ESBE – Enhanced Sustainability of Built Environment by Collaboration and Digitalization

Tiekartta – keinot kestävään vihreään kasvuun yhteistyöllä ja digitalisaatiolla

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ESBE

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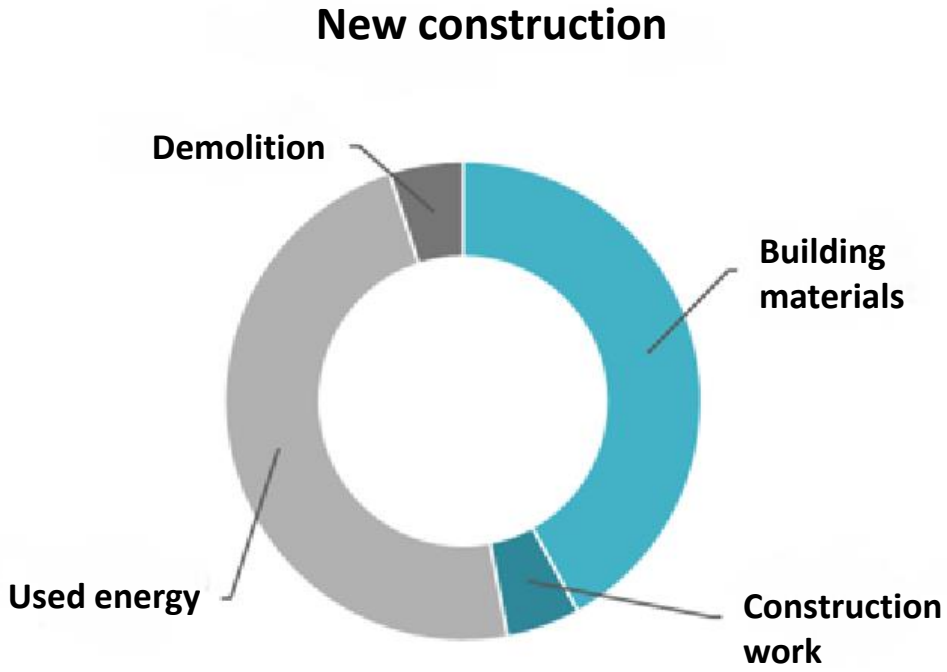
Distribution of emissions during the life cycle of a building



Most of the carbon footprint and life-cycle cost of living consists of energy use during use.

Kuha, R. 2022. s.12, Jäätvuori ym. 2021, s.11

How can this energy efficiency be achieved most easily and cheaply?

