use. Offices comprise the most common building type, especially in Belgium, Ireland, and Finland, where they constitute over 50% of total surface area. Other prominent categories include police stations, higher education facilities, and residential housing. Notably, police stations make up 43% of Ireland's portfolio, schools represent 35% in Austria, and defence buildings account for 28% in Italy. However, comparability across countries is limited due to differences in classification systems.

Figure 2 Distribution of Portfolio by Building Type (% of Total Floor Area)

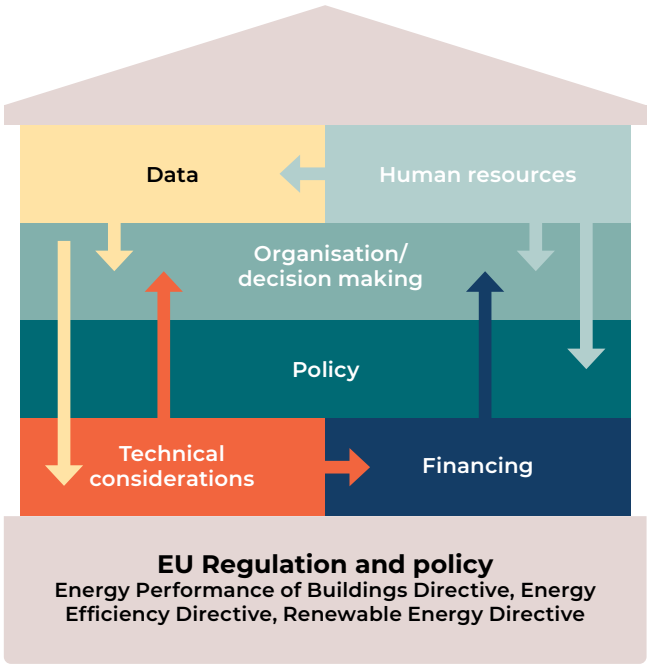


Most state buildings are owned by government bodies, though office rentals are common in Ireland and Finland.

Operating in a diverse landscape: key considerations

Effective management of state building portfolios requires a comprehensive approach that addresses a range of interconnected factors (see Figure 3). Key considerations, such as **data management, human resource capacity and expertise, organisational and decision-making structures, national policies, financing, and technical requirements**, are all closely interlinked, each relying on each other. These considerations must be aligned with EU regulations and policy objectives, which serve as a foundational framework for driving sustainability initiatives and achieving energy performance targets. In addressing these considerations, it is essential to adopt a systemic perspective that considers the interconnectedness of each component. For instance, when focusing on data management, it is vital to ensure that the data effectively informs decision-making processes. The following section highlights both the challenges inherent in each element and the opportunities available to overcome them, fostering a comprehensive approach to achieving sustainable and effective outcomes.

Figure 3 Interlinkages between the **key considerations** regarding state building stock portfolio management



Improving sustainability performance of state buildings - challenges and opportunities

Key message: Public bodies must take a multi-faceted approach, taking into consideration climate, core business, and sustainability.

To enhance the sustainability performance of building portfolios, state building managers should establish clear targets accompanied by strategic plans to achieve them, while ensuring effective building operation and renovation practices with the required financial and human means. Public bodies must navigate between the three pillars (as illustrated in Figure 4):

1. Their *usual portfolio management framework* ("core business") typically designed to ensure that buildings meet or even exceed the needs and expectations of their occupants, while ensuring that the management of the building portfolio is cost-effective, efficient, and sustainable.

2. The *decarbonisation pathway* driven by the EU and national agenda with clear targets translated through a multi-layer governance scheme, with a first focus on energy efficiency ("GHG emissions"); and

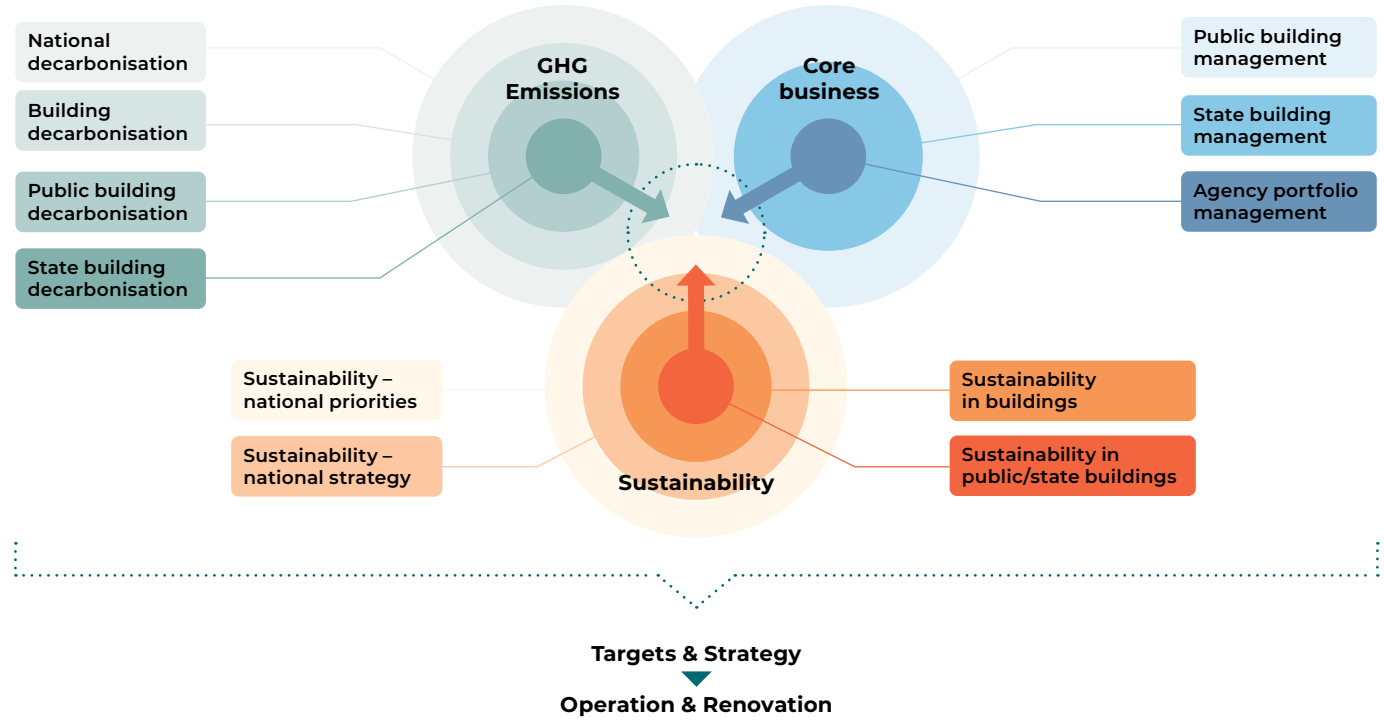
3. Improving sustainability factors in buildings globally, without strict sector-specific priorities, nor regulation for buildings, involves a flexible approach that targets various aspects of environmental, social, and economic sustainability ("sustainability").

The building operation and renovation processes will be guided by specific targets and strategies, which are shaped by the three pillars, illustrated in Figure 4. Daily operation and planned renovation are integrated into real estate management practices through the six key considerations (Figure 3), where both challenges and opportunities for achieving sustainability and energy goals can be identified.

NOTE: ***"Greenhouse Gas Emissions (GHG) emissions"*** **is used as an umbrella for energy efficiency and specific components of sustainability here because it aligns with established regulatory frameworks and objectives. These frameworks provide clear guidance on key performance indicators (KPIs), targets, and measurable outcomes. In contrast, other aspects of sustainability may lack such well-defined regulatory structures, making it more challenging to incorporate them systematically into decision-making and policy design. This approach ensures a structured alignment with climate-related goals while maintaining some connection to broader sustainability objectives.**

Cité administrative de Lille

Figure 4 Framework influencing environmental sustainability targets and strategies to properly operate and renovate building portfolios



The following section summarises some of the main challenges and related opportunities throughout the six considerations.

