Smart Readiness Indicator for Buildings

Experiences from a Cold Climate Country

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Smart Readiness Indicator (SRI) for Buildings

What is an SRI for buildings?

- Methodological framework
- Calculation methodology

Experiences from a cold climate country

- Finnish SRI related project
- Case assessments

What is an SRI for buildings?

A framework for assessing the buildings' readiness for smart operation

Enforced under the revised EPBD (2018)

- 1st technical study: 02/2017-08/2018
- 2nd technical study: 12/2018-**07/2020**

Evaluates the building's ability to…

- improve its overall energy efficiency
- answer the occupants needs
- react to the grid signals

Aims at making the added value of building smartness more tangible for building users, owners, tenants and smart service providers

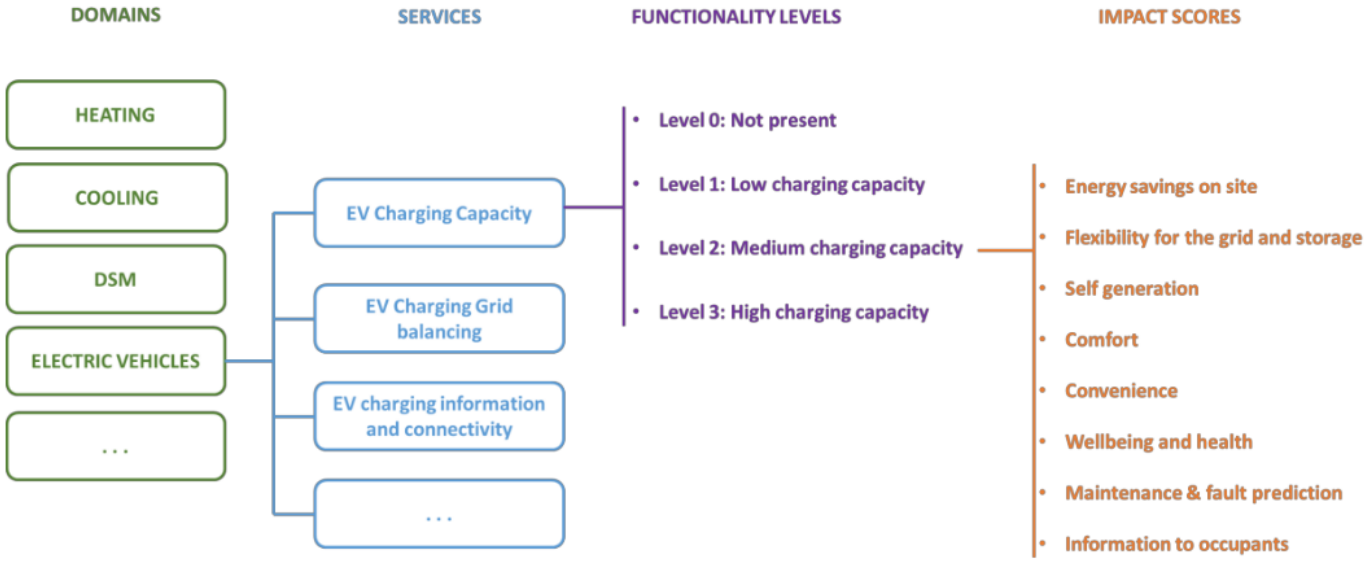
Methodological framework

SRI is based on the assessment of smart **ready** services

- A predefined list of 52 services
- 10 main domains

Methodological framework

- Each service has 1-4 functionality levels (i.e. level of smartness)
- Each service (and the specified functionality levels) have an additional impact factor on eight impact categories