Ventilation heat recovery 0-45% -> 70%

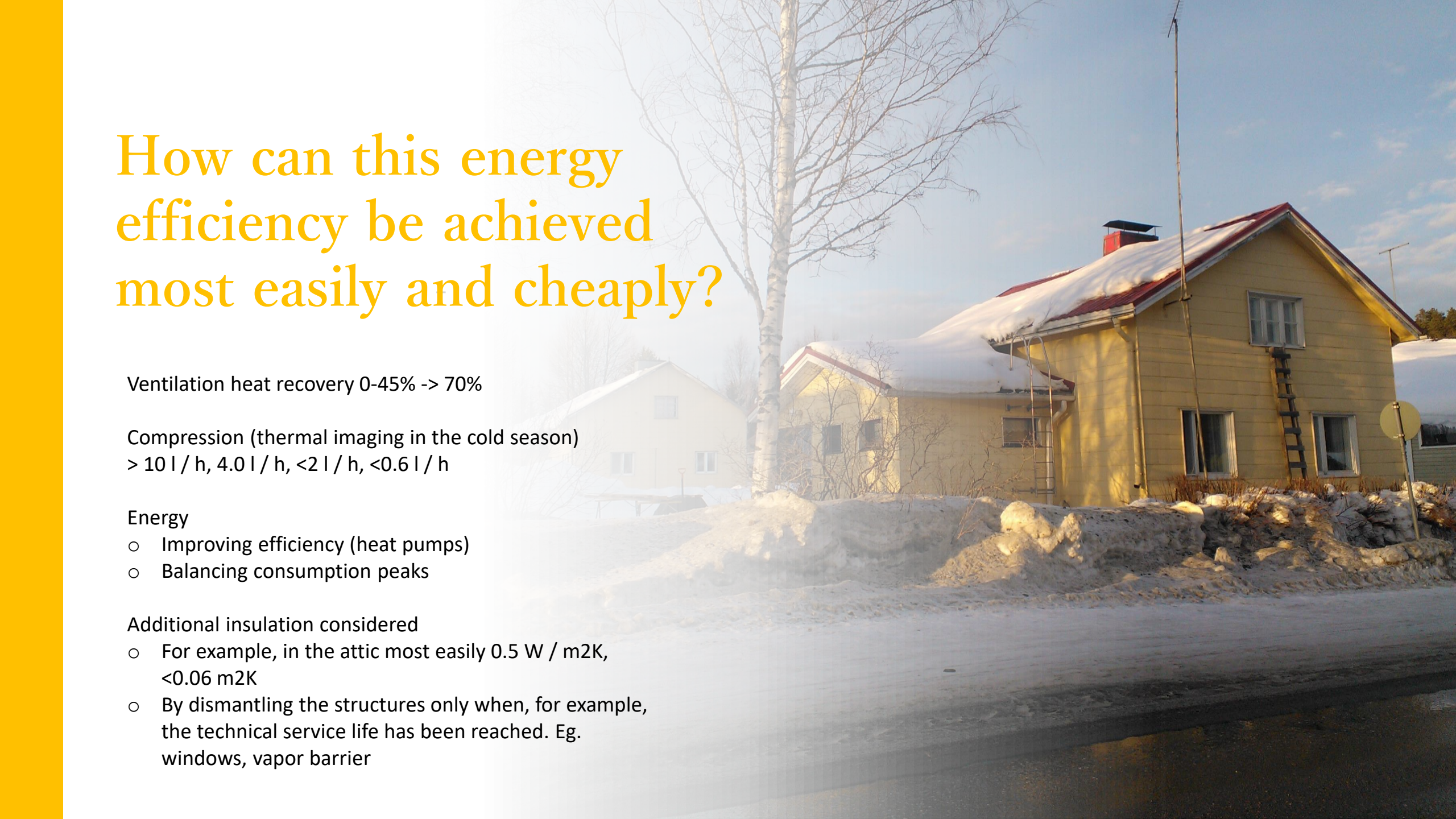
Compression (thermal imaging in the cold season)
> 10 l / h, 4.0 l / h, <2 l / h, <0.6 l / h

Energy

- Improving efficiency (heat pumps)
- Balancing consumption peaks

Additional insulation considered

- For example, in the attic most easily 0.5 W / m2K, <0.06 m2K
- By dismantling the structures only when, for example, the technical service life has been reached. Eg. windows, vapor barrier



Reducing energy use electricity / heat / cooling

Renewal of lighting
Heating method

Energy quality
- Production efficiency
- Ecology of production (renewable / fossil incineration)

