



# SRI-ENACT

Co-creating Tools and Services  
for Smart Readiness Indicator Uptake

## Co-creation Workshop

*Current Landscape*

04/05/2023

Apostolos Arsenopoulos (NTUA)



The LIFE21-CET-SMARTREADY-SRI-ENACT project has received funding from the European Union's LIFE Programme under grant agreement N°101077201

# In a nutshell

What?

**Assessment of a building's capacity to accommodate smart ready services**

Why?

Raise awareness about the **added value of building smartness**, stimulate investment, support technology uptake

Who?

EU Member States (currently **optional, mandatory from 2026** for some building types)

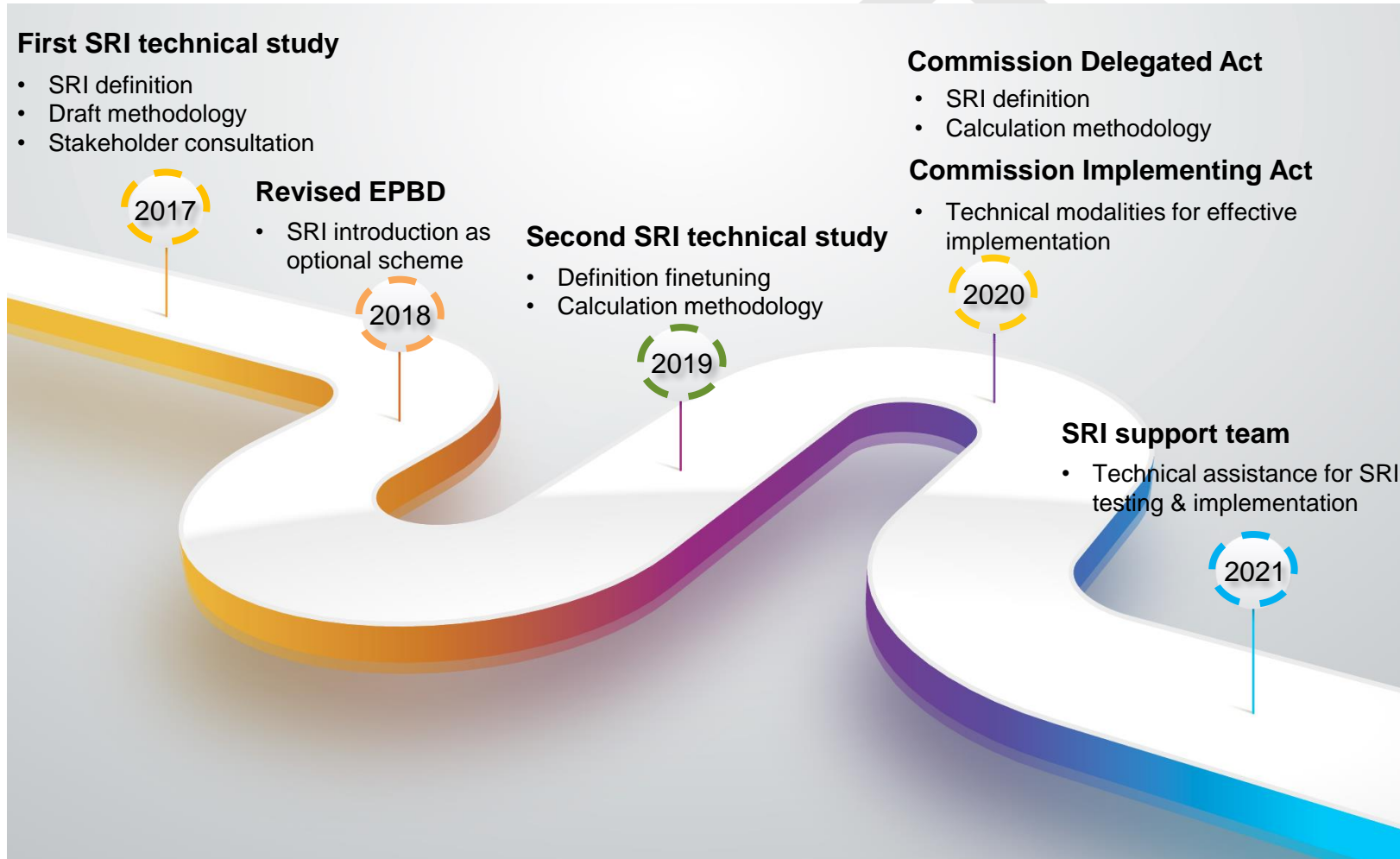
How?

