ENERGY
INNOVATION &
ENGINEERING

Will energy efficiency services be able to boost decarbonisation investments in multifamily houses?

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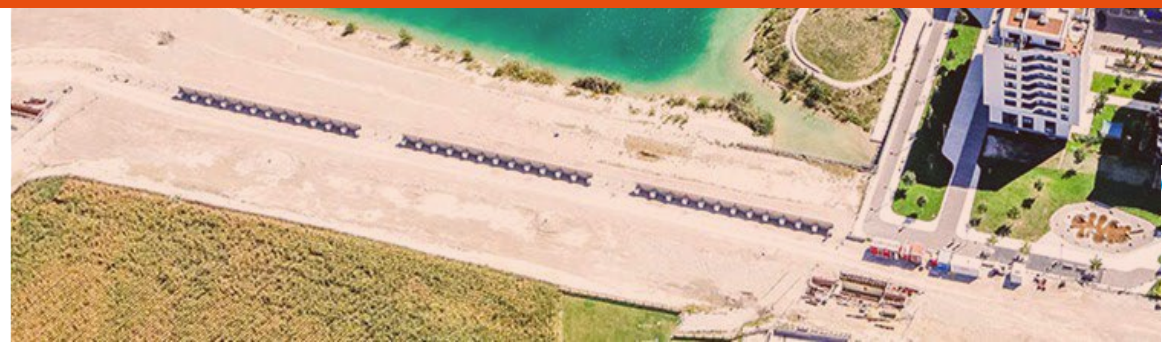
Klemens Leutgöb
Mirjana Wissinger
Rachel Leutgöb



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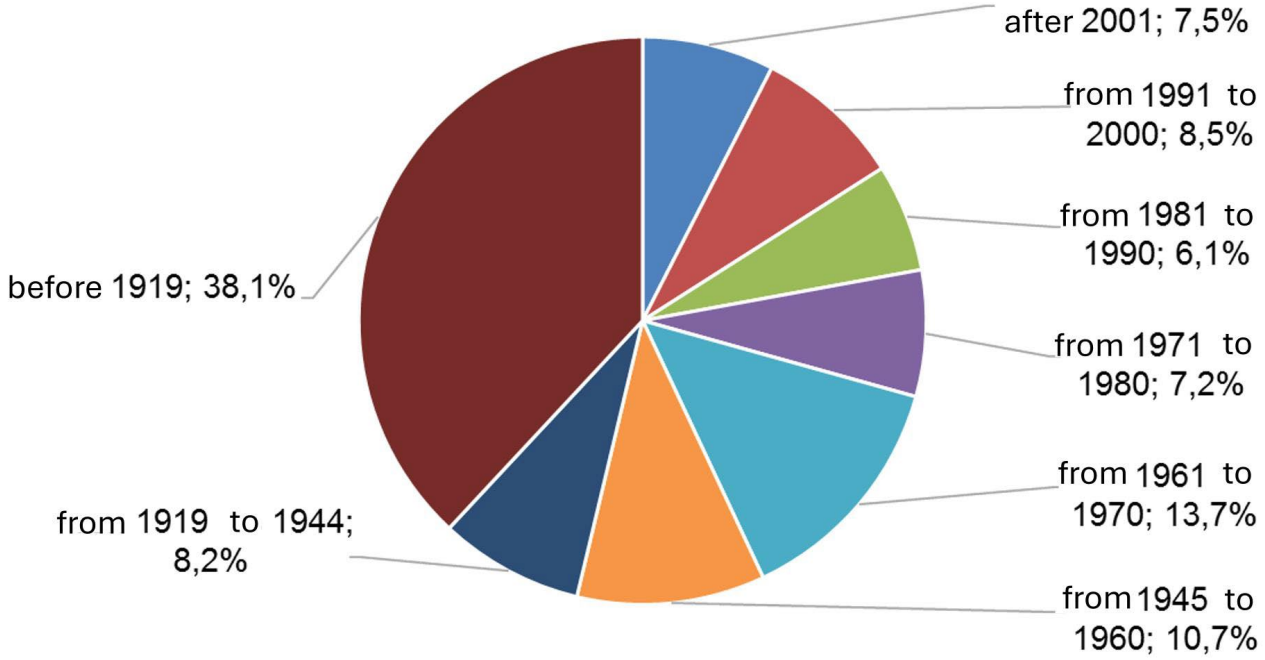
Comprehensive decarbonisation of MFH - why now?