Balancing consumption peaks

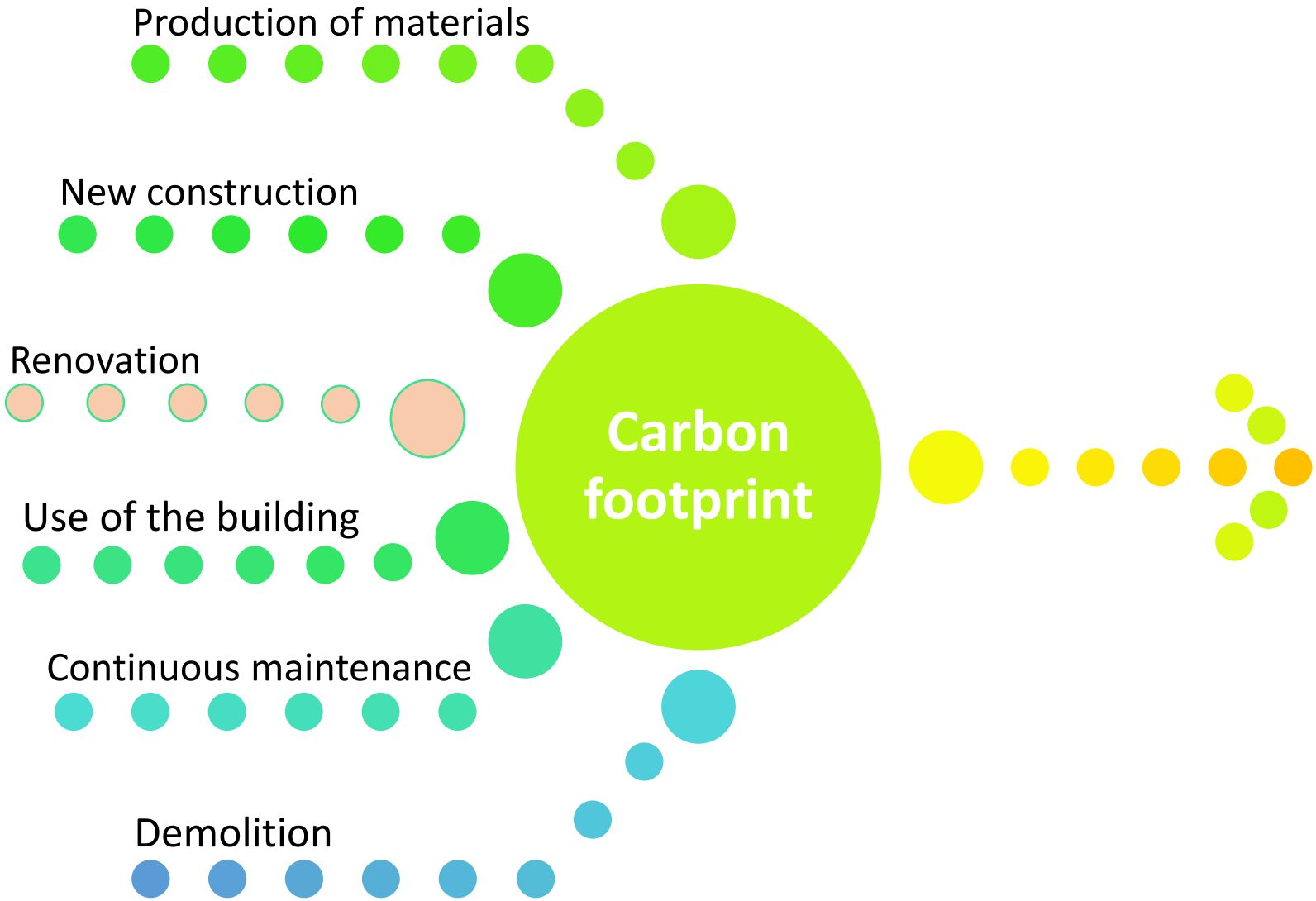
Pending:
- Heat recovery from wastewater
- Energy storage
  - Thermal batteries
  - Electric batteries

Payback periods

Heat pump technology
- Air
- Geo / water bodies
- Exhaust air
- Sewage
- Waste heat from freezing / cooling

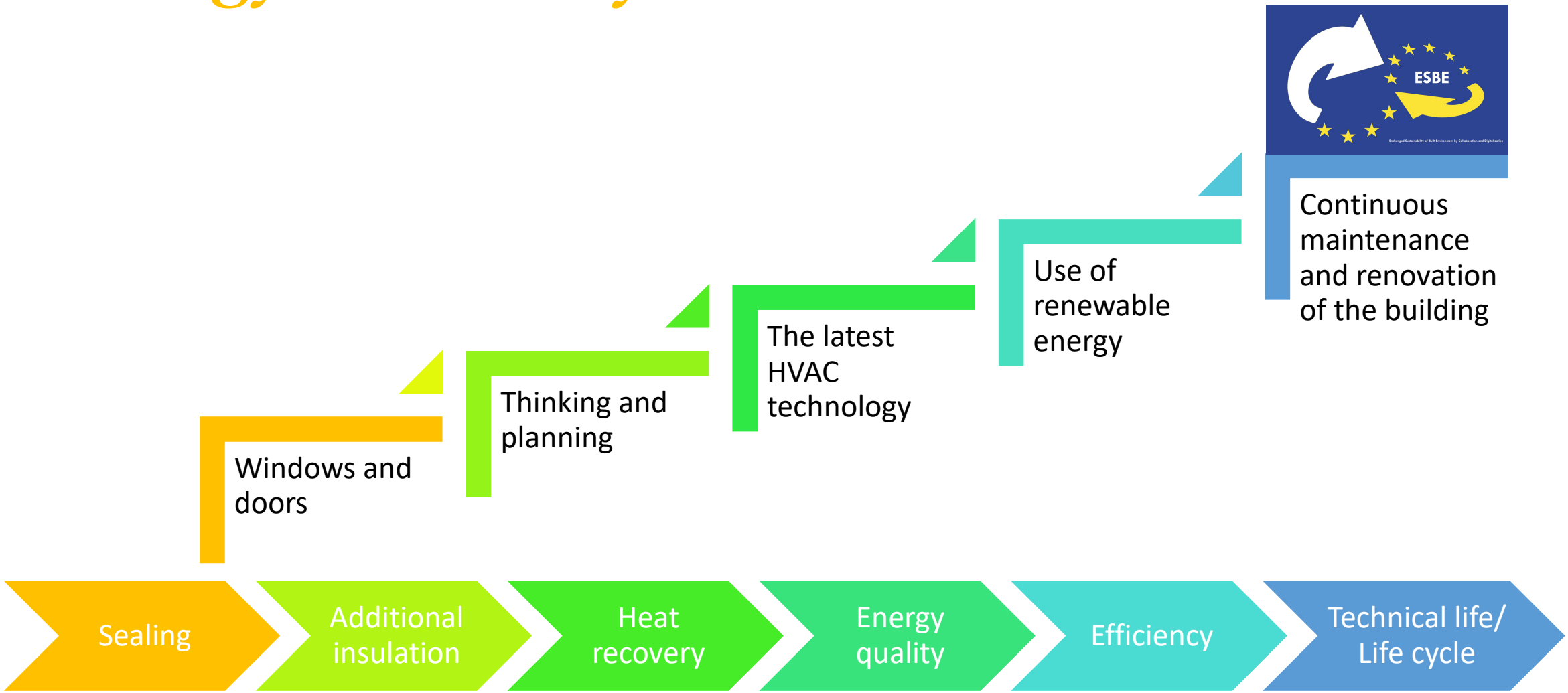
Photovoltaics
Solar heating / hot water heating

