Smart Built4EU
The European Smart Buildings Community

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Policy Recom-mendations

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Introduction

The building sector is one of the key enablers to achieve low carbon emission goals for 2050. To use the full potential of this transition, buildings need to transform from passive isolated elements to smart buildings, able to adapt to occupants needs and act as active nodes well integrated to the energy grids and other infrastructures.

SmartBuilt4EU supports the innovation ecosystem of the smart building value chain in embracing this challenge through networking and communication actions. The project fosters knowledge-sharing between ongoing R&D (Research and Development) initiatives and developed a Strategic Research Innovation Agenda (SRIA) combined to policy recommendations to support the further uptake of smart buildings.

The ten policy recommendations presented in this booklet have been developed based on the collaborative work done by SmartBuilt4EU Task Forces from February 2021 to September 2022, consolidated by the consortium's expertise as well as desktop research. More than 190 persons contributed to the White Papers produced by the Task Forces. Contributors include members of the SmartBuilt4EU consortium and its Expert Board, and volunteers from the Smart Building Innovation Community (SBIC), of which a large part is involved in EU-funded projects.

SmartBuilt4EU policy recommendations cover the 10 following topics:

01 **smart buildings data governance**	02 **open data culture/framework**
03 **dynamic building certificates (e.g. logbook)**	04 **national or local regulations supporting the smartening of the bulding stock**
05 **interoperability of smart solutions and flexibility of smart buildings**	06 **SRI implementation support**
07 **labelling of devices and building certification**	08 **regulatory sandboxes**
09 **(green) public procurement**	10 **upskilling**

The order of these topics is taking into account feedback received during an online consultation on the relative importance of each recommendation. In the next sections, each policy recommendation is introduced by background information and broken down into several key actions. For each key action, levels of intervention (EU, national, local) are also proposed.

01

Define clear rules at EU level for smart buildings data governance (data access, ownership, privacy, usage rights, consent) to build trust and enable new business models

Background

The building sector must deliver a smarter, more flexible and resilient data-driven built environment. This includes providing technical solutions and services building upon data (including user behaviour data) gathered from smart devices, Internet of Things (IoT) and embedded sensors. Data storage, protection and access therefore need to be addressed carefully: although data sharing to provide enhanced services and optimise the building operation is highly desirable, buildings cannot turn into 'Big Brothers' with potential cybersecurity breaches. While the General Data Protection Regulation (GDPR) entered into force in 2018 and the European Union (EU) is developing cybersecurity policies and strategy packages, building occupants and end-users are still largely unaware of their rights with regard to data privacy and of the fate of the data they (sometimes unknowingly) agree to share.

The notion of data governance, crucial for cybersecurity, privacy and the integrity of an activity, is becoming essential at a time when data production can hardly be slowed down. According to the EC[1], the term 'Data governance' means *"a set of rules and means to use data, for example through sharing mechanisms, agreements and technical standards. It implies structures and processes to share data in a secure manner, including through trusted third parties"*.

Several regulations, certification frameworks and standards are relevant to the topic of data governance however none of them are specific to smart buildings:

- New Data Governance Act[2][3] (DGA) entered into force on 23 June 2022 and applicable from September 2023;
- General Data Protection Regulation (Regulation (EU) 2016/679);
- Regulation (EU) 2018/1807 on a framework for the free flow of non-personal data in the EU;
- Directive (EU) 2019/1024 on open data and the re-use of public sector information.

In the revision of the Energy Performance of Buildings Directive (EPBD) proposed by the EC in December 2021, a new Article 14 specific to building data ensures that the building owner, tenant and manager or third parties can have access to building systems' data, so as to facilitate development of new services related to buildings. New rules on data interoperability and access to data are to be laid down by the EC by means of an Implementing Act. According to the proposal, MS shall set up national databases for Energy Performance Certificates of buildings, which also allows to gather data related to building renovation passports and Smart Readiness Indicators (SRI).

[1] https://ec.europa.eu/commission/presscorner/detail/en/qanda_20_2103#Data%20governance
[2] https://digital-strategy.ec.europa.eu/en/policies/data-governance-act
[3] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022R0868

Proposed key actions

ACTION 1.1

Design and implement clear guidelines on data collection and data management procedures for Smart Buildings, in line with the proposal for the revision of the EPBD

Level of application: EU ● National ● Local ○

- Adopt implementing acts of EPBD detailing interoperability requirements and non-discriminatory and transparent procedures for access to the data;
- Provide clear guidelines to MS so they can facilitate the full interoperability of services and of data exchange within the EU, making sure it is compliant with GDPR, and laying down clear requirements for data quality and integrity;
- Coordinate with MS for a consistent approach across the EU to set the relevant charges for access to data by parties such as financial institutions, aggregators, energy suppliers, energy services providers.

