



A Strategy for the Efficient Renovation of Germany's Building Stock

The Individual Renovation Roadmap

06.06.2013 / Dr. Martin Pehnt (IFEU),
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ecee Summer Study





STRATEGIE FÜR EINE WIRKUNGSVOLLE SANIERUNG DES DEUTSCHEN GEBÄUDEBESTANDES



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[Gaßner, Groß, Stedter & Coll.]
Partnerschaft von Rechtsanwältinnen

Ulf Sieberg

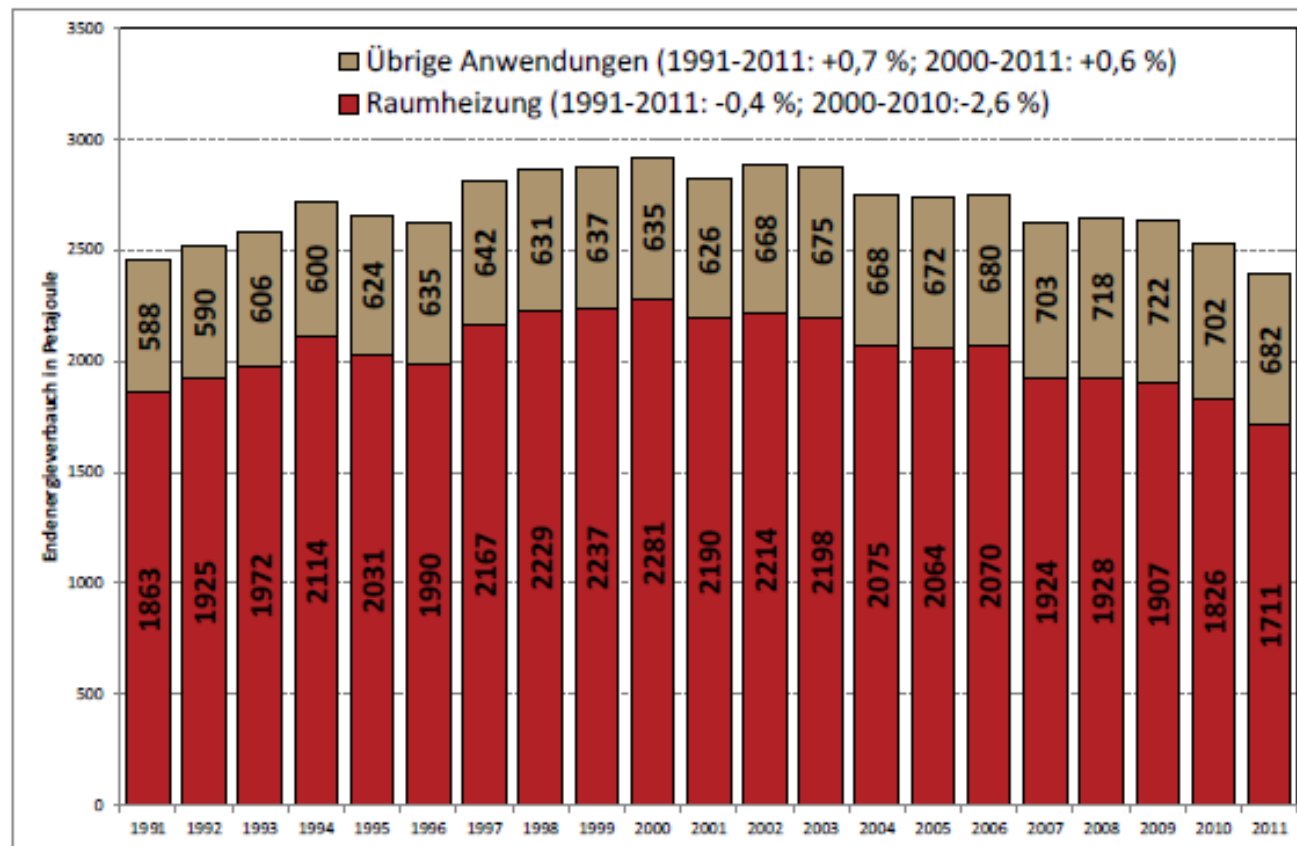
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Final Energy Demand of Households [PJ]

Demand for space heating went down significantly in the last decade, despite an increase in living space of 25 % since 1991.

