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TIMEPAC 

# SRI Demo

Implementing the SRI in the national context – findings from research projects supporting the Austrian SRI testing phase

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Dieses Projekt wird aus Mitteln des Klima- und  
Energiefonds gefördert und im Rahmen des Programms  
„Leuchttürme für resiliente Städte 2040“ durchgeführt.

# Context

## The Energy Performance of Buildings Directive (EPBD)

The upcoming **recast** of the EPBD foresees the implementation of a Smart Readiness Indicator (SRI) for **non-residential buildings** with an effective rated output for heating systems of over **290 kW**.

The SRI has been first introduced in the **2018 revision of the EPBD**, and a **methodology for the assessment of the SRI** has subsequently been proposed by a study commissioned by the European Commission.

The European Member states can now, within a five-year phase, **test the implementation of the SRI**.

**Austria is one of the first countries** entering into such a testing phase.

# Context

## The European and National Building Regulations



# Context

## The Smart Readiness Indicator

*“...The smart readiness indicator should be used to measure the capacity of buildings to use information and communication technologies and electronic systems to **adapt the operation of buildings to the needs of the occupants and the grid and to improve the energy efficiency and overall performance of buildings.** 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...”*

Directive (EU) 2018/844 of the European Parliament and of the Council of 30 May 2018 Amending Directive 2010/31/EU on the Energy Performance of Buildings Directive 2012/27/EU on Energy Efficiency; L156/75; Official Journal of the European Union: Brussels, Belgium, 2018.

# How can the SRI be assessed?

## Analysis and comparison of different SRI calculation methodologies

Do the different methods provide **comparable results**?

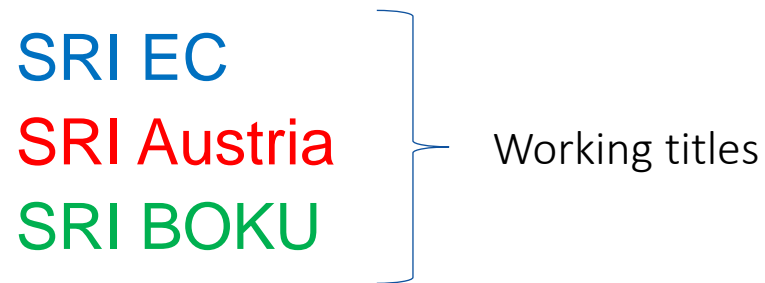
Can **energy efficiency and CO<sub>2</sub> emissions** be mapped?

How much effort is required to **collect the data for the methods**?

How do **qualitative and quantitative** methods differ?

# SRI Methodologies

## Comparison of three methodologies



Difference in a **purely qualitative** approach (**SRI EC**)

or a **mix** of qualitative and quantitative approach (**SRI Austria**)

or a **purely quantitative** (**SRI BOKU**) approach.

Comparison of key parameters in the three methodologies

Parameter	SRI EC	SRI Austria	SRI BOKU
Storage	x	x	x
Load	x	x	-
Total energy demand	-	-	-
Grid interaction	-	x	x
Heating	x	x	x
Cooling	x	x	x
Ventilation	x	x	x
Hot water	x	x	x
On-site energy generation	x	x	x
Dynamic building skin	x	x	x
Monitoring and Building Management System (BMS)	x	x	x
User Integration	-	x	-

# SRI Methodologies

## Case Studies

Key data of  
prototypical case  
studies used for  
comparative  
assessment

	Building 1	Building 2	Building 3	Building 4	Building 5	Building 6	Building 7
<b>Building type</b>	office	residential	office	university / office	multi-family residential	multi-family residential	multi-family residential
<b>Year of construction</b>	2012	2004	2008	2020	2017	refurbished 2017	refurbished 2017
<b>Gross floor area [m<sup>2</sup>]</b>	8820	417	9430	4080	743-1080	227	665
<b>Building system</b>	GWHP, DH	biomass boiler	GWHP	district heating, chiller	microgrid, local heating network, BM	microgrid, local heating network, BM	microgrid, local heating network, BM
<b>Heating</b>	TAS, underfloor heating	TAS	TAS	TAS	LTSH	radiators	radiators
<b>Hot water</b>	electrical water heater	solar thermal, biomass	electrical water heater	electrical water heater	LHN, E- storage in summer	LHN, E-storage in summer	LHN, E-storage in summer
<b>On-site energy generation</b>	PV on roof and facade, 2 small scale wind turbines	PV on roof and facade, solar thermal	PV on roof and facade, solar thermal	-	PV on roof	PV on roof	PV on roof
<b>Storage</b>	-	thermal storage	thermal storage	3000l heating storage	electrical in local grid	electrical in local grid	electrical in local grid
<b>BMS</b>	yes	-	Yes	yes	yes	yes	yes

