



enercity



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23.10.2019

**passive house for everyone -
comfortable and affordable**

region and city of hanover

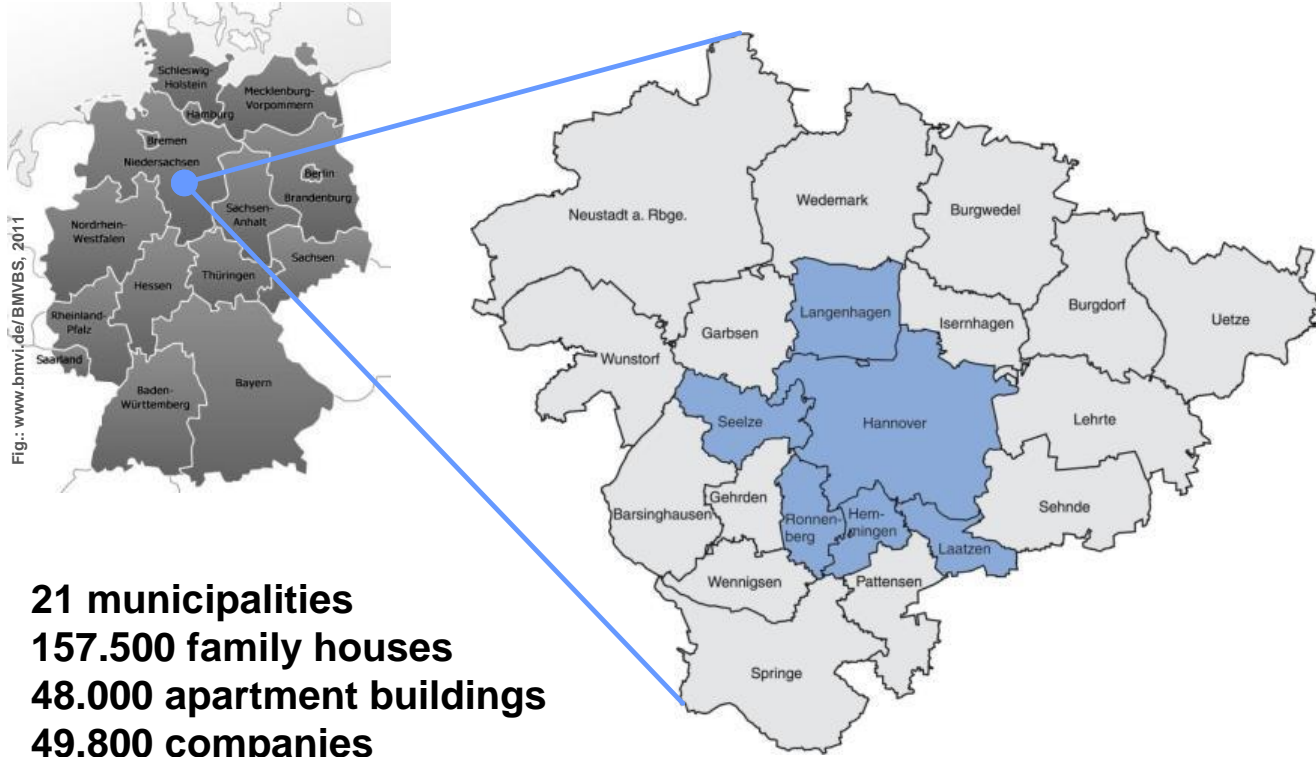


Fig.: www.bmvi.de/BMVBSt, 2011

21 municipalities
157.500 family houses
48.000 apartment buildings
49.800 companies
1.2 million inhabitants (ca. 520.000 City of Hanover)

proKlima – fund a partnership since 1998



proKlima area = net grid area
of energy supplier “enercity Stadtwerke Hannover AG”

partnership of proKlima since 1998



push

with financial
incentives to
owners



inform

information and
training:
to owners, architects,
ingenieurs and
construction workers