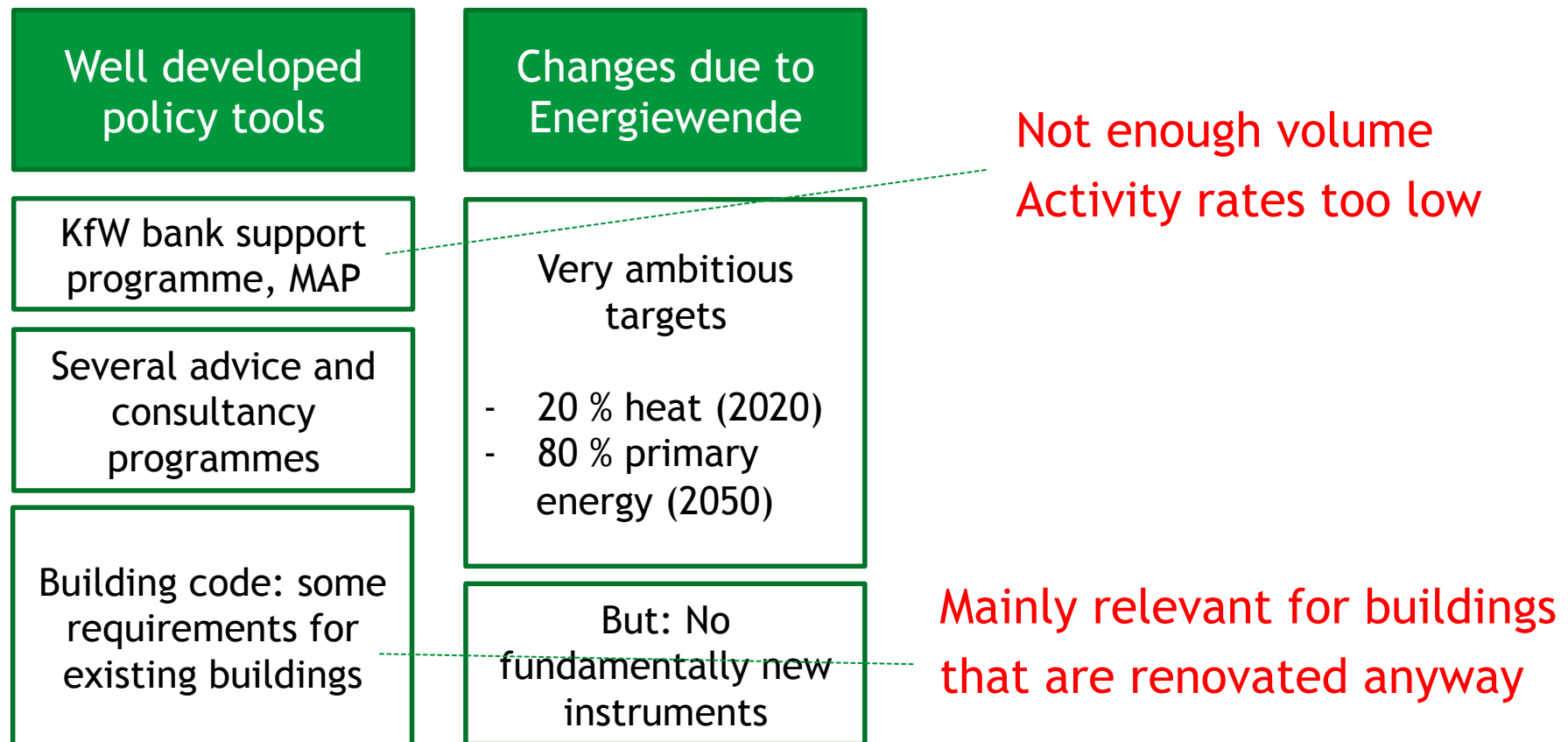


Other

Space heating

The building sector ... and the „German Energiewende“ (Energy transformation)

Good starting conditions ... but not good enough.



The building sector ... and the „German Energiewende“ (Energy transformation)

Good starting conditions ... but not good enough.

