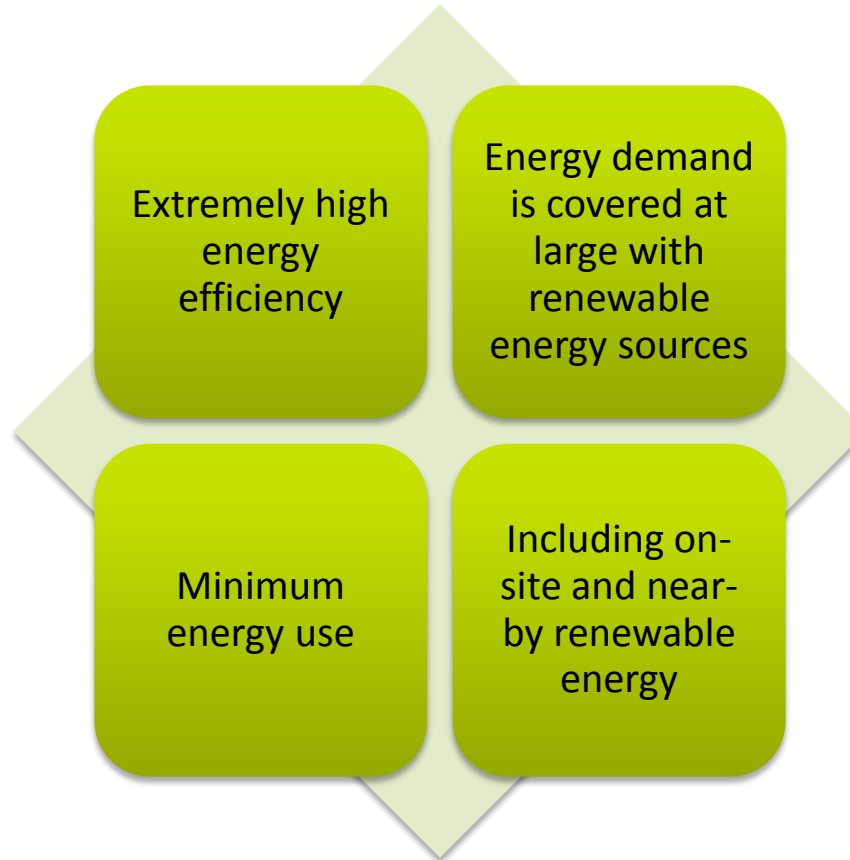


# Defining "nearly zero" in Finland - FInZEB

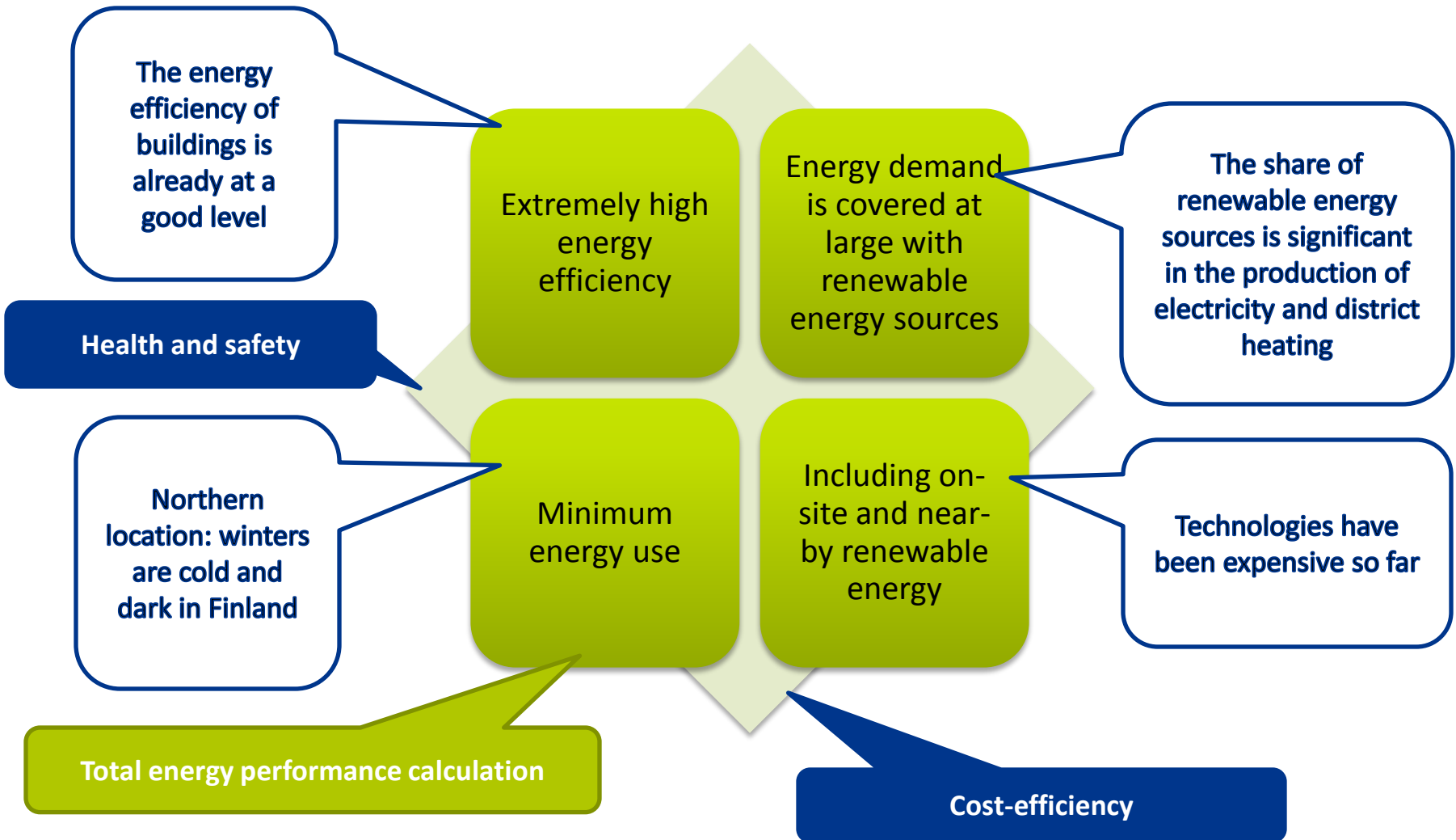
HP4NZEB-seminar 15.06.2015