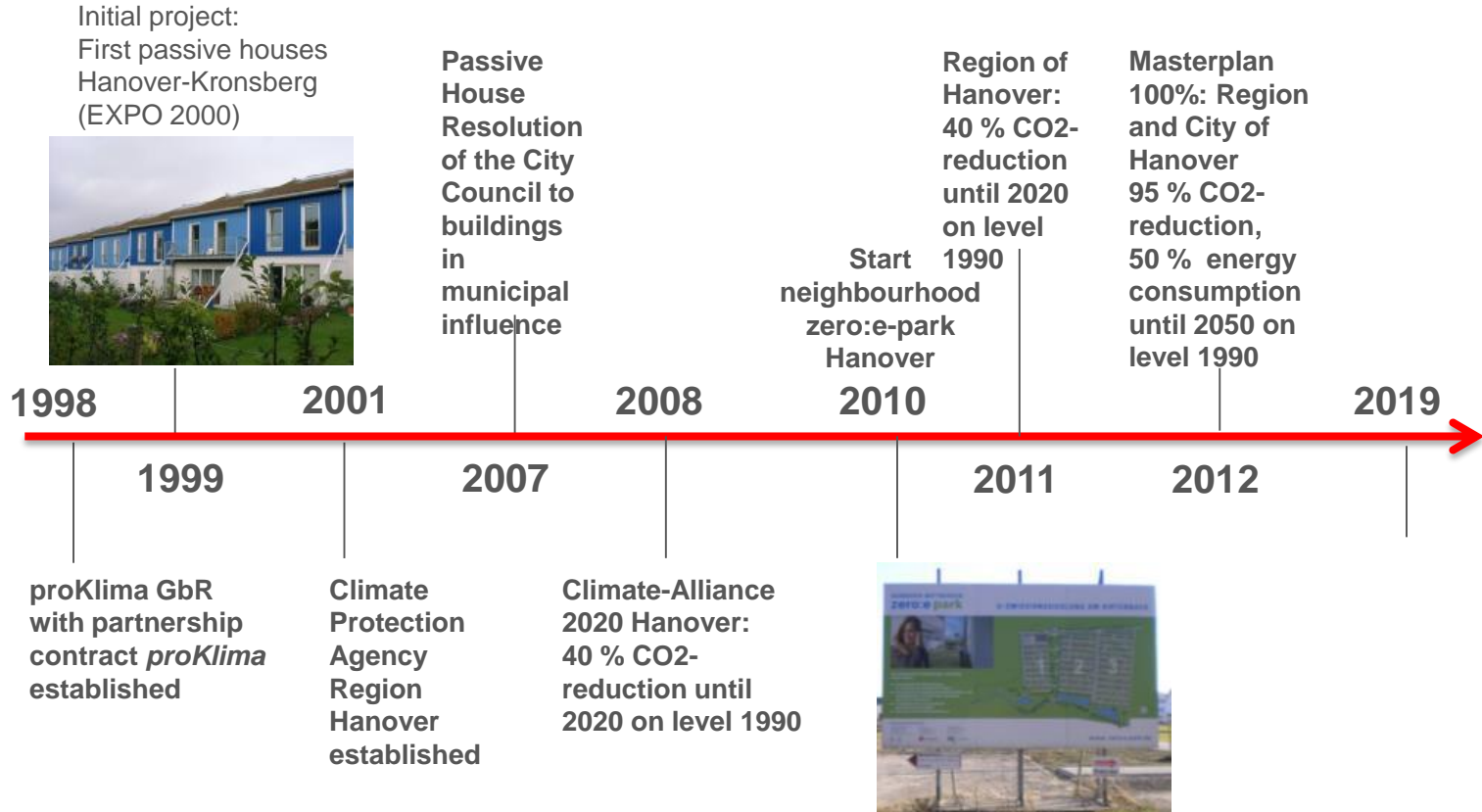


pull

organisation of
quality assurance
process

+ build up expert knowlegde → involved in energy studies

milestones over the past 20 years



proKlima subsidy programmes 2019



400 TEUR



800 TEUR



150 TEUR