Well developed policy tools

KfW bank support programme, MAP

Several advice and consultancy programmes

Building code: some requirements for existing buildings

Changes due to Energiewende

Very ambitious targets

- 20 % heat (2020)
- 80 % primary energy (2050)

But: No fundamentally new instruments

Many new policy ideas

- Further development building code
- New enforcement strategy
- Legal entitlement to financial support
- Environmental rent index
- Tax instruments
- CO₂ adjustment of fuel tax
- Activating property administrators...
-



Energy demand of buildings

in a long-term perspective

- No long-term, easy-to-communicate perspective for building owners with continuous incentives to consider renovations

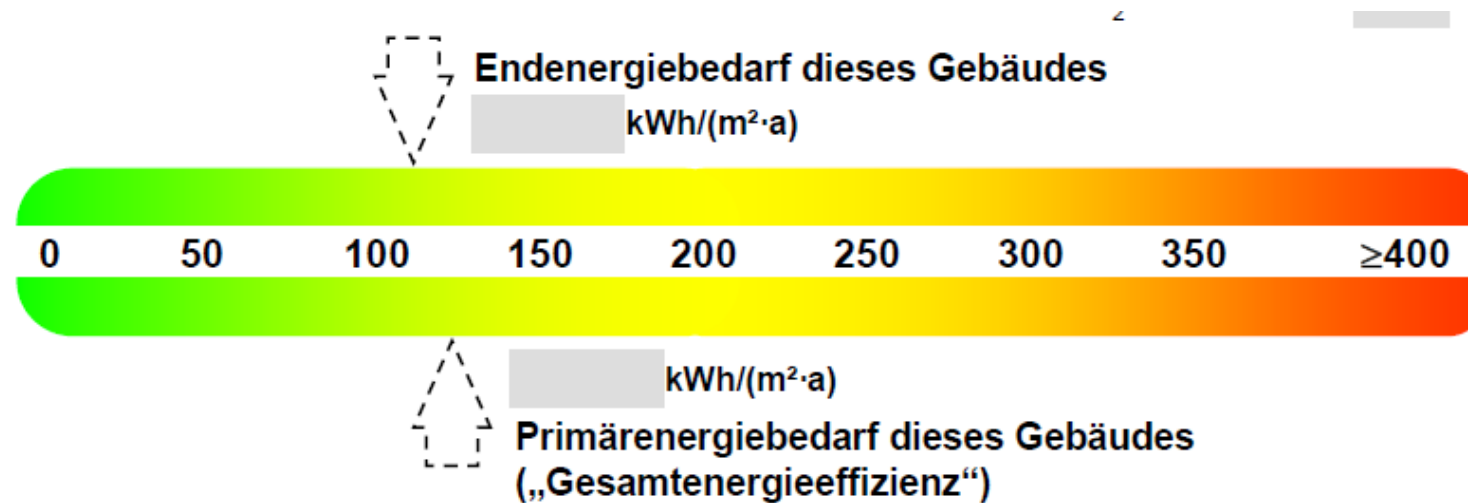
→ „Individual Renovation Roadmap“
(„gebäudeindividueller Sanierungsfahrplan“)

2050



Component 1: Create transparency with regarding the status quo of the building

by introducing an efficiency label based on the envelope and the HVACR





Component 1: Create transparency with regarding the status quo of the building

by introducing an efficiency label based on the envelope and the HVACR

Energie-Pass (Skizze)

Straße
Ort
Gebäudetyp
Baujahr

Pflichtgasse 1
69120 Heidelberg
Einfamilienhaus
1954

Gesamt-energieeffizienz

hohe Effizienz

geringe Effizienz

Effizienz Gebäudehülle

Effizienz Anlagentechnik

Gesamt-Effizienzklasse

Endenergie
für Heizung und Warmwasser
in kWh pro m² Wohnfläche und Jahr

beheizbare Wohnfläche
*Alle Angaben berechnet mit Standardrahmenbedingung

Platz für Formalien (Aussteller, Datum etc.)