ACTION 1.2

Clearly define the governance framework and the role of trusted third parties as warrant of cybersecurity and data privacy to build up trust, in line with the Data Governance Act

Level of application: EU ● National ● Local ○

- Establish a clear governance framework for smart buildings with the objective of building trust among individuals and undertakings in relation to data access, control, sharing, use and re-use in buildings. This framework should be aligned with the new DGA, with a concrete application to the field of smart buildings;
- Establish the first 'data intermediaries' that connect individuals and companies on one side with data users on the other, for the specific case of smart buildings and set up safeguards to guarantee their neutrality, transparency and trustworthiness.

ACTION 1.3

Set up a central registry or data space to give users a personal unique interface to make their data available and control it, in a just and safe way

Level of application: EU ● National ● Local ●

- Set up a common European Data Space for buildings and for the construction sector;
- Define common guidelines for MS to set up national databases for energy performance of buildings so that building information can easily be transferred to the EU Building Stock Observatory;
- Establish and widely communicate (through smart building data intermediaries) appropriate mechanisms for data subjects to know and meaningfully exercise their rights (i.e. giving and withdrawing their consent to data processing, the right of access to their own data, the right to the rectification of inaccurate personal data, the right of erasure or right 'to be forgotten', the right to restrict processing and the right to data portability according to Regulation (EU) 2016/679).

02

Develop and enforce an open data culture to improve knowledge sharing on building performances and replication

Background

Data from an extensive diversity of sources, including building automation systems, IoT sensors, and mobile devices, is today reachable in the cloud. Building monitoring and control, and the use of real-time data, has the potential to greatly improve building quality and comfort, while reducing the building's energy use. Collection of data could be combined with prediction models and integrated in data-driven performance assessment, e.g., by using and enhancing digital twins. A first step is ensuring that all data can be used to their full extent, i.e., avoiding data-silos.

Feedback from new data into existing schemes should help to enhance these digital twins and underlying models, where specific focus could be on tackling human and data biases. Achieving building performance as foreseen in the design stage is a recognized challenge. Research conducted in the field has shown widespread low occupant satisfaction with indoor thermal environments[4]. Thus, building monitoring, control, and real-time data can play an important role in reducing the performance gap between design and operation and improve the overall design, commissioning and operational performance of buildings in interaction with the climate, the users and the wider energy system.

In this context, an open data culture and open interfaces are essential to foster knowledge sharing, avoiding vendor lock-in and proprietary solutions, while providing various stakeholders (e.g., prosumers, building operators, energy services providers, etc.) the flexibility to integrate, visualise and analyse data coming from different sources and enabling the creation of innovative solutions and added value services.

[4] Brager, G., Zhang, H., & Arens, E. (2015). Evolving opportunities for providing thermal comfort. *Building Research and Information*, 43(3), 274–287. https://doi.org/10.1080/09613218.2015.993536

Proposed key actions

ACTION 2.1

Develop a framework for an open-access platform to enable data access and data sharing in buildings and districts, and to promote the replication of successful stories

Level of application: EU ● National ● Local ○

- Design and set up a framework for an open-access platform enabling data access and data sharing in buildings and districts for knowledge sharing with different actors and sectors, with specific attention to data security, privacy and consent. It will be in line with the new DGA and the strategy for common European Data Spaces also stating data rights and requirements for data quality and integrity, and defining the role of trusted third parties as warrant of cybersecurity and data privacy;
- Support the development of such open-access platforms for the practitioners to promote/access success stories of semantically interoperable large-scale implementations (including data on costs and real savings) that can be easily replicated;
- Set up a central registry to give users a personal and unique interface for filling, updating, and sharing information, in a just and safe way with possible information exchange considering EU and national norms and portals;
- Analyse the successful open data incentives at local and national levels related to the smartening of buildings (in view of energy efficiency, indoor environment quality, etc) to propose scaling up and replication plan in all EU countries.

ACTION 2.2

Include 'open source' requirements in regulation

Level of application: EU ● National ● Local ○

- Require that any device/application that will not be maintained has to publicly release its core functionalities/source code to make it upgradeable so that legacy can be guaranteed for existing applications, avoiding vendor lock-in and planned obsolescence;
- Promote open standards to support the development of open, modular end-to-end interoperability (in buildings and with the grid).

03

Have building certificates evolve towards a more dynamic evaluation of performances, taking into account the contribution from smart technologies, addressing not only energy performance but also comfort, health, environmental impact and flexibility potential – Digital Building Logbook

Background

A significant number of initiatives related to the rating and assessment of buildings performance have appeared on the market in the last decades, either pushed from public policy makers or from private construction stakeholders. There is a pressing need to harmonise the purpose but also the processes associated with these initiatives as they involve significant costs, time and burden for construction professionals. While taking into account the final users' expectations, as well as identifying the main beneficiaries of such certificates and associated datasets, it is recognized that better integrating these rating schemes is important. Moreover, smart buildings can also proactively push the data they continuously collect and monitor towards a new generation of management systems and contribute significantly to ease the assessment processes, make it dynamic, and able to handle various objectives such as comfort, health, environmental impacts or flexibility.