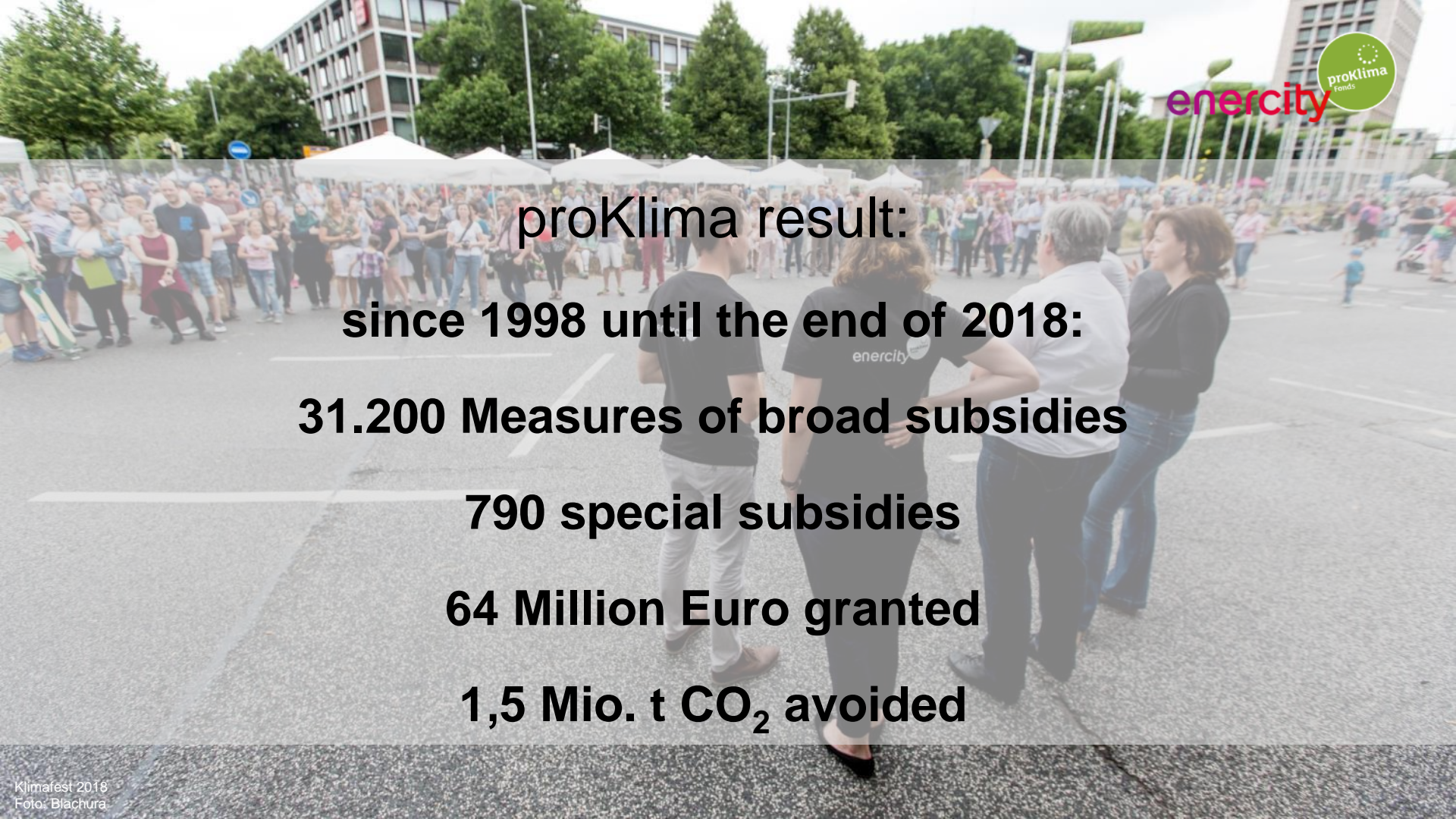


150 TEUR



50 TEUR

budget 2019 in total: 1,8 Mio. EUR



proKlima result:
since 1998 until the end of 2018:
31.200 Measures of broad subsidies
790 special subsidies
64 Million Euro granted
1,5 Mio. t CO₂ avoided