Energieträger
Kennzahl

Erdgas
173

150 m²

Klasse Gebäudestandard

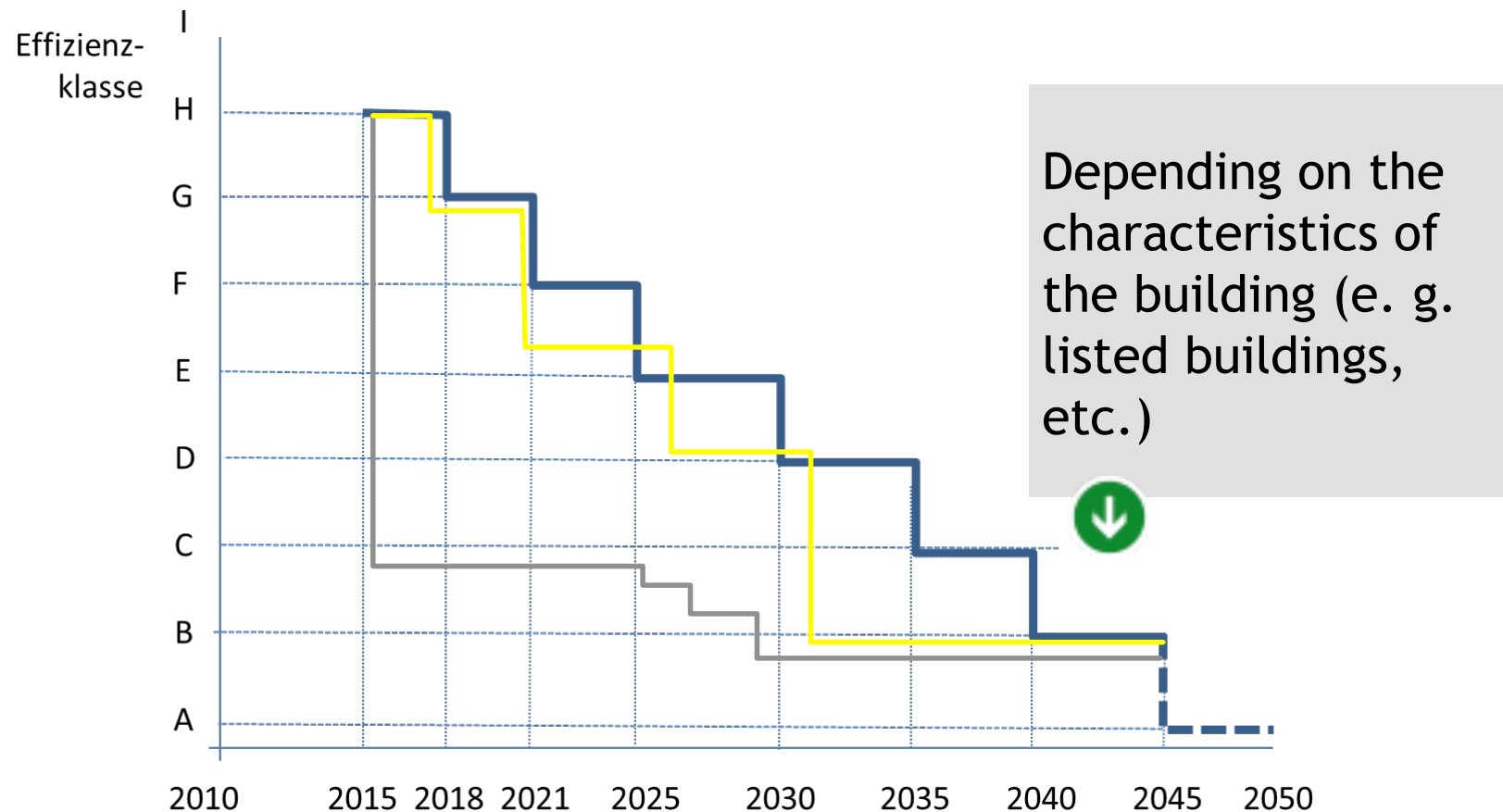
A	Effizienzhaus 40, Passivhäuser	A ⁺ (Plus-Energiegebäude)
B	Effizienzhaus 55 /	B ⁺ (Plus-Energiegebäude)
C	Effizienzhaus 85, Effizienzhaus 55 mit Wärmepumpe	
D	EnEV 2009 Neubau und Effizienzhaus 115	
E	EnEV 2007 Neubau (EFH), teilsanierte Bestand-MFH	
F	EFH nach WSV 1984, teilsan. Bestand, unsanierte GMFH	
G	unsanierte kompakte MFH, teilsanierte EFH	
H	unsanierte EFH/ZFH	
I		

Based on the GHG coefficient (e_{CO_2})

Based on specific thermal heat and cooling requirement q_H



Component 2: Define a long-term target for the individual building



Component 3: Communicate the Roadmap to the Building Owner within Building Energy Audits

- Communicate advantages and disadvantages of deep and staged renovations (compare LC costs, GHG emissions, ...)
- Define appropriate **orders** in which the renovation measures are taken
- Point to potential lock-in effects of partial renovations (**compatibility with target**) and to **interfaces** with future renovation requirements (long list of be-aware-ofs)
- Create **enthusiasm** for the long-term perspective
- Incorporate the Renovation Roadmap into a wider **campaign**





Component 3: Energy Audits

Detached House: Obere Kirchgasse 26

STATE

Efficiency
rating
G



Unrenovated old
building with old
boiler

Reason

Time frame

TARGET

Efficiency
rating
B

2013

20xx

Remarks: The best approach is to replace the boiler after the building's insulation. As boiler has to be replaced, financing options for complete renovation should be examined.



