The smart readiness indicator for buildings: current status and next steps

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The Smart Readiness Indicator (SRI) for buildings was introduced in 2018 by the Directive amending the Energy Performance of Buildings Directive (2018/844/EU) [1]. Since Autumn 2020, following the intensive development and extensive stakeholder consultation activities of the two SRI technical support studies contracted by the European Commission's (EC) Directorate General for Energy (DG ENER), the first Smart Readiness Indicator version is ready. Furthermore, the so-called SRI legal acts (EU regulations) have entered into force across the EU's Member States on January 10th, 2021. By design the SRI is a voluntary scheme so it is now up to the Member States of the European Union to decide how to implement the SRI at national level and as desired only after undergoing a no commitment national testing exercise.

Keywords: digitalization, digital transformation, smart buildings, performance, qualitative assessment, certification, renovation, people-centred, indoor environmental quality, health, well-being energy optimization, energy flexibility

Not at all familiar with the SRI?

The 2018 revision of the European Energy Performance of Buildings Directive (EPBD) aims to further promote smart building technologies, in particular through the establishment of a Smart Readiness Indicator (SRI) for buildings (**Figure 1**). This indicator will allow for rating the smart readiness of buildings, i.e. the capability of buildings (or building units) to adapt their operation to the needs of the occupant, also optimizing energy efficiency and overall performance, and to adapt their operation in reaction to signals from the grid (energy flexibility). The smart readiness indicator should raise awareness amongst building owners and occupants of the value behind building automation and electronic monitoring of technical building systems and should give confidence to occupants about the actual savings of those new enhanced functionalities.

Current status

On 22 September 2020 the final results (final report and summary) of the second SRI technical study have been officially published by the EC's Publication Office [**2**]. On the official website of the second SRI technical support study the final report and summary are furthermore accompanied by:

- Two annexes in excel sheet format (Annex C - simplified service catalogue, Annex D - detailed service catalogue) [**3**]
- SRI Topical Group C 1st recommendations report [**4**] prepared by a self-managed group of stakeholders that advocates the SRI should be future proof and evolve to a data-driven assessment

Alongside, the SRI legal acts (SRI delegated act, SRI implementing act), after a prior official European Commission feedback round during Summer 2020 [**5**] have been published in the Official Journal of the European Union on December 21st, 2020 and have entered into force on January 10th, 2021:

- SRI delegated act [**6**] (*Regulation establishing an optional common Union scheme for rating the smart readiness of buildings that is to say the definition of the smart readiness indicator and a common methodology by which it is to be calculated. The methodology consists of calculating smart readiness scores of buildings or building units and deriving smart readiness rating of buildings or building units*)
- SRI implementing act [**7**] (*Regulation detailing the technical modalities for the effective implementation of an optional common Union scheme for rating the smart readiness of buildings established in the SRI delegated act*)

The first SRI version is basically a qualitative assessment of the smart readiness of a given building with 3 key functionalities at centre stage (**Figure 2**).