Dynamic information is automatically and regularly updated, meaning it changes over time as new information becomes available. It is foreseen that the dynamic information enables a better understanding of a building's performance over its lifecycle (e.g., monitoring of resource consumption and renewable energy generation)[5]. An increasing number of research initiatives addresses this topic[6] paving the way towards a better understanding of the datasets at hand and their operational use in a new generation of building management systems relying on the latest trends in data analytics and AI. Therefore, the key 'data fields' considered as dynamic datasets are associated with the building operation and use phase.
Two main types of technological systems having the ability to handle dynamic data often encountered in smart buildings are the ones associated with 1) the automation (BACS - Building Automation and Control System) and 2) the management of internal organisational processes related to space and people requiring a regular update (such as control access, occupancy management and other functions targeted to the occupants)[7].

[5] European Commission, Executive Agency for Small and Medium-sized Enterprises, Volt, J., Toth, Z., Glicker, J., et al., Definition of the digital building logbook : report 1 of the study on the development of a European Union framework for buildings' digital logbook, Publications Office, 2020, https://data.europa.eu/doi/10.2826/480977
[6] See for instance Fnais, A., Rezgui, Y., Petri, I. et al. The application of life cycle assessment in buildings: challenges, and directions for future research. Int J Life Cycle Assess 27, 627–654 (2022). https://doi.org/10.1007/s11367-022-02058-5
[7] A more detailed list is available in the 'EU Definition of the Digital Building Logbook' report, p26
[8] This issue is the central question addressed in SmartBuilt4EU's TF3C White Paper.

An example of using this kind of datasets in certification and evaluation is the 'dynamic SRI' concept, which "could be defined as the regular update of the SRI score for a given building, and the 'live' verification that the referenced smart functionalities are operative. Ensuring this dynamic dimension implies that the data collection and SRI score calculation processes are automated, and that links to real-time building data are implemented" . But there are other certificates and tools which can benefit from and extended with such approach, either pushed by 1) regulation such as Energy Performance Certificates (EPC), Digital Building Logbook (DBL), Building Renovation Passports (BRPs), or 2) private markets such as Ready2Services, SmartScore, WiredScore.

The DBL is a central approach to consolidate the various 'data lakes' involved by this growing number of initiatives. Indeed, DBL can serve as an archive where all building information can be stored and continuously updated. In this way a full record of the building history will be electronically available with data regarding construction plans and permits, maintenance and system replacement activities, energy and heat consumption and production, etc.

Proposed key actions

ACTION 3.1

Seek for integration or alignment amongst the various existing policy-oriented certificates and similar initiatives such as EPCs, BRPs, SRI as well as private schemes such as R2S, Wired Score, Smart Score, etc.

Level of application: EU ● National ● Local ○

- Carry out a policy-level and competitivity-oriented analysis in order to estimate the potential for integration or alignment amongst the various initiatives such as EPCs, BRPs - Building Renovation Passport, SRI as well as private assessment schemes such as Ready2Services, WiredScore, SmartScore, etc.;
- Assess the potential for these schemes to evolve according to the various constraints encountered in construction markets in the Member States.

ACTION 3.2

Evaluate the value added by dynamic evaluations, their potential contribution to policy objectives and foreseen implementation

Level of application: EU ● National ● Local ○

- Carry on a systematic review of existing policies and associated certifications to assess the interest for dynamic evaluation;
- Get feedback from all stakeholders and evaluate the feasibility (costs), with a focus on the professionals involved in the delivery of such certificates (e.g., EPC assessors' bodies).

ACTION 3.3

Raise awareness amongst public authorities and private organisations in charge of certificates on the potential in the consideration of dynamic data

Level of application: EU ● National ● Local ●

- Organise information campaign directed to these actors;
- Make a case for public/private collaborations in order to discover new opportunities for servicing building data;
- Showcase research results illustrating novel approaches to using dynamic building data (LCA, energy flexibility, user comfort, etc.) in public events.

04

Encourage MS to set up national or local regulations supporting the smartening of the building stock through stricter building codes, with clear long-term objectives and incentives (e.g., subsidies, tax reduction, easier obtention of building permit for smart/high performing buildings)

Background

It is generally accepted that smartening of the building stock leads to both improved monitoring and understanding and improved performance across multiple factors including energy consumption, safety, and human health/comfort. However, adoption of 'smarter' building systems and technologies has so far been on an ad-hoc basis with only limited optional encouragement for this in the relevant local regulations. Key adoption progress has been by early adopting, well informed building owners/operators who act on increasing the smartness of their buildings, usually with a view on decreasing energy costs.