# A nearly zero energy building (EPBD)

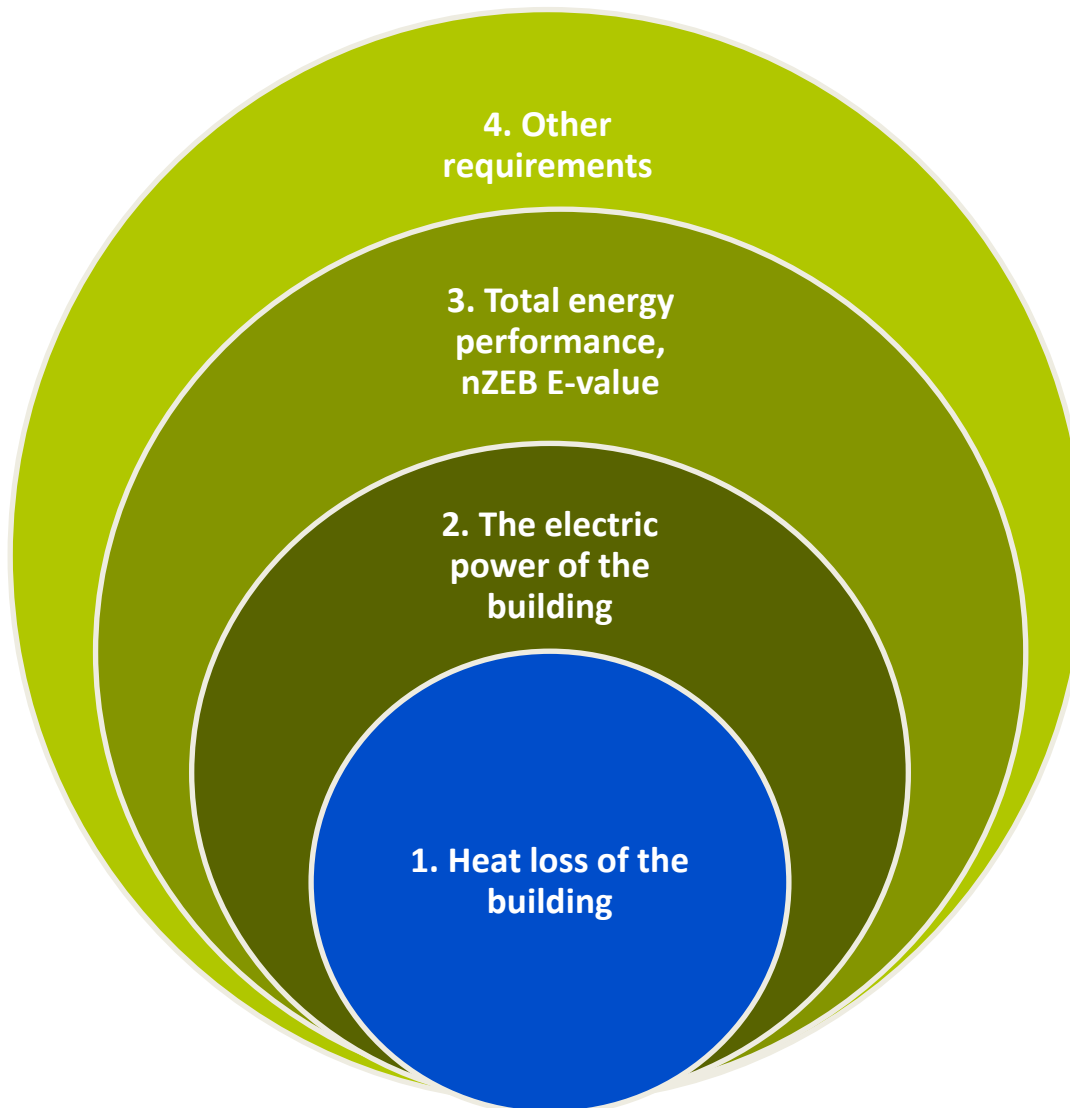
(EU Energy Performance of Buildings Directive)



