



Federal Ministry
for Economic Affairs
and Climate Action



MITTELSTAND
GLOBAL
ENERGY SOLUTIONS
MADE IN GERMANY

Energy efficiency in buildings

Ludwig Rongen

RoA RONGEN ARCHITECTS
PartG mbB

Zagreb 2022-09-13



Facilitator

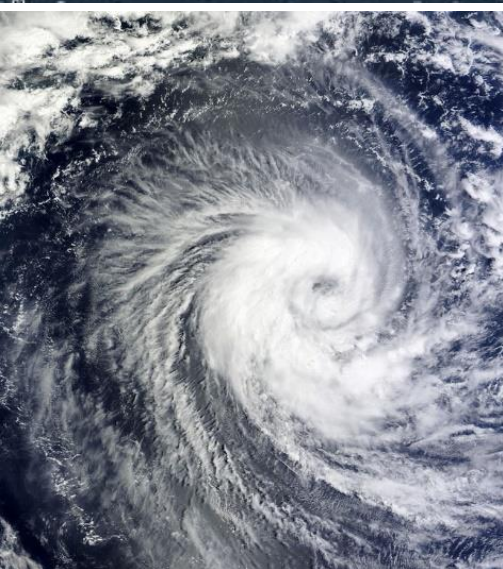
It has long been undeniable:

The currently

...and unfortunately still longer time continuing...

GREATEST THREAT to mankind is

...



climate change!!!

Reducing CO₂ emissions
means first and foremost

ENERGY SAVING!

The *Passivhaus* has long been
recognized highest standard in energy-saving building construction worldwide
...
but also *this*
must continue to develop!

The future energy supply will come from renewable energy sources!!



wind



water



sun



earth

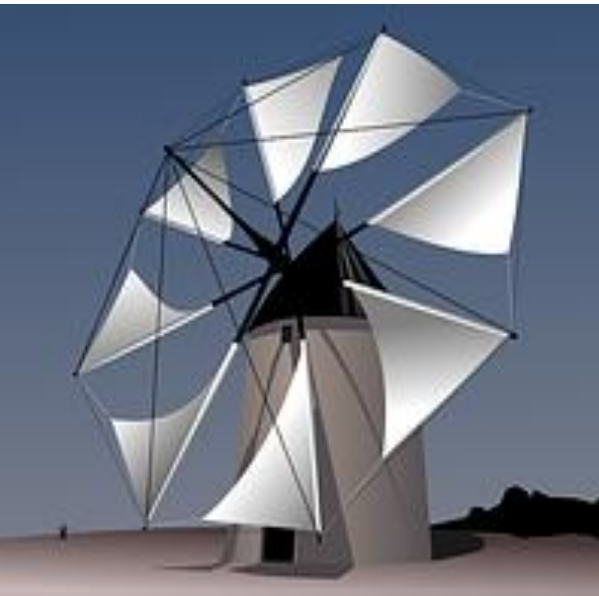


...which at best are generated
where they are also consumed!

maximum energy excess with minimum self-consumption



RENEWABLE ENERGIES



STORAGE TECHNOLOGY





Avoid hazardous waste!!!



Reusable / renewable building materials

CLIMATE AND ENVIRONMENTALLY FRIENDLY... **RESOURCE-SAVING**... FORWARD-LOOKING



Resource-saving
water consumption
!!!





Every day in Germany,
around 54 hectares of land
are designated for new settlements,
and
new land is designated.

Land consumption
approx. 76 football fields

gettyimages
simonkr



76 football fields per day !!!

gettyimages
David Madison



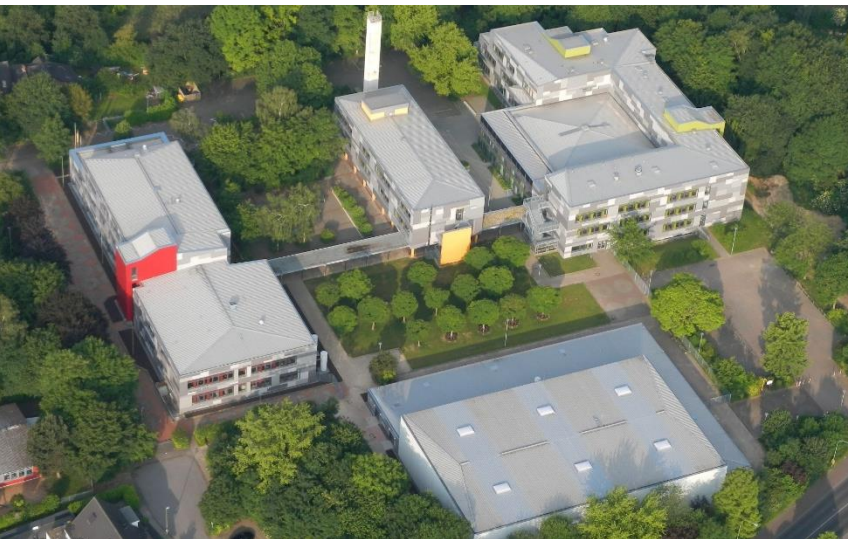


Unsealing of surfaces
Improvement of microclimate
Reduction of particulate matter
Increase in quality of stay



<https://www.istockphoto.com/>

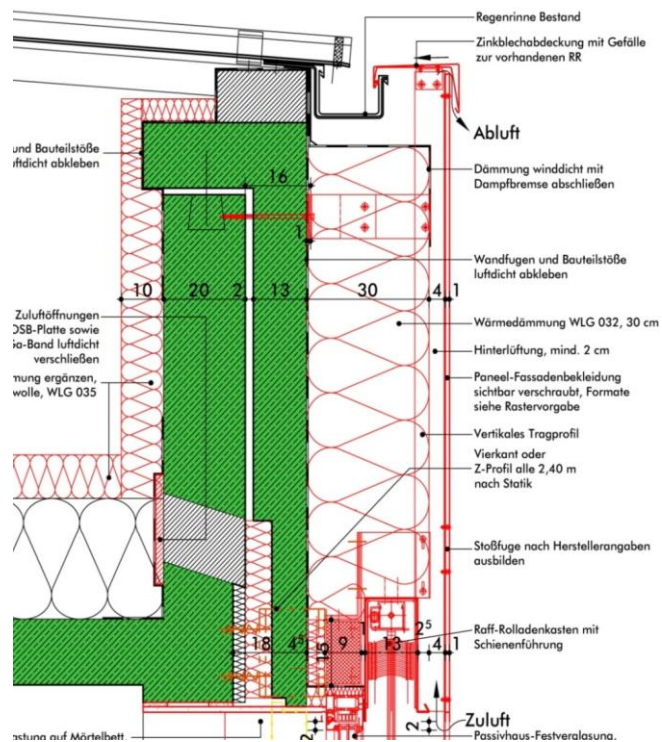
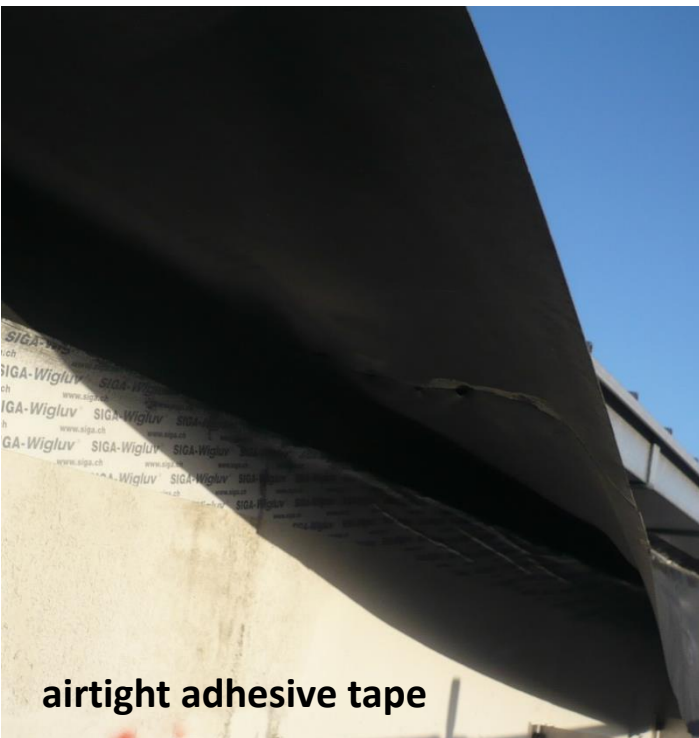
...nor should we be indifferent to where the good U-value comes from