The primary progress in this area has been the development of the SRI. The SRI rates the smart readiness of buildings in terms of the capability of performing: (a) optimisation of energy efficiency and overall, in-use performance, (b) adaption of their operation to the needs of the occupant, (c) adaption to signals from the grid (for example, energy flexibility).

Since then, smart building solutions have become a strong leverage for increased energy efficiency in buildings along with improved quality of life for occupants and other added values in terms of their performance. For instance, it is estimated that full-scale digitalisation in non-residential construction would lead to annual global cost savings of 10% to 17% in the operations phase. A primary enabler for these gains is the adoption of digital twins and building automation along with IoT and embedded sensors. However, none of this is possible if a building lacks a basic level of 'smartness'.

Much work needs to be done to properly enable this at EU, national and local levels. The actions set out below seek to set out a logical program of activities to enable the increase of smartness across the EU-wide building stock .

Proposed key actions

ACTION 4.1

Update and subsequently enforce compliance with building regulations to impose a minimum level of smartness (according to SRI) for new and renovated buildings.

Level of application: EU ● National ● Local ○

- Encourage MS to set clear long-term objectives for building smartness and corresponding requirements for buildings (including in building codes), thus completing the minimum requirements for energy performance laid down in the EPBD;
- Support MS in enforcing such requirements and in investing in their implementation.

ACTION 4.2

Implement a set of positive encouragement measures to incentive the specification of smart building components and their integration from the planning and design phase.

Level of application: EU ● National ● Local ○

- Enable and encourage MS to develop a set of measures (e.g., subsidies, tax reduction) to reward early adopters of smart buildings, incentivising them to include smart building components in their designs, for instance through the EU Recovery Funds or other funding instruments;
- MS and local authorities could fast track the obtention of building permits for smart and high performing buildings.

ACTION 4.3

Enforce adoption of SRI in building permitting processes.

Level of application: EU ● National ● Local ●

- As a start, implement a requirement that SRIs are calculated as part of the building permitting process, but do not enforce a specific level of compliance.

05

Support the roll-out of interoperability of smart solutions and flexibility of smart buildings through data-driven standards and regulation

Background

Smart building solutions are a strong leverage for increased energy efficiency in buildings, improved quality of life for occupants and added value for work performance. However, the degree of interoperability of technical building systems (and software tools that use data from these systems) can be a limiting factor affecting the smart services and impacts that can be delivered within a building. Interoperability is essential for allowing technical building systems to interact with the energy grids, can avoid duplication of efforts and is desirable in the light of future upgrades of the building. Interoperability in smart buildings refers to several fields, namely energy management, smart appliances, comfort and lighting, control and connectivity, security. According to ETSI[9]: interoperability *"can be considered to be the ability of two or more systems or components to exchange data and use information"*. Different categories of interoperability are also described by ETSI in their White Paper N°3 (ETSI, 2008): technical (communication of hardware and software components), syntactical (data formats), semantic (understanding and interpretation of content), and organisational interoperability (organisations to effectively communicate and transfer). Building management systems have evolved in recent years to support and efficiently operate diverse systems and appliances through technologies and ICT solutions; however, comprehensive multi-system management using one all-inclusive building management systems (in a manager-of-managers role) and standardisation of data flows, data analysis, and actuation remains an unattained goal[10].

Different initiatives already exist or are being developed to support interoperability, such as Building Operating System, Communication protocols and gateways, OpenBIM, Open Commissioning Tools, IFC & IoT for digital twins, and demand response technologies. In spite of the development of these initiatives, assessing the different levels of interoperability of a building is currently a challenge. Whilst interoperability is acknowledged as a very important concern in relation to the SRI, there are significant limitations to the actionability of the explicit evaluation of the interoperability. The way interoperability is considered by other existing smart certifications also varies greatly from one certification to the other. Another specific challenge is that energy management systems and smart home devices are often not interoperable but are linked to a certain brand, technology and/or standard. Data integration issues often relate to a lack of frameworks and GDPR norms.

[9] ETSI (2008) White Paper No. 3: Achieving Technical Interoperability - the ETSI Approach. Authors: Hans van der Veer (Alcatel-Lucent), Anthony Wiles (ETSI Secretariat). 3rd edition - April 2008
[10] D. Minoli, K. Sohraby, and B. Occhiogrosso, "IoT Considerations, Requirements, and Architectures for Smart Buildings – Energy Optimization and Next Generation Building Management Systems," IEEE Internet Things J., vol. 4, no. 1, pp. 1–1, 2017

Proposed key actions

ACTION 5.1

Design principles and rules for integration of interoperability in EU regulation

Level of application: EU ● National ○ Local ○

- Integrate interoperability into EPBD, DBL, Building Passport, and SRI, under a unified and shared EU ontology and semantics. The SRI could potentially play a role in informing the market actors on this important aspect and even assist in shaping the market;
- Set up minimum levels of interoperability or smartness of buildings needed to monitor energy performance and maintain the energy certificates validation;
- Develop regulations to demand open standards, create an imperative for strategic data flexibility to discourage vendor lock-in (see also Policy recommendation N°2).