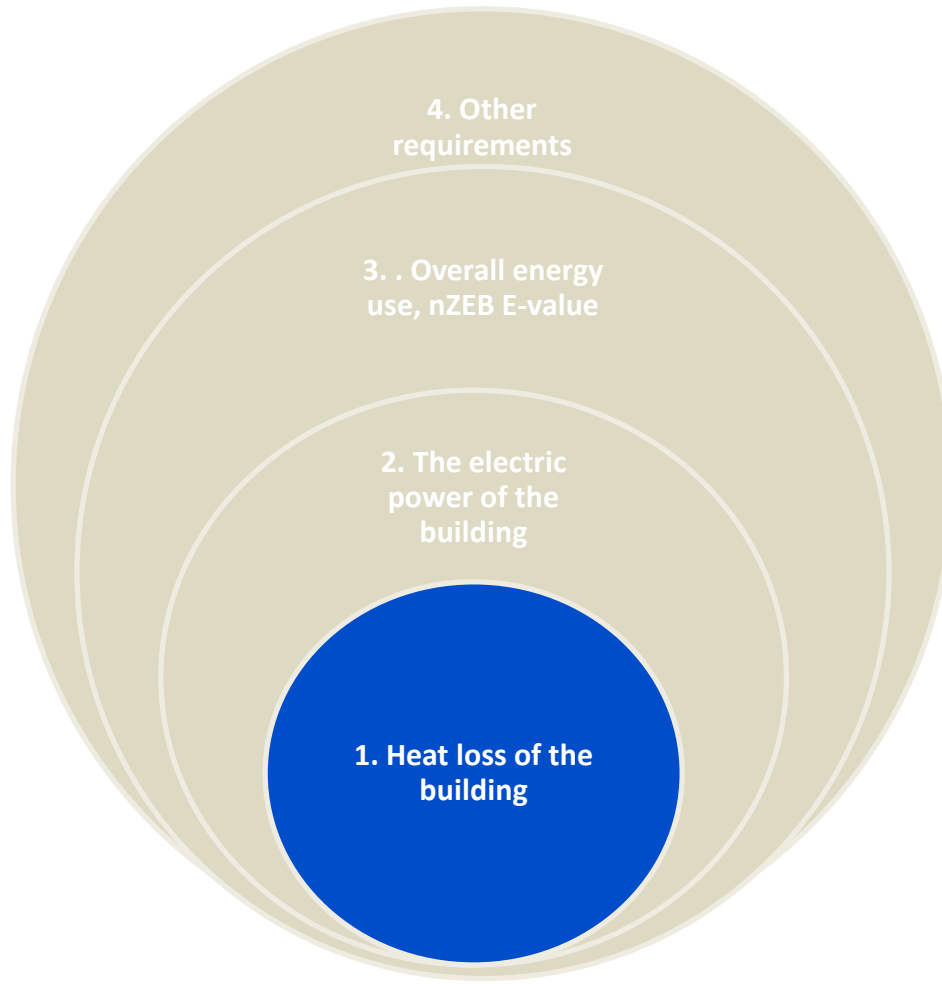
# The starting point in FInZEB



# The features of a nZEB-building



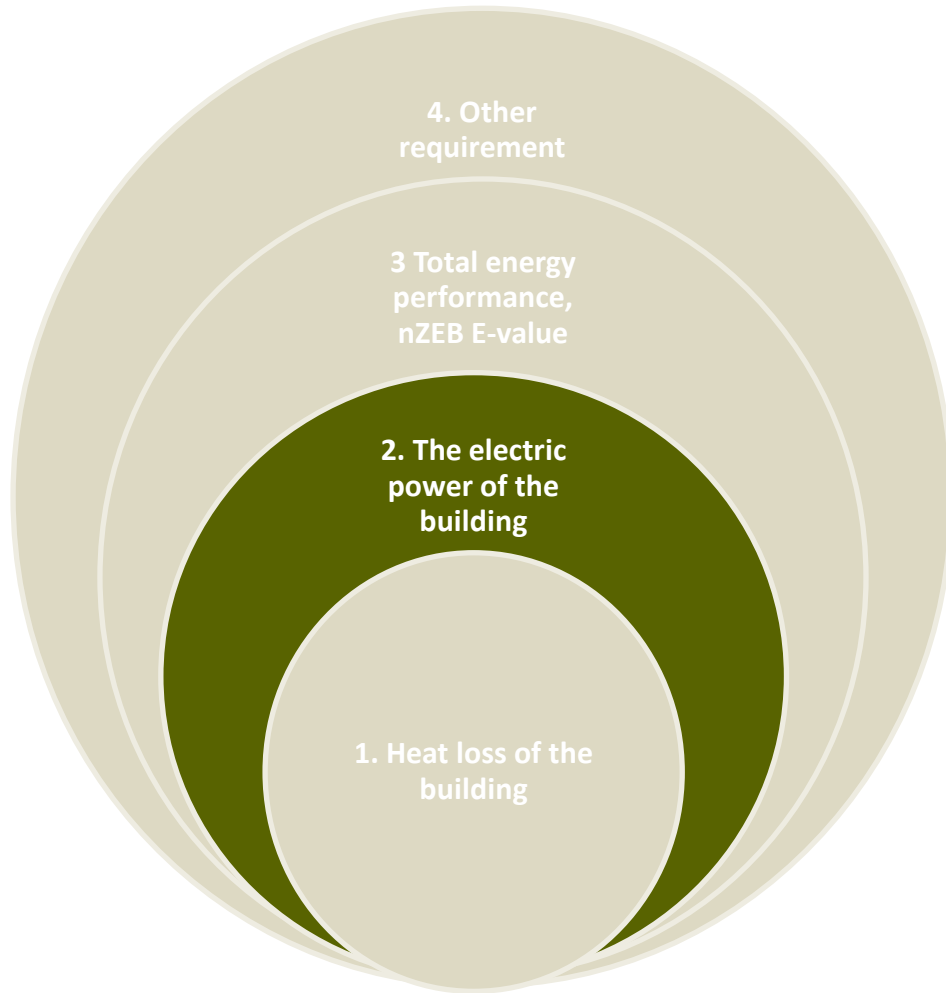
# 1. Heat losses



## FInZEB proposal:

- The current heat loss balancing calculation with updated values for comparison
- Requirements for the thermal transmittance of the structures (U-values) remain mainly at the current level (set in year 2012)
- Better windows, U-value for comparison eg.  $0,8 \text{ W/m}^2, \text{K}$
- Tighter comparison value for heat recovery efficiency: proposal 60 % (excl. hospitals)
- Possibly an updated comparison value for air tightness as well