Structured methodology from the EC, **customisable** to the local context

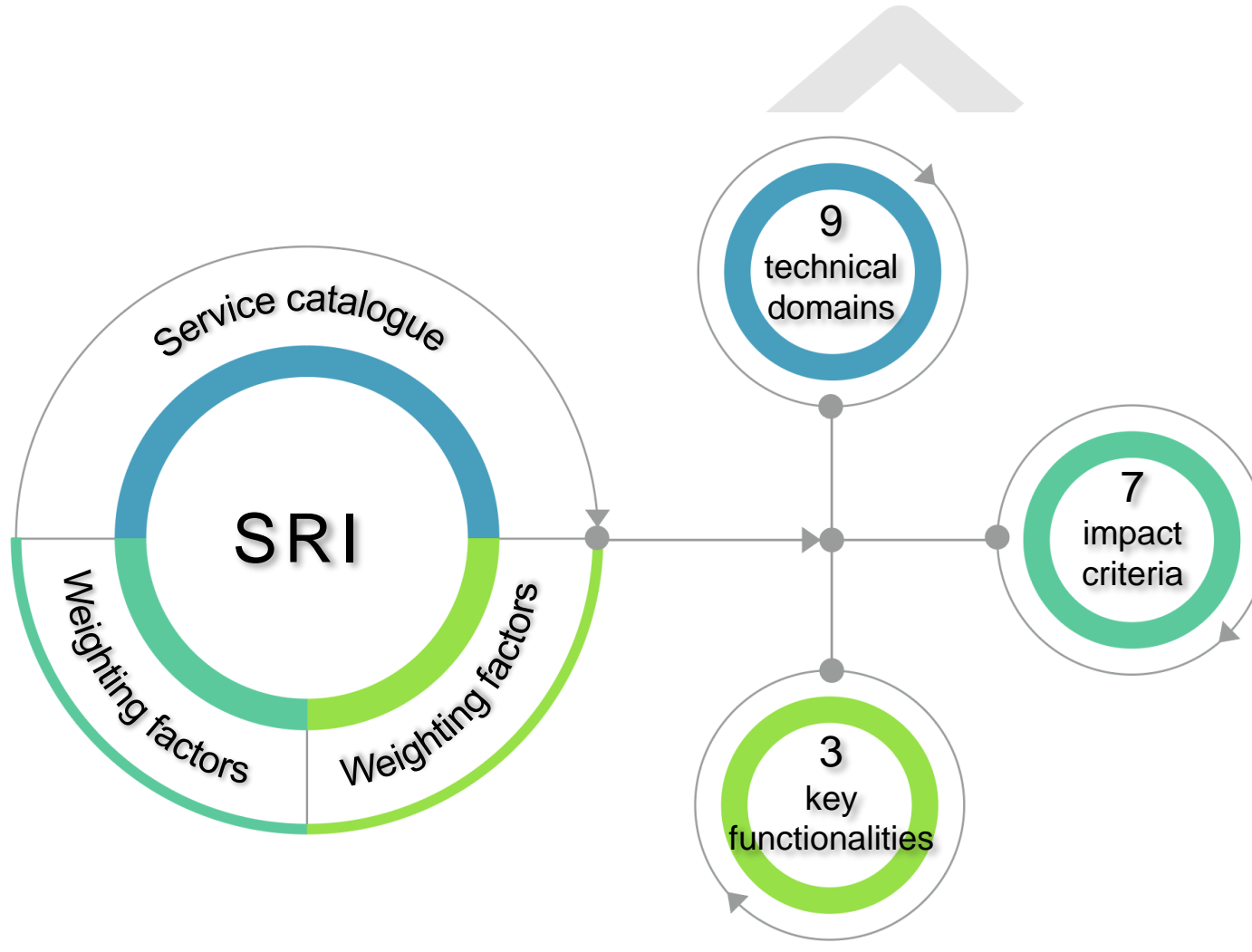
So far?