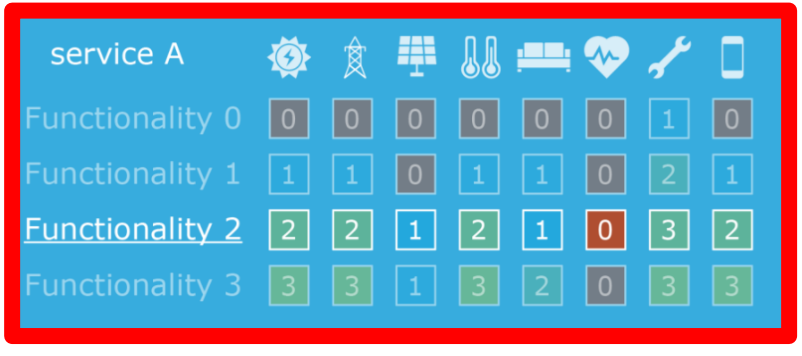


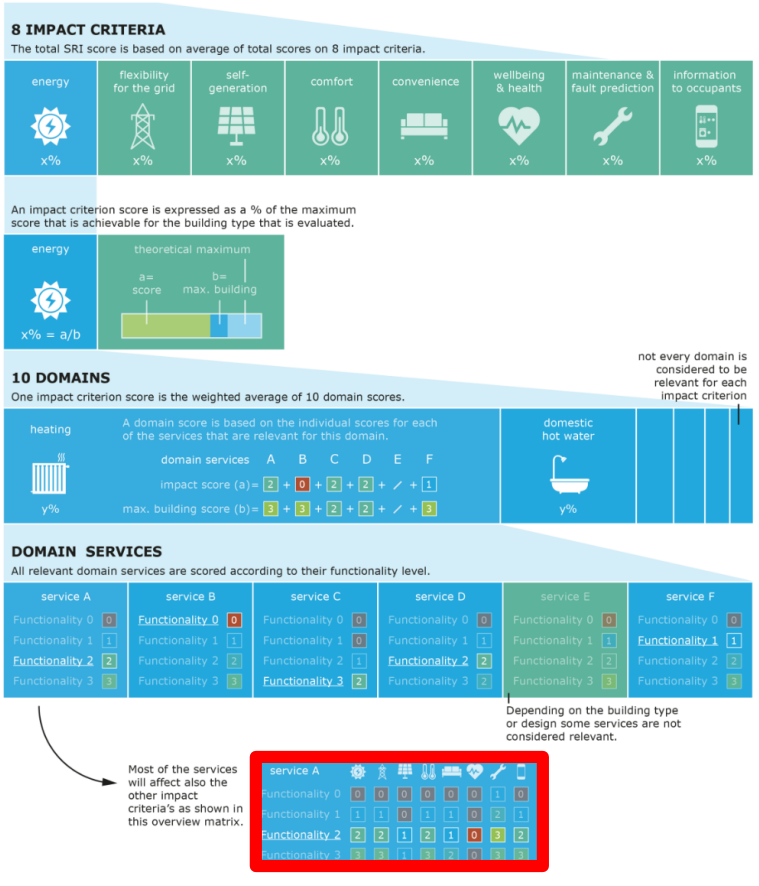
Calculation methodology

Step 1: Select the applicable services

Step 2: Determine the **actual** functionality level for each applicable service

Step 3: Apply service level impact scores



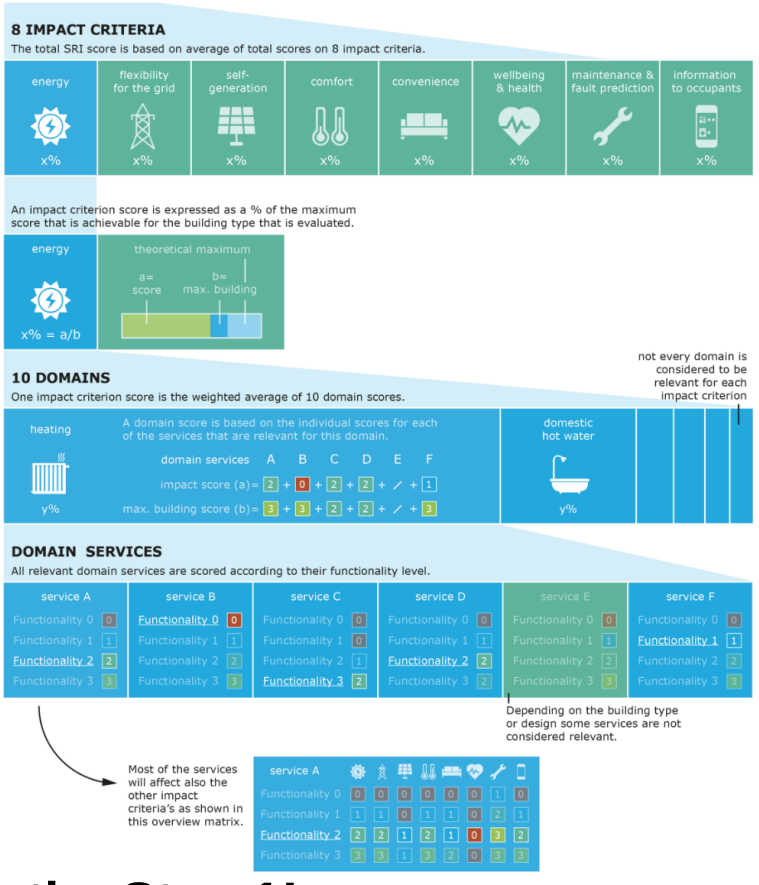


Calculation methodology

Step 4: Aggregate all scores and weight them by domains

Step 5: Calculate the **maximum** obtainable impact score (i.e. repeat the **steps 2 – 4**)

Step 6: The overall SRI score is calculated as the ratio of the **actual** impact score and the **maximum** obtainable score



The final score is solely dependent on the Step 1!

Experiences from a Cold Climate Country

SRI case assessments (Finland)

10+ buildings were assessed during the spring 2019

Most of the cases represented a state-of-the-art building

Typical assessment took 1,5 – 2 hours

The SRI 1st technical support study was applied

Summary

Building Type	Year of Construction	Assessed Services	Absolute SRI Score	Relative SRI Score
Shopping Centre	2003	41/52	73 %	92 %
Office	1990	36/52	43 %	60 %