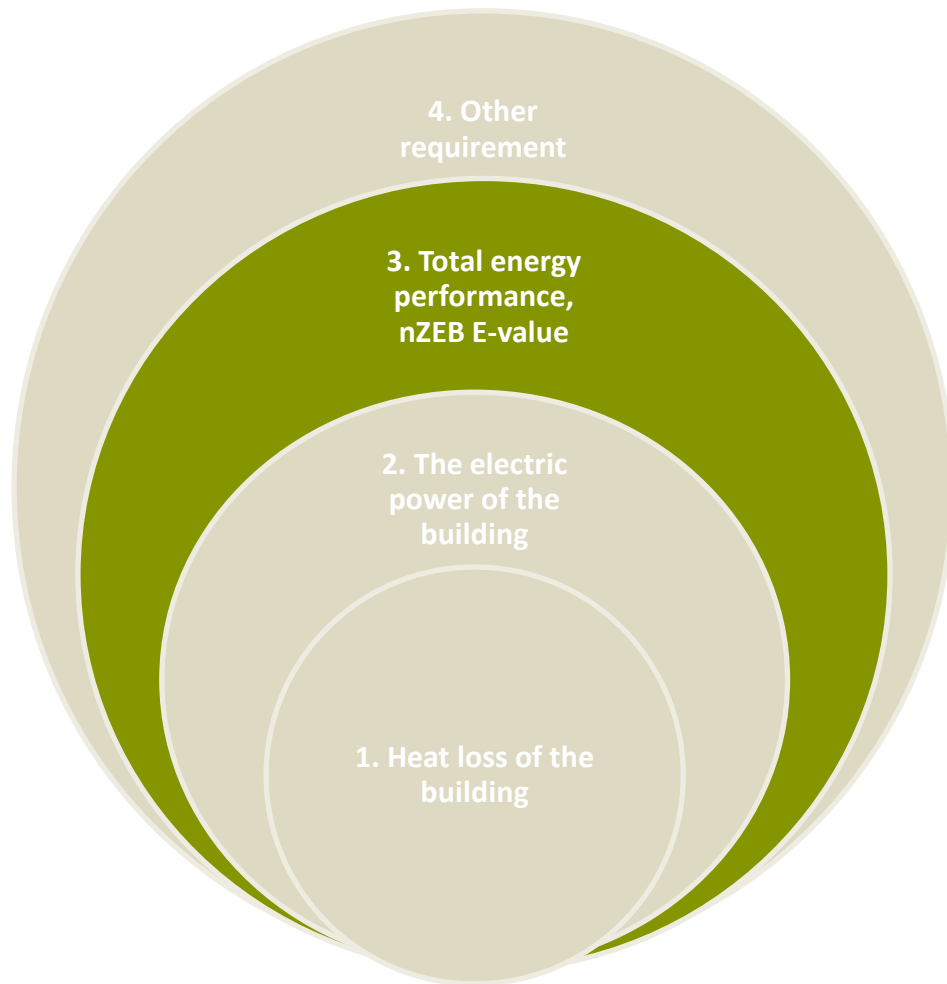
# 2. The electric power



## FInZEB proposals:

- A calculated peak electric power of a building must be calculated
- A certain percentage of the peak power should be demand based controlled (percentage depends on building type)
- The rules for calculation require development
- The goal is technology and market driven situation, such as demand side management (SmartGrid)
- The objective is to reduce harmful impacts of the buildings' electric power peaks on electricity grid and to reduce emissions of the electricity production.

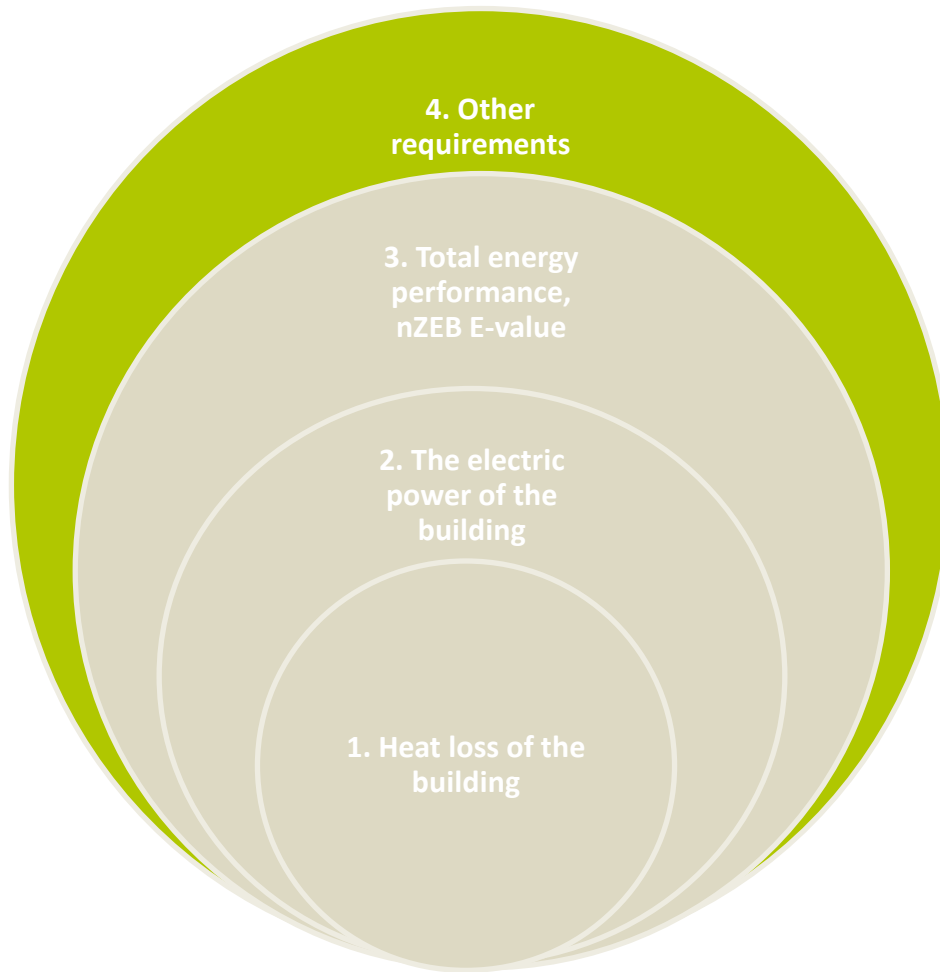
# 3. nZEB-E-value



## FInZEB proposal:

- The total energy performance of a building will be calculated with updated E-value calculation norms
- Existing energy carrier factors
- Renewable energy produced on-site or near-by is taken into account in reducing the annual use of delivered energy in the building
- Renewable energy sold out can partly be taken into account in reducing the E-value
- The distribution of the energy use and the use of delivered energy (E-value output) must be reported

# 4. Other requirements



## FInZEB proposal:

### When applying for a building permit

- Indoor temperature analysis (indoor conditions during the summer)
- SFP value of the ventilation system
- RER value must be calculated (no requirement)
- Energy certificate

### When commissioning

- Air tightness is measured
- Energy consumption with actual estimated use is calculated
- Energy certificate is updated
- Instructions for operation and maintenance
- The correspondence between the design and the real operation of the energy consuming systems must be checked.



# FInZEB calculation steps

The determination of the energy saving actions in typical buildings and calculation of their impact on the energy use of the building

LCC calculations of the energy saving actions

The compilation of the energy saving actions into action packages. Energy and LCC analyses of the action packages.