- Unstable energy markets - higher price fluctuations
- Tightening of regulatory frameworks
  - Spatial energy planning and partial obligations to decarbonize energy supply
- Improvement of public incentive schemes
- Obligations of non-financial reporting according to CSRD increase transparency
  - Large housing companies need to report on the sustainability of their economic activities
  - Financial institutions have to present the sustainability of their financing portfolio

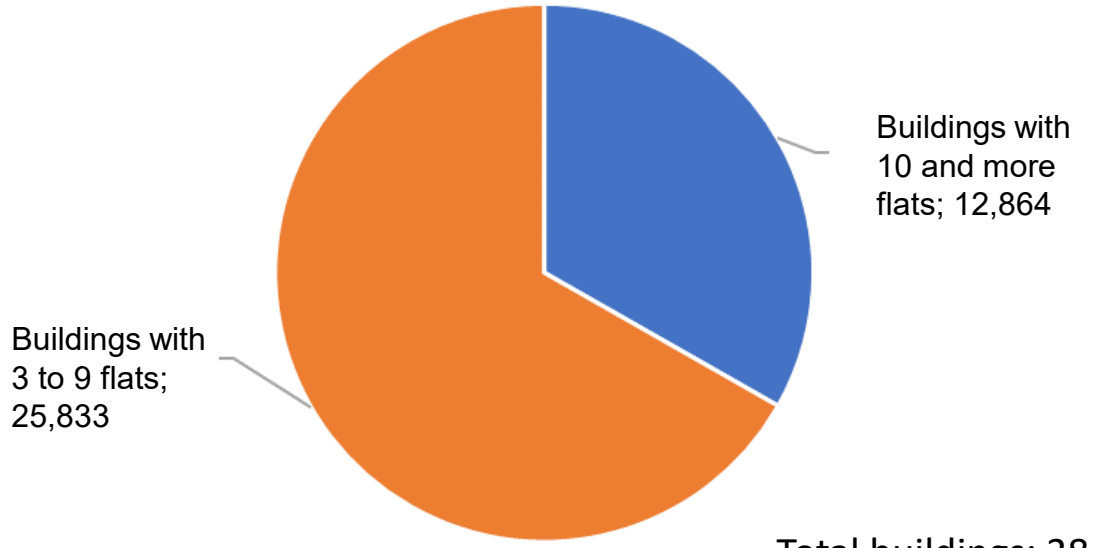
The challenge of decentral gas-fired floor heating in the MFH stock



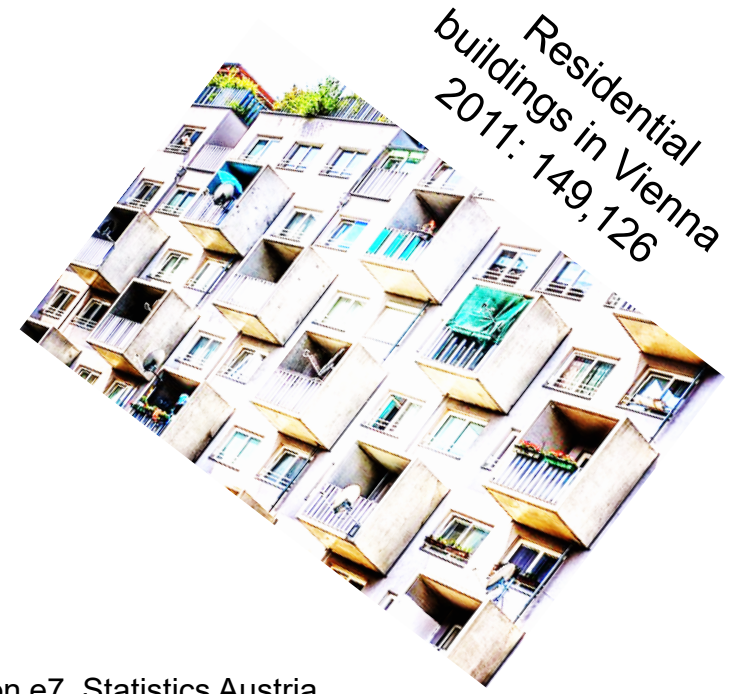
Source: e7 calculation, data based on Statistics Austria for Austria for 2015

