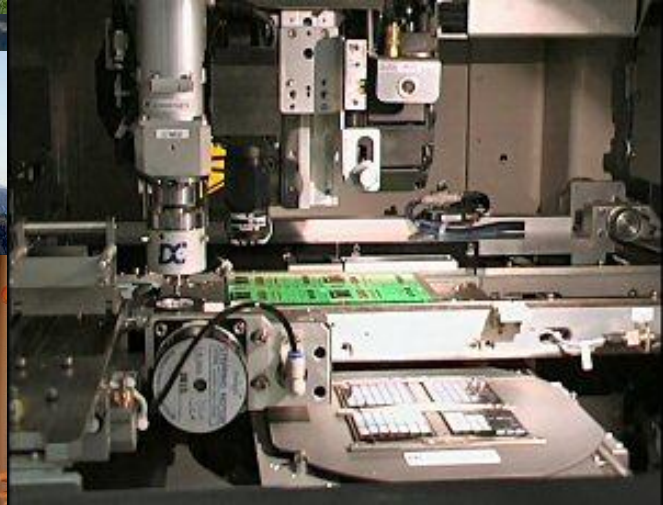
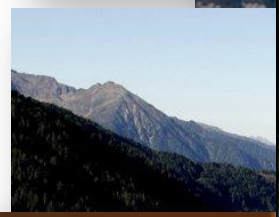


The Tyrolian Path in Social Housing:
From low-energy- to Passiv House and
further to complex sustainability
buildings

„Neue Heimat Tirol (NHT)“ as pioneer



NHT
NEUE HEIMAT TIROL



NEUE HEIMAT TIROL (NHT)



NHT

- Partners / shareholders
50 % County of the Tyrol, 50 % City of Innsbruck
- Administration of 17.000 apartments, thereof
13.500 ownership of NHT
- Annual building volume for new constructions
approximately € 70 Mio.
- Annual building volume for rehabilitation
approximately € 18 Mio.

Strategic goals

New constructions

- Maintaining and expanding leadership in *Low-Cost-Image*
- Strengthening competence in energy sector
- Constructing buildings with low management costs: since 2012 only passiv houses!



Existing buildings

- Accelerating energy optimization
- Optimizing CAFM-program
- Modernizing / refurbishing housing portfolio towards high energy efficiency
- Pursuing stable house rents and management costs, expanding controlling



Brand policy NHT: „Energy competent living“

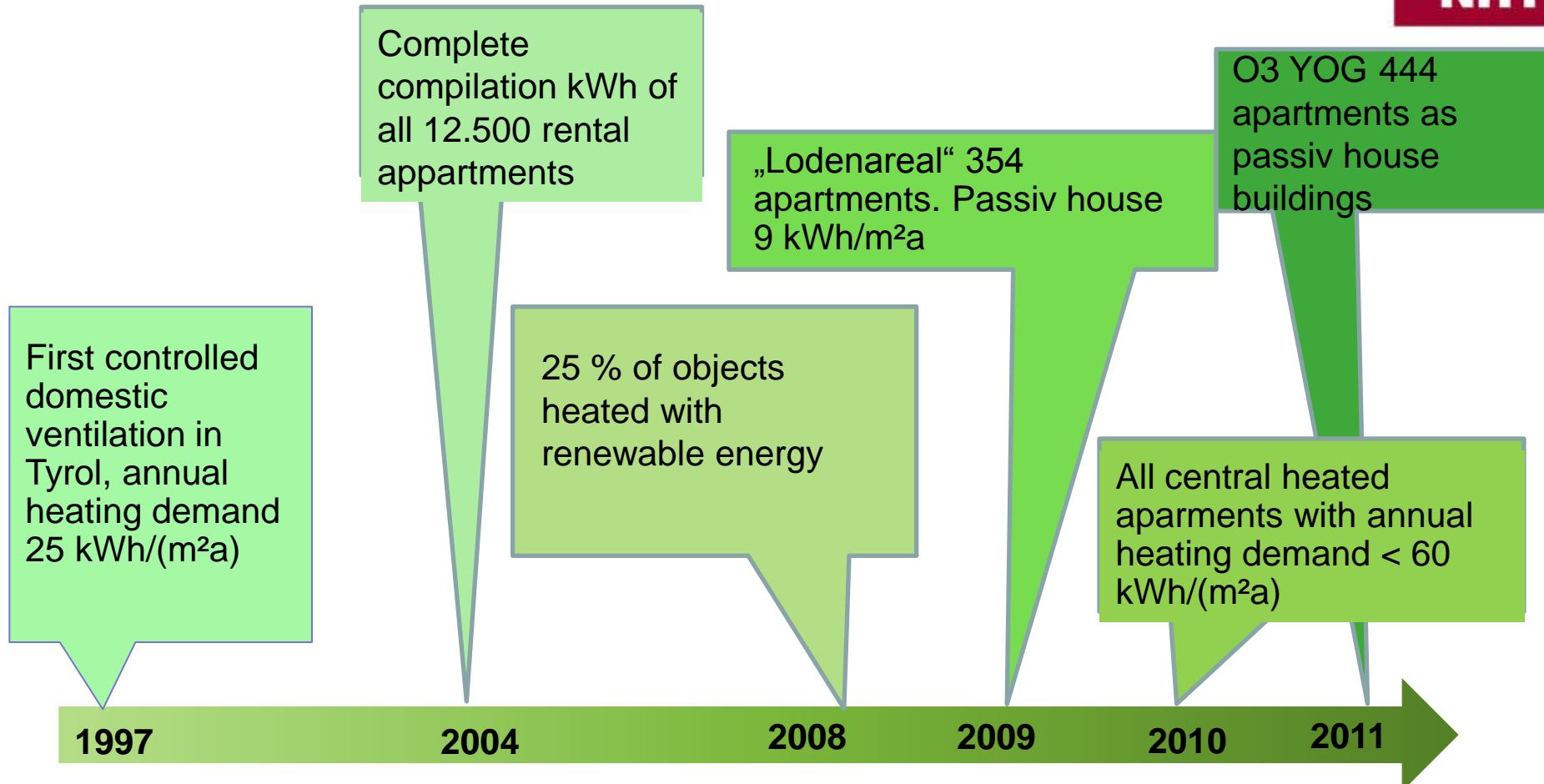
- Property management of 17.000 apartments
- 10.300 apartments with central heating (incl. private ownership)
- 253 heating facilities, more than 200 with remote inquiry
- 1 specialist engaged in enterprise only for energy optimization
- 11.500 m² solar area – providing 50 % warm water energy (350 kWh per year)
- 2012 new constructions only as passiv houses