Component 3: Energy Audits

Detached House: Obere Kirchgasse 26

STATE

Efficiency
rating
G

Complete renovation



Unrenovated old
building with old
boiler

Reason

Time frame

2013

TARGET

Efficiency
rating
B

Total

Investment
costs
62'000€

CO₂ Red.:
X t p.a.
Cost Red.:
x € p.a.

• Boiler
exchange
• Roof
renovation
• Facade
• Windows
• Perimeter
insulation

Efficiency
rating
B

Investment
costs
62'000€

CO₂ Red.:
X t p.a.
Cost Red.:
x € p.a.

20xx

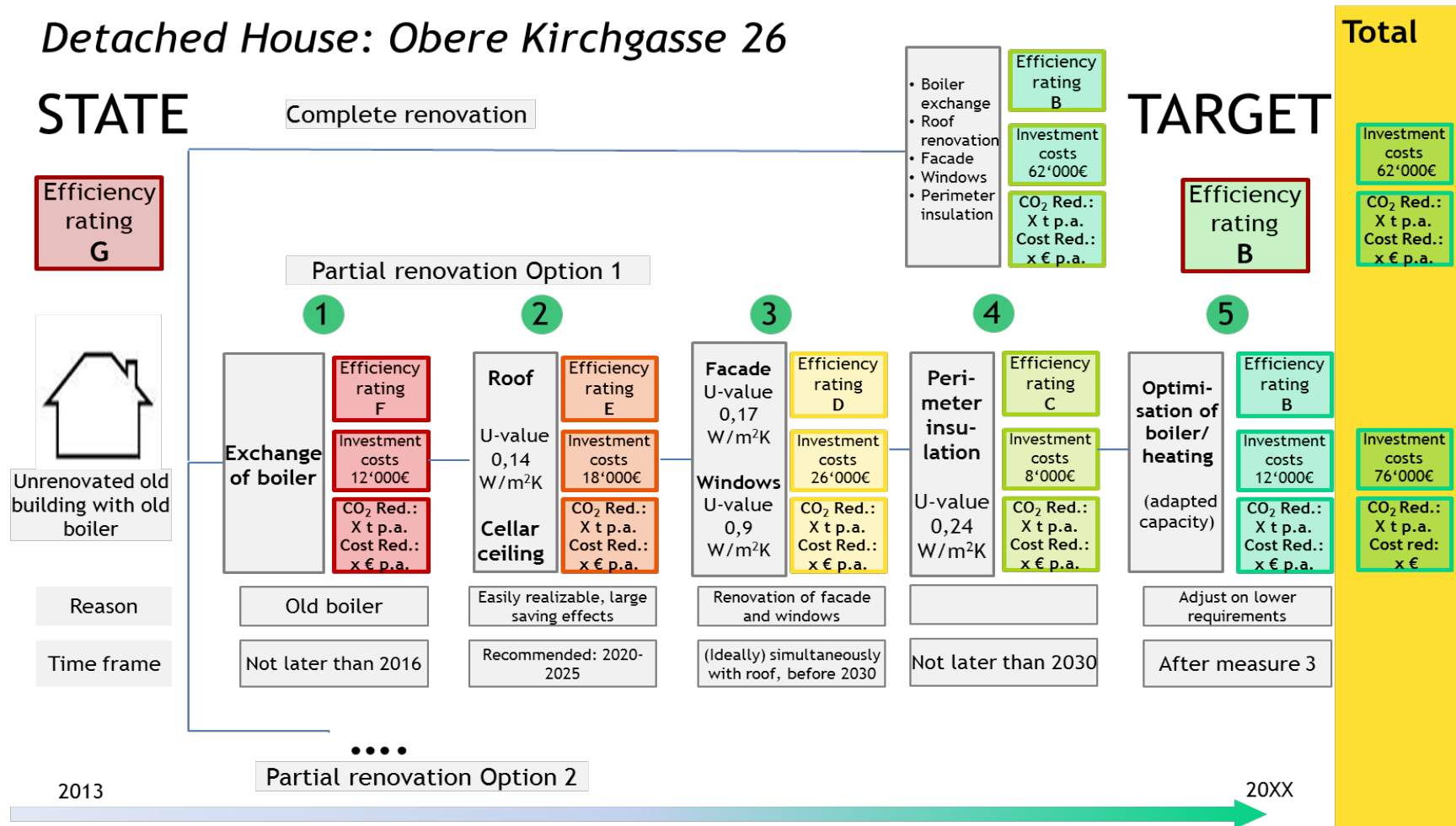
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Component 3: Energy Audits