a small selction of the non-residential passivhouse-buildings in Hanover



a small selection of the residential passivhouse-buildings in hanover



Fotos: proklima / Foto: Aussieker, P. Mahlstadt, Langrade, Seifert

a small selection of the modernisations with passivhouse-components in Hanover



efficiency increase in 50 years



VW Käfer

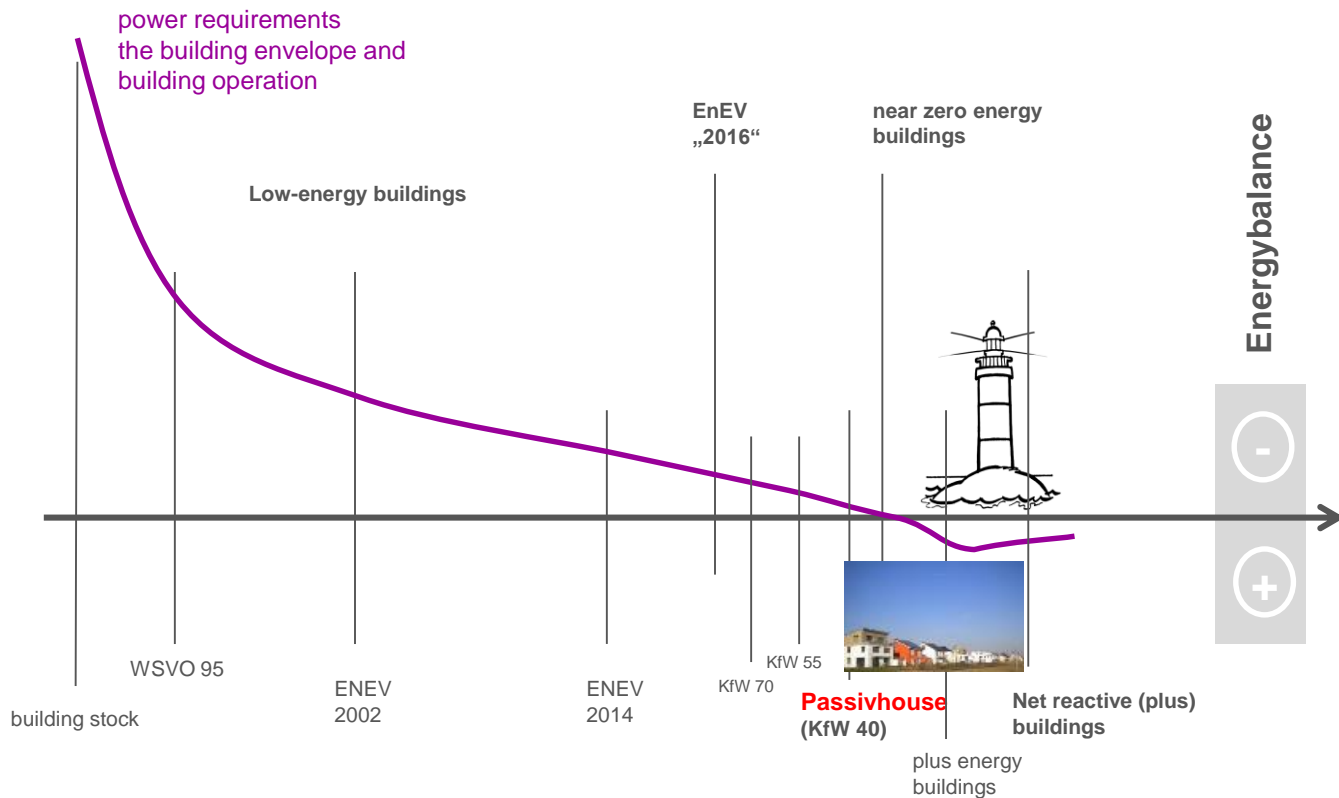
BJ 1955 , 739kg, 30PS, 110 km/h
Verbrauch: 7,5l/100km