Office	2014	44/52	48 %	55 %
Educational	2018	45/52	47 %	52 %
Residential	2010	35/52	42 %	51 %
Office	2013	44/52	42 %	50 %
Educational	2015	33/52	35 %	46 %
Office	2004	36/52	35 %	46 %
Residential	2018	28/52	28 %	46 %
Hotel	(2020)	39/52	33 %	41 %
Residential	1967	20/52	11 %	40 %

Absolute SRI Score = Actual impact scores of the building / Maximum impact scores of all the 52 services

Relative SRI Score = Actual impact scores of the building / Maximum impact scores of all the assessed services

Design by Laura Remes

KOy Malminkaari 21

Project Data	
Location	Helsinki, Finland
Year of Construction	1990
Type of Building	Office Building
Floor Area	6 998 m²
Number of Floors	4
Environmental Certificate	BREEAM Very Good
Indoor Climate Class	S2

Basic Design Features

- District Heating + Water Radiators
- Mechanical Balanced Ventilation with Heat Recovery
- Passive Chilled Beams

↑ Intelligent monitoring control, 87,5 % of impact categories covered, most of them above medium level

↓ 30 % of domains not applied

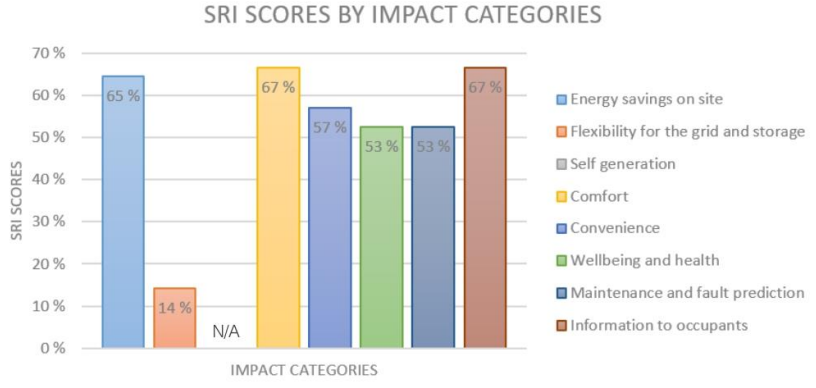
?! Overall SRI score above the medium level as most of the impact categories