Energy carrier analysis

Proposal of the nZEB E-value levels

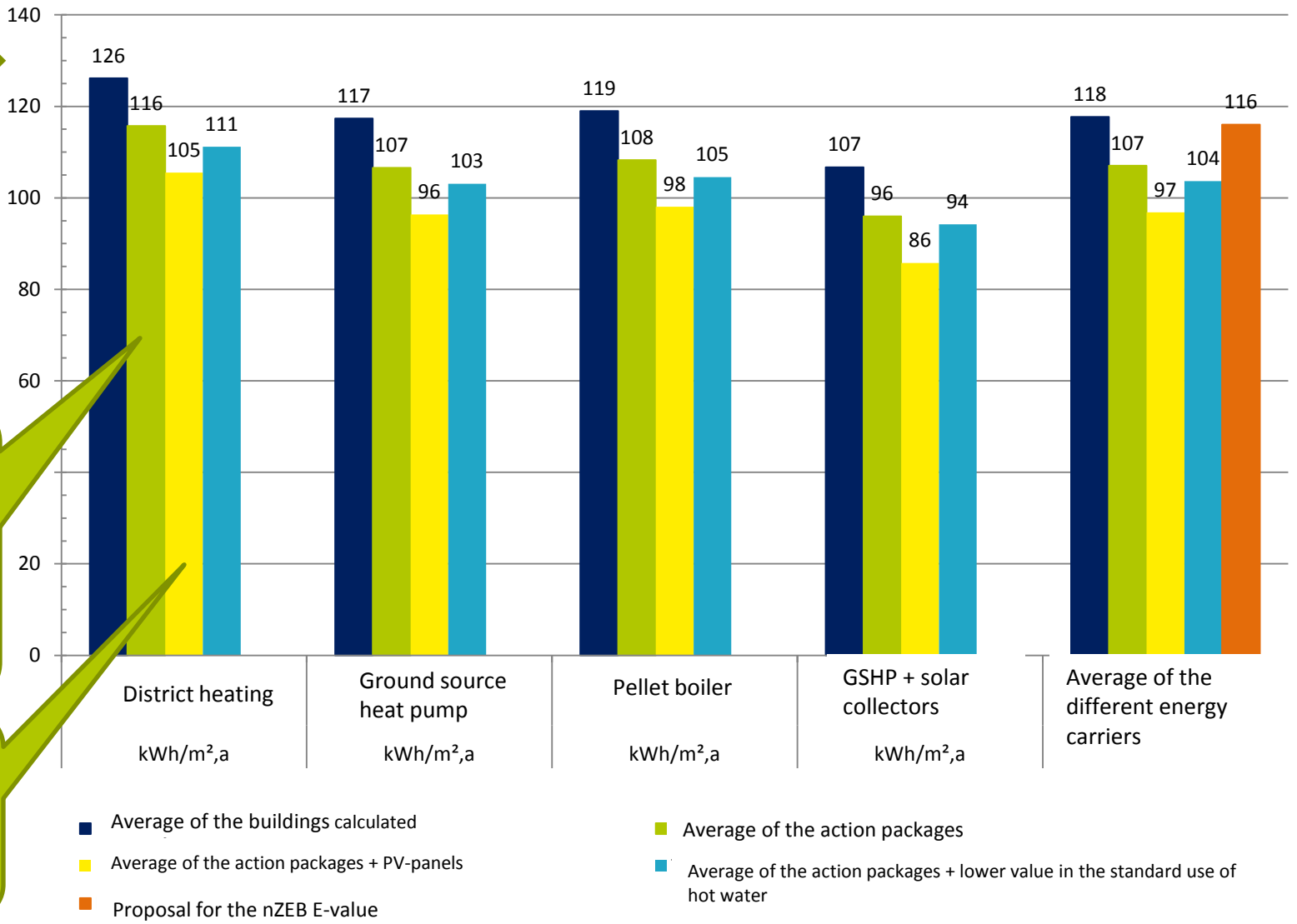
# APARTMENT BUILDINGS: FInZEB-E-value

Current  
**C-class**  
(130 kWh/m<sup>2</sup>,a)

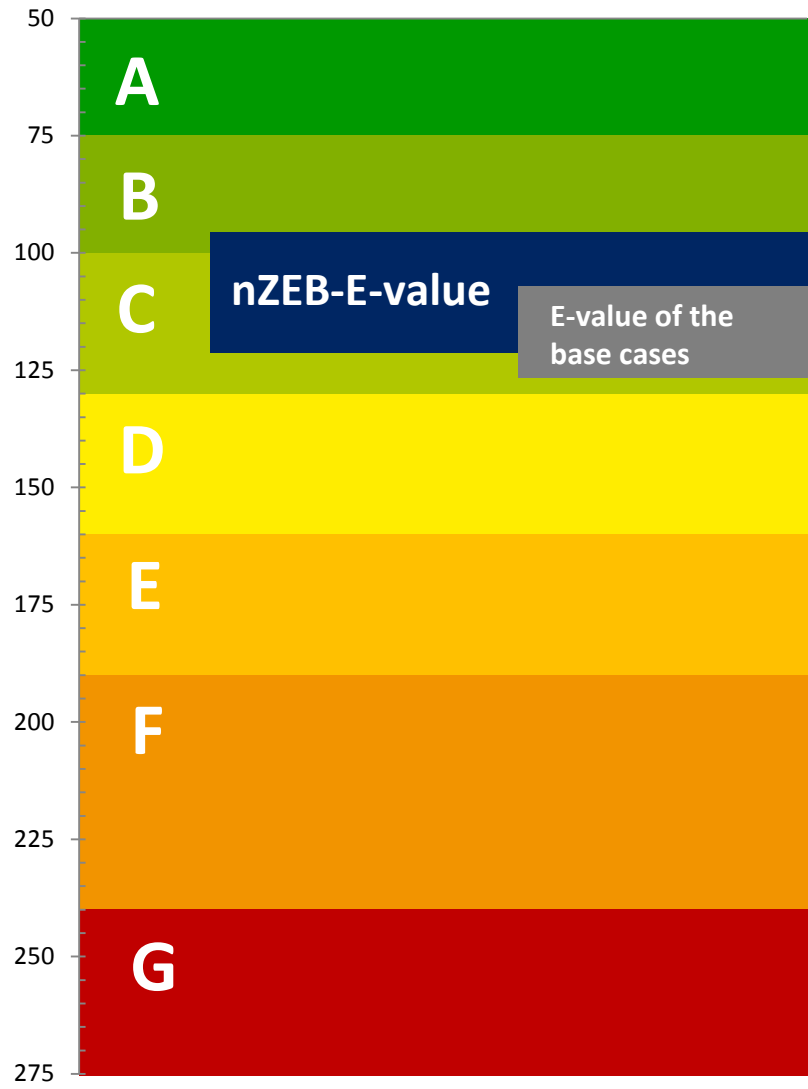
Current  
**A-class**  
(75 kWh/m<sup>2</sup>,a)

Calculated with the D3/2012 norms; can be compared with the current E-value kWh/m<sup>2</sup>,a

E-value with renewable energy



# APARTMENT BUILDINGS: FInZEB-E-value



Calculated nZEB-E-values between 96 - 116 kWh/m<sup>2</sup>,a.  
**Proposal for nZEB-E-value: 116 kWh/m<sup>2</sup>,a.**

E-values of the base cases between 107 - 126 kWh/m<sup>2</sup>,a.