7 EU countries – Denmark, Austria, France, Finland, Czech Republic, Croatia, Spain (enters the test phase soon)

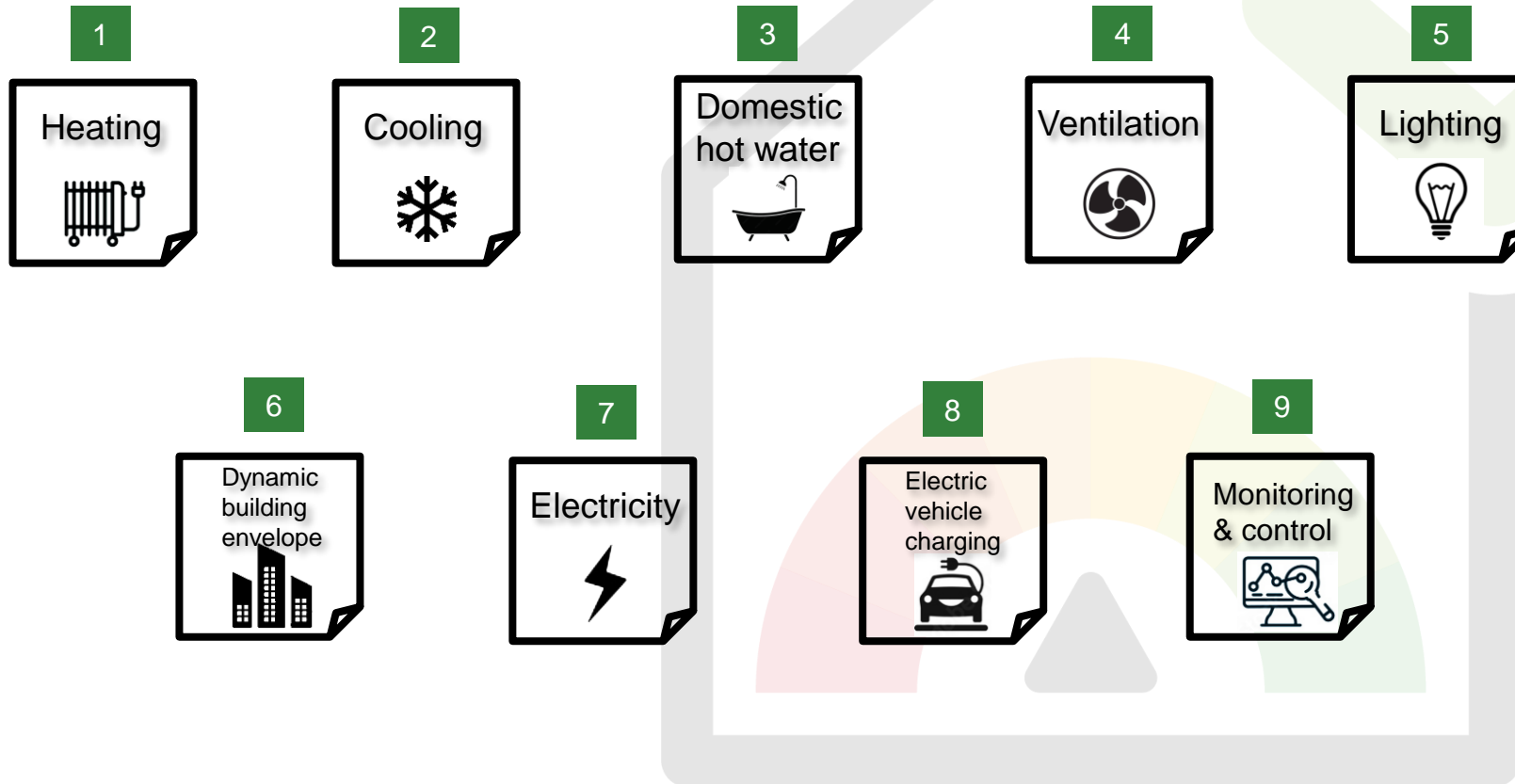
# History of the SRI



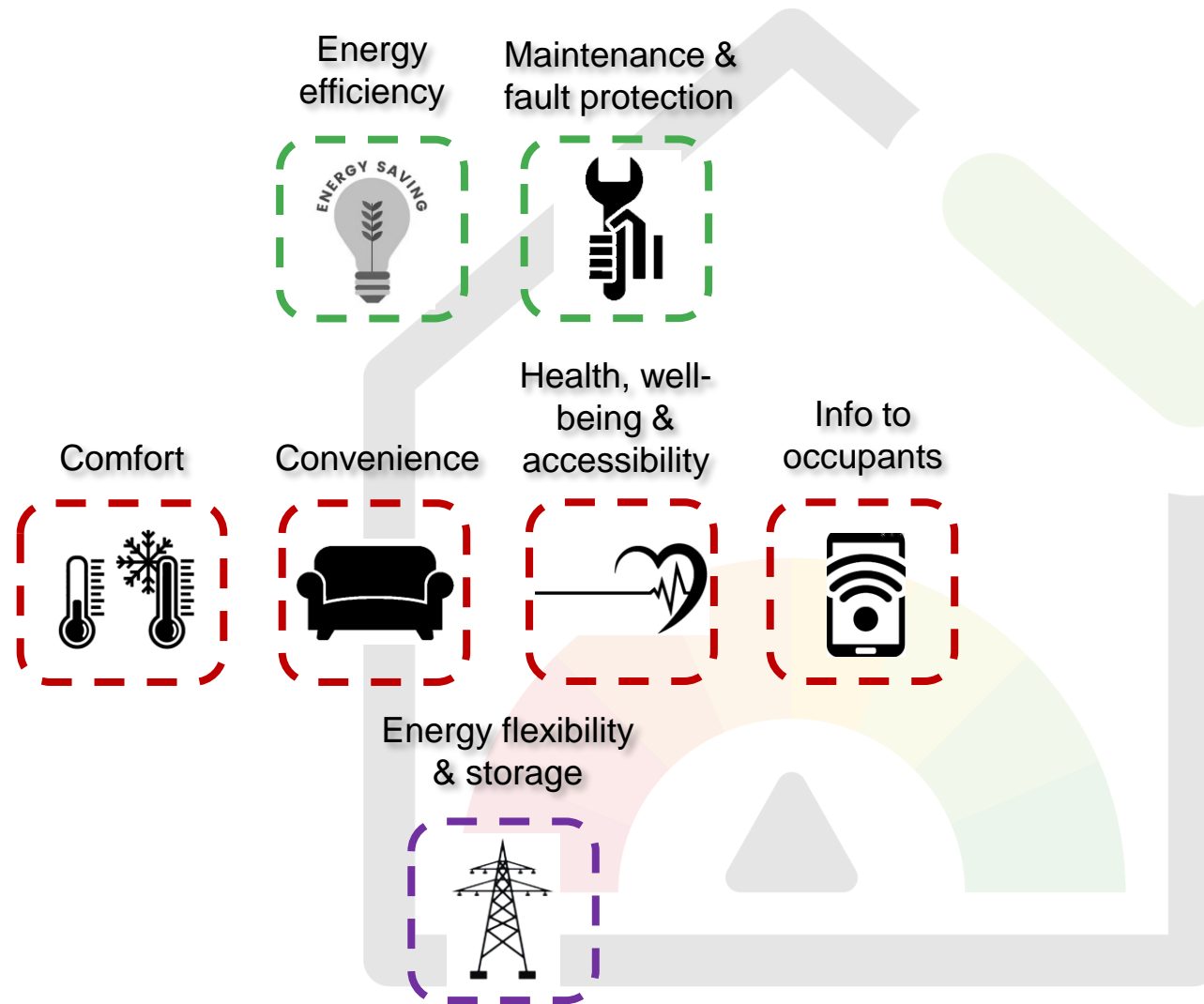
# SRI features



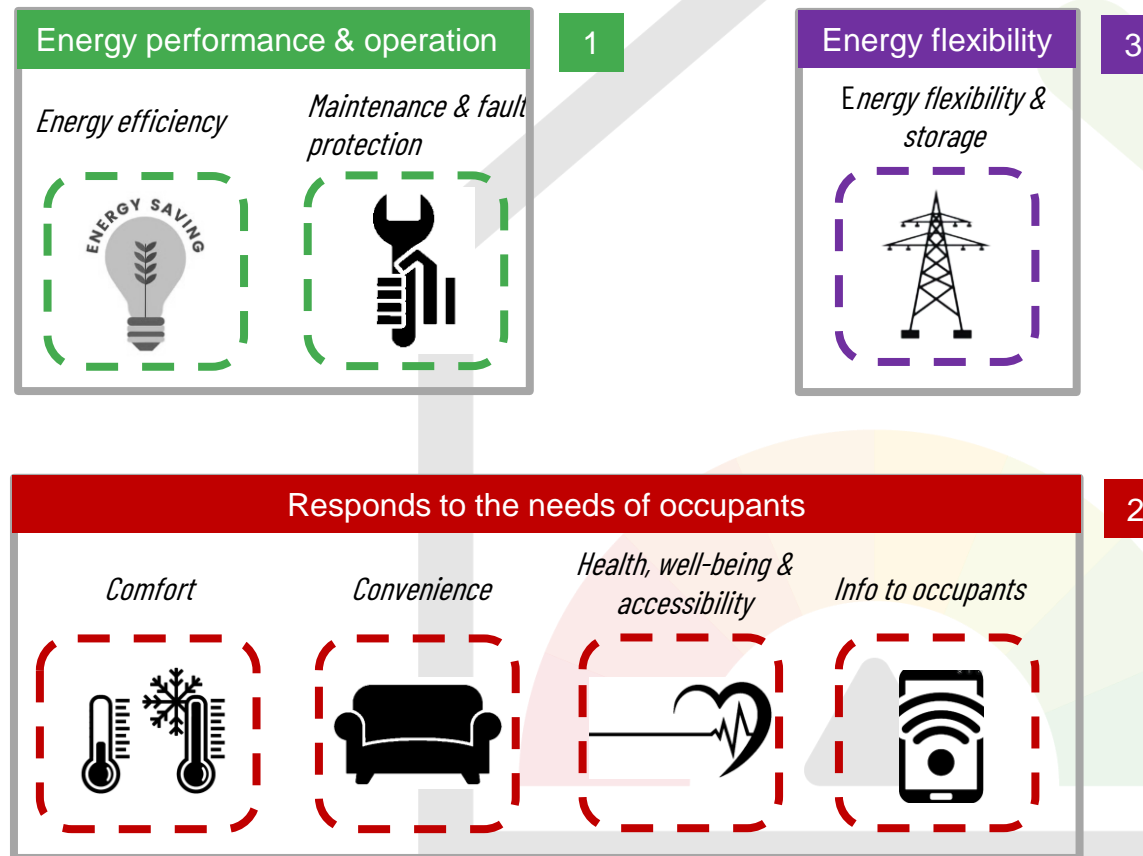
# Technical domains



# Impact criteria



# Key functionalities



# Smartness levels of services

Functionality levels of smart ready service A		Pre-defined scores (between 0-3) per smart ready service						
		Energy efficiency	Maintenance and fault protection	Comfort	Convenience	Health, well-being and accessibility	Information to occupants	Energy flexibility and storage
<b>Level 0</b>	Non-smart	[0-3]	[0-3]	[0-3]	[0-3]	[0-3]	[0-3]	[0-3]
<b>Level 1</b>	...	[0-3]	[0-3]	[0-3]	[0-3]	[0-3]	[0-3]	[0-3]
<b>Level 2</b>	...	[0-3]	[0-3]	[0-3]	[0-3]	[0-3]	[0-3]	[0-3]
<b>Level 3</b>	...	[0-3]	[0-3]	[0-3]	[0-3]	[0-3]	[0-3]	[0-3]
<b>Level 4</b>	Maximum smartness	[0-3]	[0-3]	[0-3]	[0-3]	[0-3]	[0-3]	[0-3]

e.g.,

Domain	Smart ready service	Functionality level 0	Functionality level 1	Functionality level 2	Functionality level 3	Functionality level 4
Heating	Heat emission control	No automatic control	Central automatic control	Individual room control	Individual room control with communication between controllers	Individual room control with communication and presence control