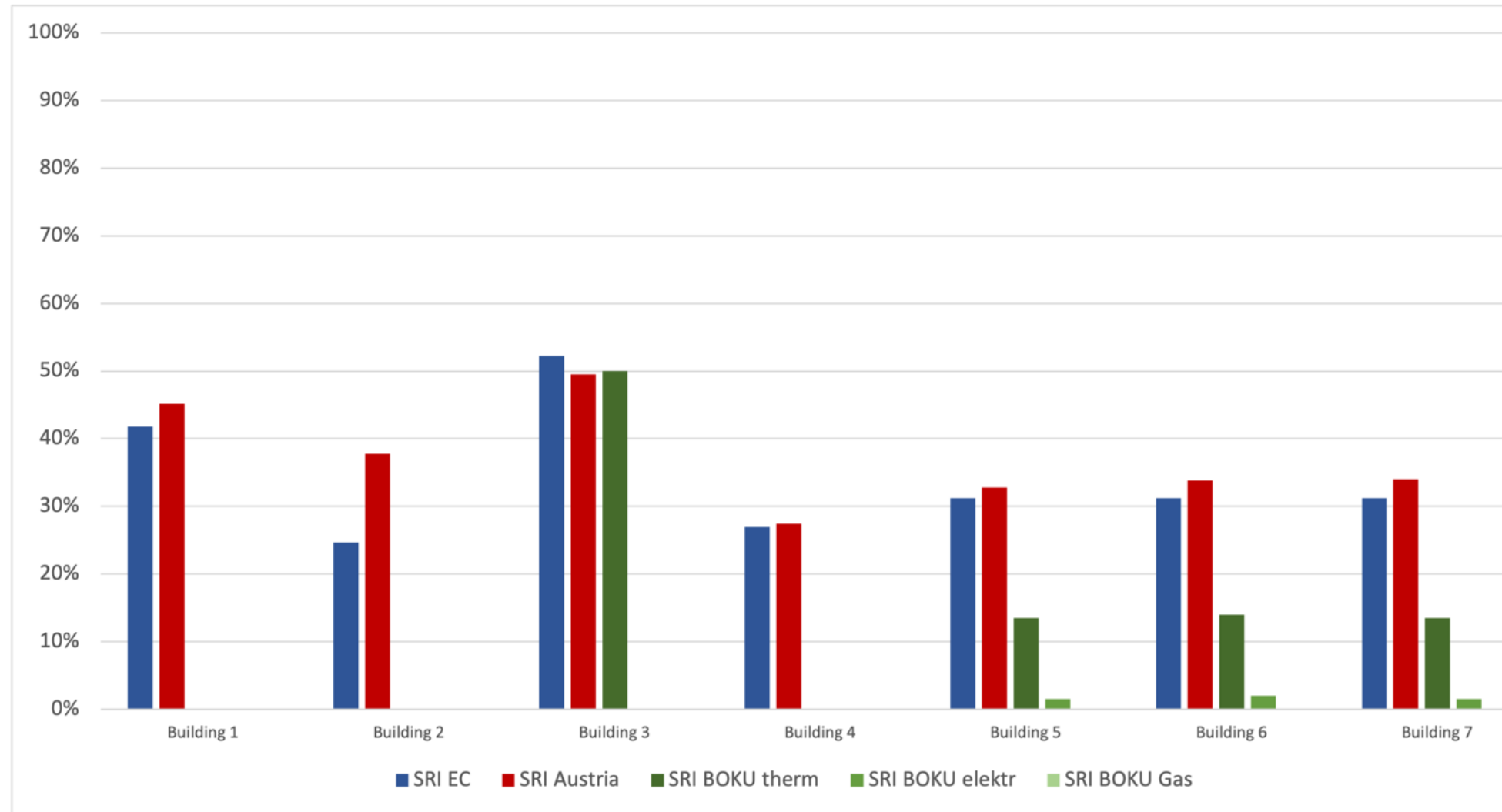


# SRI Methodologies

## Results

SRI results for the applied methodologies from the prototypical case studies

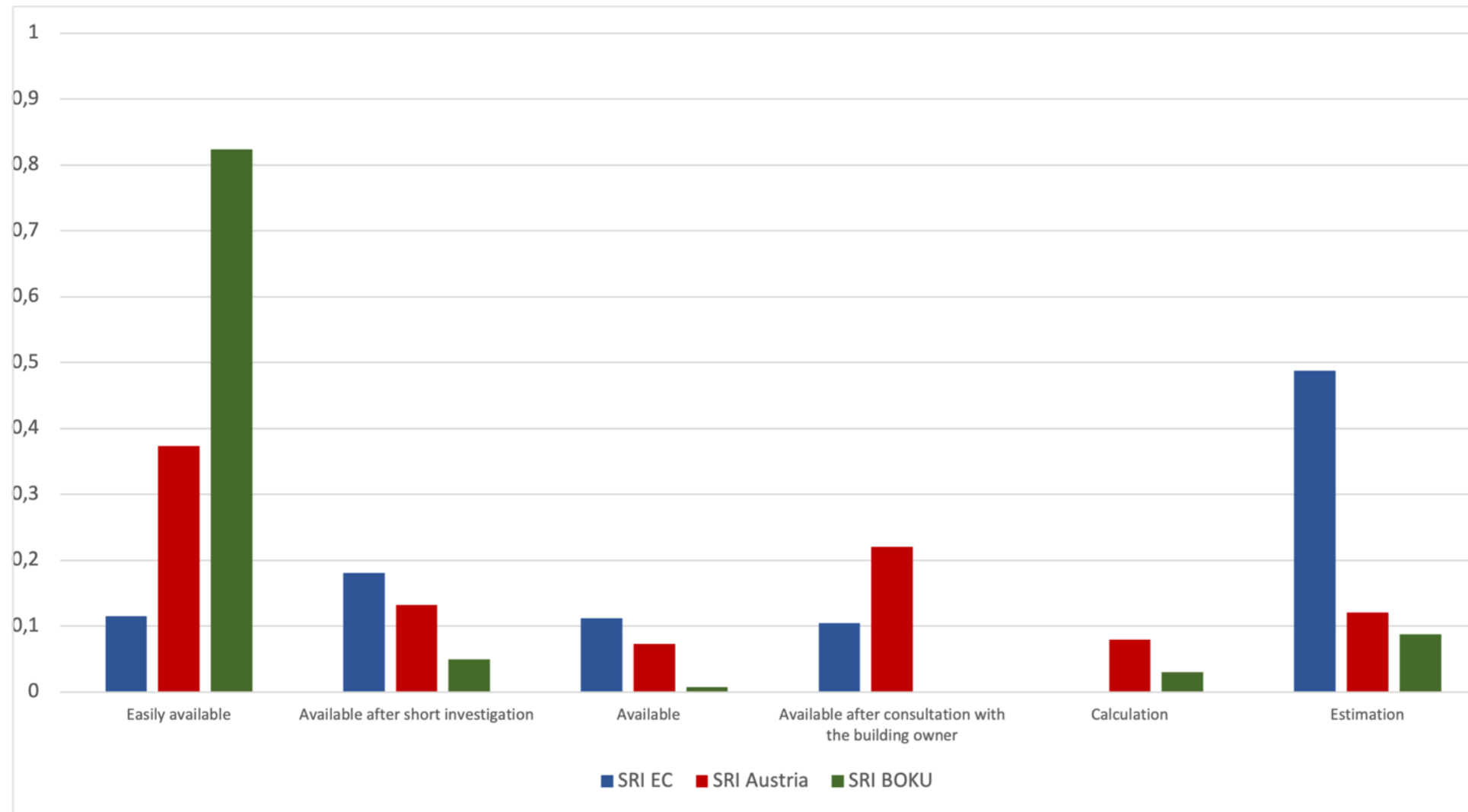
Results have been normalized towards a 100% range for comparability



# SRI Methodologies

## Results

Comparison of ease of data acquisition between the three methodologies



# SRI Methodologies

## Conclusions

A **qualitative (subjective) approach** leads to a **series of assumptions** and thus different results by different users.