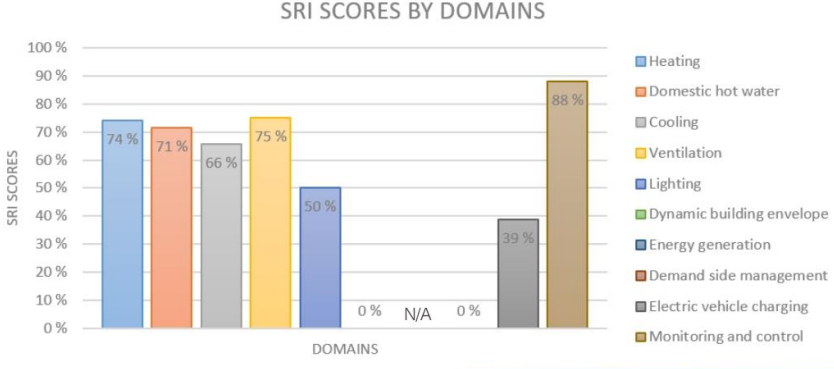
Design by Laura Remes

KOy Malminkaari 21

SRI score

60%





N/A - Category/domain is not assessed, because of irrelevance

Design by Laura Remes

Intelligent lighting, automatic heating system, 90 % of domains covered

Demand side management and storage of locally generated energy not applied

?! Low scores on energy generation, because there is no storage. The best energy class A!

Väre

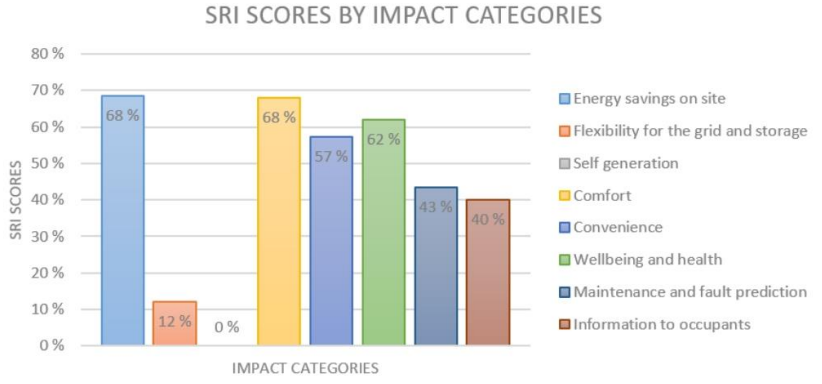
Project Data

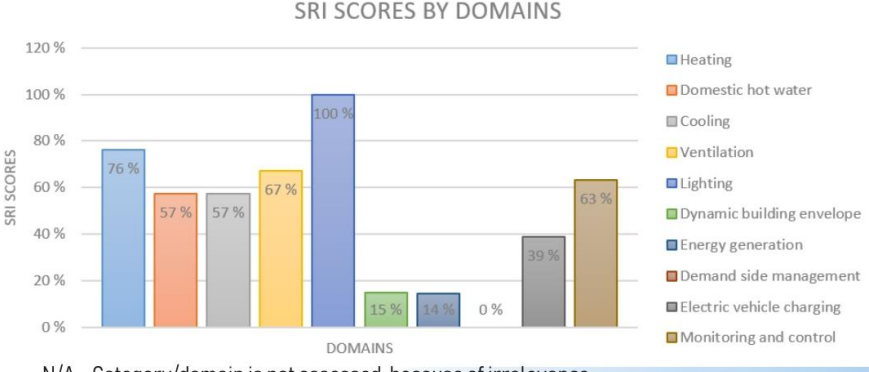
Location	Espoo, Finland
Year of Construction	2018
Type of Building	Educational Building
Floor Area	43 000 m²
Number of Floors	4
Energy Class	A
Indoor Climate Class	S2