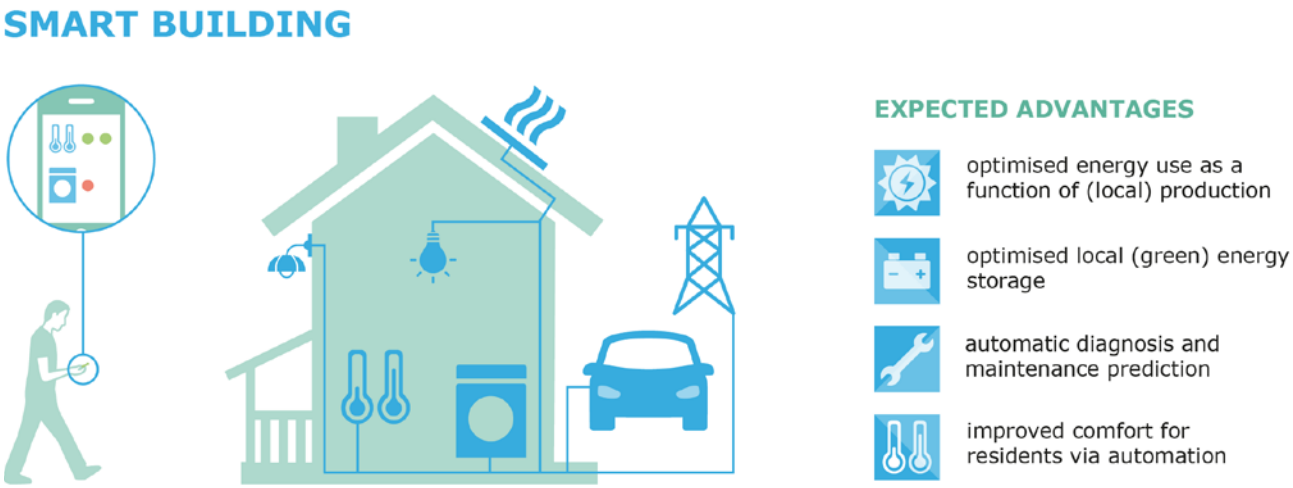

Figure 1. Expected advantages of smart technologies in buildings (SRI technical support studies).

Figure 2. Three key functionalities of smart readiness in buildings (SRI technical support studies).

For each key functionality of smart readiness in buildings there are one or several impact criteria (e.g. the readiness to facilitate maintenance and efficient operation has two criteria energy savings and maintenance and fault prediction) based on which the smart services (from the SRI service catalogue) available in a given building receive scores structured within 9 domains (i.e. heating, domestic hot water, cooling, ventilation, lighting, electricity, electric vehicles, dynamic envelope, monitoring and control) as illustrated in **Figure 3**.

The results of the SRI qualitative assessment could be displayed either as a single score, three scores, one for each key functionality of smart readiness in buildings (**Figure 4**) or in a matrix detailed view enabling to visualize the scores of all SRI domains against the SRI impacts criteria (**Figure 5**).

The SRI assessment covers all smart services available in a given building, so the detailed view is practically possible for any assessed building. The SRI scores can be aggregated per impact criterion, per key functionality or in a single score thanks to the usage of weighting factors (**Figure 6**).

Figure 4. Example of Tri-partite mnemonics to convey the overall SRI score/rank and sub-score/ranks for the three SRI key functionalities (SRI technical support studies).