Detached House: Obere Kirchgasse 26

STATE



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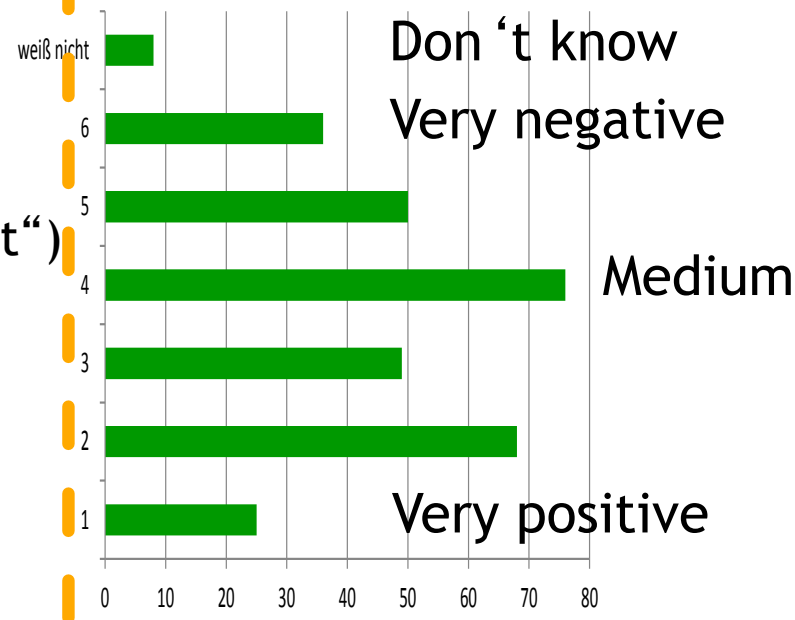


Inclusion of a Renovation Roadmap in Audits

Since July 2012, the publicly funded Audit Programme („Energieberatung vor Ort“) requires a streamlined version of the renovation roadmap.

IFEU survey among 400 energy consultants

How do you evaluate the new renovation roadmap?



Consequences

- Consider the circumstances of the building owner (age, financial, willingness,)
- Provide the energy consultants with very attractive material to include in the audit reports to reduce their reluctance
- Adjust the consultancy software
- Train the consultants