VW Beetle

BJ 2005 , 1200kg, 75PS, 160 km/h
Verbrauch: 7,1l/100km

building efficiency increase in 50 years

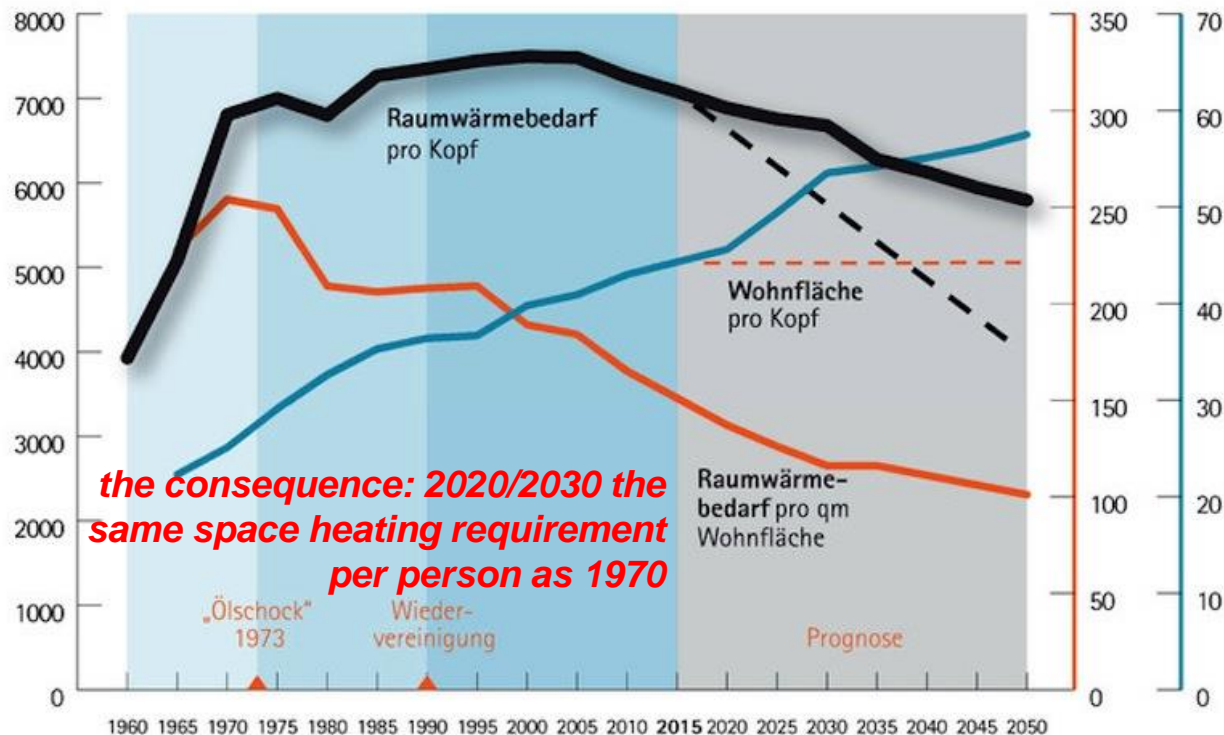


more efficiency – on more and more space!

space heating demand
per person (kWh/a)

space heating demand
per m² living space (kWh/a)

Living space
per person (m²)



Think living differently

more efficiency

more renewables

smaller

SIMPLER

more communities



building data

building type

New building with 13 flats, 6 family apartments, 5-group kindergarten as well as 3 commercial units

energy reference area

870 m² Kita

586 m² commercial

2.720 m² living space

project costs

8,9 Mio. €

proKlima promotion

205.000 €

standard of efficiency

KfW Efficiency House 40

passive house

building parameters

Heat demand according to PHPP balance 10 kWh/(m²a)



Möhringsberg
Foto: Woltersmann

building data

draft

4-storey block construction with recessed staggered storey and partial basement: The day care centre on the ground floor extends into the inner courtyard. There a generously designed playground opens up for the children.

structure

The load-bearing structure in the 4 full storeys is formed by reinforced concrete ceilings and sand-lime brick walls. The staircases are made of sand-lime brick for bracing.

The staggered storey is a wooden construction.



building envelopes

exterior walls: U-value 0.12 W/(m²K)

Element facade as prefabricated timber construction with 24 cm mineral wool filling, inside with OSB planking, outside cement-bonded chipboard, on top 6 cm composite thermal insulation system.

Inside installation level with 6 cm insulation and plaster board.

Other solid wall areas are designed with 24 to 30 cm mineral wool thermal insulation composite system.