For Austria differentiated by age of construction

Residential buildings in Vienna with gas-fired floor heating systems



Total buildings: 38,697

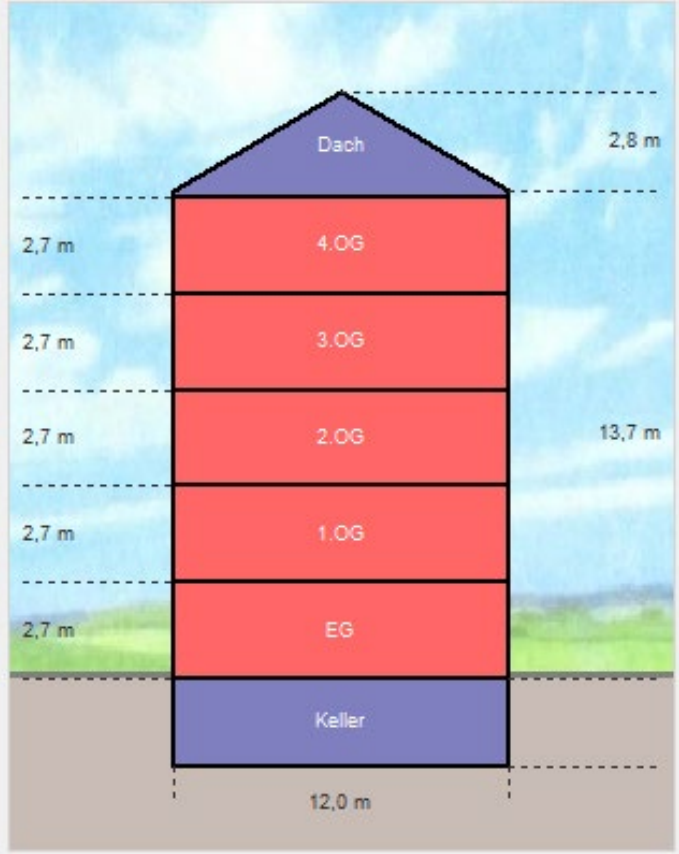


Source: Calculation e7, Statistics Austria

Based on the age of the building and the corresponding building classification (3 to 9 flats or utilisation units and more than 10 flats or utilisation units), the number of buildings with gas-fired floor heating was determined. The calculations showed that there are **approx. 38,700 buildings supplied by gas-fired floor heating, of which approx. 25,800 buildings** have **fewer than 10 flats.**

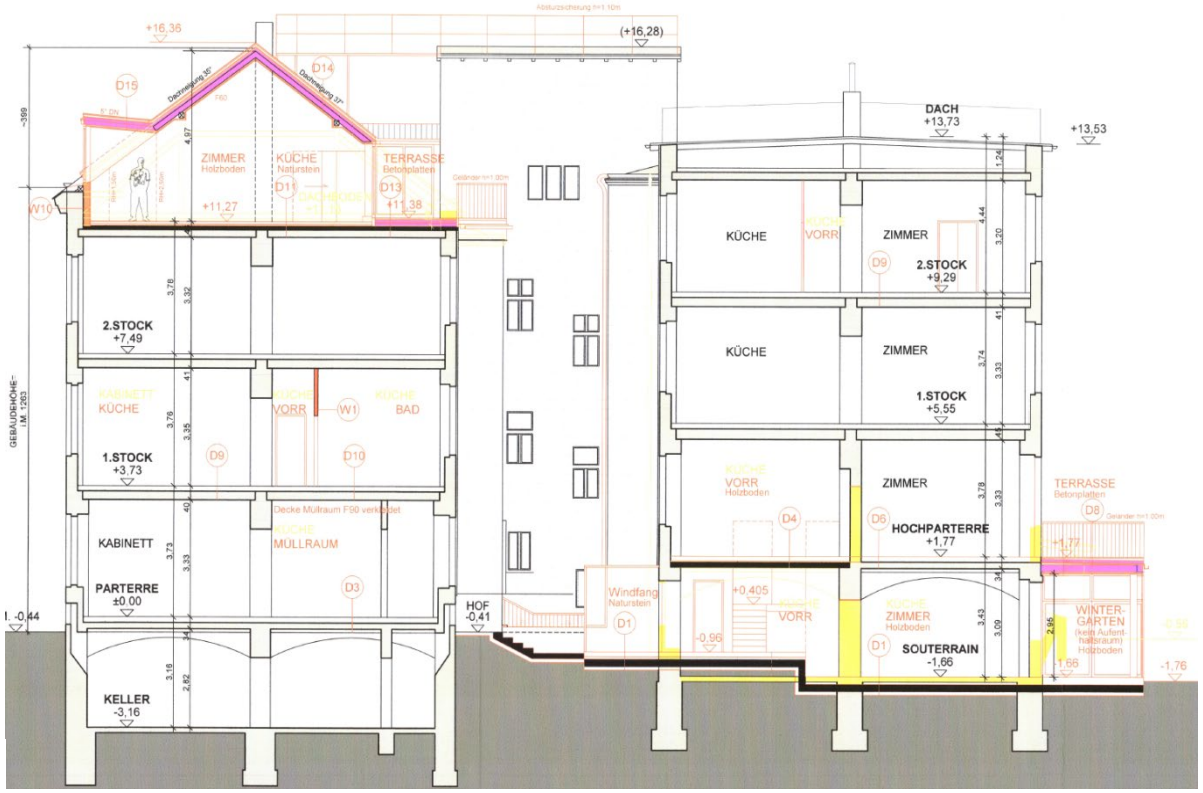
Example refurbishment of a 70s apartment building