Box 1 Operations, Maintenance and Renovation

Building operations and maintenance work together to sustain performance and occupant comfort. **Operations involves daily activities** like temperature, light, and resource use, while **maintenance ensures system functionality** through repairs and replacements. **Renovation**, distinct from these, **focuses on strategic upgrades** for improved functionality, sustainability, or compliance, targeting long-term transformation beyond routine management.

Renovation efforts are deeply influenced by operation decisions, particularly regarding technical standards, space sufficiency, and data management. However, renovation projects are more forward-looking, often focusing on enhancing the organisation's capabilities to meet future demands or to achieve strategic goals such as innovation, sustainability, or growth.


Cité administrative Amiens

Unpacking the key considerations

Key message: The six key considerations are deeply interdependent, with each influencing, enhancing, or potentially impeding the others. Understanding their unique challenges and solutions, while addressing these interconnected factors holistically is essential for achieving a more sustainable public building stock.

Financing

Challenges

Finance is one of the most significant challenges to achieving sustainability in state-owned buildings, particularly regarding energy efficiency. Funding mechanisms generally fall into the following categories: state budget allocations, direct loans, and private investments. State budgets are inherently constrained and must be balanced against competing public priorities. Direct loans, while often a feasible option, contribute to national debt and require careful consideration of repayment obligations. Private financing, driven by investor expectations of returns, necessitates ensuring financial viability. However, recently some private investors are willing to accept reduced returns to support decarbonisation and sustainability objectives, although requiring risks to be covered appropriately.

Barriers to financing state-owned building renovations/upgrades include the limited financial attractiveness of these projects for the investors (public and/or private); concerns about increasing public debt; the high perceived risks associated with such investments; the increasing need to limit direct public funding while emphasising value generation of projects to attract private investors; and difficulties in accessing capital. Underlying factors hindering investment in building renovations include, among others, long payback periods, split incentives, inadequate financial instruments, budget constraints and limited knowledge of available technologies. Limitations on State budget deficits make it difficult to undertake large-scale renovations without negatively affecting national debt, regardless of the financing model.

Approaches to navigating key challenges

Establishing temporary, dedicated funds to complement the budget allocated to portfolio management can improve the attractiveness of investments. Implementing financial instruments designed to attract private investment without relying on public de-risking mechanisms can reduce the strain on public debt while fostering sustainable funding solutions. In particular, the use of energy performance contracting (EPC) can help de-risk investments for the investor to access capital (see box 2). Additionally, quantifying the co-benefits of energy efficiency measures—such as improved indoor air quality, increased property value, enhanced occupant comfort—can provide added incentives beyond financial returns. Other sustainability factors should be monetised(using frameworks like Social Cost-Benefit Analysis, a Multi-Criteria Decision Analysis, or tools like EN 15459-1 and ISO 52000-1 providing guidance for evaluating cost-optimal energy retrofits, integrating co-benefits where data is available) to take into account their long term added value.

Elektrisch materieel op het Binnenhof in Den Haag, maart 2024. Beeld: RVB/Bart Maat

Box 2 Energy Performance Contracting (EPC)

Energy Performance Contracting is a financing mechanism that can be used to improve/ renovate buildings and deliver savings by way of operation and maintenance (type 1) or as an investment in new assets (type 2).

Type 1:
Operation and Maintenance

In this model, the contractor is incentivised to optimise the building's operation and maintenance to achieve energy savings. Payments are directly tied to the contractor's ability to deliver measurable efficiency improvements, ensuring ongoing energy cost reductions.

Type 2:
Investment in New Assets

For larger investments, such as upgrading building systems, insulating the building or installing renewable energy technologies, the contractor guarantees the performance of new assets. This reduces risks for investors who may lack the technical expertise to assess or manage performance risks, making the project more bankable.

Eurostat's 2017 guidance allows EPCs to be recorded off-balance sheet in government accounts under specific conditions. This approach ensures that the financial liabilities associated with EPCs do not impact national debt levels, provided that the private sector partner bears the majority of project risks, such as construction and energy performance. This enables public authorities to undertake energy efficiency projects without straining public budgets or breaching fiscal constraints.

A Guide to the Statistical Treatment of Energy Performance Contracts - Eurostat, EIB, 2018, Available here

Key takeaways

- **Align sustainability and budget allocation:** the responsibility for sustainability performance should be closely aligned with the authority over budget allocation and financial decisions, ideally within the same institution or organisation. This alignment is crucial to ensuring coherence in sustainability goals and enabling effective financial planning that supports these priorities.

- **Utilise Energy Performance Contracting:** Energy Performance Contracting requires customised approaches, such as bundling specific building types to achieve economies of scale while distributing risk across a group of buildings. To maximise the potential of EPCs, its scope should be expanded beyond simple, low-investment measures with quick returns, addressing more comprehensive and impactful upgrades that contribute to long-term sustainability goals.

- **Value sustainability:** valuation of the main sustainability factors, including the co-benefits of energy efficiency and adaptation to climate change impacts, should be recognised and factored into financial decision-making (see box 3).

- **Account for risk and increase bankability:** large investments may fall short of expected energy savings due to user behaviour or technical issues, which can heighten risks for subsequent projects. To maximise the effectiveness of upgrades and minimise uncertainties, decision-makers should prioritise strong technical expertise, foster occupant collaboration, and implement robust de-risking strategies. Bundling invesments with various payback times is another way to increase overall project bankability. These measures help ensure that energy efficiency improvements deliver consistent and reliable outcomes.

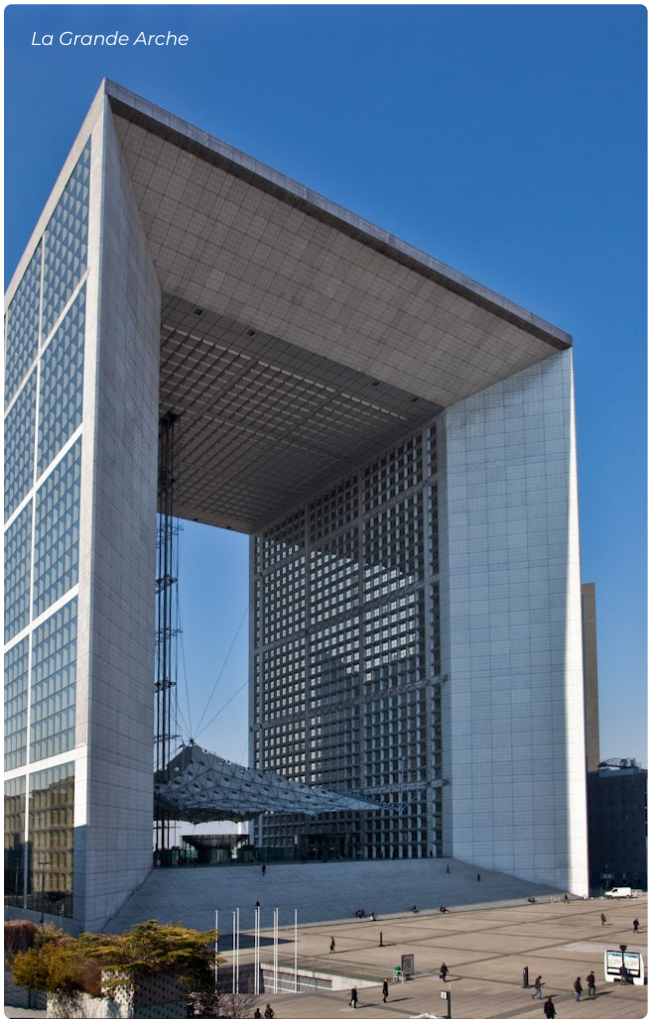
- **Reduce impact on public accounts:** public authorities can avoid increasing public debt and by applying Eurostat's 2017 guidance to record EPCs off-balance sheet (see box 2) where they apply as de-risking tool.

- **Mobilising private finance:** setting up a financial system with a private entity responsible to assess the risks, provide the technical and financial means, and to pass back a share of the risk to the public entity can leverage private finance. Funding to fill in financial gaps to make investments attractive could possibly complement the scheme. Private finance can also be mobilised via EPCs (see box 2).