A purely objective and data-driven approach can be limited in terms of a very comprehensive result. The results will highly depend on the **quality and availability of the data** at the time of the assessment (e.g. at the design stage).

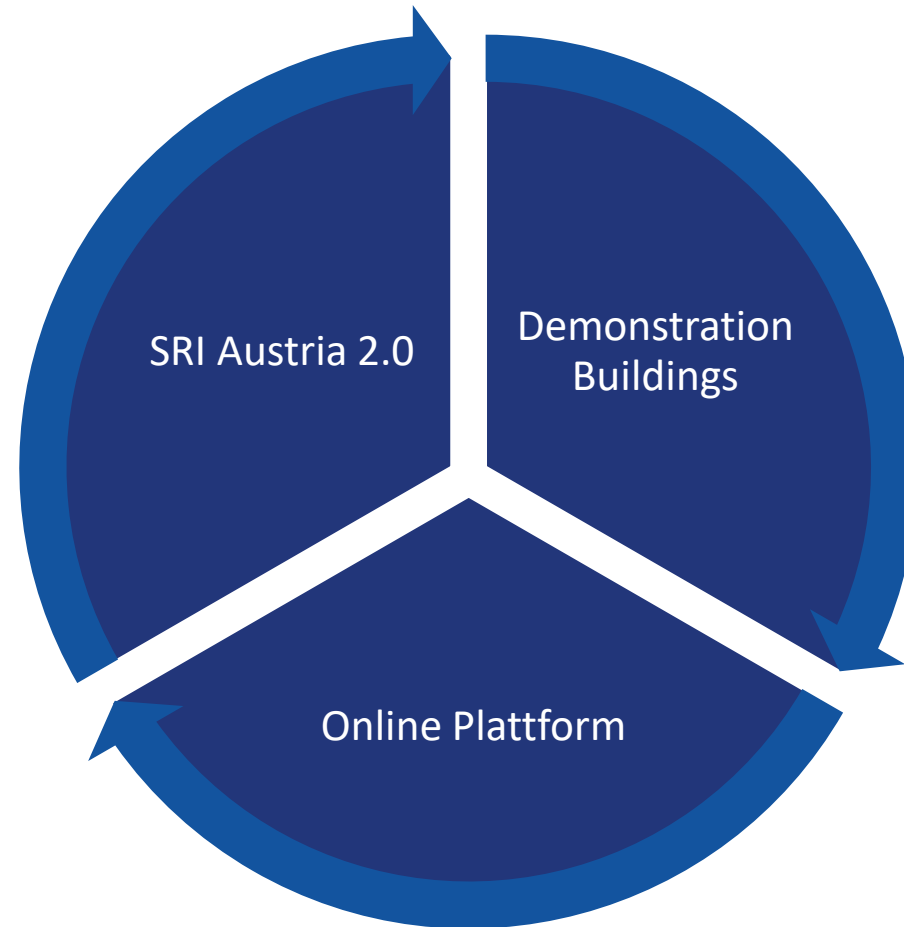
The **time and data-availability factor** needs to be taken into account.

**More case-studies** need to be analysed to draw more comprehensive conclusions.

There is **no “best” methodology**, as it depends on what the key driver should be...

Results first published in ISEC 2022 conference.