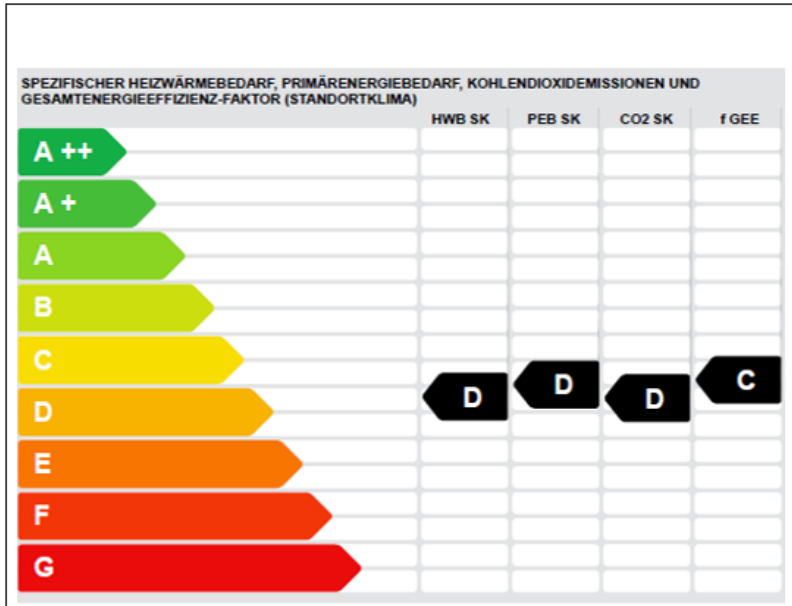
- Property with 5 storeys
- Attic space not converted
- 32x12m floor space
- GFA= 1920m²
- 20 residential units
- Central gas heat supply



Example: Refurbishment of a Gründerzeit building

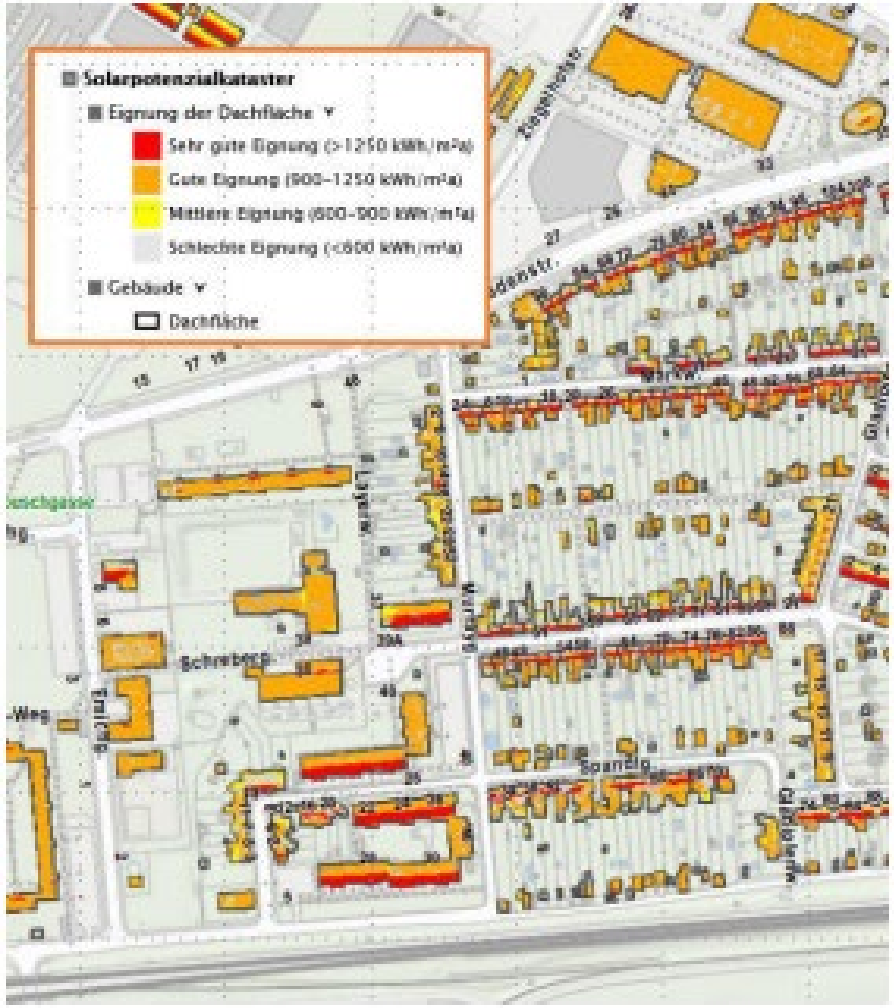
- Partially renovated property with loft conversion
- Two-part building (H wing)
- 13 residential units with a total living space of around 1100 m².
- Gas floor heating systems with decentralised DHW heating
- Co-supply of neighbouring buildings possible