Box 3 Valuation of sustainability measures

Valuing sustainability in building projects requires integrating environmental, social, and economic factors into financial and performance evaluations. This involves monetising benefits such as enhanced working conditions, improved occupant health, and reductions in resource use and waste, alongside traditional financial metrics. These valuations should carry equal weight in decision-making processes, factoring in asset depreciation and long-term changes in value to provide a comprehensive assessment.

Tools like Life Cycle Analysis (LCA) can assess total cost of ownership, incorporating sustainability benefits, but they are often time-intensive and not suited for large portfolios. Certifications like LEED or BREEAM offer alternatives but require additional budgets and are not easily scalable. To address these gaps, some state building agencies have developed tailored tools to evaluate and integrate sustainability measures effectively.



La Grande Arche

Organisation and Decision Making

For daily operation and maintenance, decisions rely on accurate data, guiding technical choices, equipment settings, and space management.

Challenges

Efforts to enhance the sustainability of public buildings may be hindered by complex internal organisational structures, insufficiently clear decision-making processes, differing priorities, limited capacity and knowledge, reluctance to adopt changes, and weak information and monitoring systems. Additionally, internal agency decision-making power is often fragmented, which can complicate the ability to take coherent action.

Approaches to navigating key challenges

Ensuring sustainable operation and renovation requires **embedding sustainability into both the organisational strategy and the decision-making processes**. This begins with integrating clear sustainability goals (such as goals related to circular economy, nature, life cycle assessment of materials, etc.) into the strategy. These goals should be supported by specific, measurable KPIs and tangible targets, which should be used as core performance indicators for building operations. Within the organisation, embedding sustainability means actively monitoring these indicators across both individual buildings and the entire portfolio, while differentiating indicators for individual portfolio level. For example, at the individual building level, indicators might include energy consumption per building part and per fuel type with detailed information on the operating parameters (e.g. level of temperature, hours of occupancy). At the portfolio level, indicators could focus on aggregate metrics such as the overall energy consumption per square meter and building type across all buildings or the percentage of the portfolio meeting specific energy efficiency standards. This monitoring process is essential for informing decision-making, guiding interventions, and ensuring ongoing improvements in operational performance and renovation efforts.

An effective decision-making system for sustainability should include key elements: clear mandates assigning responsibility for monitoring KPIs and achieving targets; appropriate tools and frameworks to guide decisions; active engagement with occupants to encourage environmentally responsible behaviour; and defined processes to determine renovation depth. Knowledge sharing and capacity building are essential to equip decision-makers with the expertise needed to address these considerations effectively.

Space optimisation solutions, such as flexible workspaces and activity-based targets per square meter, are key components of decision-making and organisational processes. These solutions require high-level decisions regarding space allocation and the placement of public agencies. Effective space management helps minimise energy consumption and resource use.

Key takeaways

- **Develop a pluri-annual strategy:** public bodies should establish a long-term, multi-year strategy grounded in robust, accurate data. This ensures clear goals, consistent progress tracking, and alignment with broader sustainability and energy performance targets.
- **Strengthen decision-making processes:** a strong, transparent decision-making framework is essential for prioritising actions, allocating resources efficiently, and maintaining accountability. This ensures effective implementation of strategies and adaptability to emerging challenges.
- **Renovation approach:** deep renovation should be prioritised to ensure fast and effective decarbonisation of the building stock, given the remaining period to reach full decarbonisation by 2050.
- **Renovation vs. demolition:** consider long-term sustainability and asset depreciation when deciding whether to renovate or reconstruct after demolition, taking into account circular economy principles and material lifecycle.
- **Incorporate sustainability:** incorporate sustainability aspects into the public body's strategy and decision-making processes by applying criteria that carry the same weight as financial considerations when setting priorities. Sustainability factors monetisation is one possible approach (see box 3).
- **Efficiently plan buildings decarbonisation:** effective planning should take into account budgetary constraints, the need to prioritise important investments, and the urgency to improve the energy performance of the building stock. Without appropriate planning, there will be no alignment with sustainability goals.
- **Space optimisation and space allocation:** setting space use targets, based on feedback and consultation with tenants to understand their actual needs, can help achieve high potential energy savings. Implementing strategies such as flexible working spaces, selling underutilised buildings, or sharing buildings between organisations can further help improve space efficiency and reduce costs.

Human resources

Challenges

A key challenge is the lack of **human resources capacity**, and/or **lack of expertise** among public authorities within public bodies responsible for ensuring the sustainable performance of their portfolio. In addition, there is a scarcity of qualified professionals (architects, engineers, construction workers, energy operators, installers, energy planners, building managers) to plan and execute renovation. Further, while practitioners are typically trained in energy performance for new builds, there is a significant gap when it comes to retrofitting existing buildings. Renovations require a higher degree of coordination and often present lower profitability compared to new construction, making them less attractive for professionals. Contributing factors include public bodies constraints on hiring and training staff, insufficient upskilling to keep pace with market and technological developments, limited integrated renovation expertise, and a lack of awareness within the professional community regarding the implementation of energy renovation needs and available resources.

Box 4 Internal vs. external factors

Differentiating between external and internal factors is key when tackling human resource challenges. While external issues like labour market constraints or regulations are beyond direct control, internal strategies—such as targeted training, adaptive recruitment, and fostering flexibility—can mitigate their impact. Addressing external challenges through effective internal measures strengthens organisational resilience.

Approaches to navigating key challenges

Training staff on energy-efficient practices or collaborating with external experts can build a knowledgeable workforce to drive sustainable building improvements. To enhance workforce development, targeted trainings, certifications, and apprenticeships should equip public body staff in operations, building management, and sustainability with up-to-date skills in energy efficiency and sustainable practices. These efforts should prioritise energy management and efficiency techniques while engaging all stakeholders, including the public, to highlight the benefits of sustainable building management.

Key takeaways

- **Leadership:** decision-making bodies, such as the board of directors, must be knowledgeable about sustainability challenges to allocate resources and make informed decisions regarding energy performance improvements.
- **In-house operational expertise:** ensure the presence of staff with strong energy management expertise to oversee building stock management, prioritise renovations, and monitor sustainability targets. Portfolio managers, engineers, and architects should ideally possess energy management skills to monitor performance, track savings, and ensure progress toward sustainability targets.
- **Skilled practitioner workforce:** employ (either in-house or as contractors) engineers and architects to select, plan, and manage renovation works, develop technical specifications, and oversee project execution.
- **Occupant engagement:** involve building occupants through representatives to gather feedback on their needs and ensure these are reflected in sustainability initiatives. Encouraging their positive behaviours for the rational use of energy and other resources is essential for reducing environmental impact.

Data Management

Data management encompasses the full lifecycle of handling information, including its collection, transfer, processing, storage, quality verification, and accessibility. It also involves creating and analysing indicators, as well as monitoring and tracking progress toward goals, ensuring data is actionable and supports decision-making effectively.

Challenges

The absence of robust data (e.g. energy use, sustainability parameters, behaviour, technical equipment, etc.) directly impacts the ability to establish benchmarks, set realistic targets, and monitor progress toward energy efficiency and sustainability goals. Such data gaps hinder the ability to develop effective building regulations and policy frameworks, limiting their capacity to drive improved sustainability performance across building portfolios.

The primary challenge for public bodies lies in acquiring, managing, and utilising data effectively, as this addresses the downstream challenges related to building regulation and planning. This includes ensuring the availability of high-quality, reliable, and cen-

Rijksvastgoedbedrijf, Korte Voorhout 7, Den Haag
Beeld: Foto: Bas Kijzers

tralised data, as well as implementing management practices and tools with the necessary expertise. Developing appropriate indicators is another critical aspect—data must be sufficiently detailed to support building-specific interventions and design efforts without overwhelming users or complicating portfolio-level planning.