ACTION 5.2

Develop open, modular end-to-end interoperability and data management frameworks *(linked to Recommendation N°2)*

Level of application: EU ● National ● Local ○

- Define frameworks covering end-to-end interoperable communication between all actors and sectors involved, such as energy networks, building energy management systems, devices, consumers, and occupants. It is relevant to consolidate security from the system operator to the smart device level;
- Provide clear guidelines to MS so they can facilitate the full interoperability of services and of data exchange within the EU, making sure it is compliant with GDPR, and laying down clear requirements for data quality and integrity.

ACTION 5.3

Support the development of certifications with the establishment of end-to-end interoperability between energy networks, building energy management systems and devices *(linked to Recommendation N°7)*

Level of application: EU ● National ● Local ●

- Develop an interoperability label (with cybersecurity certification) that enables open standard-based communication along the demand response value chain, interaction of consumers with energy markets, and data exchange and integration across brands and protocols;
- Push for the standardisation of semantic data tags for linked data in buildings, by developing data processing agreements with different stakeholders, with implementation of naming and tagging;
- Set up representative projects showcasing the added value of smart building certification assessing the level of interoperability (e.g., Ready2Service certification, Smart Score, WiredScore).

06

Support the implementation of the SRI in all Member States, based on a harmonised, common EU calculation methodology

Background

To support the SRI implementation in all MS, the EC has launched an SRI service contract in 2021 which ends in May 2023 to provide technical assistance and guidance in testing and implementing the SRI and establishing and running a setup for the support of the broad roll-out of the SRI in the EU. To pave the way for a successful SRI implementation in all MS, such support provisions need to be prolonged and extended.

The current ongoing revision of the EPBD[11] foresees a reinforcement of the SRI for large non-residential buildings as of 2026. For all other building types and also before that time, the SRI is foreseen as an optional scheme, which means that EU MS would be allowed to decide to implement the SRI on (part of) their territory, for all buildings or only for certain categories of buildings. In contrast to EPC schemes, the general principles of the methodology, the assessment rules and criteria are shared among the member states, but specific elements are to be adapted to the local context by MS. The draft version of the revision of the EPBD also adds an extra step of evaluation of the SRI instrument prior to broad scale deployment in all MS. A review of the regulation of the delegated and implementing acts is foreseen which will incorporate feedback from the national test phases for further developing the SRI and related methodology.

The current description of the common EU framework for rating the smart readiness of buildings leaves a lot of freedom and hence unclarity on how to adapt the SRI methodology for local implementation in MS.

[11] Proposal for a directive of the European parliament and of the council on the energy performance of buildings (recast); COM(2021) 802 final – 2021/0426 (COD); Brussels, Belgium; December 15, 2021

Proposed key actions

ACTION 6.1

Provide technical and financial support for the testing of the SRI instrument

Level of application: EU ● National ○ Local ○

- Foresee technical support for the analysis and evaluation of the SRI instrument tested in MS currently engaged in a testing phase and of assessments executed by other stakeholders to feed into a potential next improvement iteration round of the SRI methodology;
- Prolong and extend existing technical support to MS currently engaged – and those potentially involved in the future - in a test phase of the SRI;
- Foresee financial support on EU level to leverage the testing and implementation of SRI in MS;
- Support ongoing platform activities as interactive fora to exchange knowledge and experiences to further pave the way for testing and implementation of SRI schemes in preparation of large-scale deployment in all EU MS. Support extension of interactivity by organising appropriate systemic opportunities to involve all relevant stakeholders - also from other domains - interactively in the development procedures via feedback loops.

ACTION 6.2

Provide technical assistance to further detail the common EU SRI framework to unequivocally specify the SRI scheme for application to a variety of building types and locations throughout the EU.

Level of application: EU ● National ○ Local ○

- Further detail those aspects that can be set as common to the SRI methodological framework and those aspects that minimally require freedom to allow deployment in all MS taking into account local specific aspects, such as for instance differences in standards and legal requirements between MS. Also specify regulation in border areas to allow flexibility exchange among MS;
- Make clear reference to standards and establish a set of standards - including harmonisation of existing standards between MS and development of new specific standards wherever needed, preferably open standards and coordinated with other domains (i.e., openBIM and openGIS) - to unequivocally specify all aspects of the calculation methodology;
- Update and extend the current set of service catalogues into a consolidated set of service catalogues that forms the basis for MS to adopt for national implementation;
- Develop a calibration methodology or equally effective alternative to allow better matching of the national building stock smart readiness characteristics with the SRI labelling range with room for technological evolutions and future potential smart readiness improvements in the building stock.
- Develop a EU central tool - including a template for SRI reporting - and database for