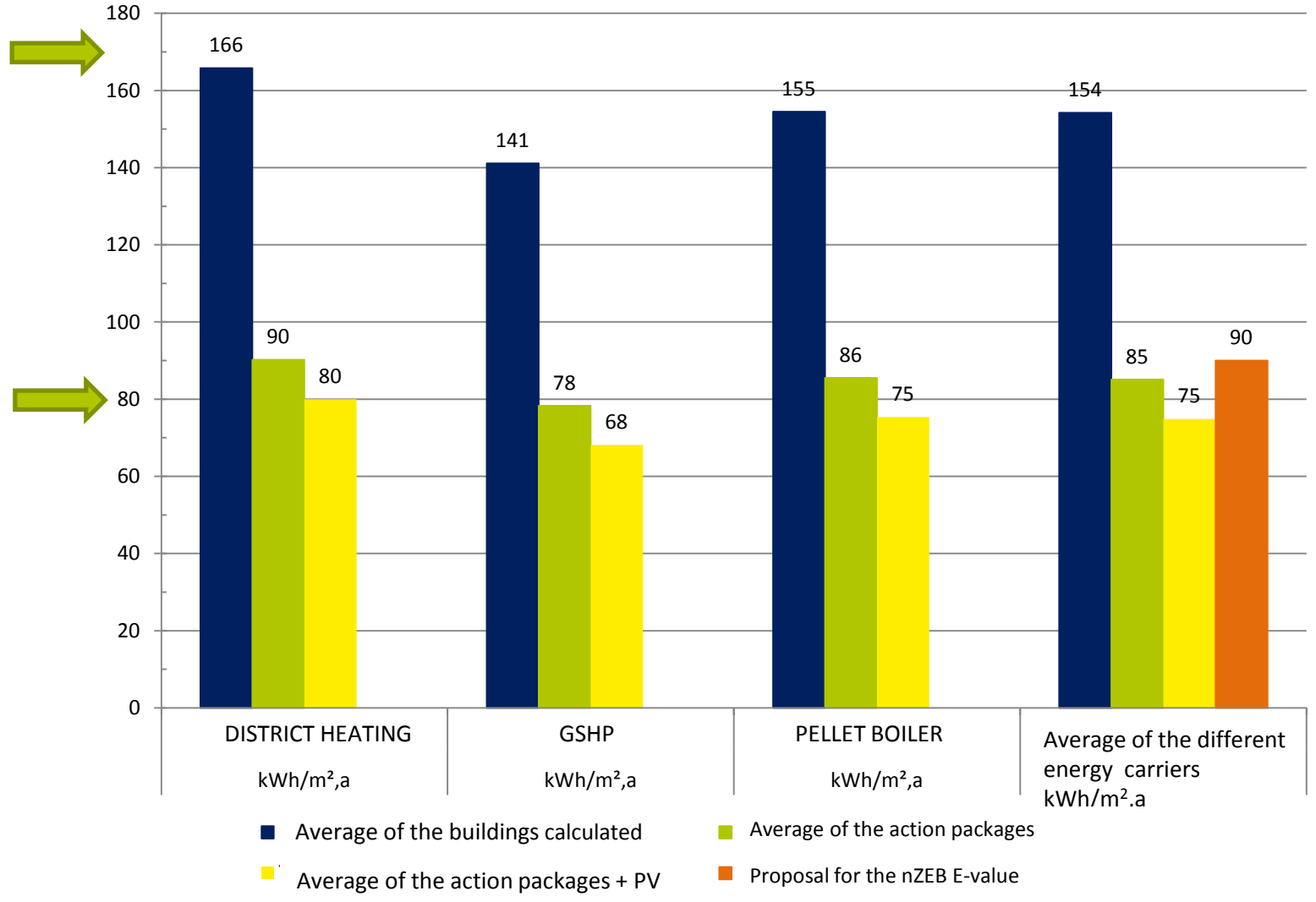
Current minimum requirement (Finnish Building Code: D3/2012) for new buildings: class C, E-value 130 kWh/m<sup>2</sup>,a.

The scale of energy efficiency classes according to the regulation 27.2.2013 by the Ministry of the Environment

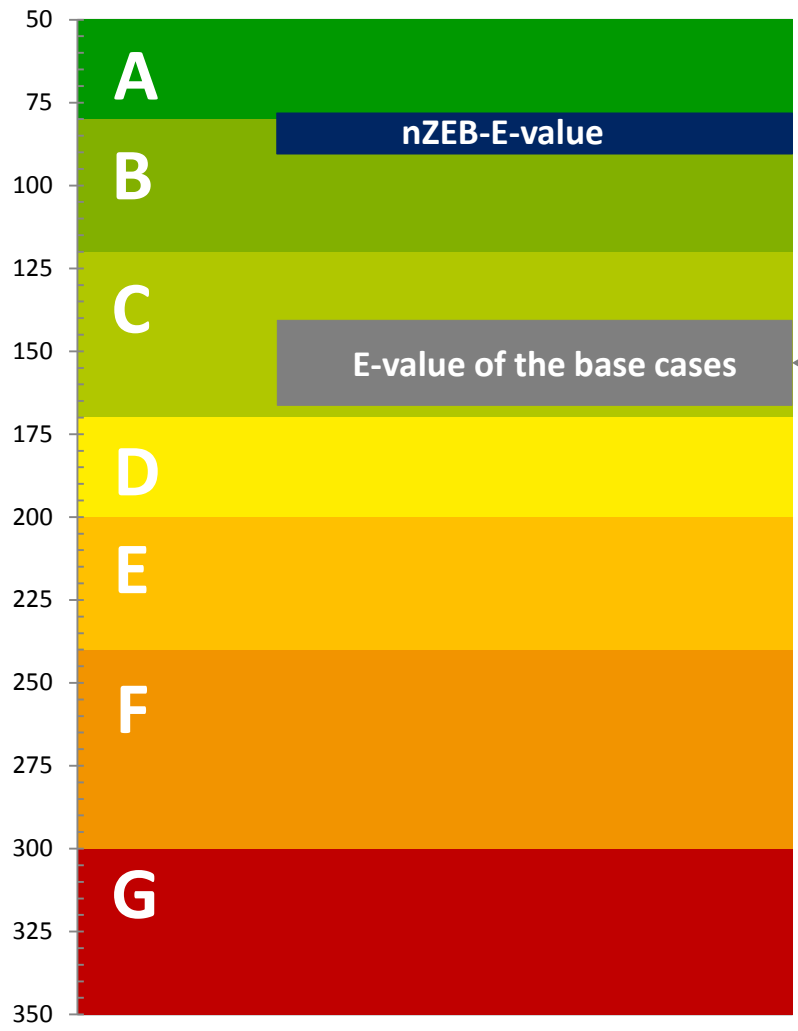
# OFFICE BUILDINGS: FInZEB-E-value

Current C-class  
(170 kWh/m<sup>2</sup>,a)