These challenges stem from limited data collection infrastructure, various technical barriers, data privacy and confidentiality issues, a lack of data knowledge and skills, inadequate data management systems at both building and portfolio levels (leading to information overload), and insufficient data metering systems. Moreover, these data issues are interconnected with various other challenges, including a shortage of human resources to effectively enter, manage and analyse data, as well as difficulties to properly inform decision making processes. Recognising these linkages is crucial in understanding the complex nature of data-related challenges and in formulating effective strategies to address them.

Approaches to navigating key challenges

Detailed and operational data is necessary at building level. Data can be provided by tools and meters, by employees (e.g. energy team), or by contractors (e.g. energy advisors, or EPC contractors). Depending on building size and complexity, detailed data should be consolidated into KPIs at either building- or central-level, for large or small buildings, respectively. The integration of building data into a centralised database should focus on crucial KPIs to monitor sustainability performance of all buildings, ideally by categorising them. Only these KPIs will allow to identify weakly performing buildings at central level, planning interventions, allocating budget. Data collection and storage can be automated or gathered manually through daily operation, auditing campaign, or awareness campaign. Dedicated energy managers can help defining proxies for missing data. Broader sustainability metrics (beyond energy) are needed for comprehensive building performance evaluation.

Key takeaways

- An appropriate **data management strategy** is required and should ideally build on other practices or initiatives, such as on Energy Performance Contracts to develop KPIs and data collection processes, on energy/sustainability auditing to identify and centralise datasets, on existing Energy Performance Certificates, or on awareness campaigns to require employees to collect and store data.

- **Data management integration:** data necessary to manage single buildings (those could be available, e.g. via Building Management Systems) and the entire portfolio should be as integrated as possible, and available to decision-makers at different levels. This facilitates the alignment of operational and strategic decisions (such as renovations), as well as supporting other good practices, such as tracking performance via KPIs, benchmarking, and designing scalable and replicable renovation actions that can be implemented in multiple buildings.

- **Tailored deployment:** depending on the size and diversity of the stock, it can be useful to split the complete portfolio into sets of buildings with similar characteristics to ease data management system design, based on building category (e.g. separate schools and offices), on location (e.g. all in the same city), or on the occupants (in case their role in data collection is expected to be important).

- **Balance decentralised vs centralised systems:** data management is most of the time a combination between centralised systems (to assess comparable KPIs, identify weak buildings and plan interventions) and decentralised ones (to carry out in depth assessments and precise works or measures).Finding the appropriate balance and designing a comprehensive data management scheme is an essential step.

- **Enhance Data Collection:** decision makers should evaluate existing or new/innovative methodologies for gathering energy and usage data or determine if tailored systems are required.

- **Continuous learning:** data management requires ongoing development of in-house capacity to address evolving challenges such as new datasets, constraints, and increasingly specific needs. This includes identifying opportunities for improvements, the integration of sustainability factors, and adopting new technologies. Consider integrated approaches for both training and data management.

- **Energy data optimisation:** sub-metering and smart metering provide detailed, real-time energy data, enabling precise monitoring and improved decision-making. By identifying specific energy uses and automating data collection, these tools enhance accountability, optimise efficiency, and support targeted sustainability interventions.

Policy

Challenges

A key challenge is **keeping abreast of policy updates**. Countries with complex institutional systems may face challenges in aligning policies and regulations. Factors such as limited coordination with the concerned authorities, variations in policies or regulations, and limited direction provided by authorities can seriously hinder progress to achieve sustainability goals. While there are currently clear goals and regulation with regard to climate in the building sector (inc. energy), other key sustainability factors are still not precisely defined. There is in particular insufficient definition of the key factors that require attention and priority. However, these policy frameworks are evolving, with among others the Taxonomy Regulation and the Do No Significant Harm (DNSH) principle progressively implemented in the building sector. Finding the appropriate approach to ensure current renovations are future proof remains a challenge, possibly leading to inconsistencies within emerging policy frameworks. The complex interplay between all these elements, emphasises the need for improved coordination with authorities, clarity in the legal framework, and enhanced financial, human and technical capacity to achieve policy alignment and overcome the challenges at hand.

Approaches to navigating key challenges

Government policies shape the regulatory frameworks, incentives, and standards governing all real estate, including zoning laws, building codes, sustainability mandates, and tax benefits. These measures set requirements while promoting innovation and progress. Government should also establish specific sustainability targets that apply to public real estate, together with ad hoc guidance.
Additionally, governments can develop tools to help navigate the complexity and meet the climate goals such as data platforms, mapping systems, and decision-making frameworks. These tools can guide practitioners in aligning their operations with policy goals. These enablers, combined with regulatory preconditions, are crucial for deploying sustainable and efficient solutions. By leveraging these resources, practitioners can navigate challenges and meet policy objectives effectively.

Key takeaways

- **Update Energy Performance Certificates (EPCs):** regularly review and update EPCs to assess current energy performance and identify areas for improvement. (Note: annual updates are mandatory under the Energy Efficiency Directive for large buildings.)
- **Stay informed on regulations:** authorities should keep up to date with evolving energy efficiency and sustainability regulations, guidelines, standards, and certification requirements, integrating these into awareness-raising and capacity-building efforts.
- **Collaborate with public authorities:** public authorities can provide guidance, expertise, and contribute to fix sustainability targets, possibly looking at the DNSH emerging framework.
- **Incorporate decision-making feedback:** engage with decision-makers to help design and implement tools that are fit for purpose, ensuring effective management and alignment with objectives.
- **Seek guidance on specific topics:** identify areas where guidance from public authorities may be beneficial to support decision-making and improve implementation.

Box 5 Energy Efficiency First (EE1st)

Article 3 of the Energy Efficiency Directive (EU) 2023/1791 (EED) requires Member States to embed the **Energy Efficiency First (EE1st) principle** into their legislative and regulatory frameworks. The EE1st principle prioritises demand-side solutions by stipulating that energy efficiency measures must be considered and prioritised over supply-side investments when they are proven to be more cost-effective. This approach ensures that resources are allocated to reducing energy demand, maximising savings, and enhancing sustainability before expanding energy production.

Technical challenges and standardisation

Challenges

Additional technical challenges arise from the complex nature of operating and renovating state buildings. These challenges can include outdated infrastructure, difficulty to integrate new technologies, complex compliance with energy efficiency standards like building codes or with safety regulations, or difficulty to identify worst performing elements and/or the best mitigating solutions and functionality of the renovated buildings.

Material challenges include the availability, cost, but also social considerations of procurement within the value chain, all of which directly impact the ability to achieve the desired sustainability improvements. Sustainable and low-carbon materials often come with higher upfront costs compared to conventional alternatives. The lack of awareness around well-established methodologies for material Life Cycle Assessment, and especially lifecycle carbon of materials also hinders the integration of sustainable considerations in the choices and decision making. Furthermore, a comprehensive LCA approach tailored for portfolio-wide application to support informed decision-making is currently lacking.

In addition, state building portfolios often include historic buildings, many of which are protected, which limits possible interventions technically and financially and can hinder the adoption of new technologies. Key challenges in the renovation of historic buildings are the preservation of architectural integrity and compliance with stringent heritage protection laws.

Approaches to navigating key challenges

The choice for certain upgrades and renovation measures over others depends on a number of factors including national context, as well as the state and status of the buildings The most common measures include wall insulation, cooling and heating retrofit and the installation of renewable energy sources, particularly solar PV, as well as the replacement of windows. The “Energy Efficiency First” approach is a useful concept to favour energy efficiency and decrease energy consumption over pure cost-benefit considerations (see policy section). Renewable energy systems should also be an integral part of energy renovation approaches.

Key Takeaways

- **Concrete and flexible guidance for technical options:** in order to accelerate technical decisions, integrate clear guidance into planning tools (rapid identification of most appropriate solution to mitigate weak performance), training practices (build knowledge on specific technical domains), data management systems (collect and treat ad hoc data), and works management (support architects and engineers in designing and building effectively).

- **Maintain flexibility in decision-making:** establish a framework that incorporates regular data reviews and updates, allowing decisions to adapt to emerging trends or insights, including energy efficiency first considerations (see box 4). Allocate time for stakeholder consultations at each decision point to gather actionable expertise and ensure that all perspectives are represented.