Hybrid?



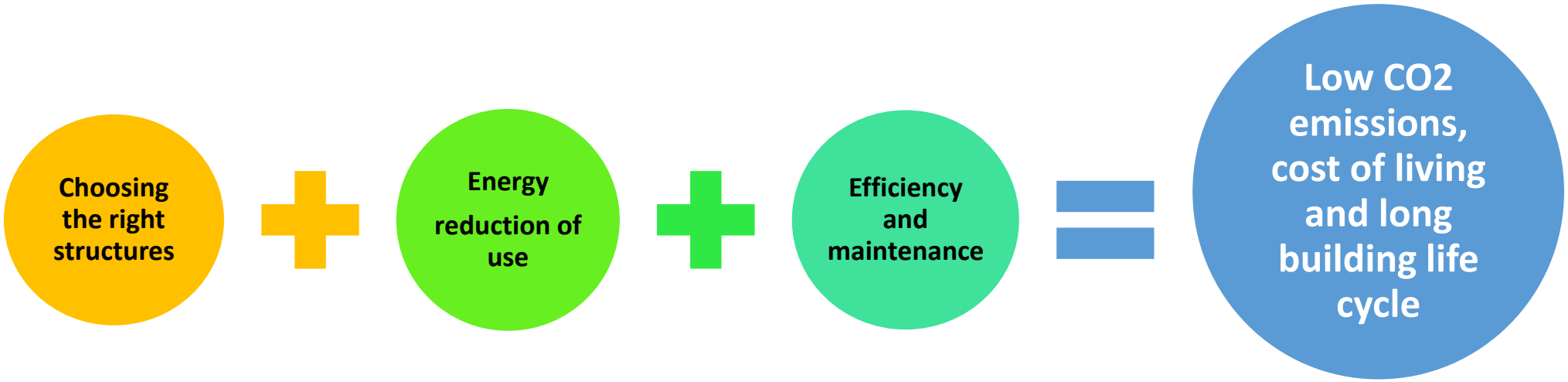
Identify the right actions during the life cycle of a building