Current A-class  
(80 kWh/m<sup>2</sup>,a)



# OFFICE BUILDINGS: FInZEB-E-value



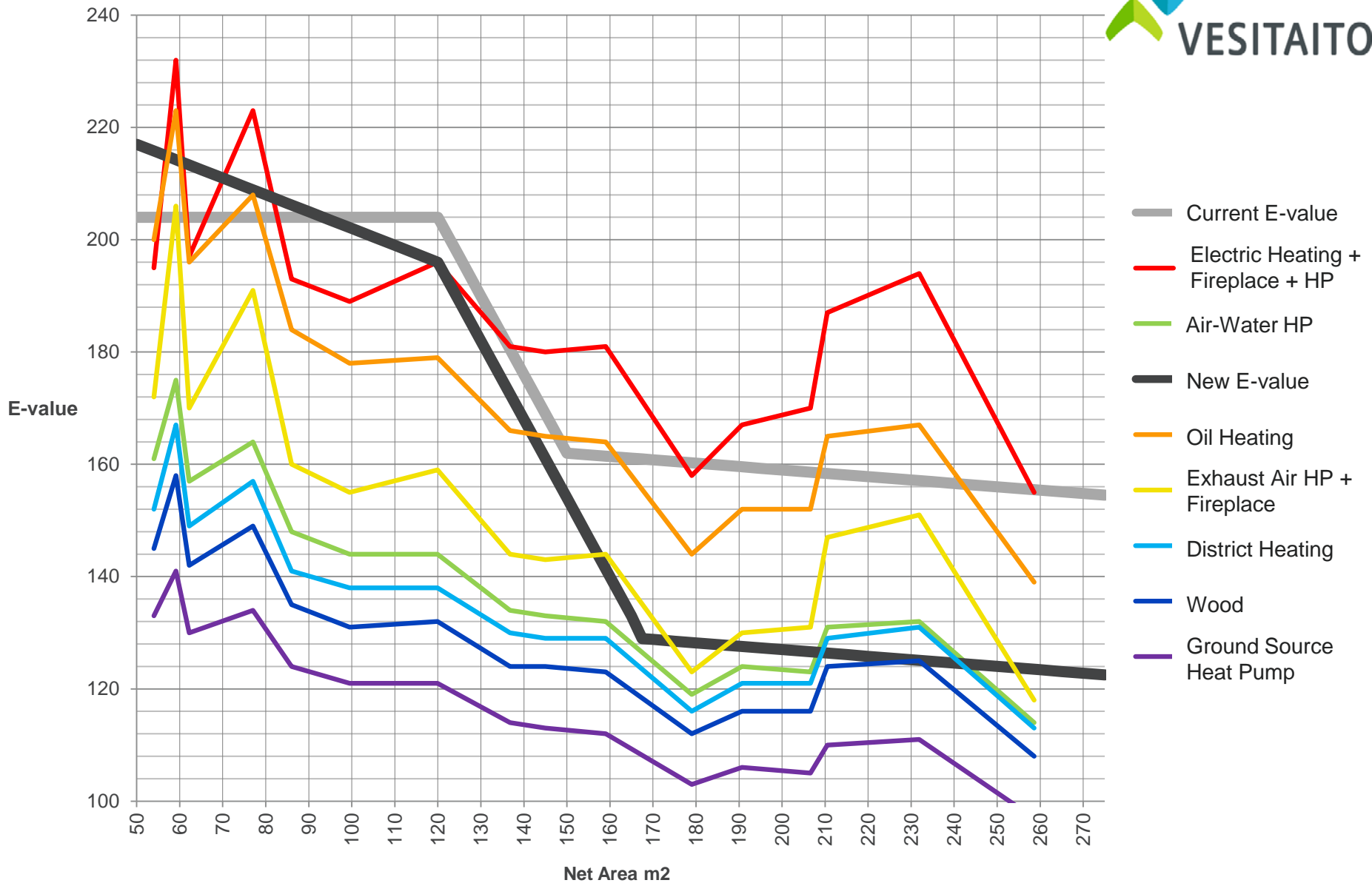
Calculated nZEB-E-values between 78 - 90 kWh/m²,a.  
**Proposal for nZEB-E-value : 90 kWh/m²,a.**

E-values of the base cases between 141 – 166 kWh/m²,a.

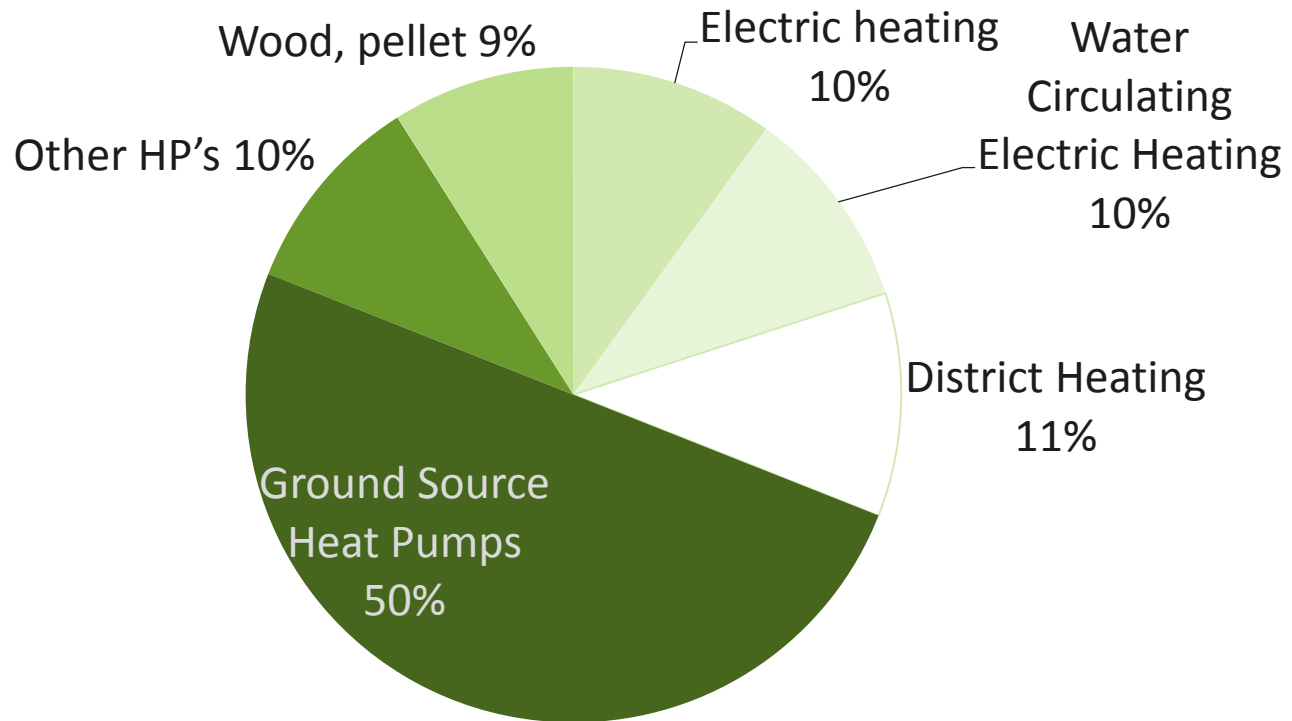
Current min. requirement (Finnish Building Code: D3/2012) for new buildings: class C, E-value 170 kWh/m²,a