# Implementation pathways

- Linkage of the **SRI to the EPC** so that an SRI assessment is triggered each time an EPC is about to be issued
- Linkage of the SRI to the construction of **new buildings and major renovations**
- **Market-based voluntary scheme** based on self-assessment and supported by on-line tools and 3rd party certified bodies for **those willing to pay**
- **Market-based voluntary scheme** based on self-assessment and supported by on-line tools and 3rd party certified bodies **subsidised by the state/utilities** in the context of promoting flexibility, energy efficiency, self-generation, etc.
- Linkage to the **Building Automation and Control Systems (BACS) and Technical Building Systems (TBS) deployment**, drawing from Articles 8, 14 and 15 of the EPBD
  - Article 8 provisions the installation, upgrade, and replacement of TBS and measures to encourage the deployment of automatic temperature regulation and zoning
  - Articles 14 (heating inspections) and 15 (cooling inspections) require all **non-residential buildings** with equivalent rated capacity for heating/cooling > 290 kW to have BACS by 2025
- Linkage to the **roll-out of smart meters**
- **Mix of the above** based on subsidies, financial instruments, etc.

# Current landscape in Greece

Trigger points	Coverage rates (annually)	
	Residential sector	Tertiary sector
EPC assessment	~ 4.9%	~ 4.14%
Major renovations	~ 0.8%	~ 1%
New building construction	~ 1%	~ 0.9%
Smart meter installation	~ 3%	~ 3%
HVAC inspections	~ 2.7%	~ 5%

\*Data retrieved from Verbeke et al. (2020) and Buildingcert (2020).

# Main challenges

- Limited availability of open data (e.g., EPC inspections, etc.)
- Potential low credibility of the results, as inspectors may falsely fill the inspection sheet in order to improve the EPC class of a building (for instance, by indicating that there is a BACS in a building when it is actually absent or not working)
- Inadequate training of the inspectors
- Lack of financial motives and programmes to support a wide uptake of smart technologies
- Personal data to be handled - GDPR and cybersecurity issues raised

# Funding mechanisms

- **Exoikonomo Programme (2021-2030):**
  - Energy renovation of at least 105,000 homes by 2025
  - Officially in effect until the end of 2021
  - Supported by the National Recovery and Resilience Plan in a next round during the second half of 2022
  - Future support (planning period 2021-2027) from ERDF
- **“ELECTRA” (2020-2026):**
  - Renovation program for public buildings
  - Rolled out in 2022, managed by CRES
  - Total budget of €640 million covered by Deposits and Loans Fund
  - Leverage additional private funding reaching €1 billion
  - Eligible buildings: energy class C or lower - elevated to energy class B or even higher after the implementation of the renovation measures
- **Exoikonomo-Epixeiro Programme:**
  - Energy efficiency interventions in SMEs
  - Total budget of €200 million
  - Half allocated to the tourism sector - half to the commercial sector and services.
- **Infrastructure fund:**
  - Intended to both private and public sectors
  - Favourable financing terms for the implementation of small- and medium-sized projects, with an emphasis on energy, environment and urban development





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*Implementation Pathways*

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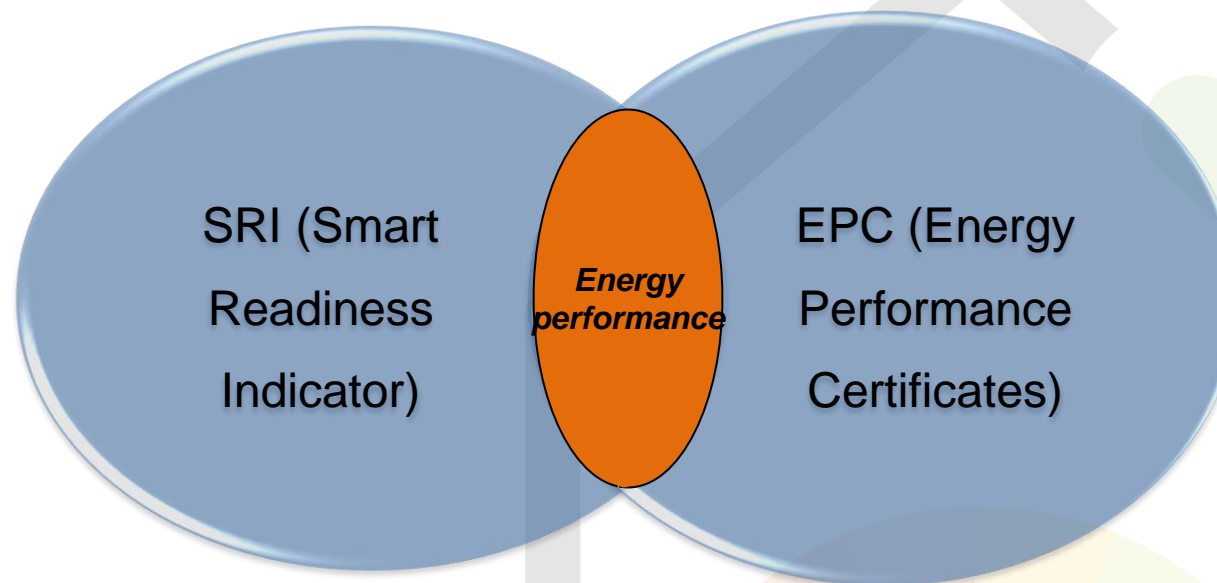
# Implementation pathways suggested by the EC