SRI calculation incorporating appropriate possibilities for adaptation to the national context and for updates over time;

- Define clear procedures and a change management framework for updating the SRI methodology, also considering potential evolution towards more dynamic certification based on real time data;
- Provide information and education via appropriate channels for MS implementing bodies including possibilities for adapted support in the process of national adoption of the SRI scheme. Centrally develop training materials with appropriate room for adaptation to the local context and foresee guidance in setting up frameworks for national training and certification of independent experts for executing SRI assessments;
- Further specify the relationship between SRI and EPC and detail the way in which SRI is to be combined or included into existing EPC schemes, the DBL, renovation passport and other building databases also on the level of the national building stock. Consider extending the evaluation framework to also include other relevant indicators such as broader environmental impacts, resilience and co-benefits.

ACTION 6.3

Provide support for the definition, introduction, expansion and strengthening of minimum building smart readiness standards and the establishment of appropriate monitoring, evaluation and enforcement frameworks in the MS

Level of application: EU ● National ○ Local ○

- Update building regulations to make them easier to understand and comply with;
- Develop a methodology to define minimum levels of building smart readiness on the local level and encourage MS to set clear long-term objectives and corresponding requirements for buildings. This requires the establishment of the methodological framework of cost optimality in the determination of minimum levels of building smart readiness (similar to that as it is in place for EPCs), including the preparatory work such as carrying out appropriate expert consultations on EU level;
- Support member states in the establishment of an appropriate monitoring and evaluation framework and provide support for member states to introduce independent control and enforcement mechanisms for SRI compliance and quality assurance, minimum levels of building smart readiness levels and improvement of the existing building stock;
- Launch informative campaigns to support the roll-out and acceptance of common, harmonised SRI schemes throughout EU MS with primary focus on benefits of increasing the smart readiness of all buildings for the building users and society as a whole with links to evolution of smart readiness performance of the building stock and showcasing of good practices;
- Provide information and education via appropriate channels for MS implementing bodies in the process of national adoption of the SRI scheme.

07

Make a convincing case for building smartness: make visible and easy to understand the benefits of smartness for building owners/managers and occupants through labelling of devices and building certification

Background

Building owners and occupants, property managers as well as insurers need to be made aware, through education and clear information, of the potential benefits and co-benefits of smart technologies. To that end, certification and labelling have an instrumental role to play.

For instance, the SRI raises awareness on the benefits promised by smart building technologies (such as building automation and monitoring of building systems including heating, hot water, ventilation, lighting, etc.).

In order to make a more convincing case for building smartness, the SRI and the elements contributing to it should gain more knowledge with various stakeholders. The ongoing testing phase in some MS[12] is an important step for this.

As there are already many initiatives ongoing regarding building and installation certification, both public (e.g., EU energy label and ecodesign[13]), and commercial (e.g., BREEAM and LEED certification, Ready2Services, SmartScore, WiredScore), it is wise to align further actions to co-benefit from the ongoing initiatives.

[12] https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/smart-readiness-indicator/sri-test-phases_en

[13] https://commission.europa.eu/energy-climate-change-environment/standards-tools-and-labels/products-labelling-rules-and-requirements/energy-label-and-ecodesign/about_en

Proposed key actions

ACTION 7.1

Facilitate third-party certification and third-party certified labelling through easier and simple process, and standardised evaluation of methods of benefits

Level of application: EU ● National ● Local ○

- Include in regulation third-party certified labelling for smart building devices, in line with the Environmental Products Declarations and Energy Labelling, and including SRI service levels (or smartness information) as well as information on interoperability, cybersecurity and data privacy;
- Make the certification process easy, simple and accessible for all stakeholders, i.e., easy to present as part of the building documentation, link with Digital Building Logbook (DBL), etc.;
- Standardise evaluation methods of benefits including co-benefits valorisation (e.g., comfort, convenience, health, well-being and accessibility), in line with the SRI impact categories.

ACTION 7.2

Link with other certification programmes such as LEED, BREEAM, WELL, R2S to include economic and environmental benefits as well as user comfort and health

Level of application: EU ● National ● Local ○

- Map the existing certification frameworks that define requirements (in terms of design and monitoring) for sustainable buildings (e.g., DGNB , BREEAM) and user-centric buildings (e.g., WELL);
- Promote the development of 'Green and Smart' Building certifications (e.g., adaptation of LEED / BREEAM / Ready2Service)
- Promote the use of user-centric standards that could be adopted at building's early design phase and based on European values and perspectives (e.g., BREEAM, WELL).