The scale of energy efficiency classes according to the regulation 27.2.2013 by the Ministry of the Environment

# PROPOSAL FOR E-VALUES FOR DETACHED HOUSES



# Heating System in New Single-Family Houses



Additional heat sources: fireplaces, Air-Air heat pumps and solar collectors (solar panels are on their way)

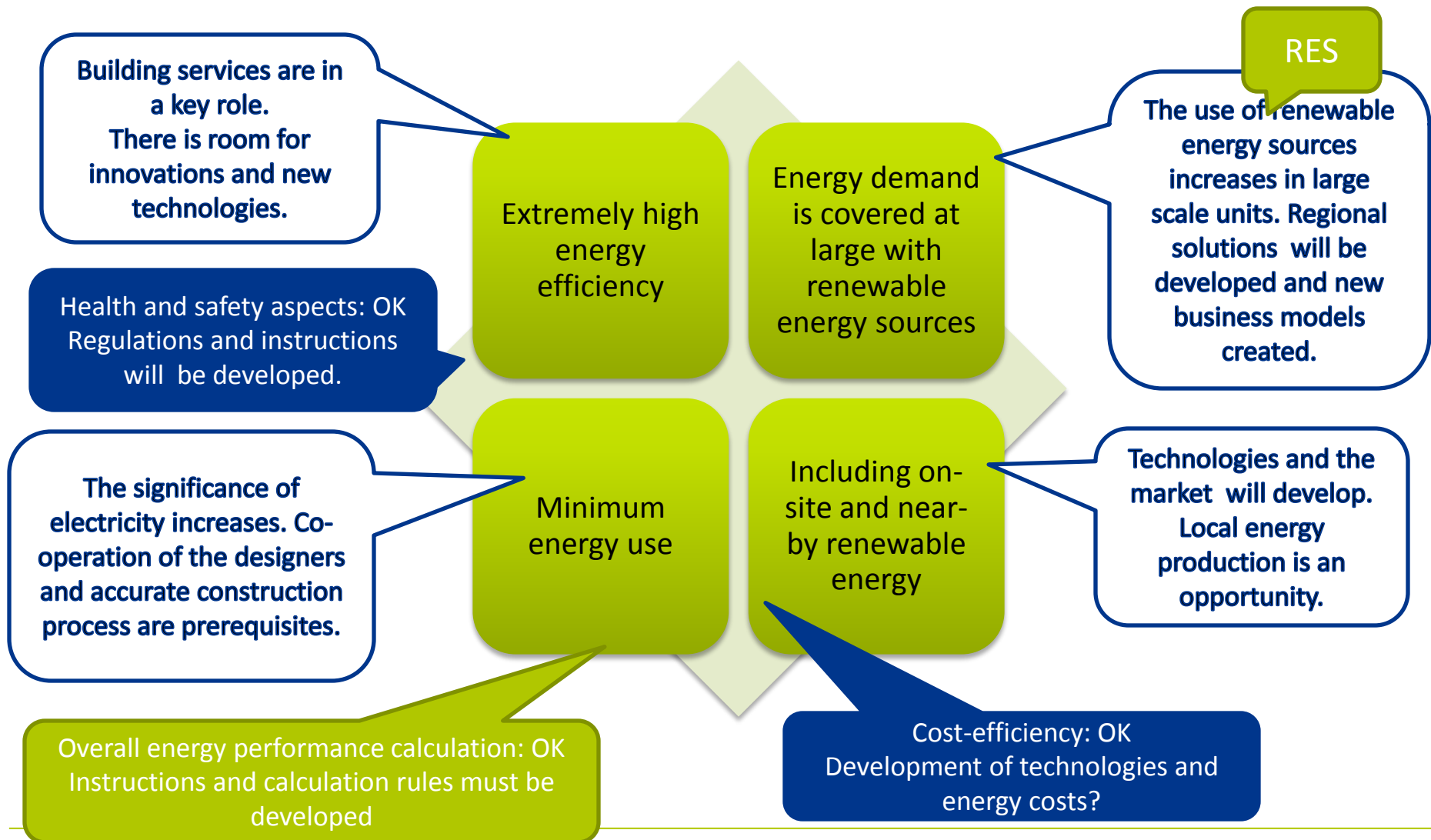
# Different starting points for the nZEB level in different building types

	E-value requirement D3/2012	Porposal for nZEB-E-value	Change
Small residential buildings depending on the size of the building	160...204	120...204	
Apartment buildings	130	116	-11 %
Office buildings	170	90	- 47 %
Schools	170	104	- 39 %
Day care centers	170	107	- 37 %
Retail and commercial buildings	240	143	- 40 %
Sports hall	170	115	- 32 %
Hotels	240	182	- 24 %
Hospitals	450	418	- 7 %

The values are mostly in the current energy performance class B



# FInZEB viewpoints



# Next steps

- Beginning of 2016 → First version of the legislation
- 1.1.2017 → New legislation into force
- 1.1.2018 → All new buildings must be nZEB-buildings (building permit)

FInZEB-E-value proposals and building  
type specific background information  
can be found at the project website  
[www.finzeb.fi](http://www.finzeb.fi)