Energy performance of buildings regulation in Luxembourg

Efficiency + decarbonization of heating and cooling → heat pumps will be the reference system for all new buildings from 2023

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Legal framework

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European level

EPBD

- Directive 2010/31/EU
- Directive (EU) 2018/844

EED

- Directive 2012/27/EU
- Directive (EU) 2018/2002

National level Luxembourg

transposition

- Law “rational use of energy”
  - **New** Regulation “Energy performance of **buildings**” — **2021**
  - Regulation “Energy performance of **non-residential** buildings” — **2010**
  - Regulation “Energy performance of **residential** buildings” — **2007**

Legal framework: Energy performance timeline

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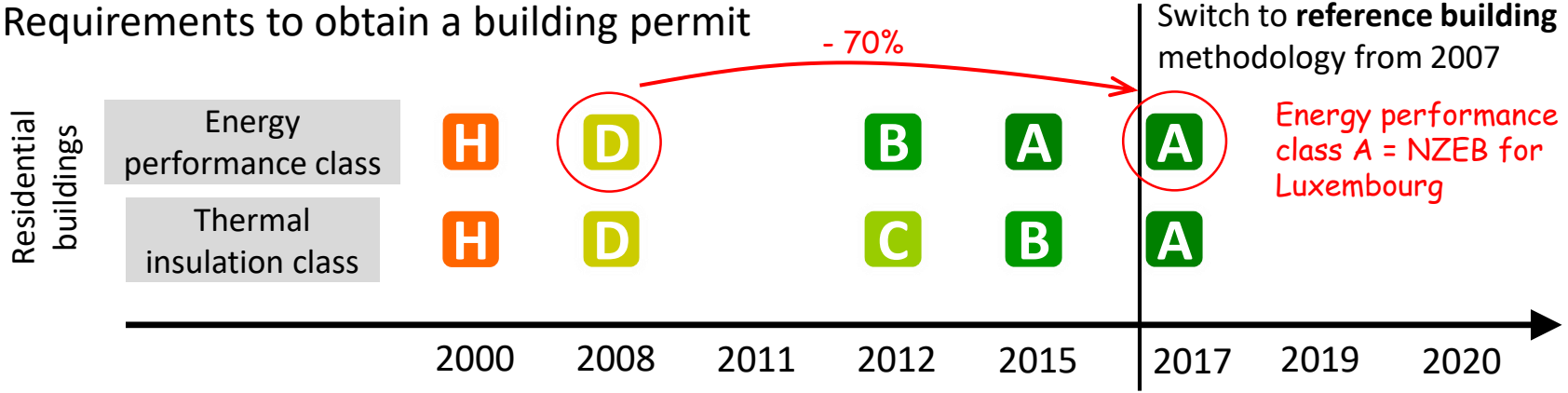
Requirements to obtain a building permit



Energy performance class

Primary energy

Category	A	B	C	D	E	F	G	H	I
Multi-family	≤ 45	≤ 75	≤ 85	≤ 100	≤ 155	≤ 225	≤ 280	≤ 355	> 355
Single-family	≤ 45	≤ 95	≤ 125	≤ 145	≤ 210	≤ 295	≤ 395	≤ 530	> 530

Thermal insulation class

Heating demand

Category	A	B	C	D	E	F	G	H	I
Multi-family	≤ 14	≤ 27	≤ 43	≤ 54	≤ 85	≤ 115	≤ 150	≤ 185	> 185
Single-family	≤ 22	≤ 43	≤ 69	≤ 86	≤ 130	≤ 170	≤ 230	≤ 295	> 295

values in kWh/(m²y)

Energy performance: Regulatory requirements

- **Component-specific** technical requirements
  - Insulation of the building envelope (Limits on the U-Values of components)
  - Heat protection in summer (Limitation on the transmission level of sun light)
  - Airtightness (Limits on the envelope)
  - Requirements on technical systems

- **Building-specific** limitation of the energy demand
  - Heating demand (→ Thermal insulation class)
  - Primary energy consumption (→ Energy efficiency class)

} Reference Building sets the reference !

The reference building methodology

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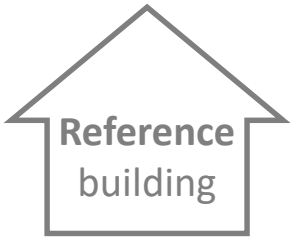
Idea: compute two energy balances and compare → real vs. reference building



Energy balance with

- Real cubature (geometry)
- Real location
- **Individual** *U*-values
- **Individual** airtightness
- **Individual** technical systems

identical

Energy balance with

- Real cubature (geometry)
- Real location
- **Prescribed** *U*-values
- **Prescribed** airtightness
- **Prescribed** technical systems

Energy efficiency

Decarbonize via more ambitious reference → from 01.01.2023 gas condensing boiler replaced by air source HEAT PUMP !

Heating demand
Primary energy consumption
$\leq$
Reference heating demand
Reference primary energy consumption

Reference building methodology + heat pumps

- **Advantages of the reference building methodology**
  - become independent from building cubature (geometry) → don't limit architectural creativity and freedom
  - become independent from the buildings future location ("neutralize" for example exposure to wind and sun)
  - the influence of "external factors" (wind, sun, …) increases with higher energy efficiency standards → reference building methodology guarantees buildability even under "bad" external conditions
- **Decarbonization → HEAT PUMP in reference building from 2023**
  - **fossil free heating set as reference** ("electricity based buildings")
  - fossil based heatings not "forbidden", but practically impossible to reach the reference energy performance without heat pump

The reference building methodology

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Many thanks for your attention.

Questions and answers?

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