08

Enable regulatory sandboxes to test new concepts and business models and facilitate access to 'demo spaces'

Background

The deployment of energy communities, flexibility services to and from the grid, and other innovative concepts and business models contributing to the energy transition, is facing several bottlenecks - even if the technology is available and interoperability is ensured. As an example, there are discrepancies between national and European legislations, there are no well-defined mechanisms on data protection, anonymisation, use and privacy. Moreover, to deliver systemic change at both national and European levels, there is a need to not only test new concepts such as energy communities, flexibility services, smart building management, etc. but to do so in a manner that they can be adapted, replicated and scaled-up at national and European levels while in compliance with respective directives and legislations. This naturally should follow in the form of regulatory sandboxes to ensure compliance and harmony across different directives and legislations at European and national levels.

According to the European Council, regulatory sandboxes are defined as concrete frameworks which, by providing a structured context for experimentation, enable where appropriate in a real-world environment the testing of innovative technologies, products, services or approaches – especially in the context of digitalisation – for a limited time and in a limited part of a sector or area under regulatory supervision ensuring that appropriate safeguards are in place[14].

[14] https://www.consilium.europa.eu/en/press/press-releases/2020/11/16/regulatory-sandboxes-and-experimentation-clauses-as-tools-for-better-regulation-council-adopts-conclusions/

Proposed key actions

ACTION 8.1

Build regulatory sandboxes for new business models related to smart buildings

Level of application: EU ● National ● Local ●

- Use regulatory sandboxes and experimentation clauses as tools for an innovation-friendly regulatory framework that accelerate the deployment of new business models such as energy communities, provision of services to the grid, etc. ;
- In particular, accelerate the development of new market regulations enabling the provision of energy flexibility services and facilitate the access of smart buildings to flexibility markets (potentially through energy communities or aggregators).

ACTION 8.2

Facilitate the development and access to 'Demo Spaces' (living labs and scaled demonstrators) to test and validate concepts and business models

Level of application: EU ● National ● Local ●

- Create a programme ('demo spaces') that supports the trials and demonstration of technical/social R&D actions in privileged conditions (early access, reduce licencing costs, etc.) for SMEs and other construction actors;
- Conduct an up-to-date inventory of existing living labs and equip them with trust-worthy measurement tools to improve testing and validation;
- Make sure that living labs provide open access to real-time data on building's monitoring and user perspectives (in line with to Policy recommendations 1 and 2), and encourage the use of open standards and frameworks and the involvement of users;
- Push for the inclusion of Social Sciences and Humanities approaches in living labs.

09

Integrate smartness and user-centric requirements in (green and pro-innovation) public procurement

Background/Rationale

According to the European Commission, government expenditure on works, goods and services represents around 14% of EU GDP, accounting for roughly EUR 1,8 trillion annually[15]. The way in which this money is spent has clear implications for the economy, as well as for the organisations spending it and the citizens who ultimately avail of their services. By using their purchasing power to choose goods, services and works with a reduced environmental impact, they can make an important contribution towards local, regional, national and international sustainability goals.

This is the objective of Green Public Procurement (GPP), defined as "a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life-cycle when compared to goods, services and works with the same primary function that would otherwise be procured." GPP can also be a major driver for innovation, providing industry with real incentives for developing green products and services. This is particularly true in sectors where public purchasers represent a large share of the market, in particular[16]. To foster innovative technologies, GPP can also be supported by Public Procurement of Innovation (PPI), which aims to 'close the gap' between cutting-edge technology and processes and the public sector customers or users who can benefit from them.

In addition to sustainability and innovation, it is critical to put the citizens and users at the centre of public procurement. The occupants' behaviour has indeed a major impact on the actual consumption of buildings (vs the predicted one). Public acceptance of smart technologies enabling more sustainable, inclusive and comfortable buildings is also a cornerstone of the roll-out of smart buildings. Thus, focus should be placed on liaising with occupants in order to explore their diverse preferences. This is of particular importance; since the latter implies differences in comfort level which should not be overlooked whilst seeking standardisation of wellbeing definitions. Knowing the actual user behaviour can explain a significant portion of gap between actual and predicted consumption and thus, elaborate mechanisms aiming for closing this gap.

[15] European Commission (2015) Public Procurement Indicators 2013. These figures exclude spending by utility companies; earlier estimates (2011) including utility procurement were of around 19% of EU GDP, accounting for more than EUR 2,3 trillion.
[16] European Commission (2016) Buying green! A handbook on green public procurement, 3rd Edition

Proposed key actions

ACTION 9.1

Manage externalities in public procurement, by further encouraging the use of life cycle approaches, also accounting for social impacts

Level of application: EU ● National ● Local ●

- Encourage MS to use GPP whenever possible, relying upon Life Cycle Analysis (LCA) data where it is available, together with eco-labels and the evidence which these are based upon;
- Integrate social impacts to GPP, i.e., go beyond comfort (indoor air quality, natural light, comfortable working temperatures and adequate, ventilation – already mentioned in the guidelines for GPP in buildings), and also include inclusivity and user-centricity – see also 9.2 below.