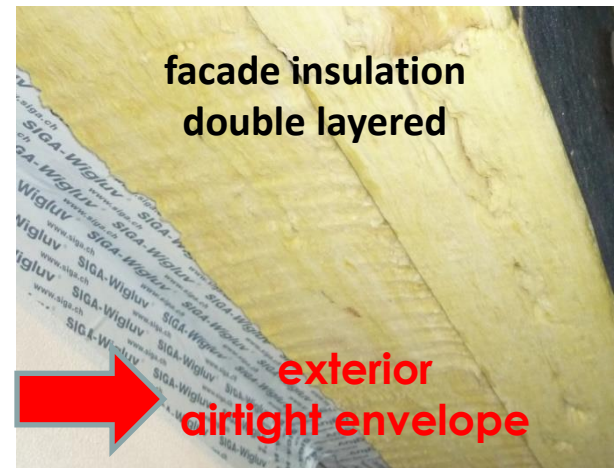
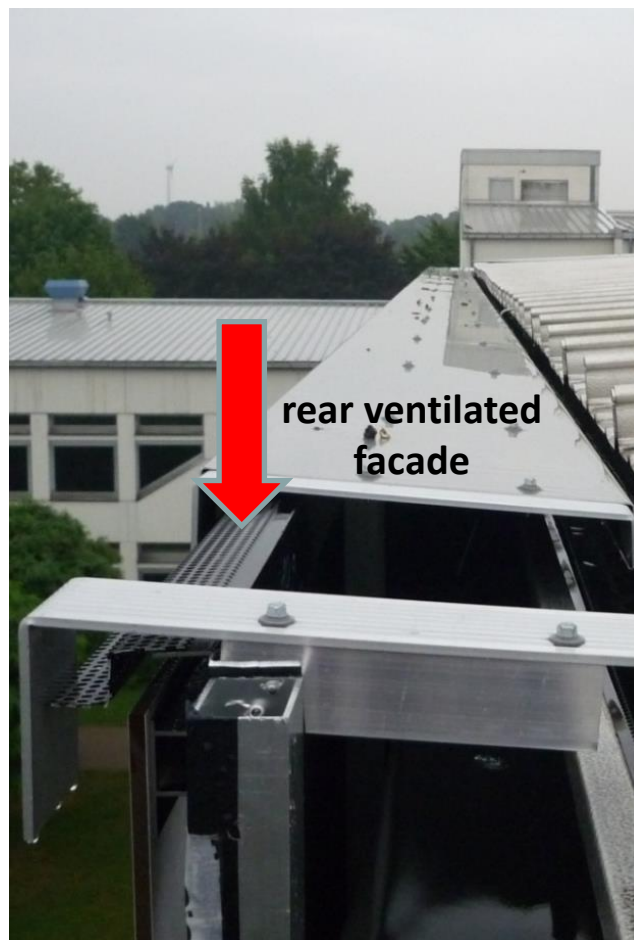


High school, Baesweiler (Germany) Energy-optimizing refurbishment to *Passivhaus*-Standard for New Buildings

Building sections 3 + 4 before refurbishment







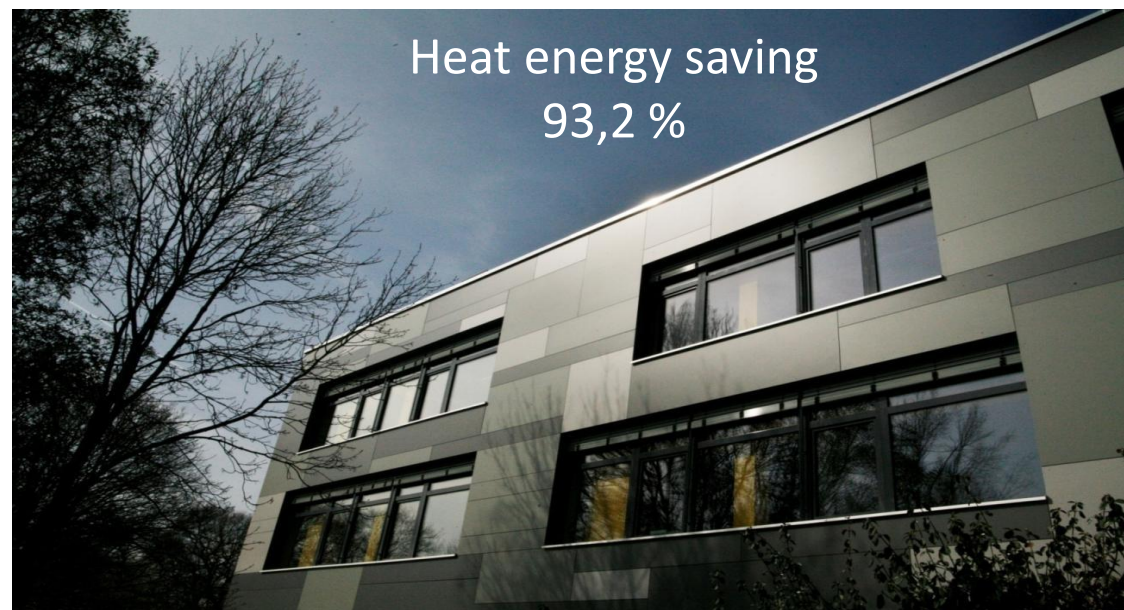


At the time
 "Best project"
 in the
 funding program
 "Investment pact for renewing
 the
 municipal infrastructure"