U-value=0.12 to 0.15 W/(m²K)

windows: U-value 0.7 W/(m²K)

highly efficient passive house windows with 3-pane glazing, in the ground floor aluminium frame, in the upper floors plastic frame
g-value 0,54



building envelope

roof and base

Staggered storey: U-value $0.09 \text{ W}/(\text{m}^2\text{K})$

16 cm board stacking ceiling with average 33 cm gradient insulation of expanded polystyrene and bitumen sealing

Flatroof concrete: U-value $0.09 \text{ W}/(\text{m}^2\text{K})$

20 cm reinforced concrete ceiling with average 33 cm sloped insulation of expanded polystyrene and bitumen sealing

Base plate: U-value $0.14 \text{ W}/(\text{m}^2\text{K})$

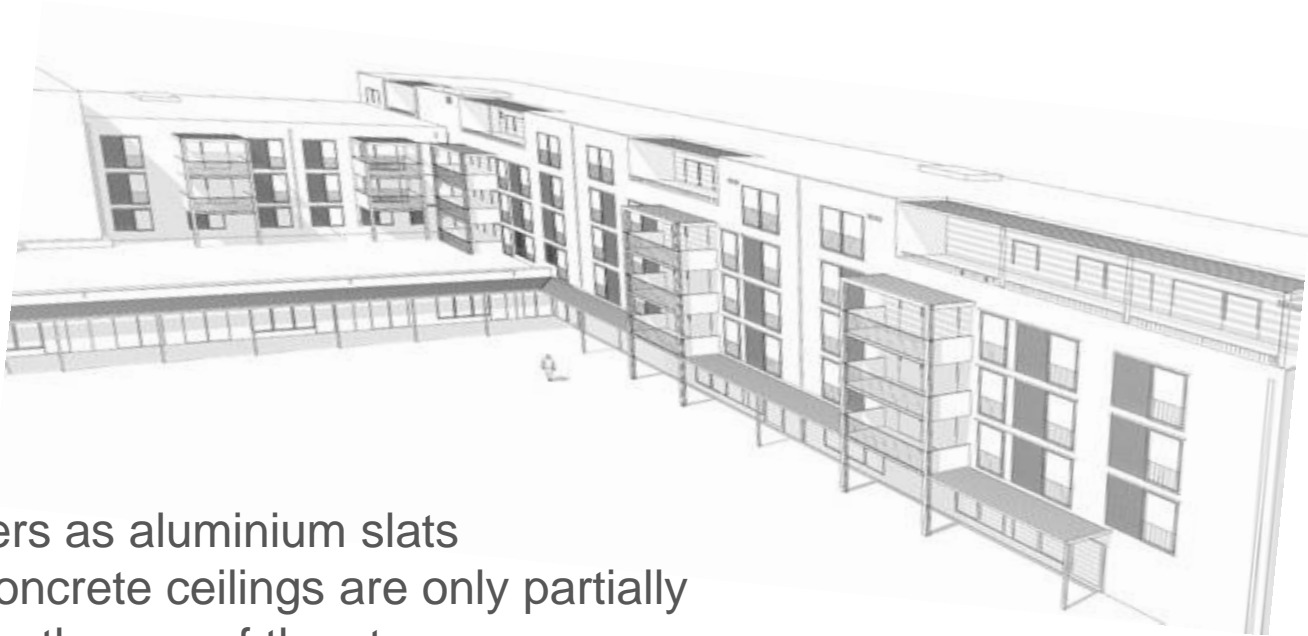
20 cm reinforced concrete floor slab with 16 cm extruded polystyrene insulation on the underside, 9 cm floating screed insulation on the top

Cellar ceiling: U-value $0.14 \text{ W}/(\text{m}^2\text{K})$

20 cm reinforced concrete ceiling with 16 cm insulation at the bottom, 9 cm insulation at the top on floating screed



summer comfort



- Sliding shutters as aluminium slats
- Reinforced concrete ceilings are only partially suspended for the use of the storage mass.
- The ventilation system is equipped with a summer bypass to bypass heat recovery.