- **Explore opportunities for on-site energy production:** in addition to energy efficiency, conduct site assessments to identify viable locations for renewable energy installations.

- **Adopt optimisation as a policy goal:** define measurable goals, such as a maximum square meter per occupant, shared workspace ratios, or operating hours and conditions. Incorporate these targets into facility management contracts and monitor progress through occupancy data analytics. Ensure alignment with operational efficiency and sustainability objectives across the portfolio.

- **Utilise Building Renovation Passports (BRPs):** BRPs help to create tailored, comprehensive renovation plans for each building, outlining necessary upgrades, timelines, and expected outcomes to achieve energy efficiency goals, by mobilising external expertise.

Solutions in Practice: Addressing Challenges

This section presents selected practices used by state real estates to increase the sustainability performance of their portfolios, while addressing the challenges of building management.

Practice 1

Energy Performance Contracting

Challenges addressed

- Lack of human resources
- Data management
- Organisation / decision making
- Financial barriers

Country

Austria

Timeline

Since 1999 - present

Actors involved

- Responsible authority: BIG (coordinator)
- Other stakeholders: Collaboration with ESCOs and building occupants

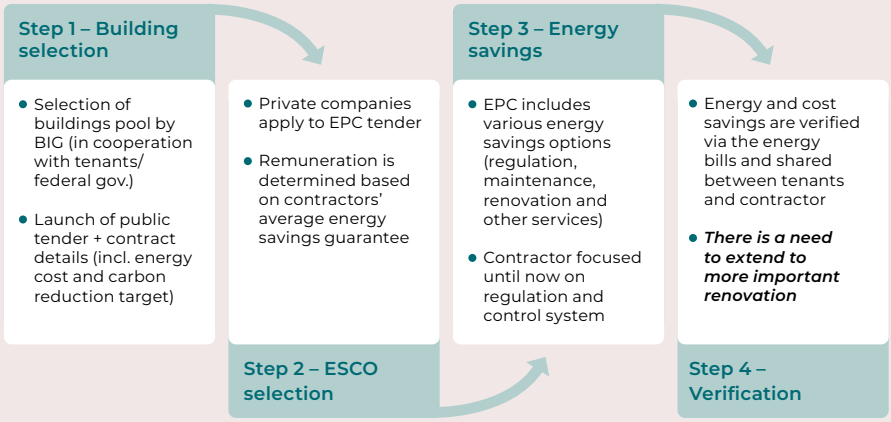
Description of the practice

With Austria's Energy Performance Contracting (EPC) between building occupants and private Energy Services Companies (ESCO), the public real estate body *Bundersimmobiliengesellschaft* (BIG) aims at reducing the energy consumption of several pools of buildings. Whereas the EPC is contracted between building occupants (i.e. energy bills payors) and ESCOs, BIG is responsible for managing the public tender and deciding which buildings should be included in the pools of buildings.

EPCs are primarily implemented in older buildings because the expected savings with improvement of the monitoring and regulation are high, leading to high return (limited investment/ significant savings). In addition, the building occupancy is an important selection criterion, as the more tenants involved in an EPC, the more complex its implementation.

In Austria, BIG applies the concept primarily to the optimisation of building services, such as the regulation and control of buildings/ heating systems. The EPC procedure at BIG is presented in the figure below. The ECPs usually run for 10 years, to ensure sufficient time for investment opportunities.

EPC contractors, in addition to optimising the building services, usually conduct educational projects with the tenants to improve energy-saving behaviour.



BIG has used EPC in

394 buildings

since 1999

(compared to ~2,000 owned properties)

Between 1999 and 2021, EPCs generated a cumulated reduction of

236,000 tCO_2

Lessons learned

- Annual energy cost savings of a pool of buildings should be **above a certain threshold** to keep savings size and investment opportunity profitable.
- Measures to increase user awareness for energy efficiency are facilitated if the building pool includes **buildings with a same tenant**.
- By prioritising quick wins (i.e. measures requiring limited investment and bringing rapidly savings), ESCOs may neglect or postpone **deeper energy retrofits** (e.g. building insulation), reducing the long-term sustainability goals. Failing to implement foundational retrofits early on might make it harder or more expensive to incorporate deeper measures later on, locking the building into a less efficient baseline.

Practice 2

Holistic Building Program - The Sustainable Minimum Standard of BIG

Challenges addressed

- Data
- Technical considerations
- Decision making

Country

Austria

Timeline

In 2020, the Sustainable Minimum Standard of the BIG was developed in combination with the HBP-Tool (2015)

Actors involved

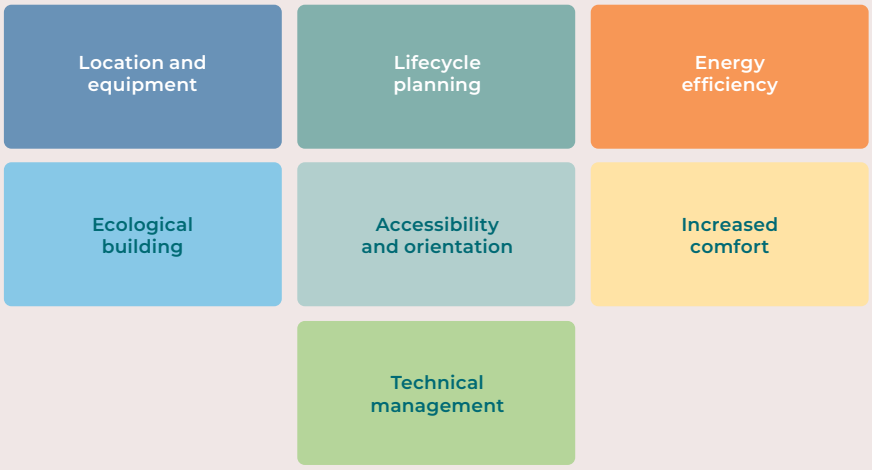
- Responsible authority: BIG
- Other stakeholders: in collaboration with external partners (architects, general planners, etc.) and Pulswerk GmbH (consultancy firm responsible for the technical implementation of the HBP)

Description of the practice

BIG developed its own rating system, the Holistic Buildings Program (HBP), to monitor, manage and plan sustainability interventions of its buildings. The HBP is an advisory, guidance, process and quality management tool establishing minimum sustainability standards in existing and new buildings. BIG decided to develop its own tool, to reduce certification costs, tailor the tool to their needs and buildings type specificities, consolidate all information in one single source, and increase and showcase BIG's competences. The HBP uses criteria and topics inspired from existing rating frameworks (i.e. ÖGNBI, ÖGNB, Klimaaktiv, BREEAM, LEED-USGBC).

A key feature of the HBP is its comprehensive online building configurator, which guides users through all phases of sustainable building projects – from planning and construction to operation – by providing a personalised online checklist covering seven thematic areas (see figure below) and seventy criteria essential for holistic building management. The goal is to achieve the highest possible value for the minimum standard criteria while ensuring an economically cost-effective implementation.

While the Transformation Matrix (see Practice #3) focuses on GHG emissions, the HPB incorporates a broader scoping of sustainability.



Lessons learned

The HBP is an effective and comprehensive sustainable planning configurator, and the following lessons can be drawn:

- The HBP is an online tool designed to be self-explanatory and intuitive.
- The most essential sustainability factors are covered for holistic planning, construction, renovation and operation. It has an appropriate balance (through criteria weighting) between energy efficiency, profitability, resources savings, and other ecological and socio-cultural factors.
- Entries directly show the total number of points achieved in 3 rating systems (Klimaaktiv, ÖGNB and EU taxonomy).
- The building construction criteria catalogue of the national Sustainable Public Procurement Action Plan (naBe) can be selected.
- The HBP includes the possibility to assess EU taxonomy conformity.