# Next Steps for SRI Test Phase in Austria



\* All names are provisional working titles and only represent the process

# Methodological Approach

## SRI Austria 2.0

SRI  
Equipment

qualitative

SRI  
Flexibility

quantitative

\* All names are provisional working titles and only represent the process

# SRI Equipment

## SRI Austria 2.0

SRI  
Equipment

qualitative

SRI  
Flexibility

quantitative

\* All names are provisional working titles and only represent the process

# SRI Equipment



\* All names are provisional working titles and only represent the process

# SRI Flexibility

## SRI Austria 2.0

SRI  
Equipment

qualitative

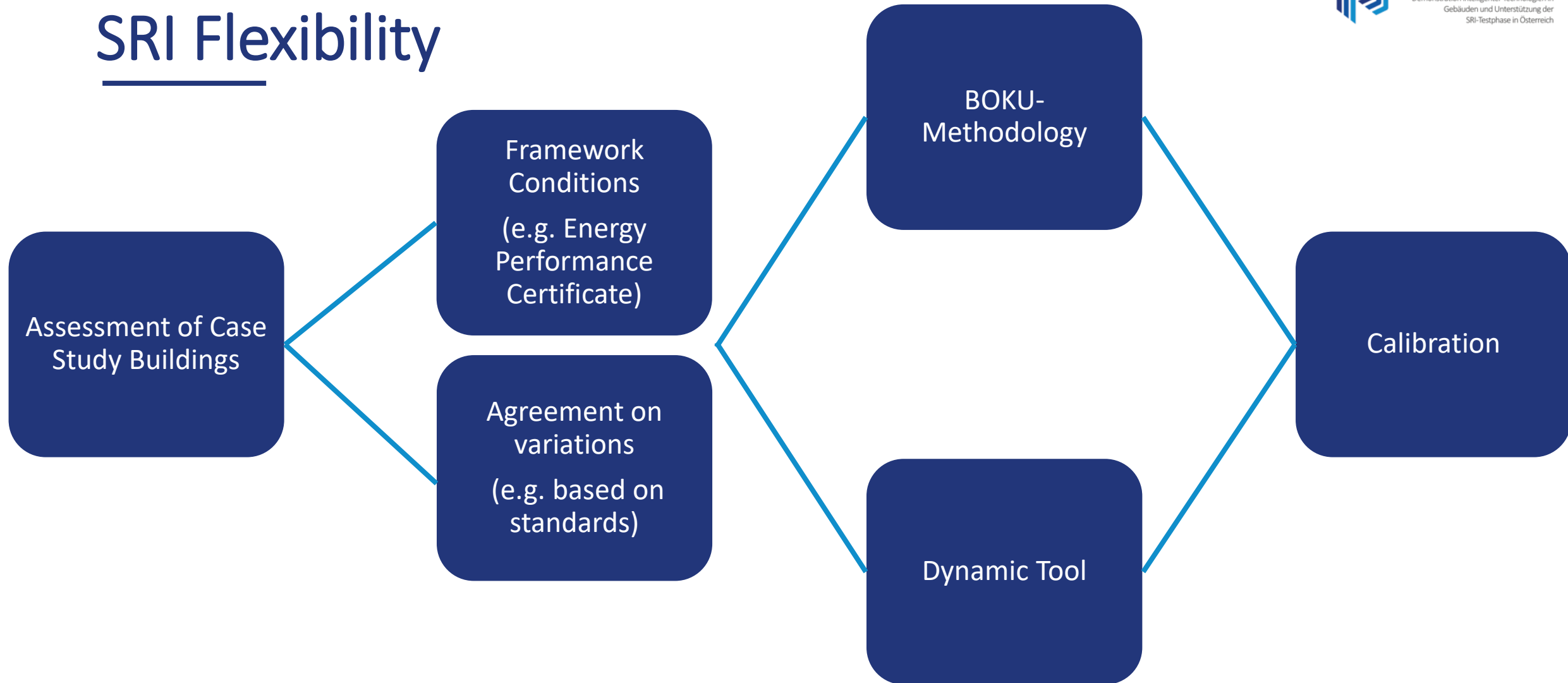
SRI  
Flexibility

quantitative

\* Alle Benennungen sind vorläufige Arbeitstitel und stellen nur den Prozess dar



# SRI Flexibility



# Open Questions

Is a simple quantitative method sufficient or do we need a dynamic calculation to make qualified statements?

