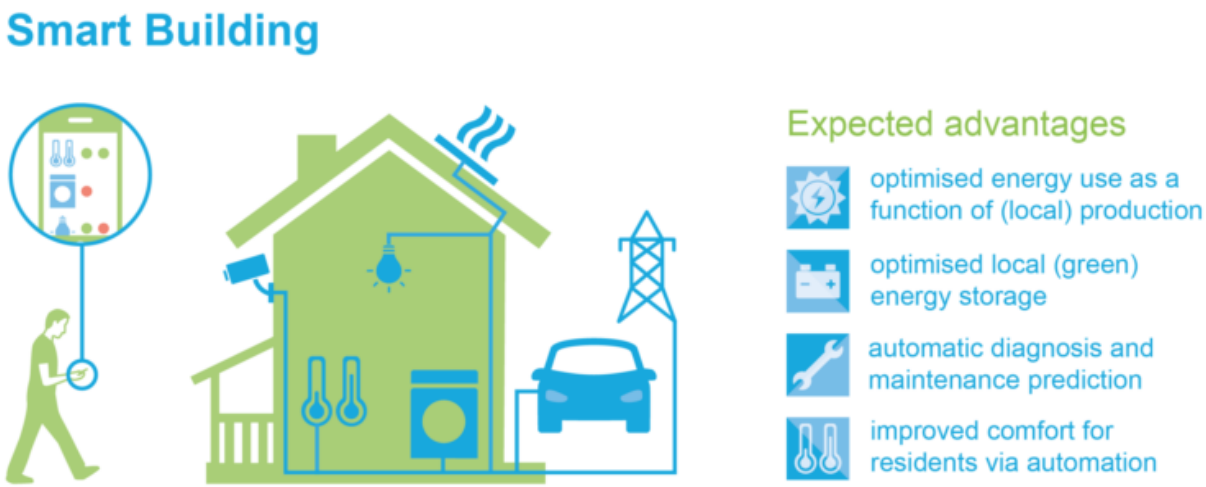
DEVELOPING A SMART READINESS INDICATOR FOR BUILDINGS

Progress update on Technical study "Support for setting up a Smart Readiness Indicator for buildings and related impact assessment" by VITO, Waide Strategic Efficiency, Ecofys and OFFIS, 12 December 2017

This document summarizes the first steps of a technical study commissioned and supervised by the European Commission services (DG ENERGY) towards the development of a smart readiness indicator for buildings[1] [2]. The smart readiness indicator is a policy initiative by the European Commission submitted as part of the proposal to amend the Energy Performance of Buildings Directive[3], currently being discussed by the European Parliament and the Council. This technical study explores the potential characteristics of the indicator via a transparent, open and interactive process, with the objective to support and inform the policy making process.

MOTIVATION - SMART BUILDINGS



There is a clear need to accelerate and finance building renovation investments and leverage smart, energy-efficient technologies in the building sector. Smart buildings integrate cutting edge ICT-based solutions for energy efficiency and energy flexibility as part of their daily operation. Such smart capabilities can effectively assist in creating healthier and more comfortable buildings with lower energy consumption and carbon impact. Smart buildings have also been identified and acknowledged as the key enablers of future energy systems for which there will be a larger share of renewables, distributed supply and energy flexibility on the demand side.

CONCEPT - SMART READINESS INDICATOR

[1] See https://smartreadinessindicator.eu for further information on the study.
[2] This summary is based on the draft interim report of the study. The reader is invited to refer to the latter for more information.
[3] COM(2016) 765 final, 30 November 2016. https://ec.europa.eu/energy/sites/ener/files/documents/1_en_act_part1_v10.pdf

The ‘Smart Readiness Indicator’ (SRI) aims at making the added value of building smartness more tangible for building users, owners and tenants. The indicator is an informative tool, which objective is to raise awareness about the benefits of smart technologies and ICT in buildings, in particular from an energy perspective. The indicator can also improve policy linkages between energy, buildings and other policy segments, in particular in the ICT area, and thereby contribute to the integration of the buildings sector into future energy systems and markets.

Smartness refers to the capability of a building or its systems to sense, interpret, communicate and actively respond in an efficient manner to the changing conditions, which are introduced by demands of the building occupant, the operation of technical building systems or the external environment (including energy grids).

A SRI for buildings shall provide information on the technological readiness of buildings to interact with their occupants and the energy grids, and their capabilities for more efficient operation and maintenance through ICT technologies.