Practice 3

Transformation Matrix

Challenges addressed

- Governance/ decision-making
- Data management
- Technical considerations

Country

Austria

Timeline

Pilot phase, expected finalisation of the Transformation Matrix in 2024

Actors involved

- Responsible authority: Real Estate Investment Management at BIG
- Other stakeholders: Collaboration with other BIG business units

Description of the practice

The Transformation Matrix is a planning tool currently developed by the Real Estate Investment Management at Bundersimmobiliengesellschaft (BIG). It aims at supporting the prioritisation of building assets in the renovation/ecological transformation process of BIG's properties portfolio. The Matrix is composed of two axes:

- **Transformation needs** – It measures the ecological performance of the asset (i.e. energy consumption and CO_2 emissions). This information is collected by BIG, via Energy Performance Certificates among others.
- **Economic attractiveness of renovation** – It measures economic values, using parameters such as location, quality, financial aspects, etc. This information is assessed based on data from rental contracts.

The output of the Transformation Matrix is a prioritisation ranking of the building assets based on their transformation needs and economic attractiveness rating. Buildings are then classified in several categories, to supports planning portfolio renovation:

- TRANSFORM – Buildings in this category have high transformation needs and economic attractiveness. Therefore, their renovation/ecological transformation should be prioritised.
- ADAPT – Buildings in this category have a high economic attractiveness, but medium need for transformation. They should hence be renovated as well, with lower priority.
- EVALUATE – The renovation of buildings in this category has a medium economic attractiveness, and such projects should be checked in detail by the responsible portfolio manager.

The underlying assumption of the Transformation Matrix is that investments/renovations in buildings with a high economic rating have a higher probability for a successful investment/refinancing via rental income as the rent can be increased and therefore should be prioritised. Conversely, buildings with a low economic rating may not be considered for renovation at all (e.g., demographic changes leading to the building no longer being needed in a few years = better to invest in another building).

Expectations with the Transformation Matrix

The Transformation Matrix is in a pilot phase so there are no lessons learned yet. The main expectations with this new scheme are:

- A comprehensive central tool to plan interventions on building stocks according to their sustainability performance, with transparent budget allocation.
- Integration of sustainability factors into the decision-making process, as CO_2 emissions will be balanced with economic attractiveness.

Practice 4

Public-private partnership

Challenges addressed

Technical considerations (accelerating building refurbishment)

Financing barriers (lowering impact on public debt through PPP approach)

Country

Belgium

Timeline

Still in development phase - Expected to be operational by the end of 2025 for Defence and end of 2027 for BBA

Actors involved

- Responsible authority: Belgian federal holding company ('Société Fédérale de Participations et d'Investissement' or 'SFPIM') in collaboration with federal buildings managers (Belgian Building Agency 'BBA' and Ministry of Defence)

Description of the practice

The Design-Renovate-Finance-Maintain (DRFM) framework is a public-private partnership (PPP) that is designed by the SPFIM, to contribute to achieving national and EU decarbonisation targets for federal state-owned buildings. The DRFM framework aims to renovate state buildings and ensure long-term maintenance, by leveraging private sector financing with a significant (+70%) public off-balance sheet financing (i.e. ensuring that more than 70% of the financing comes from private sources).

The DRFM framework entails the creation of several entities by the SFPIM: a public company (PubCo), an Operating Company (OpCo) and a financial Company (FinCo) and 42 Project Companies (SPV's) which have different responsibilities.

- SFPIM creates and owns (100%) the PubCo.
- PubCo represents the interests of the public stakeholders (42 building clusters covering 2500 buildings to be refurbished in 10 years). It assigns DRFM Facilitator(s) via public procurement and manages financial flows.
- DRFM Facilitator creates and owns OpCo and assigns staff to OpCo.
- OpCo carries out studies to prepare the works and organises the selection of ESCOs. It manages financial flows to ESCO and FinCo and organise the debt competition for each cluster separately. Debt covers 90% of financial needs.
- The ESCO conducts maintenance on energy-related equipment and renovation works. The ESCO does not ensure pre-financing. The ESCO is paid at once at acceptance of works and quarterly for maintenance services.
- FinCo is a PPP (holding company), with the participation of SFPIM (10-20%) and the DRFM-Facilitator provides (80 to 90%). It provides the needed equity for the 42 Project Companies (one SPV per cluster of buildings) created by FinCo.
- FinCo will be responsible for setting up and owning the 42 Project Companies that will be created to ensure the financing and implementation of the projects

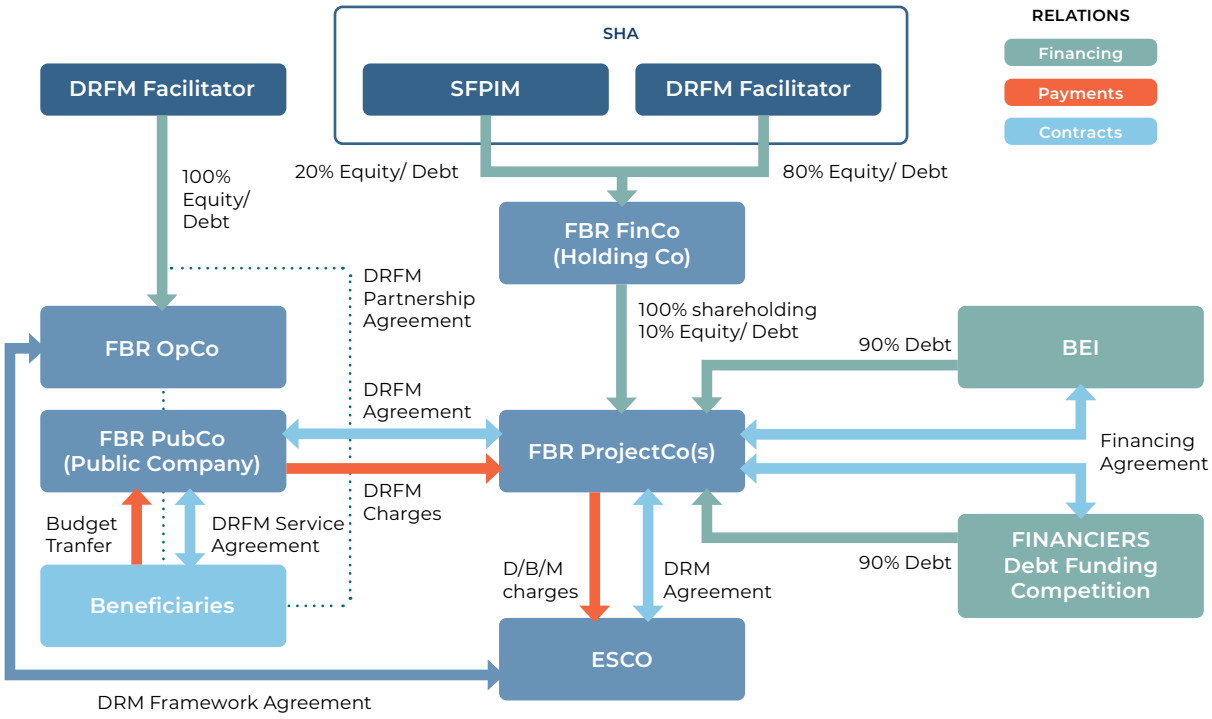
Refurbishments under DRFM are fully paid for by FinCo and debt providers to the ESCOs, through the Project Companies.

The PPP-contracts will be launched for each cluster of buildings. Each DRFM cluster must be validated via a "Value for Money" methodology to ensure that a PPP approach is preferable to a traditional approach. Criteria include technical interdependence, contracting, technical complexity, budget flexibility, innovation, availability of market actors, data security and demand stability.

The BBA aims to coincide the DRFM investments with other works that may have an impact on this, such as master plans for reducing office area through the introduction of New Ways of Working (activity based Dynamic Office environment).

This will require an alignment of the planning for the renovation of the DRFM clusters on the one hand, with the timing for the preparatory studies, customer consultations and validation (including obtaining funding) of the annex investments per cluster on the other hand.