FINANCIAL GRANT
 for the city of Basweiler
4.83 million Euros



Facade panels
 HPL (high pressure laminate)
 Recycled waste paper



Heat energy saving
 93,2 %

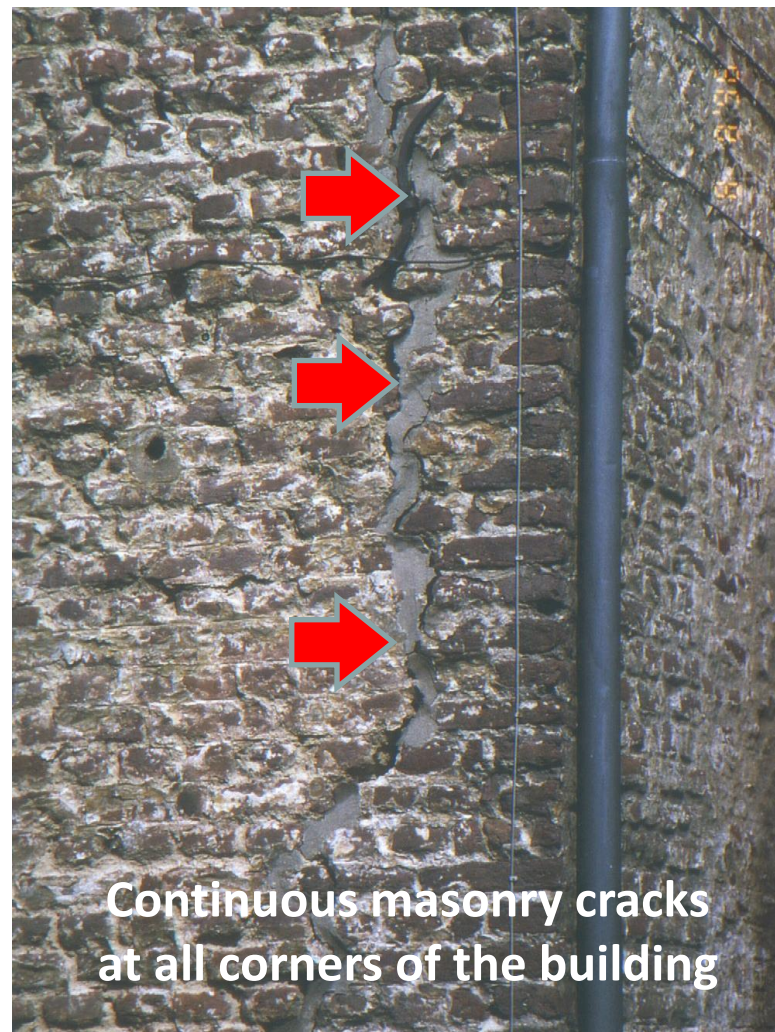
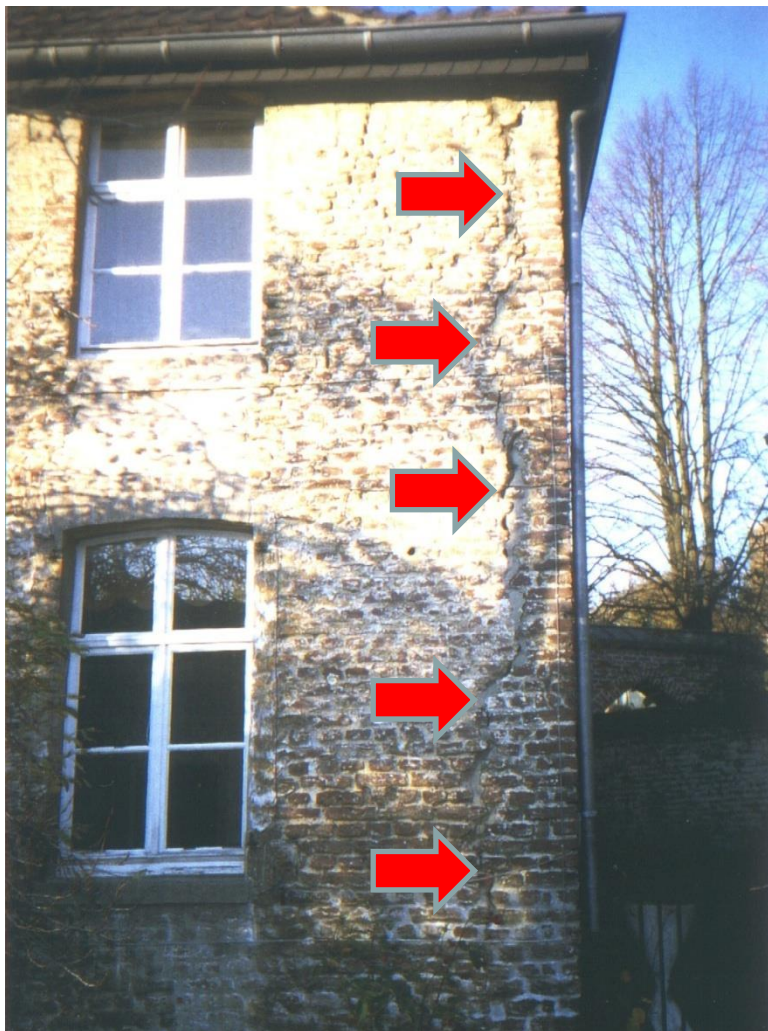


In 2010 winning project
of the German wide competition
"Municipal climate protection"