METHODOLOGY FOR A SRI

During the first stage of this study, the concept and scope of smart services was investigated and a broad catalogue of smart services was created for potential consideration in the smart readiness indicator. The catalogue is compiled in a hierarchical structure, categorising about 100 services and sub-services in 10 domains: Heating, Cooling, Domestic Hot Water, Mechanical Ventilation, Lighting, Dynamic Building Envelope, On-site Renewable Energy Generation, Demand Side Management, Electric Vehicle Charging, Monitoring and Control. For each of the services, various functionality levels were defined and their impacts have been indicatively assessed according to 8 criteria (energy savings on site, flexibility for the energy grid and storage, self-generation of energy, comfort, convenience, health, maintenance and fault prediction as well as information provided to the occupant), on a 7-level scale.

Based on this catalogue of smart services, the second phase of the study consists of investigating a prospective calculation methodology for the indicator. An initial assessment of building user expectations has orientated the approach towards one that results in a simple, expressive and easy to grasp indicator which conveys transparent and tangible information.

The SRI methodology and scoring system is currently being developed, in accordance with the following guiding principles:

- The methodology aims to create a technology-neutral level playing field for market actors through the definition of functional capability rather than the prescription of certain technological solutions.
- The methodology balances the desire for a sufficiently detailed assessment with the desire to limit the time and cost requirements of assessing the smartness of a building.
- A multi-criteria assessment method allows for the incorporation of multiple distinct domains (e.g. both heating services as well as electric vehicle charging capabilities) and multiple distinct impact categories (e.g. energy efficiency, energy flexibility and provision of information to occupants).
- The SRI methodology should be modular and flexible so it can adapt to relevant contextual factors, which include variations by building type, climate, culture and the collective impact these have on the demand for certain services.

The envisioned SRI methodology consists of a multicriteria assessment in which the impact scores of individual services are aggregated and potentially weighted to result in an overall single score assessment. It further allows this to be optionally complemented by more domains, services or impact specific indicators. Some services of the initial catalogue have been streamlined to ensure a cost-effective assessment process.

NEXT STEPS

During the 21 December meeting, the detailed progress of the study will be shared and discussed. Stakeholders are invited to share their feedback as well as provide further background information and relevant data on smart services and their expected impacts, uptake and upcoming standardisation efforts. A next iteration of the envisioned SRI methodology will be proposed in the first half of 2018, alongside an EU-level detailed impact assessment.

SRI - CALCULATION METHODOLOGY

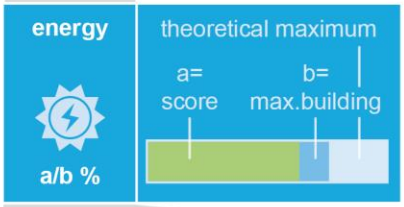
ONE SINGLE SCORE CLASSIFIES THE BUILDING'S SMART READINESS

SRI

total score is based on average of total scores on 8 impact criteria

8 IMPACT CRITERIA

energy	flexibility	self-generation	comfort	con-venience	health	tech. follow-up	info to occupant
80%	60%	40%	90%	90%	70%	60%	80%

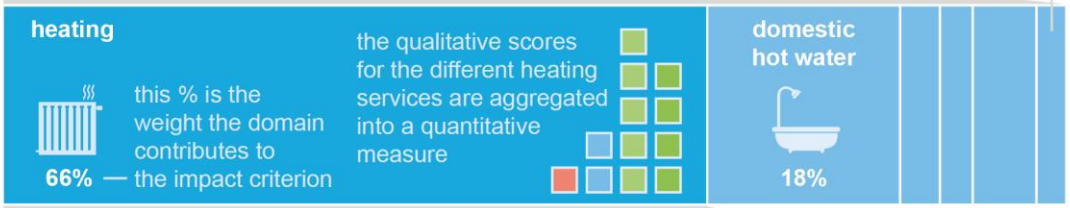


an impact criterion score is expressed as a % of the maximum score that is achievable for the building type that is evaluated

not every domain is considered to be relevant for each impact criterion

an impact criterion is the weighted average of 10 domain scores

10 DOMAINS



a domain score is based on the qualitative evaluation of the implemented services on the impact criterion considered

EACH DOMAIN COVERS A SET OF SERVICES

heating serv. A	heating serv. B	heating serv. C	heating serv. D	heating serv. E	heating serv. F
heating serv. G	heating serv. H	heating serv. I	heating serv. J	heating serv. K	heating serv. L

the qualitative evaluation depends on the service's functionality level

QUALITATIVE IMPACT OF A SERVICE ON ALL IMPACT CRITERIA

for each service several functionality levels are definied

the higher the functionality level, the higher it's expected contribution to an impact criterion