Basic Design Features

- Ground Source Heat Pump + Radiant Panels
- District Heating for Supporting Heat Generation
- Mechanical Balanced Ventilation with Heat Recovery
- Ground Coupled + Radiant Panels
- Chillers for Supporting Cooling Generation
- Solar PV Utilization

Design by Laura Remes





N/A - Category/domain is not assessed, because of irrelevance

Väre

SRI score

52%

Design by Laura Remes

Sello

Project Data	
Location	Espoo, Finland
Year of Construction	2003
Type of Building	Shopping Centre
Floor Area	100 000 m²
Number of Floors	N/A
Environmental Certificate	LEED Platinum
Indoor Climate Class	S2

Basic Design Features

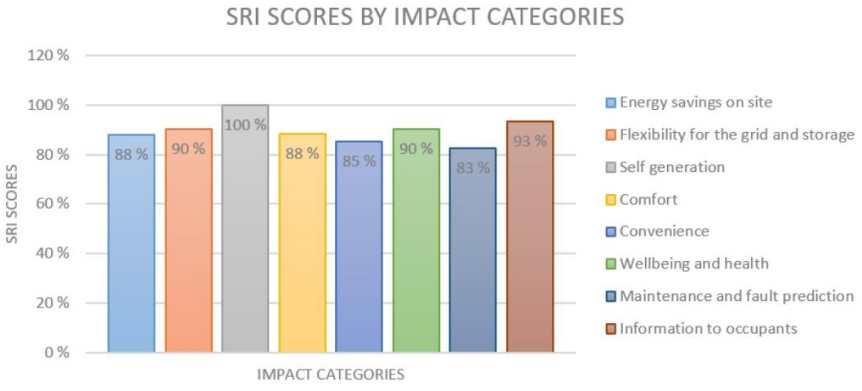
- District Heating
- Air Heating
- Mechanical Balanced Ventilation with Heat Recovery
- Solar PV Utilization
- Advanced Demand Management
- Electricity Storage

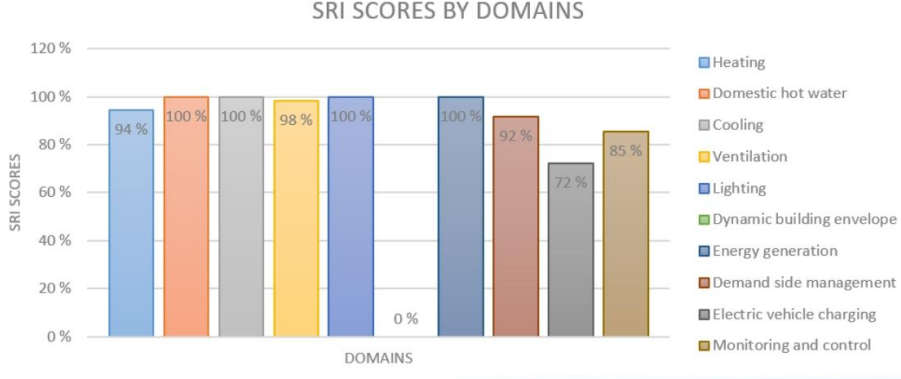
90 % of domains above medium level, 40 % of domains 100 %, high SRI scores for all impact categories, SRI A level

Dynamic building envelope not applied

?! Part of the smart energy system, microgrid functionality. High SRI score is achievable with district heating.

Design by Laura Remes





N/A - Category/domain is not assessed, because of irrelevance

Sello

SRI score

92%

Design by Laura Remes

Additional information

Smart Readiness Indicator (SRI) for Buildings:
https://smartreadinessindicator.eu/

Janhunen, E., Pulkka, L., Säynäjoki, A., & Junnila S. (2019). Applicability of the Smart Readiness Indicator for Cold Climate Countries. Buildings, 9(4), 102.
https://www.mdpi.com/2075-5309/9/4/102

THANK YOU!