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- **Market-based voluntary scheme** based on self-assessment and supported by on-line tools and 3rd party certified bodies for **those willing to pay**
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- Linkage to the **roll-out of smart meters**
- **Mix of the above** based on subsidies, financial instruments, etc.

# SWOT Analysis

Implementation Pathways (IP)	Strengths	Weaknesses	Opportunities	Threats
Linkage to EPCs	Rapid deployment using existing EPC framework	Increased EPC assessment time, cost, and complexity	Rapid regulatory adjustments based on the EPCs' framework, available funding	Housing sector gaps due to increased monetary value of houses
Linkage to new buildings and major renovations	Motivation for the construction sector	Low coverage rate of new buildings' constructions and major renovations	Collaboration between different industries (e.g., construction, technology providers, energy sector, etc.)	Higher prices for new buildings
Voluntary market-based scheme	No additional regulatory costs, targeted information to the end-users through the online tools	Lower engagement compared to the other pathways partly due to the lack of financial motives	Market engagement	Low credibility due to self-assessments and no guaranteed certification
Voluntary subsidised market-based scheme	Same as IP3	Same as IP3 but with increased engagement	Same as IP3	Same as IP3
Linkage to BACS and TBS deployment	High uptake (reaching almost IP1), influence design of BACS	Additional cost on BACS installation	Additional certification of the HVAC systems through SRI	Lack of adequate certified SRI experts will slow down the BACS deployment as well
Linkage to smart meter deployment	Increased credibility and market value	Additional regulatory cost on smart meters' roll-out	Utilities engagement and thus greater uptake	Public perception against smart meters will affect the SRI

# Direction of the EC



**! EU suggests that SRI may be coupled with EPCs towards enhancing energy performance !**



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*SRI Methods*

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# SRI Methods

Area	Method A	Method B	Method C (customised)
<b>Service catalogue</b>	<ul style="list-style-type: none"> <li>› Simplified list of 27 services</li> </ul>	<ul style="list-style-type: none"> <li>› Full list of 54 services</li> </ul>	<ul style="list-style-type: none"> <li>› Self-reporting based on Building Automation &amp; Control Systems</li> </ul>
<b>Applicability</b>	<ul style="list-style-type: none"> <li>› Existing residential</li> <li>› Small non-residential (&lt; 500 m<sup>2</sup>)</li> </ul>	<ul style="list-style-type: none"> <li>› New residential</li> <li>› Non-residential</li> </ul>	<ul style="list-style-type: none"> <li>› Residential</li> <li>› Non-residential (restricted to occupied buildings)</li> </ul>
<b>Other</b>	<ul style="list-style-type: none"> <li>› Checklist approach</li> <li>› Assessment time &lt; 1 hour</li> <li>› Self-assessment possible OR involvement of expert (certification issuing)</li> </ul>	<ul style="list-style-type: none"> <li>› Checklist approach</li> <li>› Assessment time &lt; 1 day</li> <li>› Self-assessment possible OR involvement of expert (certification issuing)</li> </ul>	<ul style="list-style-type: none"> <li>› Data over a long period required</li> <li>› Detailed specifications not available yet</li> </ul>