# Results: Variation 1

## SRI Austria 2.0

SRI  
Equipment

qualitative

SRI  
Flexibility

quantitative

Aggregated Results

## Results: Variation 2

### SRI Austria 2.0

SRI  
Equipment

qualitative

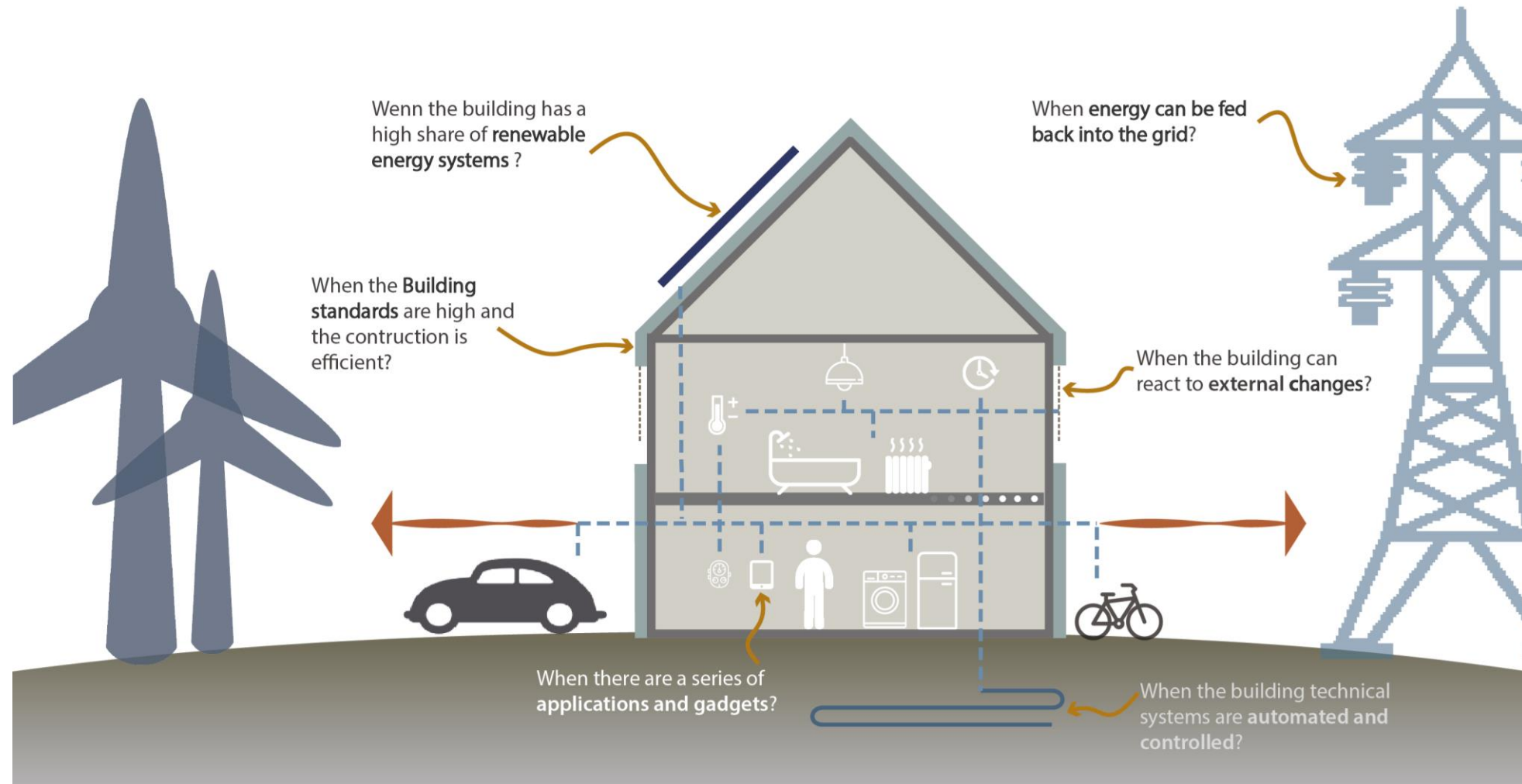
SRI Result Equipment

SRI  
Flexibility

quantitative

SRI Result Flexibility

# When is a building *smart*?



# Outlook

## Next steps in the Austrian context

Elaboration and consolidation of the **quantitative calculations**.

Analysing the methodologies **based on the case study buildings** (demonstration objects).

**Synthesis** of the results.

**Recommendation for implementation** in Austria

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