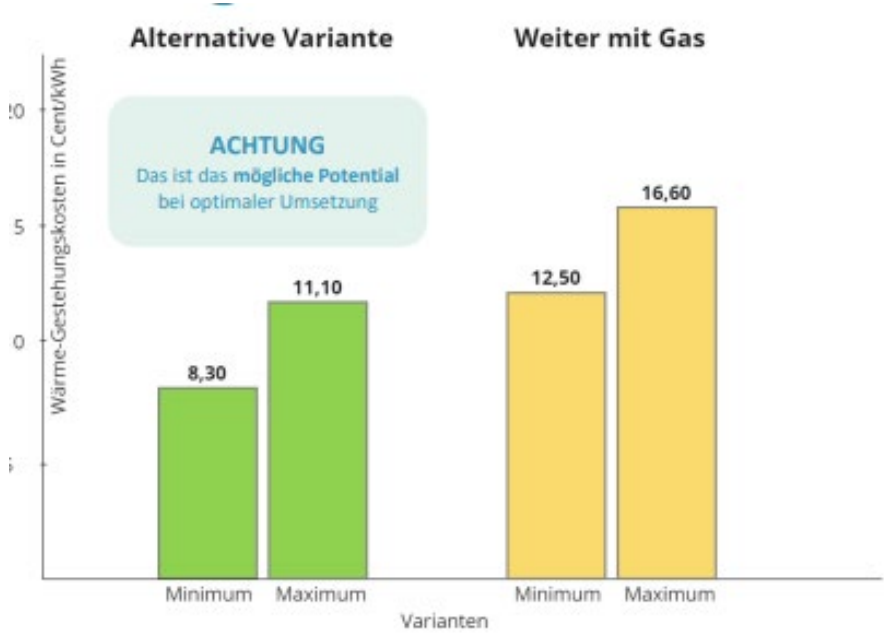


Kennzahl	Wert	Einheit
Brutto-Grundfläche	1.607,20	*m²*
Nutzfläche	1.115,00	*m²*
Brutto-Volumen	5.476,41	*m²*
HWB REF RK	110,15	*kWh/m²a*
HWB REF SK	113,15	*kWh/m²a*
WWWB	12,78	*kWh/m²a*
HEB SK	151,56	*kWh/m²a*
HHSB	16,43	*kWh/m²a*
EEB	167,98	*kWh/m²a*
PEB SK	220,75	*kWh/m²a*
CO_2	42,67	*kWh/m²a*
fGEE	1,69	-
Heizlast lt. ÖNORM B8135	83,20	*kW*