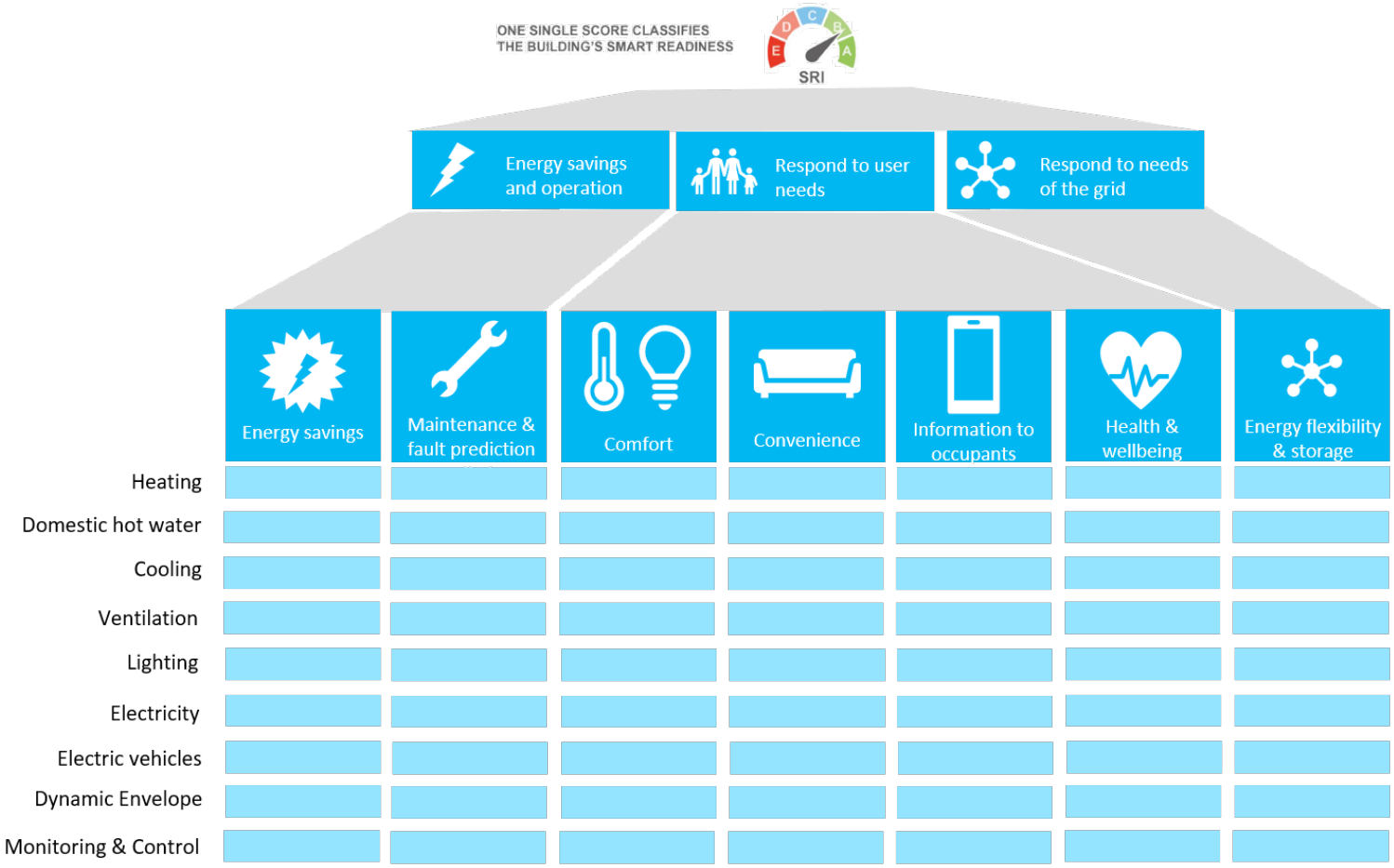

Figure 3. Proposed structure of domains and impacts criteria (SRI technical support studies).

IMPACTS

DOMAINS	Energy efficiency	Maintenance and fault protection	Comfort	Convenience	Health and well-being	Information to occupants	Energy flexibility & storage	SRI
Total	**39%**	**18%**	**60%**	**71%**	**48%**	**59%**	**0%**	**42%**
Heating	32%	18%	62%	55%	24%	74%	0%	
Sanitary hot water	17%	0%	45%	70%	67%	83%	0%	
Cooling	65%	51%	78%	72%	61%	55%	0%	
Controlled ventilation	41%	0%	55%	60%	34%	44%	0%	
Lighting	85%	14%	90%	100%	83%	15%	0%	
Dynamic building envelope	10%	0%	31%	56%	22%	46%	0%	
Electricity	10%	0%	-	-	-	68%	0%	
Electric vehicle charging	_	38%	-	82%	-	84%	0%	
Monitoring and control	52%	43%	62%	72%	45%	64%	0%	

Figure 5. Matrix showing SRI scores by domain and impact criterion, aggregate scores per impact criterion and the overall SRI score (SRI technical support studies).