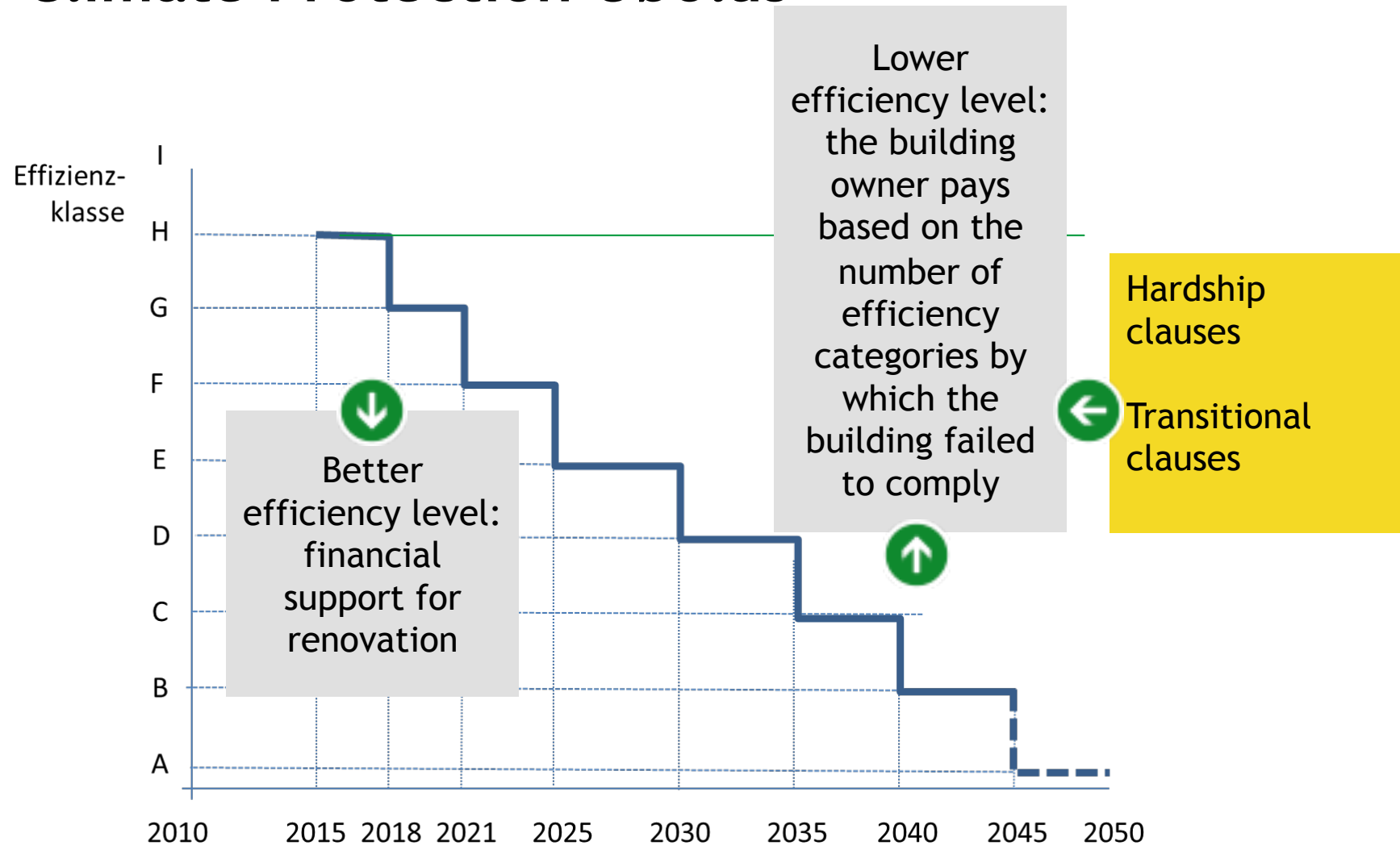


Component 4: Create Continuous Incentives to Reconsider Renovation using the Renovation Roadmap

- **Short-term:** Include the Renovation Roadmap in current legislation
 - Example State of Baden-Württemberg: Discussion if the **Renewable Heat Use Obligation** requirements can be partially fulfilled by renovation roadmap (e. g. when using biomethane; or 10 % solar heat instead of 15 %)
- **Mid-term:** Introduction of a „Climate Protection Obolus“



The Climate Protection Obolus



„Soft start“: long deadlines, qualification phase for auditors, rising obolus



Level of the obolus

- The amount of the obolus for the protection of the climate should be high enough to have a more than just symbolic effect (i.e. to work as an incentive).
- On the other hand, the obolus must not be too high as to cause a high number of cases of hardship.
- Based on
 - the saved CO₂ emissions and their “market value” or
 - on the costs caused by their damage; assuming 70 €/t: 0.2 (B-C) to 4 €/sqm/year (G-H)
 - or on the required funding for renovations or
 - ...