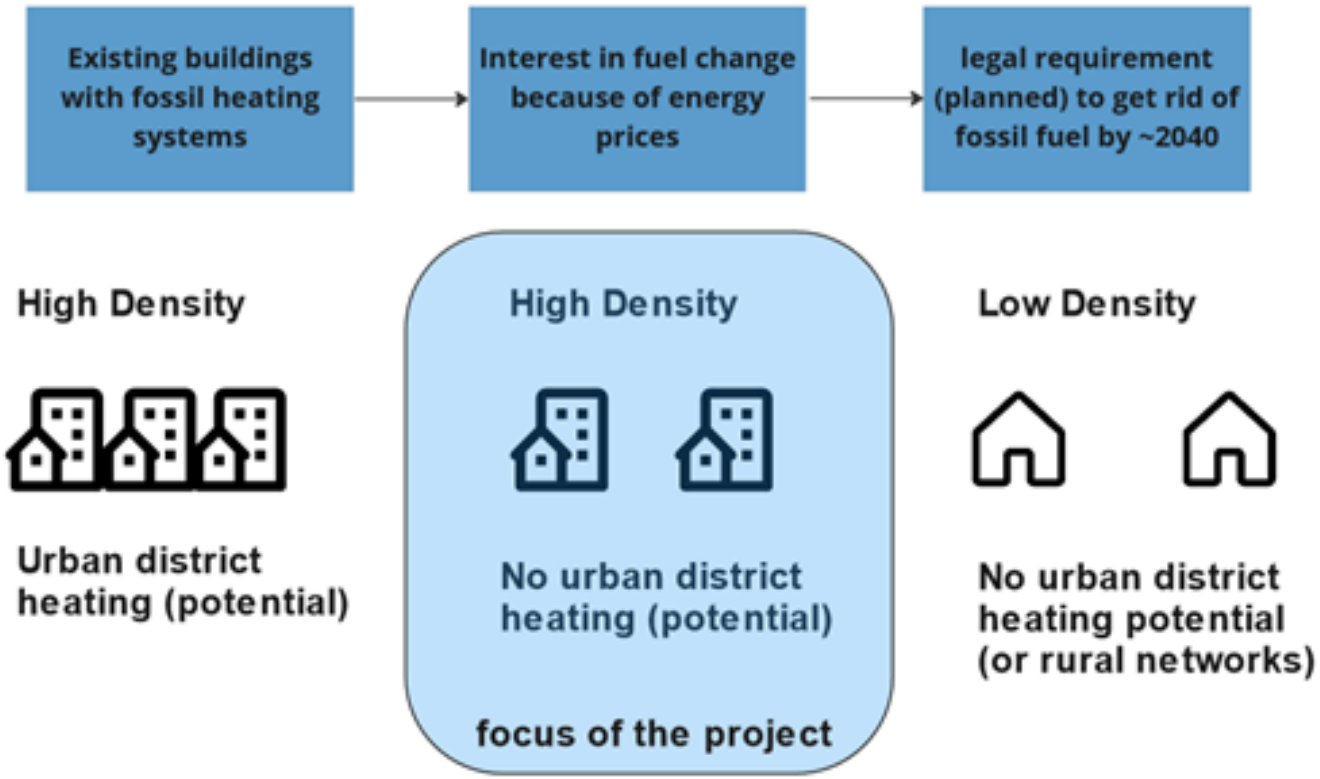
Example of terraced housing estate



- Housing cooperative
- Prevailingly decentral gas-fired floor heating, partly combined with stoves
- Great heterogeneity, as the heating systems were installed individually at different points in time