ACTION 9.2

Request a minimum level of smartness when developing new buildings or when carrying out a deep renovation

Level of application: EU ● National ● Local ●

- Set up minimum smartness requirements in public procurement for new build or deep refurbishments. These requirements could be defined at national scale however a common base should be defined at at EU scale, through GPP criteria (e.g. with regard to Internet connection and monitoring devices);
- Provide appropriate financial incentives as part of public procurement to encourage bidders to employ smart building technologies.

ACTION 9.3

Promote user satisfaction and feedback mechanisms in public procurement, from the design phase and along the building life cycle

Level of application: EU ● National ● Local ●

- Where relevant, make mandatory for bidders to develop user-satisfaction measurements and data collection mechanisms alongside evaluation methodologies;
- Include clauses for users' participation, from the design phase and along the whole (smart) building life cycle;
- Promote the creation of user personas and emphasise the diversity of needs, including those of vulnerable users (occupants with disabilities, the elderly).

ACTION 9.4

Develop requirements for data management and protection

Level of application: EU ● National ● Local ●

- Dedicate a special lot for data management, evaluating such aspects as: data management plan, data quality assessment, fitness of the proposed data collection methods;
- Ensure that data privacy and personal data protection schemes comply with the EU legislation and meet the highest standards. Personal data use should comply with GDPR and respect user consent, whilst promoting voluntary data sharing (see also Recommendations N°1 & 2).
- Promote the creation of user personas and emphasise the diversity of needs, including those of vulnerable users (occupants with disabilities, the elderly).

10

Support upskilling related to digitalisation, cybersecurity, open standards, LCA and performance-based approaches, relying on closer academic/industrial cooperation

Background

The digitalisation of the construction sector implies major changes in design methods, technologies and tools. Beyond BIM, in the light of technology advancements and societal changes related to buildings in the Industry 5.0 era, there will be a fundamental shift in designing and constructing smart buildings. With about 95% of its construction chain composed of SMEs and micro-enterprises characterised by low rates of technological adoption and innovation activity, and decreasing efficiency, digitalisation of SMEs in the construction sector is strategic for the EU. As pointed out by the EC[17],"the transformation towards a climate-neutral building stock will only be possible if existing jobs are transformed to include green and circular skills and if new job profiles emerge, such as specialists in deep building renovation, installers for advanced technological solutions, or Building Information Modelling managers". However, construction sector workers are typically not knowledgeable or lack access to digital tools that could facilitate their work: providing lifelong (digital) skills development for (blue-collars) employees within the construction sector through trainings is a priority.

Each EU country has its own individual higher education system – but all are part of the European Higher Education Area (EHEA). The EHEA system helps ensure that higher education systems across Europe are compatible - and that students, researchers and academics in Europe can collaborate and study or work abroad more easily[18]. Qualifications across Europe are comparable through the European Qualifications Framework (EQF). Initial and continuing vocational education and training (VET) are quite separate: initial VET (IVET) is usually part of a highly regulated school system, while continuing VET (CVET) is more heterogeneous.

[17] https://ec.europa.eu/energy/sites/ener/files/eu_renovation_wave_strategy.pdf
[18] https://education.ec.europa.eu/study-in-europe/planning-your-studies/higher-education-in-europe

Proposed key actions

ACTION 10.1

Improve transparency and efficiency of higher education and vocational education training related to smart buildings

Level of application: EU ● National ● Local ●

- Launch a framework with clear requirements for new initial and continuous training programmes related to Smart Buildings: frequently updated, on-site where possible (with more hands-on and practical experience, also including topics such as cybersecurity and regulation), with clear learning outcomes, clearly referenced (i.e., accessible and up-to-date catalogue), optimised geographically to be close to the SMEs in the case of CVET;
- Launch initiatives to reinforce the cooperation between educational institutions and the industry, and between higher education and VET centres, to improve the quality of training;
- Improve transparency and recognitions of qualifications related to Smart Buildings in line with the EQF (e.g., qualifications registers, skills passports), by leveraging for instance on the activities already carried out by Cedefop, the European Centre for the Development of vocational Training.

ACTION 10.2

Make continuous training compulsory, and monitor implementation through government bodies

Level of application: EU ● National ● Local ●

- Develop a new legislative framework or amend public procurement practices to make continuous training compulsory in big tenders, for instance through a 'training clause' in public (and private) procurement;
- MS to support innovative types of incentives for SMEs to invest in training;
- Environmental / governmental agencies to provide necessary support (through train-the-trainers or mentorship programmes) to make sure trainers are comfortable with the latest technologies and update their training courses accordingly;
- Environmental / governmental agencies to define clear procedures to check that qualifications are up-to-date and to encourage continuous learning.

SmartBuilt4EU
The European Smart Buildings Community

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