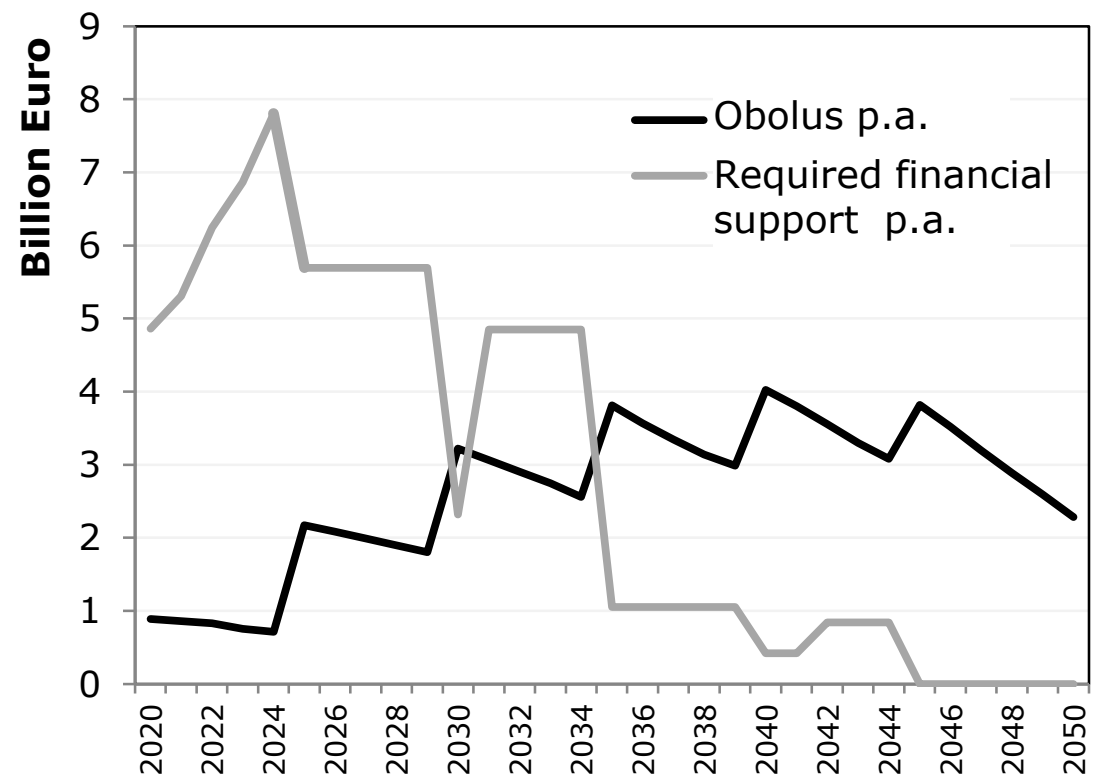


Sample calculation of obolus and required financial support for KfW bank schemes

Assumption: obolus of 0.5 Euros/sqm/year for the first renovation level not adhered to, increasing to 5 Euros/sqm²/year for six failed levels

Generated cumulative volume: approx. 50 billion € until 2050.

Required financial support: 70 billion Euros (cumulative) until 2050.



Advantages of climate protection obolus

- Addresses equally deep retrofits and partial retrofits while opening the long-term perspective
- No forced renovation, but constant choice between obolus and retrofit
- Allows budget independent funding source for retrofit
- The building owner is addressed → lowering the landlord-tenant dilemma
- Reversal of evidence: only those buildings have to prove efficiency label which want to be excepted from obolus
- Capable of being integrated in Art. 7 EED framework



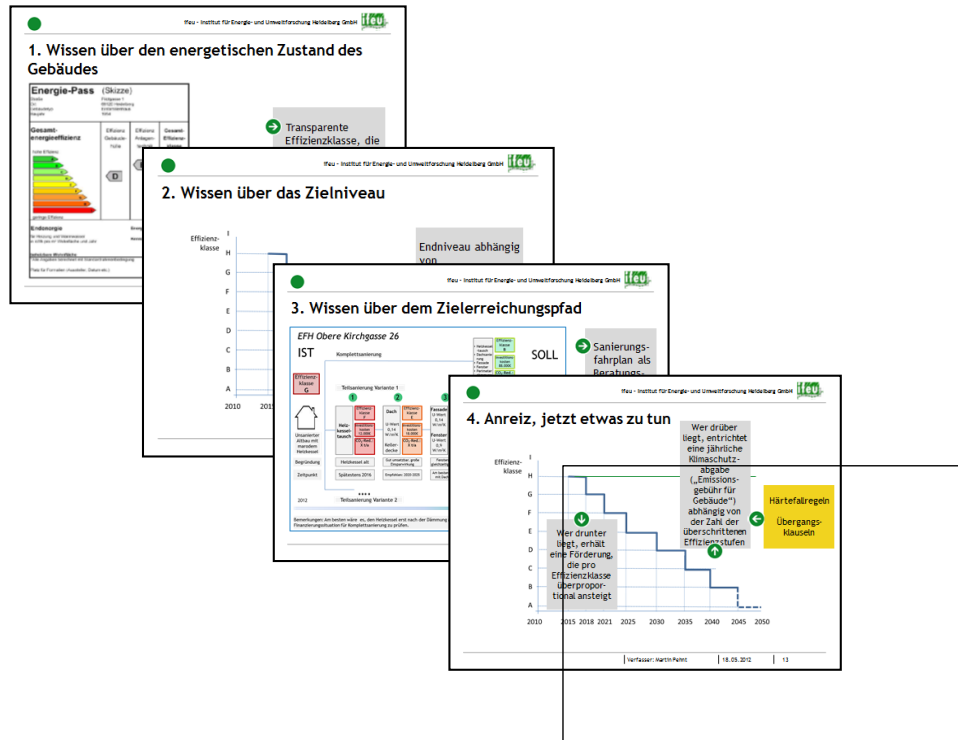
Disadvantages of the Climate Protection Obolus

- Higher efforts due to individual building relation
 - Must be combined with property tax combination to lower transaction cost
- Long-term stability of the law?
- Long-term technical robustness
- Quality of energy audits gain an overproportionally high importance
- Hardships must be regulated





Components





Thanks!



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