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## Co-creation Workshop

*Technical domains*

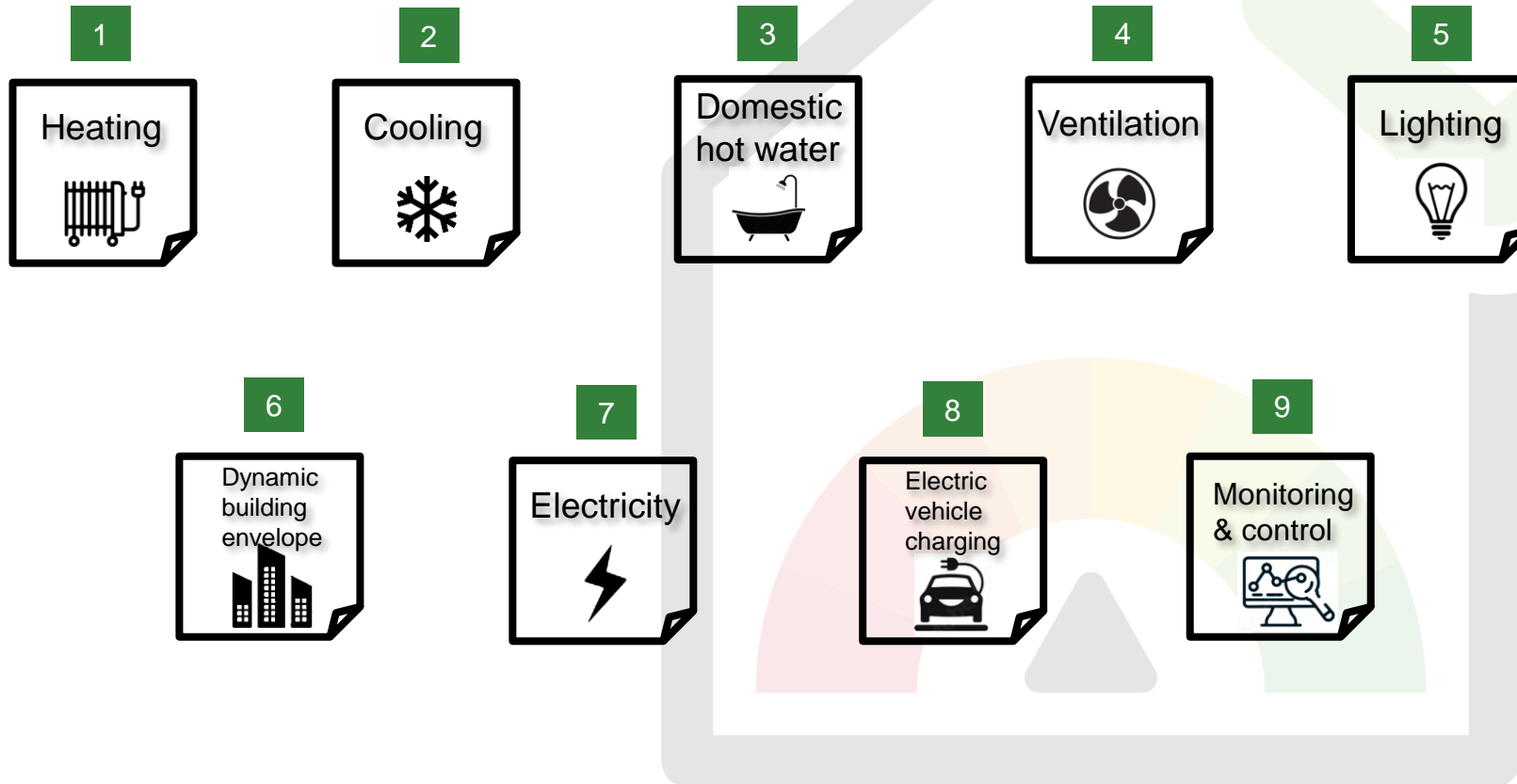
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# Technical domains





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## Co-creation Workshop

### *Weightings*

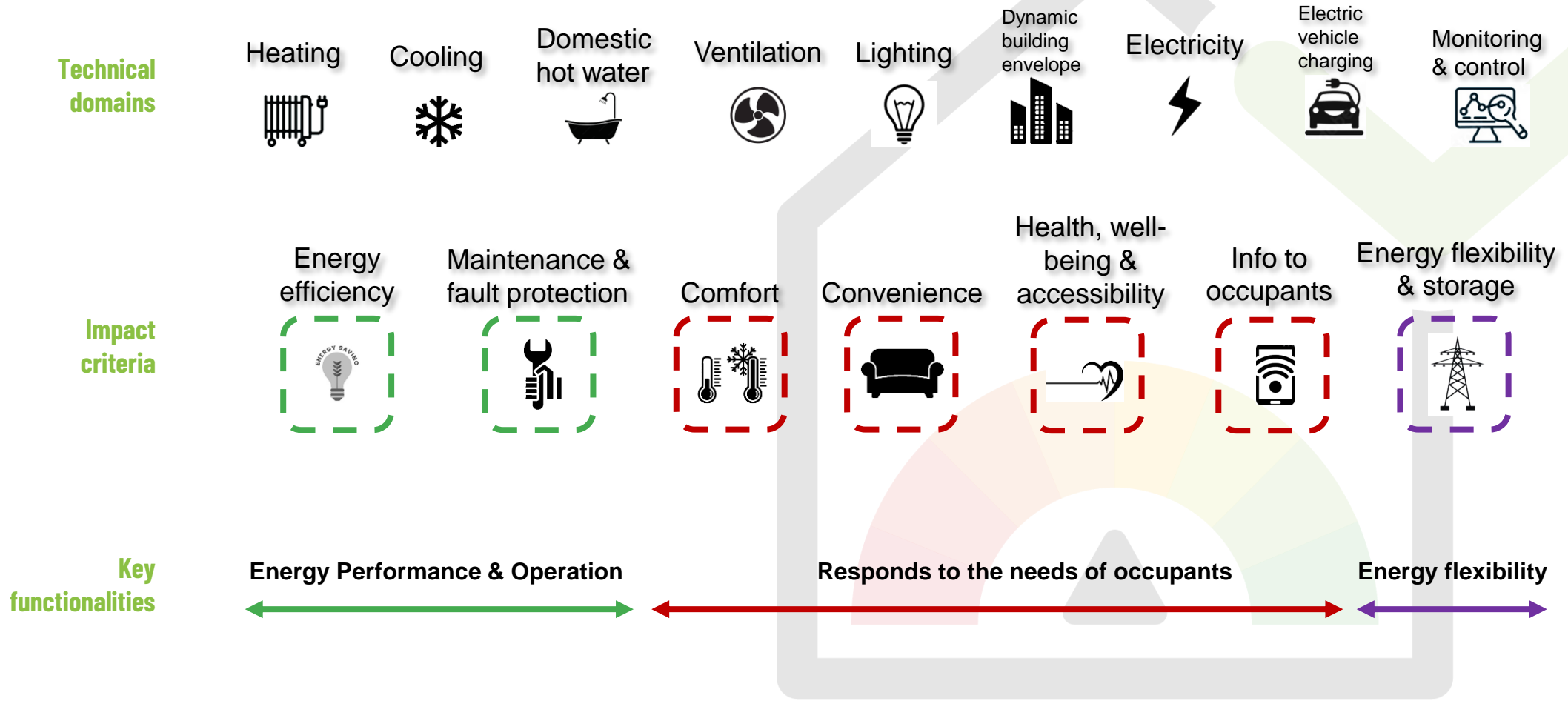
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# Overall