Quelle: h2a-hannover

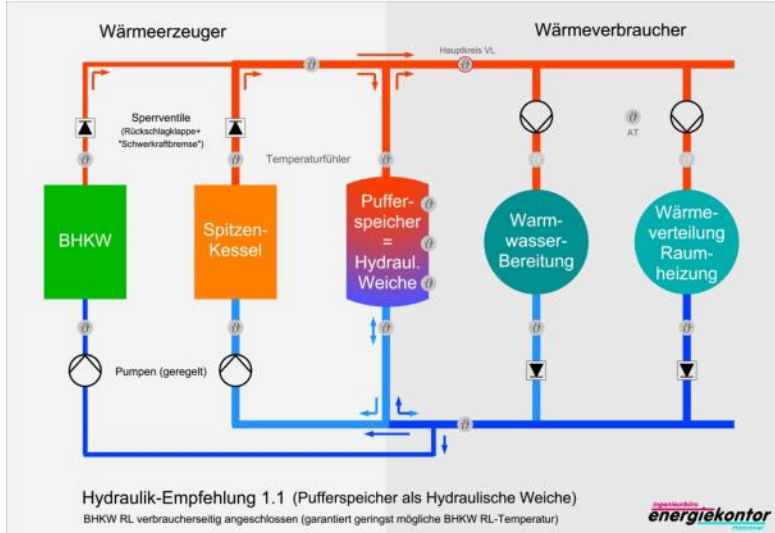


Ventilation:

Apartments: Residential central systems with volume flows from 100 to 300 m³/h, heat supply rate 84%.

Kita: zone by zone ventilation with heat recovery, volume flows from 435 to 1,370 m³/h

Trade: 3 ventilation systems with heat recovery per usage unit, 150 m³/h, 450 m³/h and 920 m³/h



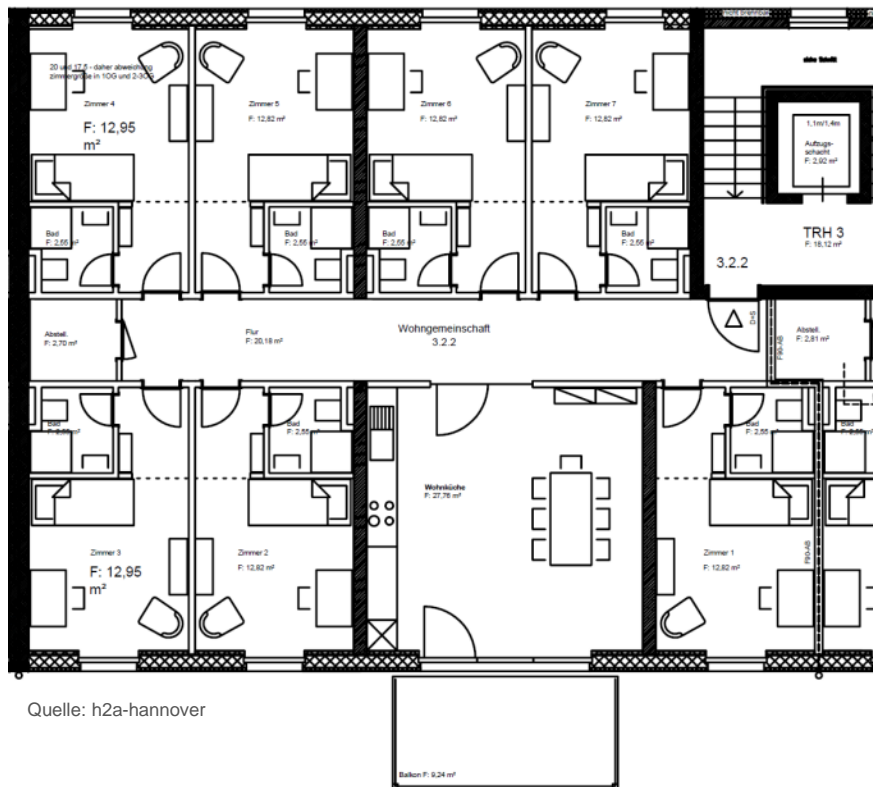
Heating system:

central heating and hot water preparation by means of CHP + peak load boiler, 8 to 16 kWel, 22 to 36 kWth

Power generation:

CHP and PV plant

low living space per person and...



Quelle: h2a-hannover

...rent including heating

- no billing of heat consumption with the users
- exemption from the heating costs ordinance
- justification: investment in measurement technology is uneconomical.

renting warm and bright in a passive house

- social, because the user has fixed and therefore calculable costs
- social, because administrative tasks can be omitted in favour of active customer management
- economically reasonable if the heat and electricity costs lead to contribution margins in the property
- economically sensible, if the previously consumption-dependent heating costs are financed by transfer payments

it has to get easier!
technically everything is possible





think differently...

highest efficiency for buildings!

the most sustainable building, is the building that is never built!

we have to be careful with our landscape and nature. we have already sealed too many areas with streets, parking lots, houses and other things of civilization!

think about new forms of living! thanks for your attention!