Low housing costs = Energy efficiency

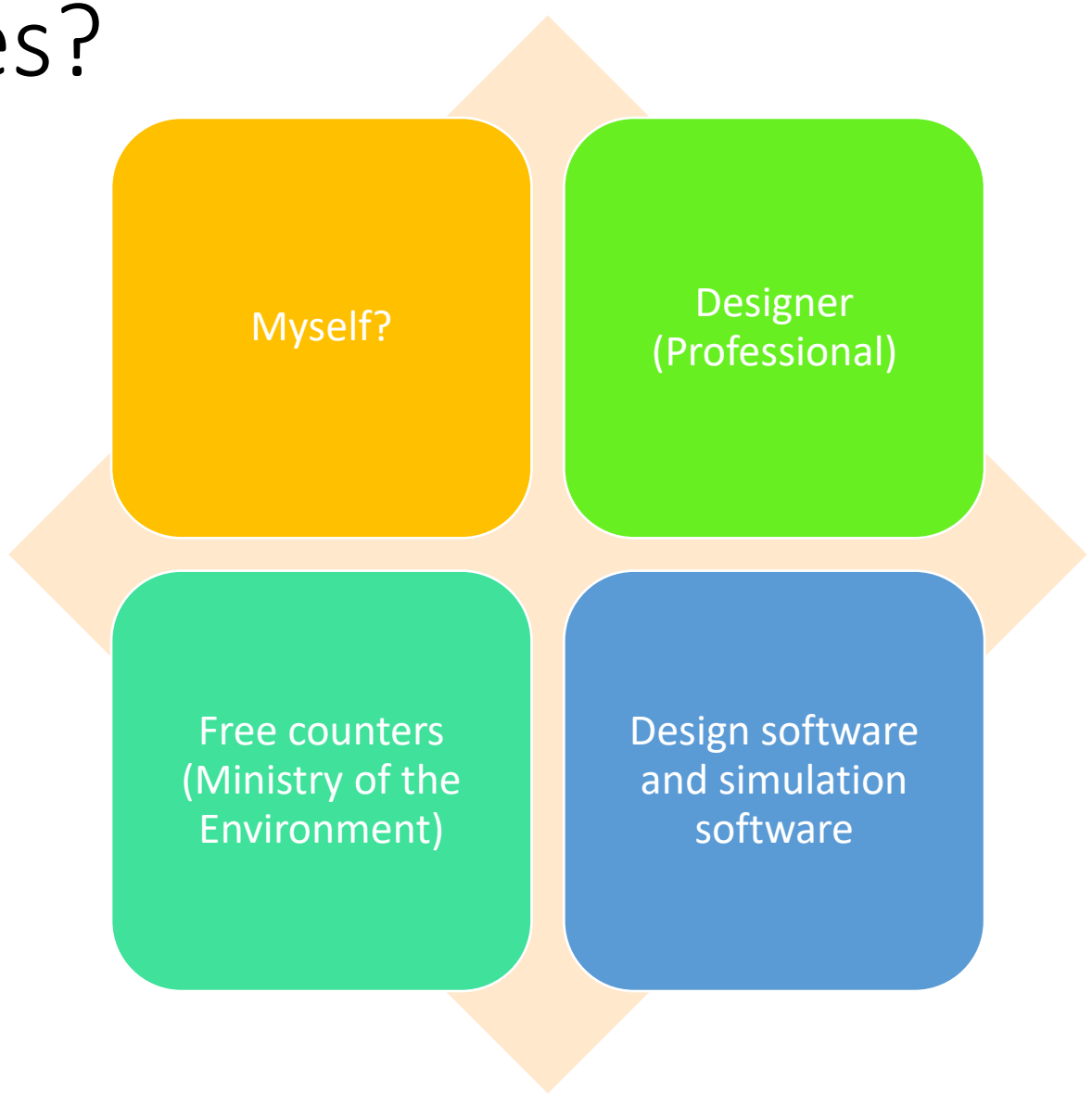


Digital tools (methods)

Life cycle calculation: OneClick LCA and LCC, YM counter, Into 7.0, etc.



Who makes?


Myself?
Designer (Professional)
Free counters (Ministry of the Environment)
Design software and simulation software

Means of control (YM/Bionova 2017)

State actions

Standard control (mandatory regulation)

Information control (information and advice)

Financial management (taxes and subsidies)

Municipal controls

Production optimization

Meeting demands

Market mechanisms and municipal actions

Figure: Impact of different types of control measures on the project.

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Control system (YM/Bionova 2017)

What are the main means of control

What is controlled / calculated?

ROAD MAP OF THE BUILDING CARBON FOOTPRINT

How is the development of guidance phased in?

What support actions are needed?