Typical MFH decarbonisation projects summarised

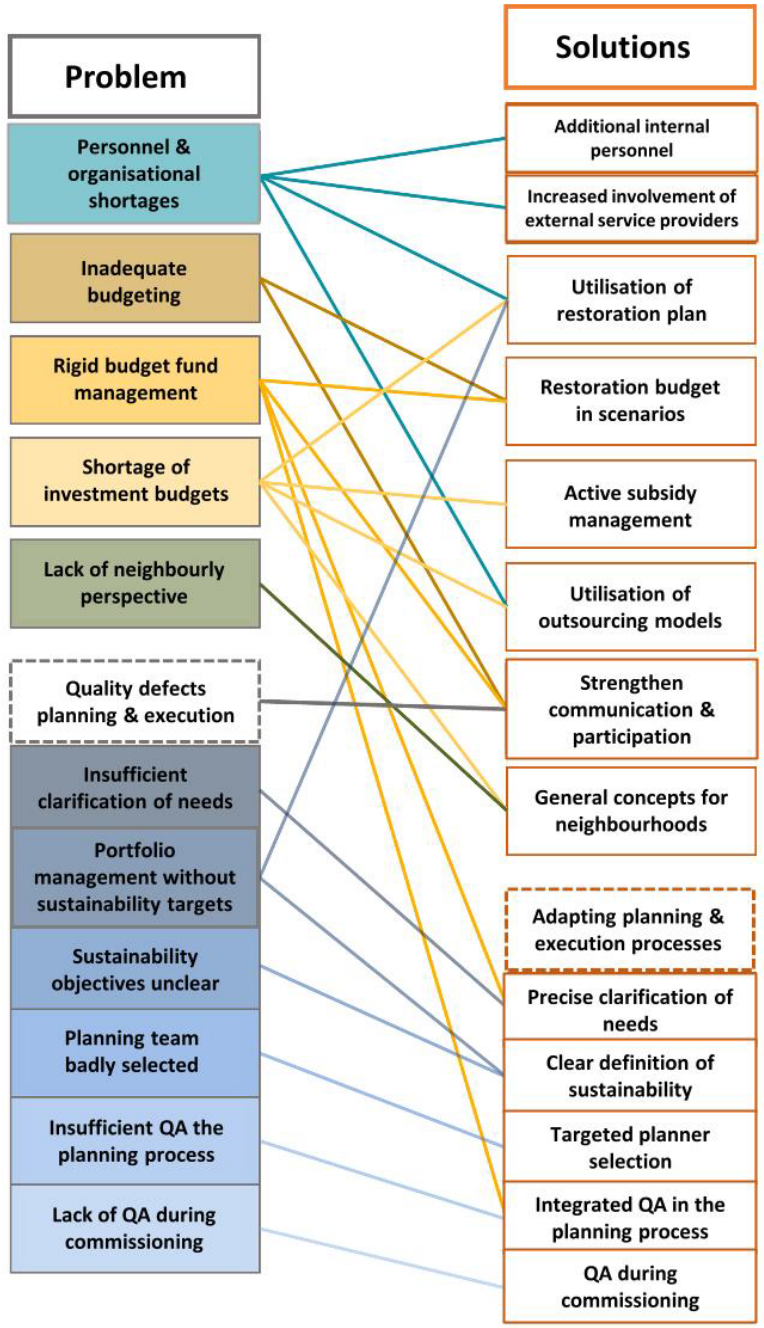


- High (to medium) density, but no district heating available
- Reduction of the temperature level
- Combination of replacement and centralisation of the heat supply and refurbishment measures
- Cost-benefit optimisation through cross-property solutions

Obstacles to self-realisation

- Personnel & organisational shortages
- Shortage of investment budgets
- Quality deficiencies in planning and execution

→ **ESCOs can offer attractive „outsourcing solutions”**



Technology package to be offered by the ESCO

Portfolio of technical measures → Composite of the **specific packages depending on the** requirements of the individual case:

- Thermal refurbishment of the building envelope (at least in part to reduce the temperature level)
- New heating supply – substitution of of gas-boiler
  - Deep drilling plus heat pump (brine-to-water)
  - Air source heat pump (supplementary or alternative)
- Construction of central heat distribution system
- Renewal of heat dissipation system (adaptation to reduced temperature level)
- Renewal of the hot water supply (e.g. via electric boiler)
- PV and/or solar thermal energy

