



# How do we assess smart readiness of the building?

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## Introduction

As one of major sector that consumes up to 40% of global energy demand and responsible for 30% of global annual green-house gas emissions [1], the buildings sector is one of the main unit that is prioritized in efforts to make EU to become climate friendly and less energy consuming. In order to actualize this target, carbon emission by buildings sectors must be substantially reduced by around 90% in 2050 [2]. Therefore, the European building stocks are transforming from unresponsive and highly-energy-demanding into smart buildings that is more efficient, decentralized, consumer-focused and powered by renewable energy to ensure that buildings are decarbonized. As an action to achieve this intention, the commission introduced a smartness indicator in the amended Directive 2010/31/EU to prepare the buildings stocks to become smart-ready buildings, which not only have a high performance but also can integrate with smart grids and utilize electricity from renewable resources to achieve carbon neutral society by 2050 [3], [4].

The EU Commission argues the adaptation of this indicator could raise the awareness amongst building owners and occupants of the value behind building automation and electronic monitoring of technical building systems. Besides, these new enhanced-functionalities, which is part of the features of a smart building, will give confidence to the occupant about the actual savings achieved [3]. Furthermore, several literatures explain that smart buildings are able to improve occupant comfort, performance or quality of life whether by providing flexible and convenient working environment [5]–[8] or by facilitating access in conducting daily activities [9]. Nevertheless, the amended Directive did not give a clear definition either for smartness indicator or smart-ready building that can be further used as a reference in preparing the building stock to be a smart-ready one.

## Research Objectives

- Gain understanding and formulate the possible features of smart buildings that can be used to compare the smart readiness level of the building.
- Indicate the smart readiness level of several types of typical Dutch residential building according to the identified features as an initial action to prepare the Dutch houses towards smart and decarbonized houses.

## Research Questions

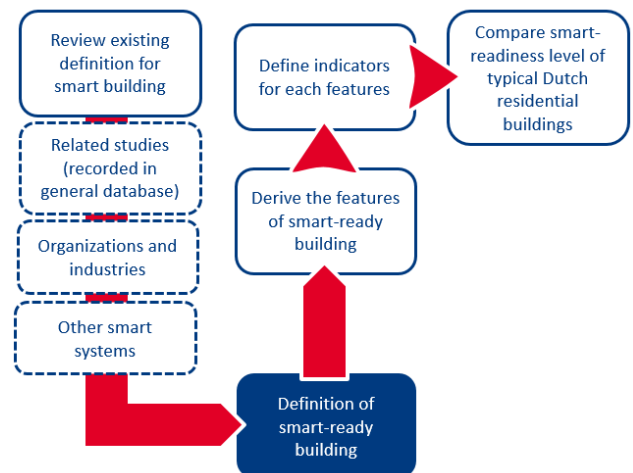
*Main question:*

How can we indicate the smart readiness of typical Dutch residential buildings?

*Sub-questions:*

- How can we define smart-ready building?
- According to the proposed definition, what kind of building-related features that can represent a smart-ready building?
- Based on the proposed features, what are the indicators for each features that can be used to identify the smart readiness level of the building?

## Methodology



## References

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