PRIZE MONEY
for the city of Baesweiler
40,000 euros

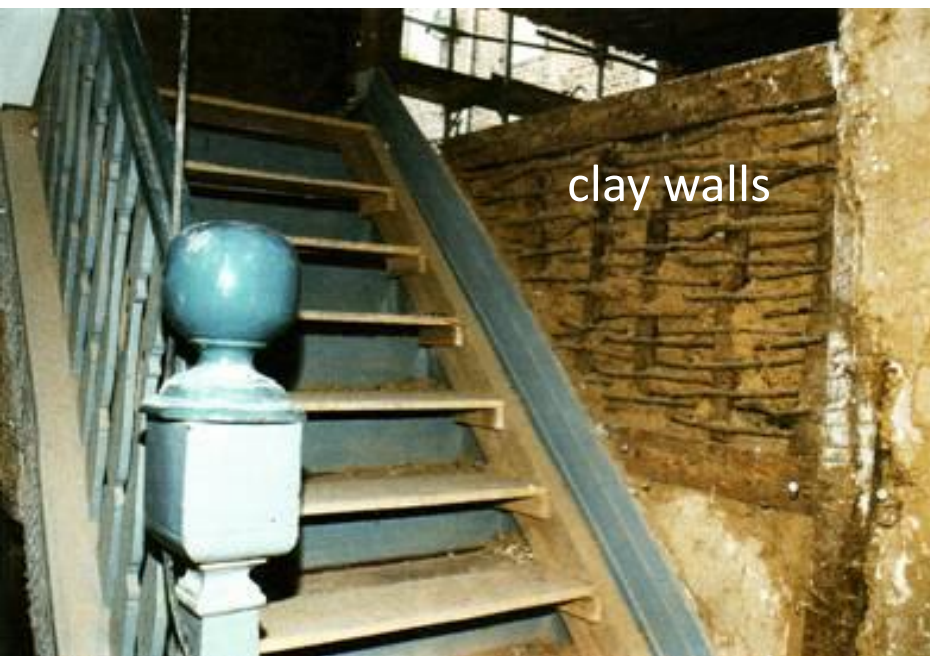


Refurbishment of a 450 years old monument



Continuous masonry cracks
at all corners of the building





clay walls