DRFM – Financial & Operational Structure



Expectations with the DRFM

The DRFM framework is in a pilot phase, so there are no lessons learned yet, but it was built on lessons learned from a previous initiative in Belgium (FEDESCO). The main expectations with this new scheme are:

- Finance is provided, for operation and maintenance at 100% by the public sector (beneficiary entities), and for renovation at 98 to 99% by the private sector (FinCo and debt providers)
- The approval of the works (and their efficiency) is done by OpCo (owned at 100% by the private DRFM-Facilitator), which covers the risk related to the investment, given that the DRFM-facilitator is also owner of the FinCo.
- Therefore, this scheme should help to mobilise private finance, with a de-risking also largely covered by the private sector, both limiting significantly the public debt increase as public financing will represent less than 30% of total investments.

Practice 5

Space Efficiency

Challenges addressed

Technical challenges and optimisation

Policy

Country

Finland

Timeline

Since 1990s to present

Actors involved

- Responsible authority: Senaatti-kiinteistöt (Senate Properties)
- Other stakeholders: collaboration with building occupants (i.e. government departments)

Description of the practice

Since the 1990s, Senaatti has been trying to minimise the unnecessary space in its office stock portfolio for sustainability, cost- and energy-efficiency purposes. In 2005, Senaatti published the first national strategy for space efficiency, which was updated last in 2021. The strategy foresees an average space reduction per FTE of the public sector but also provides individual targets for each department. Senaatti uses a collaborative approach by engaging with the management level of government departments and cooperatively deciding on space efficiency solutions that are aligned with occupants' needs and general concept of workspaces.

In practice, Senaatti is currently carrying out a number of repurposing projects where large buildings are turned into coworking spaces hosting several government departments and agencies. For example, the 'Turun yhteinen työympäristö' ('mutual working environment of Turku') aims to create a shared working space for 16 public sector agencies and actors and repurpose an existing space of approximately 10,000m2 taking into account aspects like soundproofing and enhancing security preparedness.

Within the past decade, space in the Senaatti office stock portfolio has been reduced from 30m²/FTE to 15m²/FTE. Most of the excess space freed up in this process has been sold.

Lessons learned

- **Accommodating the needs of occupants** must be at the centre of the space efficiency process to obtain **their collaboration and investment**. As such, Senaatti aims to offer a fully integrated working environment and reconceptualise working spaces as service-based entities.
- Cost savings obtained through reduced space-use have been translated into lower rental charges for occupants, providing a monetary incentive used to persuade occupants to agree on and participate in space sufficiency efforts.
- The new use-based rental system helps users to dimension and use the premises as needed and more cost-effectively than before.
- Bringing various departments together **supports simplified customer experience for the public sector**, i.e. by sharing the same office spaces, interactions between departments can be enhanced.

Practice 6

Information Campaign: Optimising Power @ Work

Challenges addressed

Human resources

Data management

Country

Ireland

Timeline

2008-present

Actors involved

- Responsible authority: Office of Public Works
- Other stakeholders: in collaboration with occupants and Energy Advisors

Description of the practice

In 2008, the Office of Public Works (OPW) launched the 'Optimising Power @ Work' campaign aimed at monitoring and optimising energy usage. The campaign has gone through two phases since its launch.
To achieve energy saving targets, the current phase of the campaign is three-fold:

1. **Use of technologies** such as Energy Monitoring Systems (EMS) (which record energy consumption every 15 minutes, and store data on OPW servers for analysis) or Building Communications Management Systems (BMS) audits (to optimise energy usage)

NOTE: BMS audits identify areas offering potential energy savings by optimising time scheduling, temperature set points, control strategies, etc.

2. Reliance on Specialist Expertise - An Energy Advisor, appointed as an OPW representative and external, private service provider, is assigned to a building, to monitor energy performance, propose improvements and targets, and recommend low- or no-cost energy-saving measures. Their role includes providing advice, training, events, and customised energy reports. The Energy Advisor also coordinates closely with the Energy Officer (from the tenant or "client department – OPW serves as the contract manager), the primary contact for each building.
3. Staff Engagement – Energy teams were formed in each building to work with Energy Advisors in identifying energy-saving opportunities. Each building should have a dedicated team, established by the tenants with support from the Energy Advisor, typically comprising individuals who can make a significant impact, such as representatives from internal facilities, ICT, and communications departments. The campaign promoted energy awareness using posters, stickers, flyers, and other communication methods, alongside regional events, awards, and staff lectures.

Approximately €1.3 million per annum is currently dedicated to the programme, entirely funded by the Departmental annual allocations under the National Development Plan (NDP).

Lessons learned

- **Communication and the use of live data** are critical to achieving energy reduction targets. By providing real-time feedback, individuals are able to see the immediate impact of their energy-saving actions, which fosters behavioural changes.
- The campaign also highlighted the **complexities of implementing energy-saving measures** across diverse building types.
- A **good tandem** between an energy advisor with expertise and an energy officer representing the tenant to collaborate, on behaviour and techniques.
- Excellent framework to **collect and analyse data** and centralise the most relevant data to **build appropriate KPIs** to track progress towards targets.

Practice 7

National climate action and decarbonisation strategies

Challenges addressed

Organisation/ decision-making

Policy

Country

Ireland

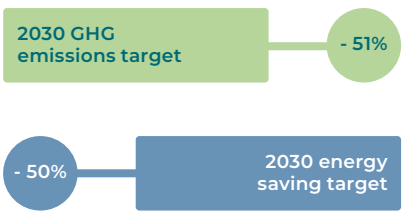
Timeline

Present to 2030-2050

Actors involved

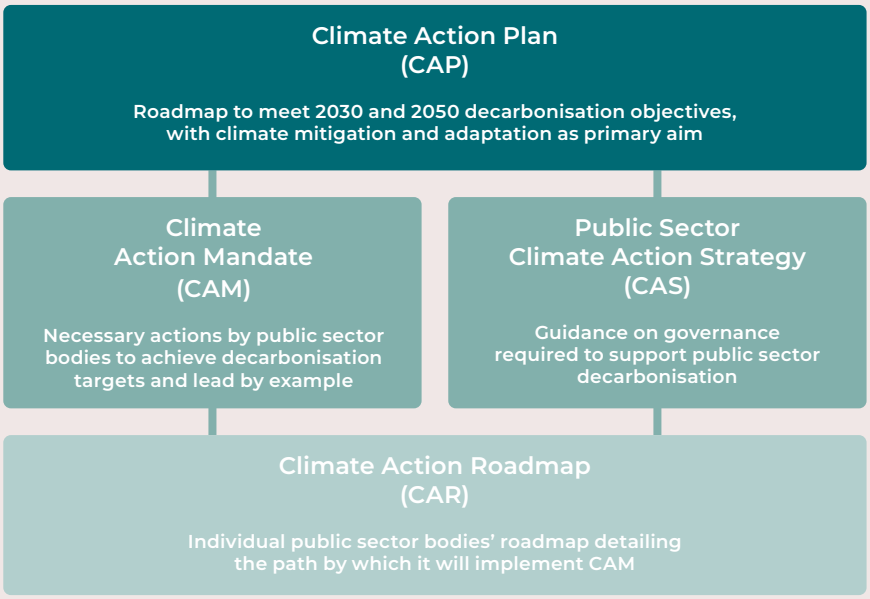
- Responsible authority: Department of the Taoiseach, Department of Environment, Climate and Communications (Provide policy and advice. Parent department of SEAI), and Sustainable Energy Authority of Ireland (SEAI)
- Other stakeholders: Public sector bodies (among which the Office of Public Works, OPW) to implement plans, mandates and roadmaps

OPW Climate Action Roadmap



Description of the practice

The public sector in Ireland is guided by several interlinked plans, mandates, and strategies to advance climate action and decarbonisation efforts, primarily focusing on energy efficiency, emissions reductions, and sustainable practices.



These interconnected plans ensure that the public sector aligns with Ireland's broader climate goals, with a particular emphasis on annual review and adaptation to ensure continued progress.

Example of a Climate Action Roadmap from the Office of Public Works

The Office of Public Works (OPW) is an Irish government agency that delivers public services for flood protection, managing government properties and heritage services. In line with the CAM and CAS, OPW has developed its own CAR which details the path by which it will implement the CAM and the actions it will undertake to achieve decarbonisation targets.