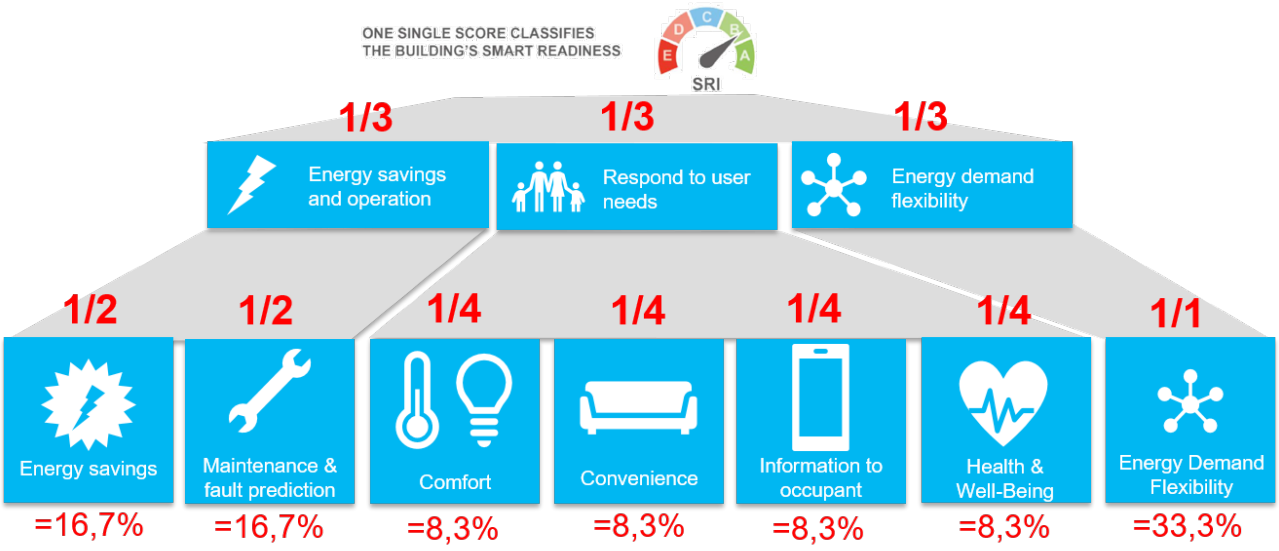

Figure 6. Aggregation of impact scores to three key functionalities or to a single score (SRI technical support studies).

"The smartness of buildings should be a means to an end and not a goal in its own right. Smartness should serve the purpose of providing with a better building in terms of energy performance, health, convenience, etc. There are some examples of buildings where technology enthusiasts have gone so far in automation that the technologies become gimmicks or are so experimental only the person who installed it knows how to operate it." stated Stijn Verbeke, senior researcher at EnergyVille/VITO and University of Antwerp, in a recent expert interview on BUILD UP (The European Portal for Energy Efficiency in Buildings) [**8**]. Stijn was the principal investigator in the first SRI technical support study and the coordinator of the consortium of the second technical support study commissioned by the European Commission's DG ENER.

NEXT steps

Being a voluntary scheme by design the Member States of the European Union are now in the process of deciding how to implement the SRI at national level. Under the European Union's principle of subsidiarity, the Member States have the right to make national level choices for many aspects of the SRI e.g. weighting factors, functionality levels, smart services catalogue. As per usual procedures they need to report and justify back to the European Commission.

- One can assume there will be only few if any Member States who go for a full implementation of the current SRI now. It's more likely that Member States consider only a national test phase where possibly no certificates will be issued. In the national test phase, it's highly likely that Member States might need to adapt the methodology to national preferences and needs to ensure national acceptance of the concept.
- Although there is no explicit timeline (start, end, duration) for the national testing exercise, the Member States do need to inform the European Commission what they are planning to do and submit an official report the latest 6 months after the testing phase is closed. In contrast, what is clear is that the two SRI legal acts (EU regulations) will be reviewed, as appropriate by 1 January 2026, in the light of the experience gained and progress made during its application.

A third SRI technical support service has been contracted by the European Commission during Spring 2021 (Call for tenders ENER/2020/OP/0015: Technical Assistance for Testing and Implementation of the Smart Readiness Indicator under the Energy Performance of Buildings Directive [**9**]) which will enable and facilitate the needed means of sharing experiences between Member States during the national testing phase, subsequent implementation phase and make further steps towards future proofing the SRI under the umbrella of the soon to be formed "SRI platform". The coordination kick-off event between Member States took place during a couple of SRI dedicated sessions as part of the Concerted Actions Energy Performance of Buildings [**10**] plenary 26-28 May 2021.