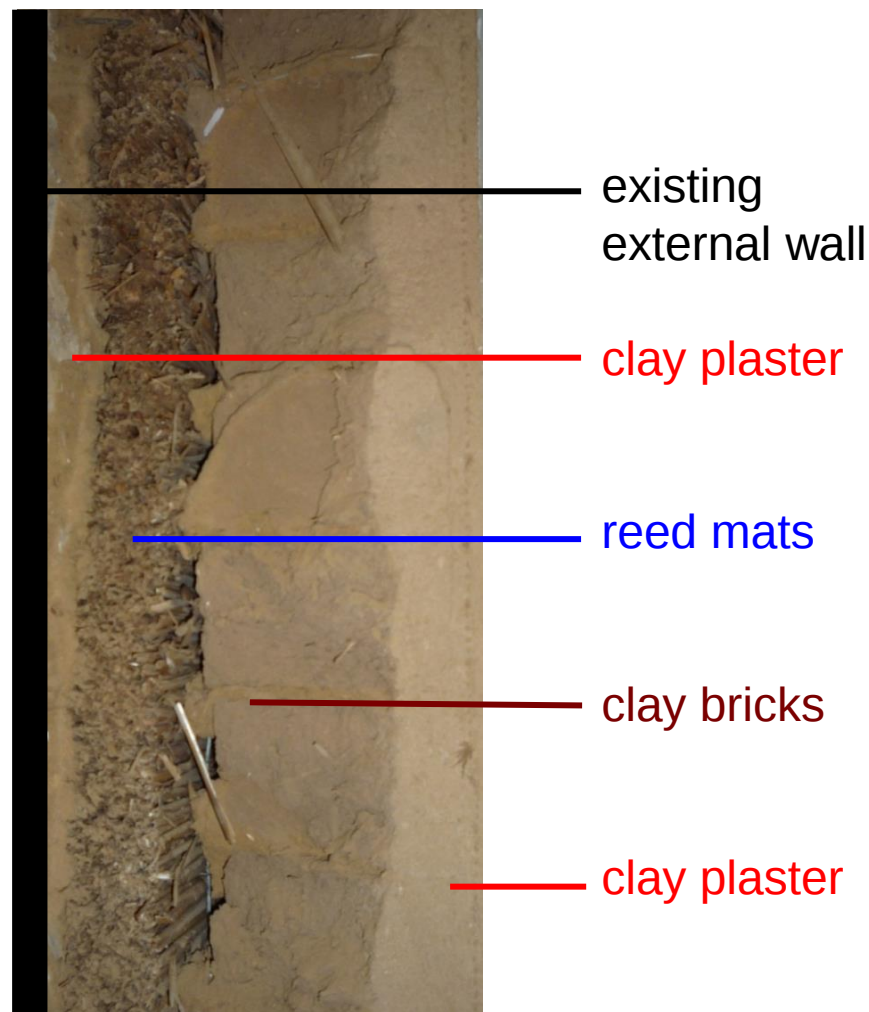


clay walls





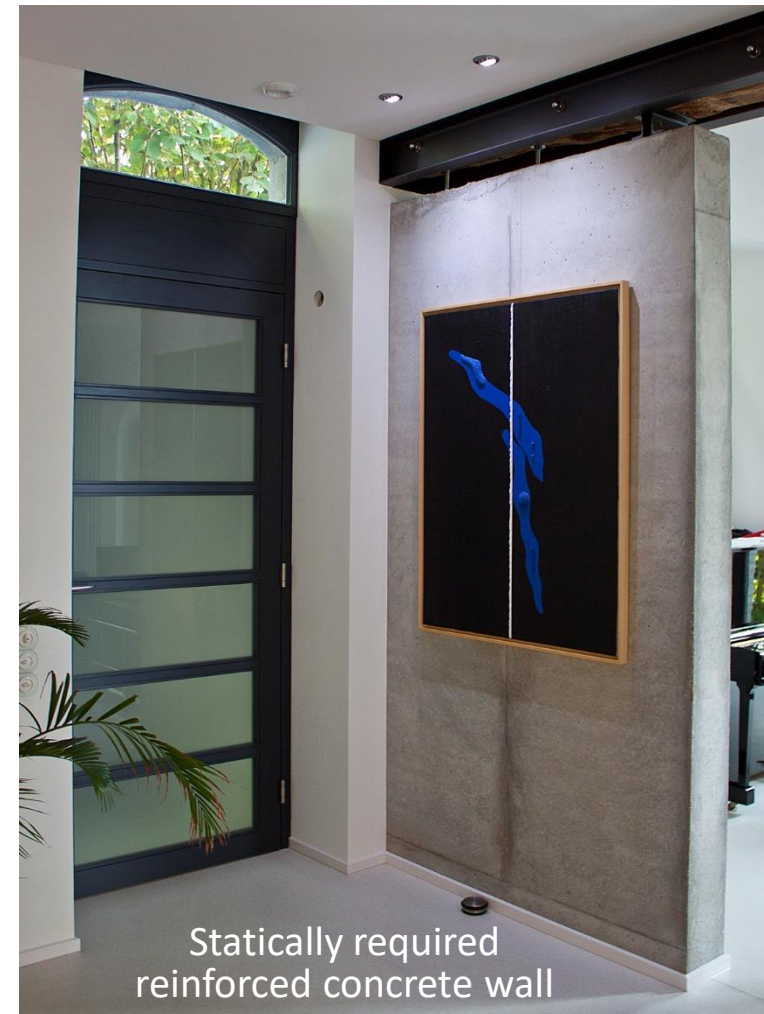
Interior thermal insulation by reed mats





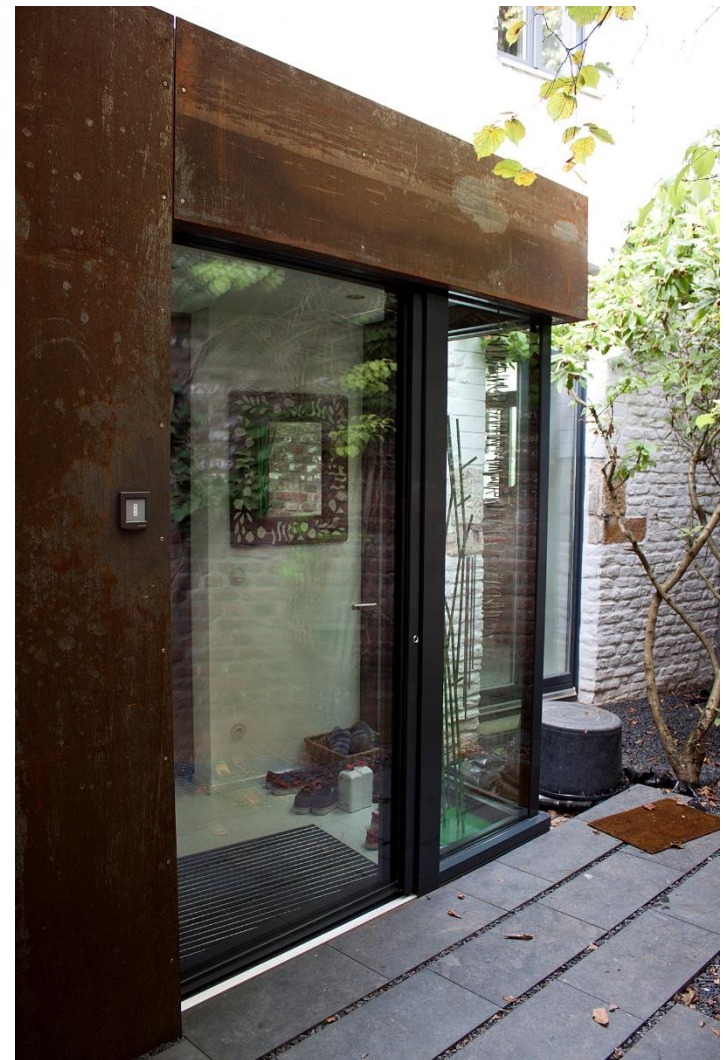
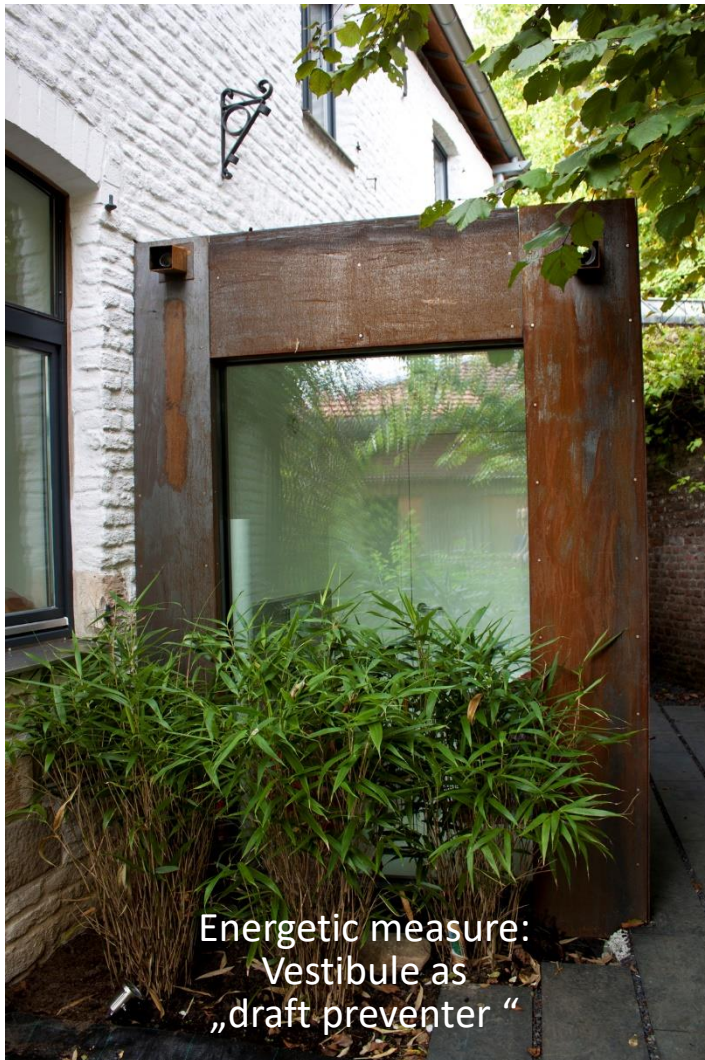