The OPW's CAR is two-fold:

1. OPW's own climate action targets and associated activities – relate to OPW's own operational energy usage in its day-to-day business; involving flood risk management, management of OPW-occupied buildings and the operating a vehicle fleet.
2. Broader public sector involvement – Given one of its primary functions is to manage state owned buildings occupied by other public bodies, the OPW has a role enabling them to meet their targets – either through energy behavior improvement programmes or through building retrofit interventions.

The department of Taoiseach oversees CAR and the SEAI provides support and guidance to public sector bodies in developing CAR. The

progress on the CAM's implementation is tracked using the SEAI Monitoring and Reporting (M&R) system with a 'comply or explain' approach. This ensures that public sector bodies are consistently working towards their climate goals.

The OPW has created a Climate Action Coordination Group which is responsible for implementing the CAR and is also tasked with reporting directly to the SEAI. The OPW is also further involved in several inter-departmental working groups aimed at sharing practices.

Lessons learned

Lessons learned from Climate Action plans, mandates and strategies in Ireland are:

- **Centralised Oversight and Support:** Having a central authority that oversees climate action roadmaps ensures consistency and adherence to national goals. The involvement of an expert body (SEAI) to provide guidance allows for public bodies to develop pragmatic strategies. In addition, clear guidance avoids long internal discussions within the agency to define targets and agree on actions to be taken (e.g. on the way to prioritise buildings).
- **Annual Review and Adaptation:** Requiring annual updates to the Climate Action Roadmaps ensures that public bodies remain responsive to new developments, technological advancements, and evolving climate goals, promoting continuous improvement.
- **Clear and Ambitious Targets:** Establishing specific targets at national level, such as reducing GHG emissions by 51% by 2030 and improving energy efficiency by 50%, provides a clear focus and drives tangible action within the public sector.
- **Comprehensive Approach:** Integrating strategies for governance, sustainable procurement, travel, and building management ensures that all aspects of public sector operations contribute to the overall decarbonisation effort.
- **Tailored Action Plans:** Allowing each public body to develop its own Climate Action Roadmap enables strategies to be tailored to the unique circumstances, challenges, and opportunities of each entity, fostering a more effective implementation of climate action measures.

Practice 8

Building Information Model

Challenges addressed

- Data
- Decision making
- Human resources

Country

Italy

Timeline

Since 2019, with ongoing initiatives

Actors involved

- Responsible authority: Agenzia del Demanio (lead)
- Other stakeholders: In collaboration with Ministry of Economy and Finance (strategic oversight and funding), architects and engineers (design and manage digital models)

Description of the practice

Since 2019, Agenzia del Demanio has adopted a Building Information Model (BIM) as a solution to manage their portfolio of public buildings. BIM is an advanced digital tool that facilitates the management of a vast amount of dynamic data related to buildings (e.g. building performance, energy consumption, structural conditions), to improve the quality of data collection and storage and increase the efficiency of interventions (such as renovation) and the overall lifecycle management of properties. Using BIM helps bring together detailed technical and product information, making it easier to manage building projects and oversee the entire life of a property. The key aspects of BIM implementation are presented in the figure below.

Design phase	Execution phase	Management phase
Ensures **design quality** with detection of inconsistencies and compliance with standards and requirements	Enhances **adherence to timeframes and budget**, minimizing risks of project delays, cost overruns and legal disputes	Provides a **comprehensive digital file** of the building, reducing operational costs, improving performance and enabling real-time monitoring through predictive maintenance systems

Thanks to the BIM model, the Agenzia del Demanio can build robust data about its building portfolio which can then be used to set and monitor energy efficiency and sustainability targets and drive improved sustainability performance across the portfolio.

The BIM model includes the digitisation of over 2,700 buildings, which are strategically selected based on their priority and impact, covering a wide variety of public buildings across Italy. The model incorporates a wide range of data, including technical, structural, product and energy performance information, as well as historical and real-time data from IoT sensors.

Data collection methods include advanced digital tools like 3D mapping, historical audits and real time monitoring, ensuring a comprehensive view of each building's lifecycle. The data collection and BIM updates are usually performed by specialised teams within the agency, including engineers and BIM experts, as well as external contractors in some cases.

Since 2019, the Agency has expanded its team by recruiting new expertise and diverse profiles across both the General Directorate and the Territorial Directorates. Agenzia offers in-house training sessions led by the BIM Headquarters, focusing on the information management process through an innovative format combining collaborative, concise, and workshop-based learning. Additionally, standard courses are provided to promote awareness and effective use of enterprise BIM tools.

Lessons learned

- BIM can significantly improve how an organisation manages building performance, but it **works best when combined with other methods and technologies**. For example, combining BIM with additional tools, like IoT sensors for real-time monitoring, can lead to even greater improvements.
- The success of BIM implementation depends on **having a robust strategy for data collection, management and updates**.

Practice 9

The City Plan of public buildings

Challenges addressed

Governance/ decision-making

Country

Italy

Timeline

Recent initiative

Actors involved

- Responsible authority: Agenzia del Demanio and local municipality
- Other stakeholders: Local authorities and stakeholders (collaboration on City Plans), Ministry of Economy and Finance (financial oversight) and private sector (project execution)

Description of the practice

The City Plan of Public Buildings is an integrated public real estate strategy implemented by Agenzia del Demanio that includes all public assets of a city or municipality (e.g. government buildings, public housing, cultural heritage sites) within the broader urban planning strategy. The objective of the City Plan of Public Buildings is to develop building solutions for public bodies that maximise efficiency of services, urban regeneration, integrated sustainability of real estate operations, well-being of communities and valorisation of public real estate assets. They rely on a structured and continuous collaboration with local authorities and stakeholders to build a common vision of the sustainable development of cities. The plan follows a multi-phase process, as presented in the figure below.

The initiative uses advanced technologies such as Building Information Management (BIM) to optimise building maintenance and contribute to urban regeneration, with results measured through ESG performance metrics.

Nine cities have to date signed an agreement with the Agenzia del Demanio to develop a city plan and conduct reconstruction works under this framework: Verona, Modena, Piacenza, Ascoli Piceno, Bari, Gaeta, Civitavecchia, L'Aquila, Rimini and by the end of 2024 the total number of signed agreements should be 17.

Expectations with the City Plans of public buildings

The City Plan of Public Buildings framework is in a pilot phase therefore there are no lessons learned yet. However, the main expectations for this new scheme are:

- Promote PPP operations in collaboration with the private sector to develop public infrastructures for the needs of the local communities (e.g. Student Housing, Clean Energy supply, etc.)
- Trigger virtuous processes of urban regeneration on the environmental, social and cultural levels through the **nine strategic axes** that guide all the Plans:
  - Regeneration, functional mix, proximity, zero soil consumption
  - Protection and enhancement of the historical and artistic heritage and cultural, scientific and technological identity
  - Environmental quality: Greening, biodiversity and bioclimatics
  - Circular transition: effectiveness and circularity in the use of resources
  - Energy transition: renewable production, efficient and smart management
  - Climate transition: adaptation, resilience, climate neutrality
  - Sustainable mobility
  - Social sharing and participation
  - Inclusion and accessibility to spaces and services, social well-being

Analysis of spatial context	Strategy and goal alignment	Action plan	Expected results	Governance and communication
• Study of area characteristics, (incl. economy culture, identity, and population trends). • Sets the foundation for the real estate strategy by considering the area's unique dynamics, (e.g. urban planning, historical and social factors, infrastructure)	• Local authorities and the Agenzia del Demanio work together to align their goals and strategies • Topics addressed: City's vision, Agency's goals, other property owners' strategies, the convergence map and multistakeholder consultation	• Outline of specific actions and strategies for real estate development • Topics addressed: planning for construction, renovation and maintenance projects, using tools like BIM technology for better predictions	• The plan focuses on achieving savings and income goals, initiating and completing investments and meeting ESG objectives	• Focus on the governance model, monitoring of achievements and risk management, maintenance of the Plan over time and realignment of strategy, communication of results

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