Figure: The main areas of roadmap implementation

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Means of control (YM/Bionova 2017)

Regulatory control
- Obligation to report emissions
- Binding limit values

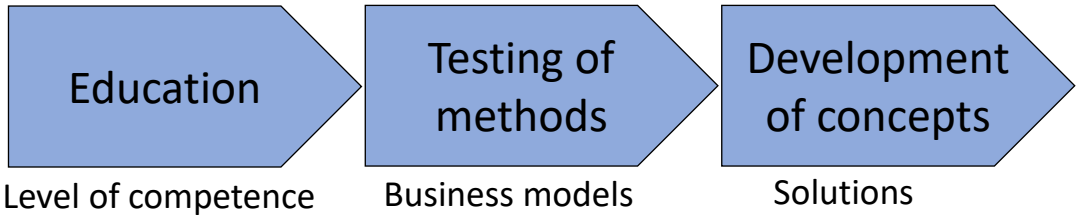
Financial management
- Additional building right
- Monetary incentives

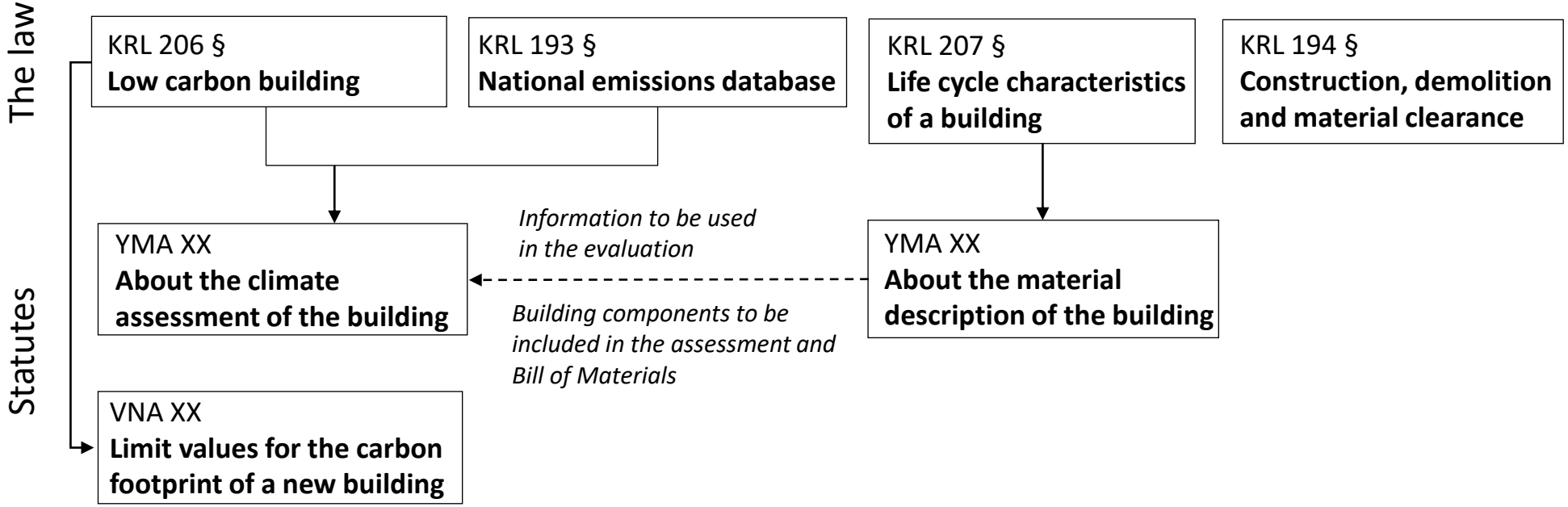
Information control
- Methodological instructions
- Tools and data
- Classification / certificate

Figure: the different means of control form a mutually supportive whole

Means of control (YM/Bionova 2017, RT 2022)

Industry preparation





Separate building law (proposal): *The low-carbon and circular economy regulatory framework for the building, RT 2022*

Tasks of universities and polytechnics (YM/Bionova 2017)

Regarding the development of competences and activities, the main contents of the roadmap from the perspective of educational institutions are the following:

- training for designers, contractors and construction product manufacturers
- tools, guidelines and document templates, training and support available to control organizations
- communication and advisory services
- production of potential online course materials for all involved
- export of skills needs to national construction curriculum

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Quality of emission calculations

(YM/Bionova 2017)

In order to work, emissions calculation requires:

- correct quantity information
- correct emission factors
- correct cropping
- correct calculation method

Thank you!

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