# Weighting Methods (1/2)

	<b>1/3</b>		<b>1/3</b>				<b>1/3</b>
<b>Key functionalities</b>	Energy performance & operation		Responds to the needs of occupants				Energy flexibility
	<b>1/2</b>	<b>1/2</b>	<b>1/4</b>	<b>1/4</b>	<b>1/4</b>	<b>1/4</b>	<b>1/1</b>
<b>Impact criteria</b>							
	Energy efficiency	Maintenance & fault protection	Comfort	Convenience	Health, well-being & accessibility	Info to occupants	Energy flexibility & storage

# Weighting Methods (2/2)

Key functionalities	Energy performance & operation		Responds to the needs of occupants				Energy flexibility
	Energy efficiency	Maintenance & fault protection	Comfort	Convenience	Health, well-being & accessibility	Info to occupants	Energy flexibility & storage
Heating	%	%	16%	10%	20%	11.4%	%
Cooling	%	%	16%	10%	20%	11.4%	%
Domestic Hot Water	%	%		10%		11.4%	%
Ventilation	%	%	16%	10%	20%	11.4%	%
Lighting	%	%	16%	10%	20%		%
Electricity	%	%		10%		11.4%	%
Dynamic Building Envelope	5%	5%	16%	10%	20%	11.4%	
Electric Vehicle Charging				10%		11.4%	5%
Monitoring & Control	20%	20%	20%	20%		20%	20%
Sum of weights	100%	100%	100%	100%	100%	100%	100%

Step 1:  
Fixed weights

Step 2:  
Equal weights

Step 3:  
Energy balance  
(depending on climate zone & type of building)

Climate zones	Countries
Northern Europe	Finland, <b>Sweden</b> , Denmark
Western Europe	UK, Ireland, <b>Germany</b> , Austria, France, Belgium, Luxembourg, The Netherlands
Southern Europe	Portugal, Spain, Cyprus, Malta, <b>Italy</b> , Greece
North-Eastern Europe	Estonia, Latvia, Lithuania, <b>Poland</b> , Slovakia, Czech Republic
South-Eastern Europe	Slovenia, Croatia, Hungary, Bulgaria, <b>Romania</b>

## 5 climate zones

(Northern Europe, Western Europe, Southern Europe, North-Eastern Europe, South-Eastern Europe)



## 6 building types

(single-family houses, small multi-family houses, large multi-family buildings, offices, wholesale and retail buildings, and educational buildings)



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## Co-creation Workshop

*EU Initiatives*

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# Common EU Initiatives

EU initiatives	Brief description	Level of implementation	Maturity	Relevance to the SRI
EPC	Energy performance rating and recommendations for cost-effective improvements	Member State level	High	Feed-in: Data from EPCs could be used to feed the SRI “energy balance” weighting method  Complementary: Inspection site visits for EPC issuing purposes could be combined with joint SRI assessments
Level(s)	Voluntary tool oriented to private sector actors that wish to demonstrate the environmental performance of their buildings	Member State level	Low	Complementary: SRI could offer further insights on the building performance that are also related to several environmental impacts
Building Renovation Passport (BRP)	Document outlining a long-term (up to 15 or 20 years) step-by-step renovation roadmap for a specific building	Member State/Regional level	Low	Complementary: SRI could be integrated as an extra component to the BRP
Building Information Modelling (BIM)	Digital tool aimed at the construction industry, providing a digital representation of a building’s characteristics in its whole life cycle	Private enterprises	High	Complementary: BIM framework entails site visits for inspecting the buildings and extracting data, which could be also used for the SRI
Broadband-ready level	Level of physical infrastructure that enables high-speed internet access	Member State level	Low	Complementary: A building’s internet connectivity constitutes a precursor to many smart-ready technologies and thus could be linked to the SRI
Digital Building Logbooks (DBL)	Simple summary of a new or refurbished building describing how it is envisaged to be maintained and serviced	Member State level	Low	Complementary: SRI could be integrated as an extra component to the DBL



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*Financial mechanisms*

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