450 year old original ceiling



Statically required
reinforced concrete wall





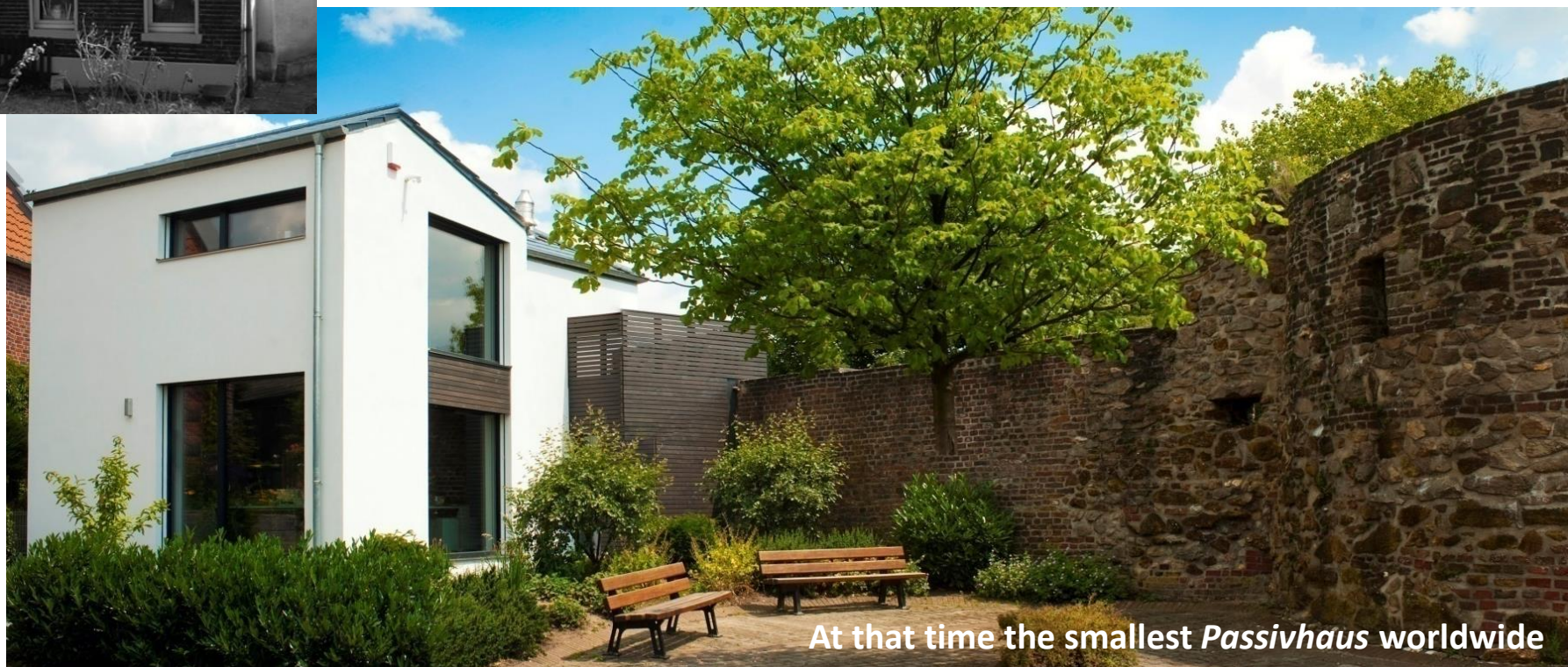






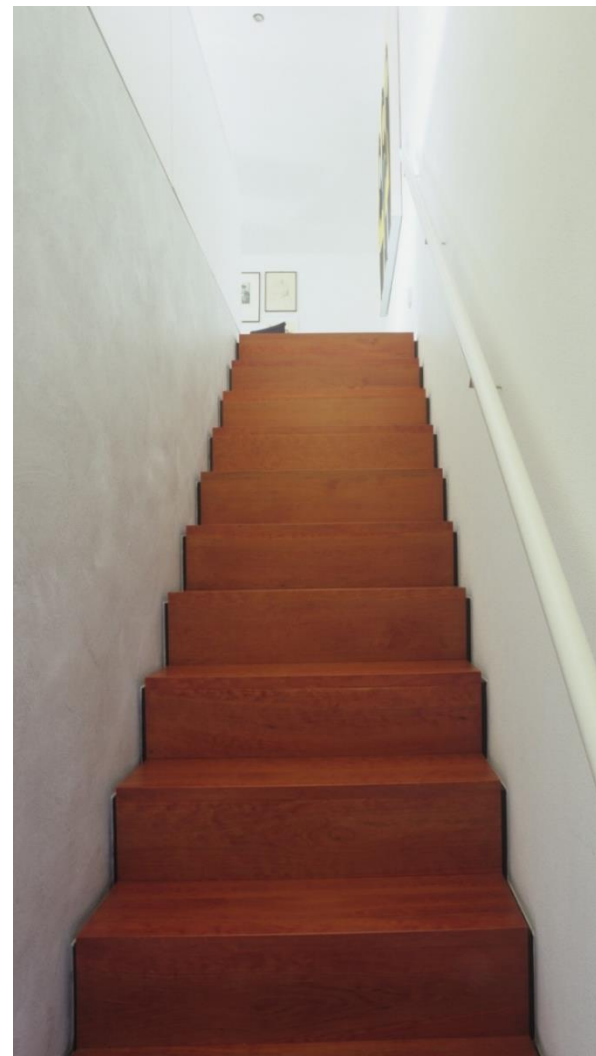
junction outer-/interior insulation





At that time the smallest *Passivhaus* worldwide







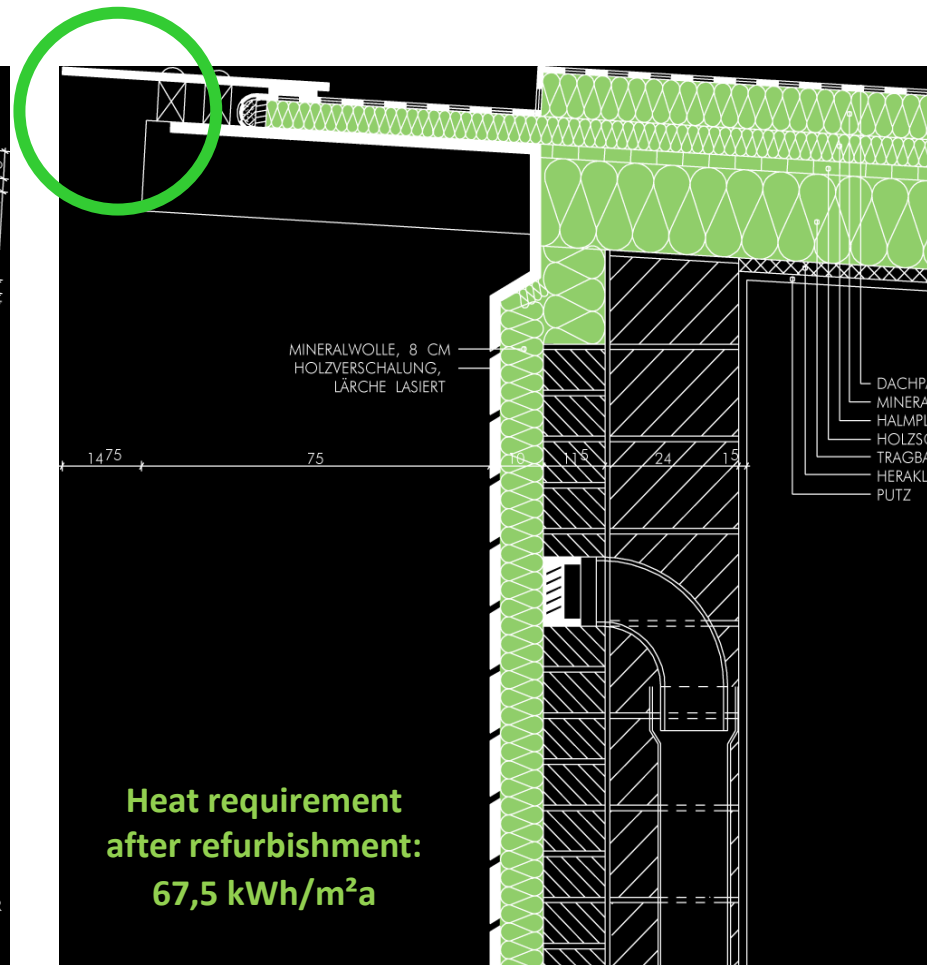
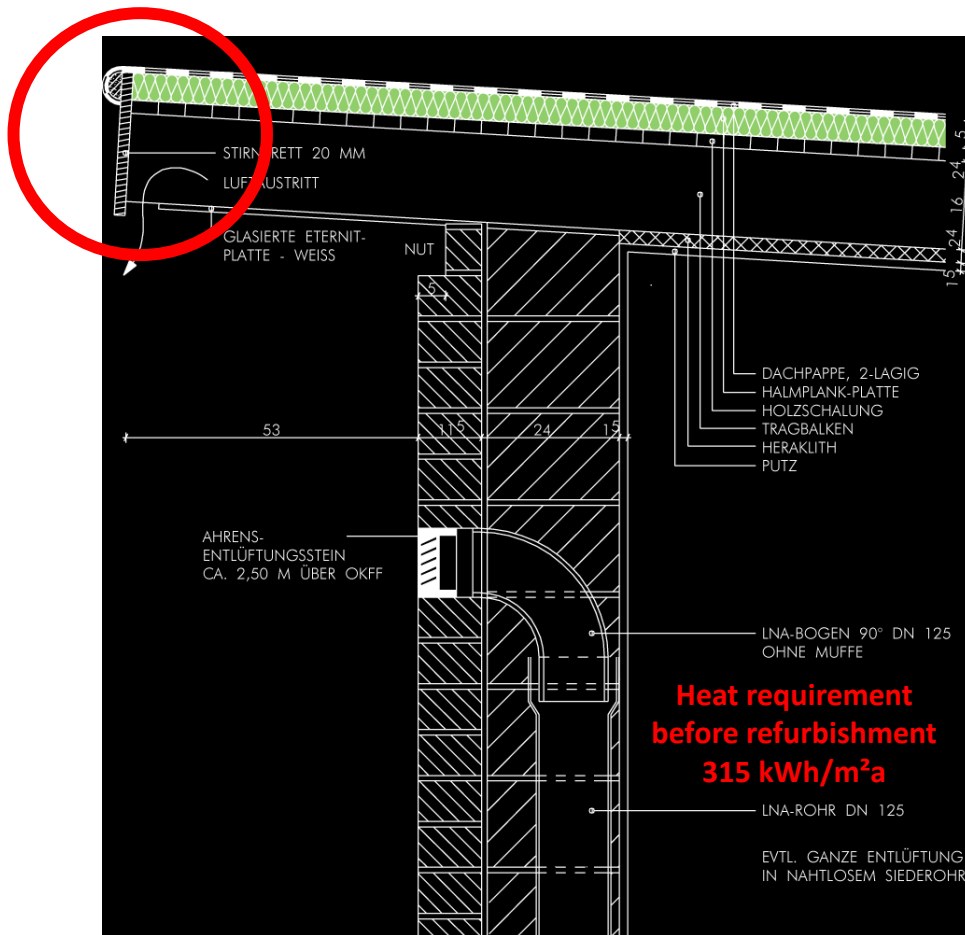
Heat supply by renewable energy: CO₂-neutral WOOD PELLETS