Role of the ESCO: Standard and optional services

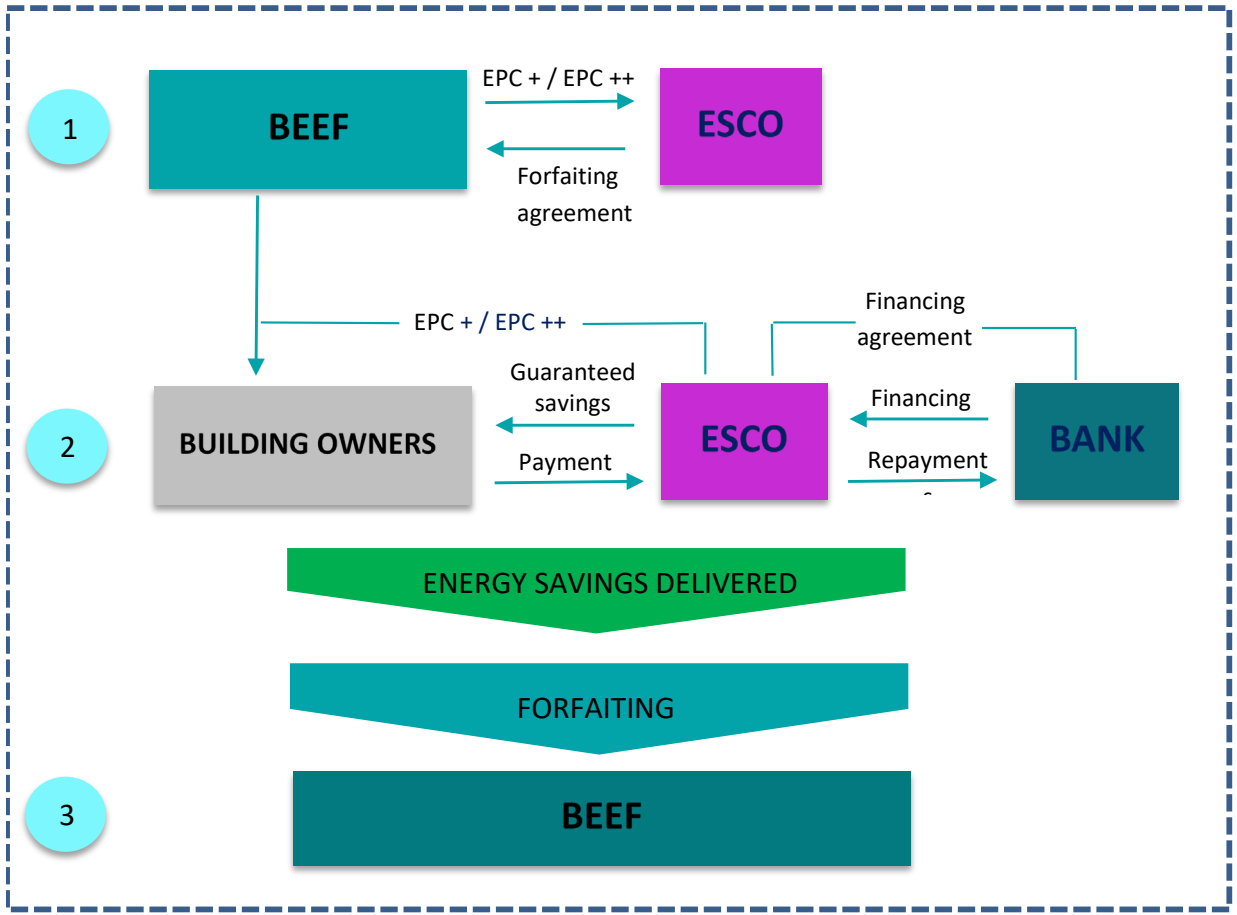
- **Standard service elements**
  - Planning, realisation, operation of the technical systems
  - Warranty service
  - Performance guarantee (promise of improved quality compared to self-implementation)
- **Optional service elements**
  - Financing
  - Construction services (or only quality assurance to a subcontracted construction company)
  - Debt collection

EES approached for the decarbonisation of MFH

- **Energy supply contracting**
  - Base price/measured price/labour price
  - Guarantee related to comfort standards, delivery quantity, price (with indexing)
- **Energy performance contracting** (revenues are linked to the savings achieved)
  - Only very few examples in residential sector (e.g. "BEEF model" as already in use in Latvia, Poland)
- **Combination:** Energy supply contracting combined with a savings guarantee that is linked to certain conditions or only applies to certain system limits

Good practice of EPC in apartment buildings

Building Energy Efficiency Facility ("BEEF")



- Comprehensive building refurbishment as a service using refinancing of long-term receivables
- SPV, which is managed by specialised fund managers.
- The contract term is between 20 and 30 years.
- Focus on the residential building sector.

Challenges related to applicable housing law

- The housing sector is subject to strict legal regulations aimed at achieving a fair balance between building owners and users
- This often leads to legal barriers, particularly in the case of capital-intensive investments that are subject to the investor-user dilemma
- Market segmentation depending on applicable housing law: the case of Austria

Tenancy law	Condominium law	Housing cooperative law
• Gründerzeit buildings (40% of MFHs with gas heating are Gründerzeit buildings) • Investor-user dilemma • Decarbonisation investment always require good collaboration beween landlord and tenants	• Challenging decision-making process • Usually no investor-user dilemma (except in the case of a high proportion of subletting) • Social challenges (e.g. older residents) • Modular offers	• No (large) market potential for ESCOs - more likely in-house realisation, as cooperatives usually have sufficient financial resources and their own construction departments

Will energy efficiency services be able to boost decarbonisation investments in multifamily houses?

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Promising market segment, but…

- **… public support required** to cover the high transaction costs **in the pre-project phase**
  - Communication process with residents
  - Development of an approach that can be implemented under housing law
  - Technical assistance to the process of selection of most suitable ESCO
- **… ESCOs must develop further** in order to be able to provide **attractive offers for MFHs**
  - Some technologies that have hardly been used in EES projects yet (e.g. deep drilling, low temperature systems, etc.)
  - Access to long-term and attractive financing enabling project durations of 30+ years (e.g. refinancing models)
  - Development of suitable EES models with guaranteed savings for the apartment buildings, preferably including cross-property solutions

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Ingenieurbüro für Energie- und Umwelttechnik

Walcherstrasse 11/43, A-1020 Wien

Tel.: +43 1 907 80 26

www.e-sieben.at

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