During 2020 the SRI Topical Group C (SRI TGC) members have prepared a 1st recommendations report with the support of REHVA Technology and Research Committee members and involved stakeholders [**11**] (published in June 2020, however kept under embargo till the publication of the final report). Many of these recommendations have also been inserted as copy-paste in the final report by the SRI study team [**12**].

The scope of the SRI TGC self-managed (volunteer based) working group is to discuss and identify future pathways of updating the existing methodology and furthermore implementing the assessment method C of SRI, which is based on measured data of the actual performance of buildings. Within the scope the SRI Topical Group C experts also analyse how to make the transition to an in-use/performance-based SRI exploring the most effective means on one hand for automating the checklist evaluation process and on the other hand for leveraging measured data and define an additional in-use SRI methodology.

With regards to the upcoming national testing phase, the following recommendations are worth highlighting:

- The most meaningful insights would be attained if the Member States would rank their national level priorities "Energy performance and operation", "Response to the needs of the occupant", "Flexibility of a building's overall electricity demand" and "All 3 of equal importance" at the beginning of the SRI testing/implementation process.

- A convergent and consistent approach between the actual assessment and final SRI scores at EU level is instrumental.
  - The Member State tailoring of the SRI qualitative assessment methodology should be either minimal (only if/as needed) and/or should be always possible to automatically convert to the EU SRI (default) to be able to compare the smart readiness level in different Member States and regions.
  - EU-wide programs to train and certify the assessors should be put in place. Importance should be given to the section "expert advices to users", in which the assessor should give suggestions on how to further improve the smart readiness of the building. Site visit, interview with the Building Operator/Owner/Tenant and proof for high-score functionality should be mandatory for SRI method B assessment.
  - For fully reaping the benefits of the SRI qualitative assessment (methods A and B) an SRI quantitative assessment (method C) measuring actual smart performance is required and could fit within the scope of the national testing. The SRI's potential needs to be captured into achieved outcomes (EU Green Deal, Renovation Wave Strategy) showing the real effect of smart building technology relying on actual building performance data.

As soon as the third SRI technical support service kick-starts its activities, most likely in Autumn 2021, the SRI TGC members shall resume activities and take further their work in full synchronicity with the national testing phase and ongoing and upcoming EU funded projects (e.g. Horizon 2020, Horizon Europe, Life) that include activities related to SRI, especially testing, demonstration, further development and market uptake e.g.

- SmartBuilt4EU H2020 project [**13**], The EU Smart Building Innovation Platform
- Next Generation Energy Performance Certificates cluster of H2020 projects
  - (Closed) ALDREN: ALliance for Deep RENovation in buildings Implementing the European Common Voluntary Certification Scheme, as back-bone along the whole deep renovation process. (project website [**14**]).
  - (Ongoing) Seven EPC sister projects covered in the EU news article "The Evolution of Building Energy Performance Assessment and Certification Scheme in Europe" included in REHVA Journal issue 01/2021 [**15**] at page 82. ■

Endnotes:

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.156.01.0075.01.ENG

[2] https://ec.europa.eu/energy/studies_main/final_studies/final-report-technical-support-development-smart-readiness-indicator_en

[3] https://smartreadinessindicator.eu/milestones-and-documents

[4] https://smartreadinessindicator.eu/stakeholder-consultation

[5] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12365-Implementation-modalities-of-the-smart-readiness-indicator-for-buildings

[6] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32020R2155&qid=1613991300428

[7] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32020R2156&qid=1613991300428

[8] https://www.buildup.eu/en/explore/links/expert-interview-stijn-verbeke-senior-researcher-energyvillevito-and-university

[9] https://etendering.ted.europa.eu/cft/cft-display.html?cftId=6874

[10] https://epbd-ca.eu/

[11] https://smartreadinessindicator.eu/stakeholder-consultation

[12] https://www.rehva.eu/news/article/final-report-smart-readiness-indicator-sri-for-buildings

[13] https://cordis.europa.eu/project/id/956936

[14] https://aldren.eu/

[15] https://www.rehva.eu/rehva-journal/detail/01-2021