Modern *Passivhaus* in harmony with the historic city wall

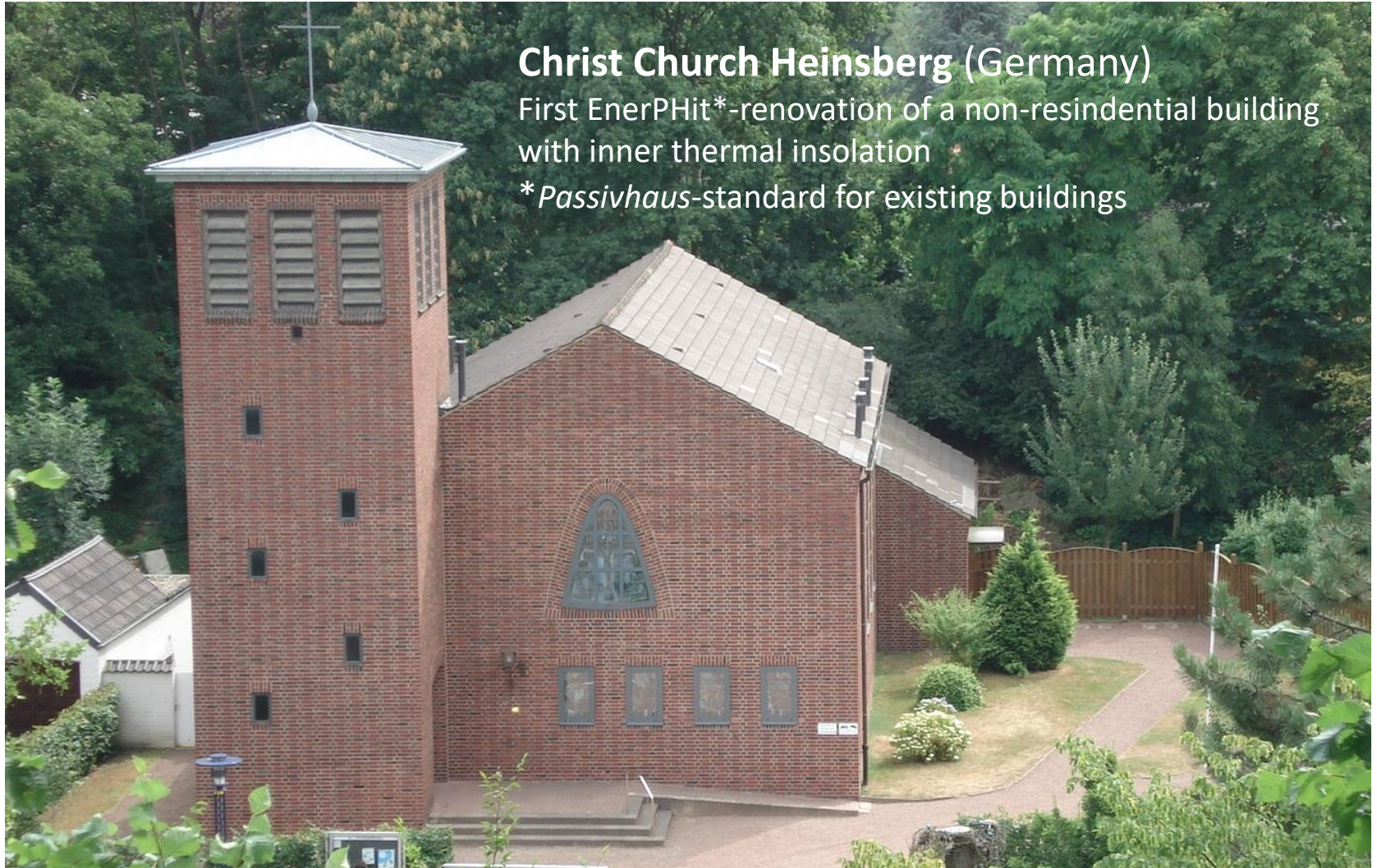
slim roof edge

Energetic optimization of a bungalow from the 1960s



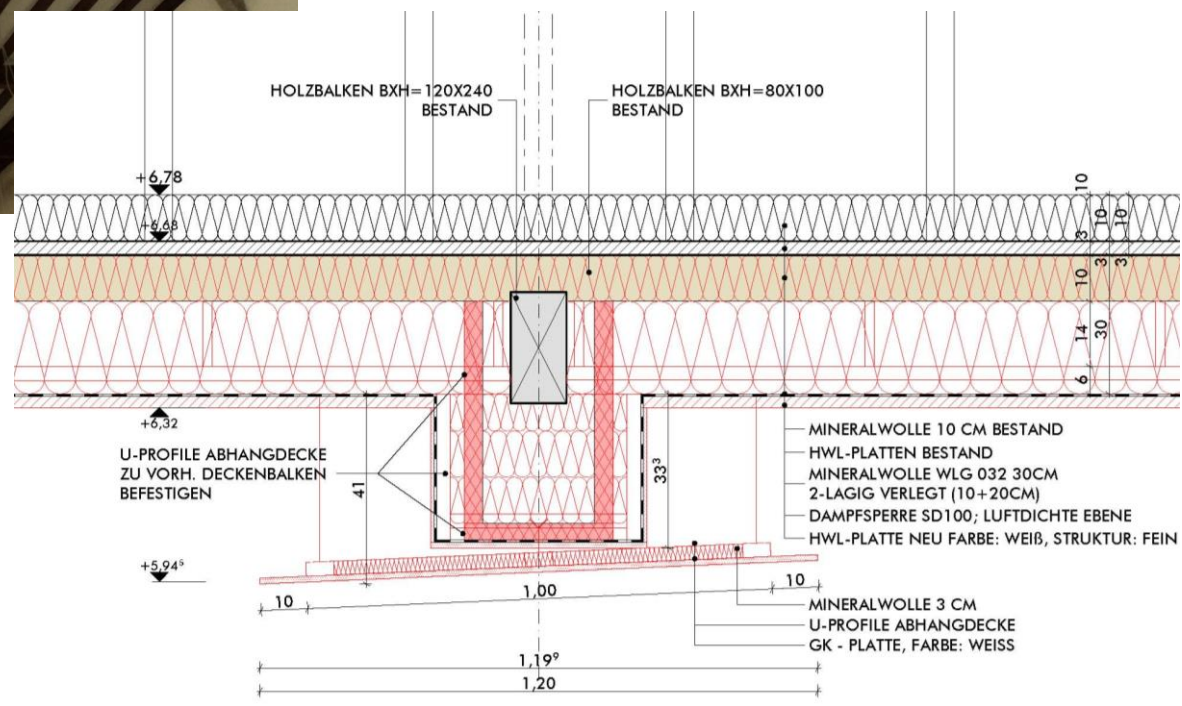
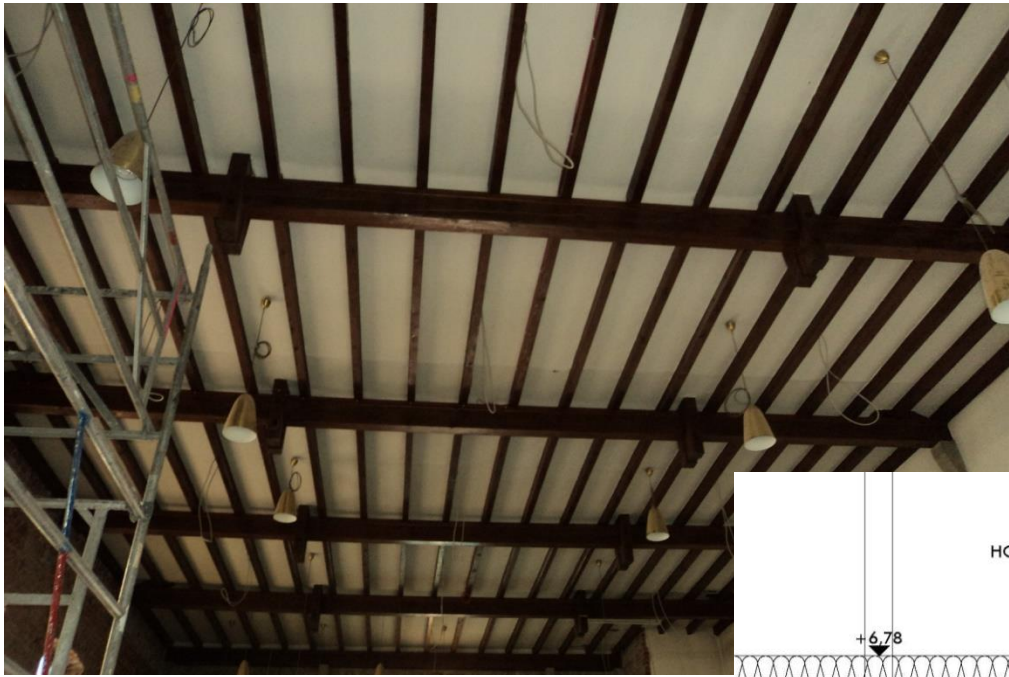
Energy saving 78,6%

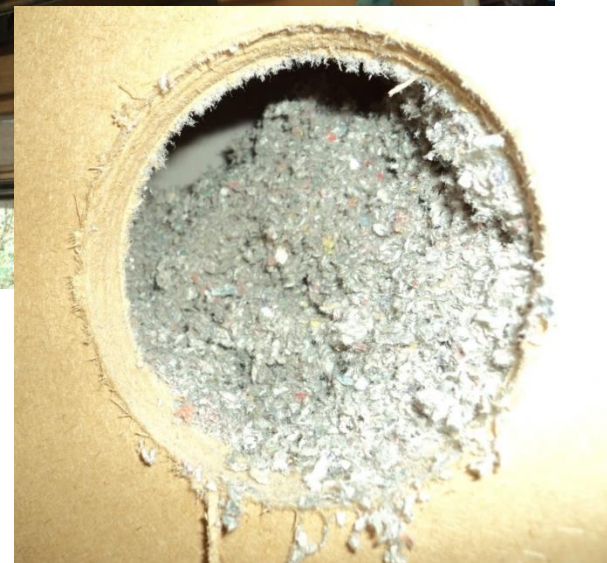




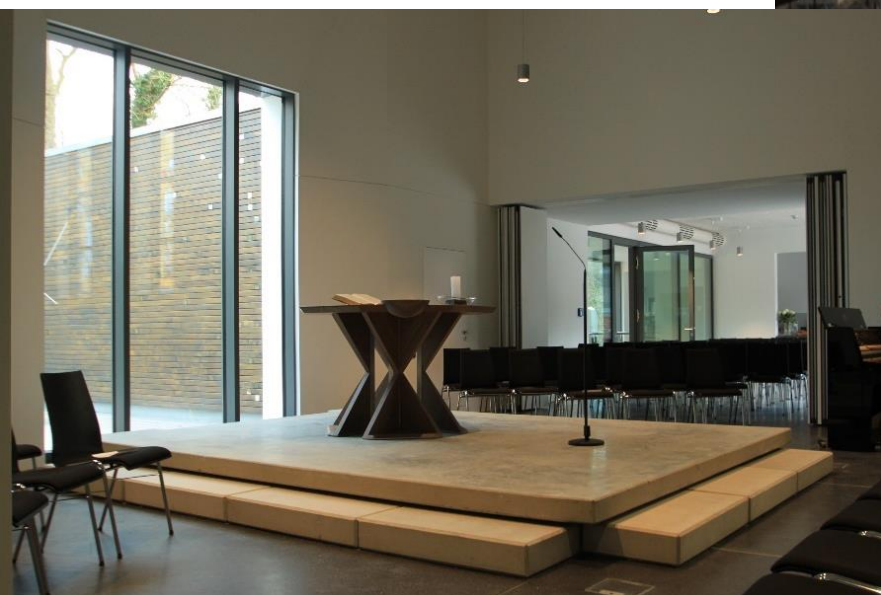


Church interior before refurbishment





cellulose as thermal insulation

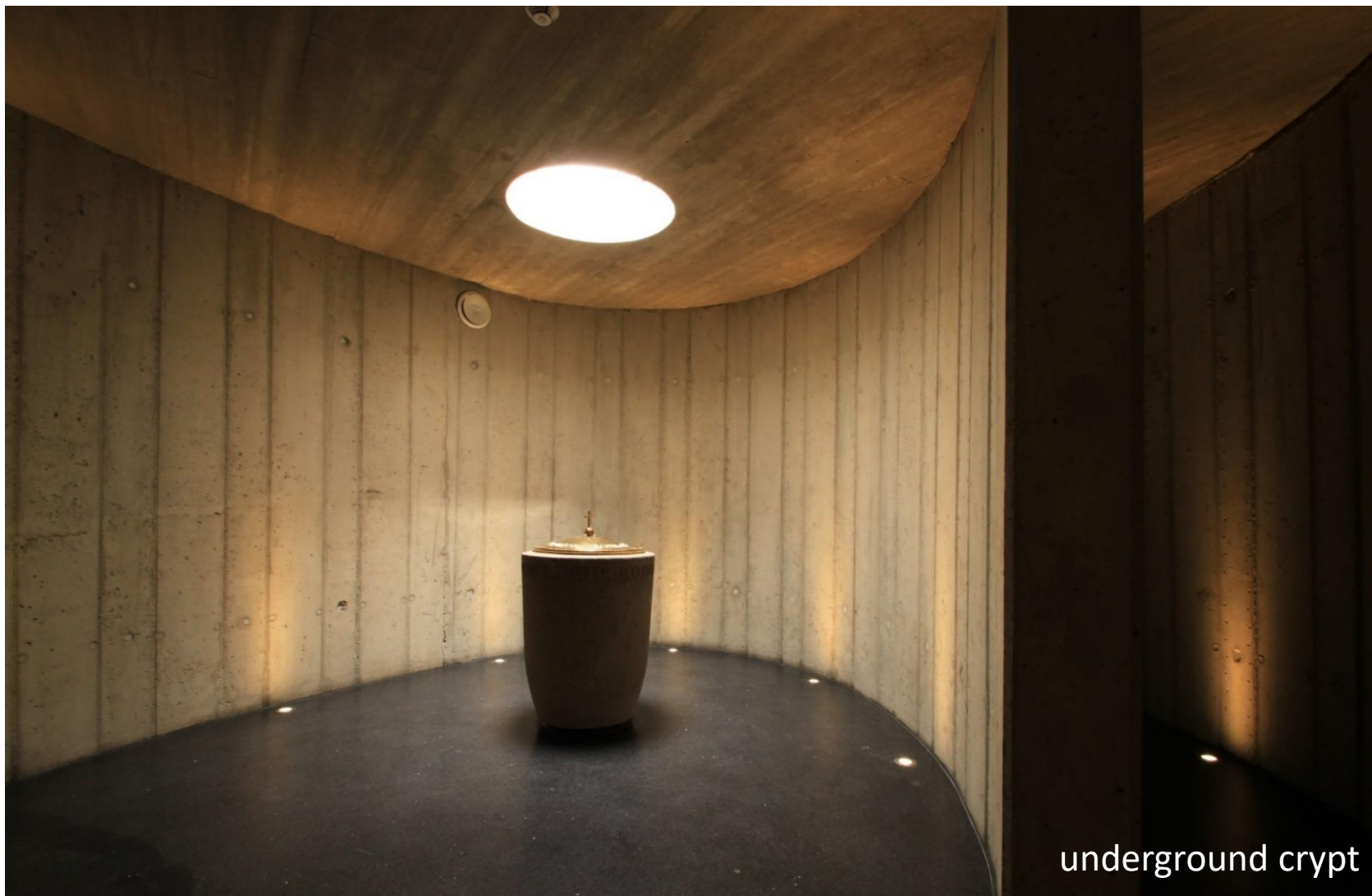


altar island





Outside baptism font





Façade-integrated photovoltaic elements



Energy consumption for heating
before the renovation: 183 kWh/m²a

after the refurbishment
(incl. hot water production and auxiliary power for the ventilation system)
8.5 kWh/m²a

Energy savings
95,4 %

CO₂ savings:
233 tons per year

...and then came

February 24th 2022



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Thank you for your attention!

Ludwig Rongen
RoA RONGEN ARCHITECTS
PartG mbB
www.roa.eu



Facilitator