In purposful steps towards sustainability



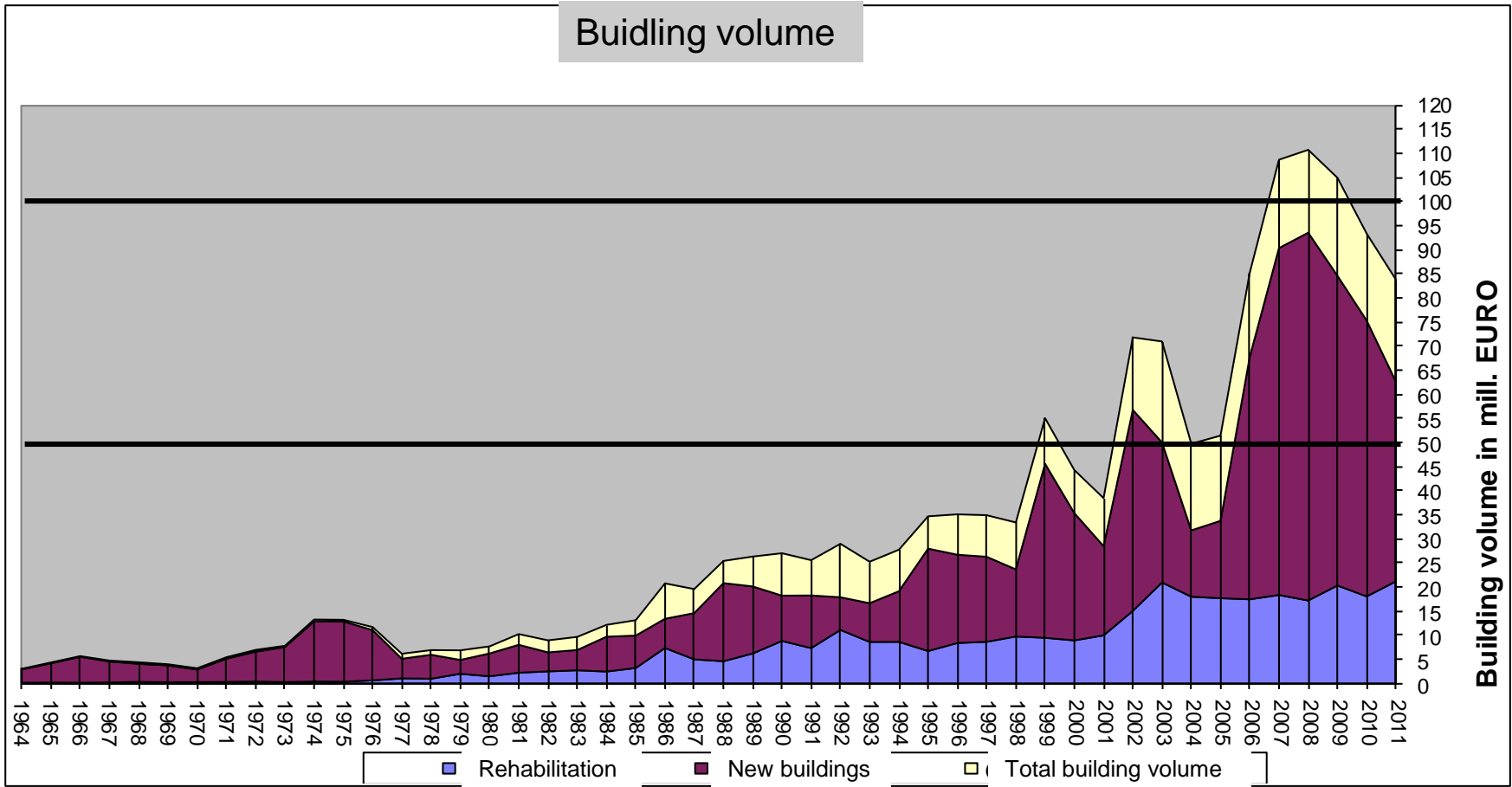
Know-how development about energy issues within Neue Heimat Tirol (NHT)

NHT



For several decades – thermal insulation: 20 years – 5500 apartments ⇒ maintenance investments **€ 224 millions**, now annually nearly € 20 millions

Building volume NHT – New buildings and rehabilitation

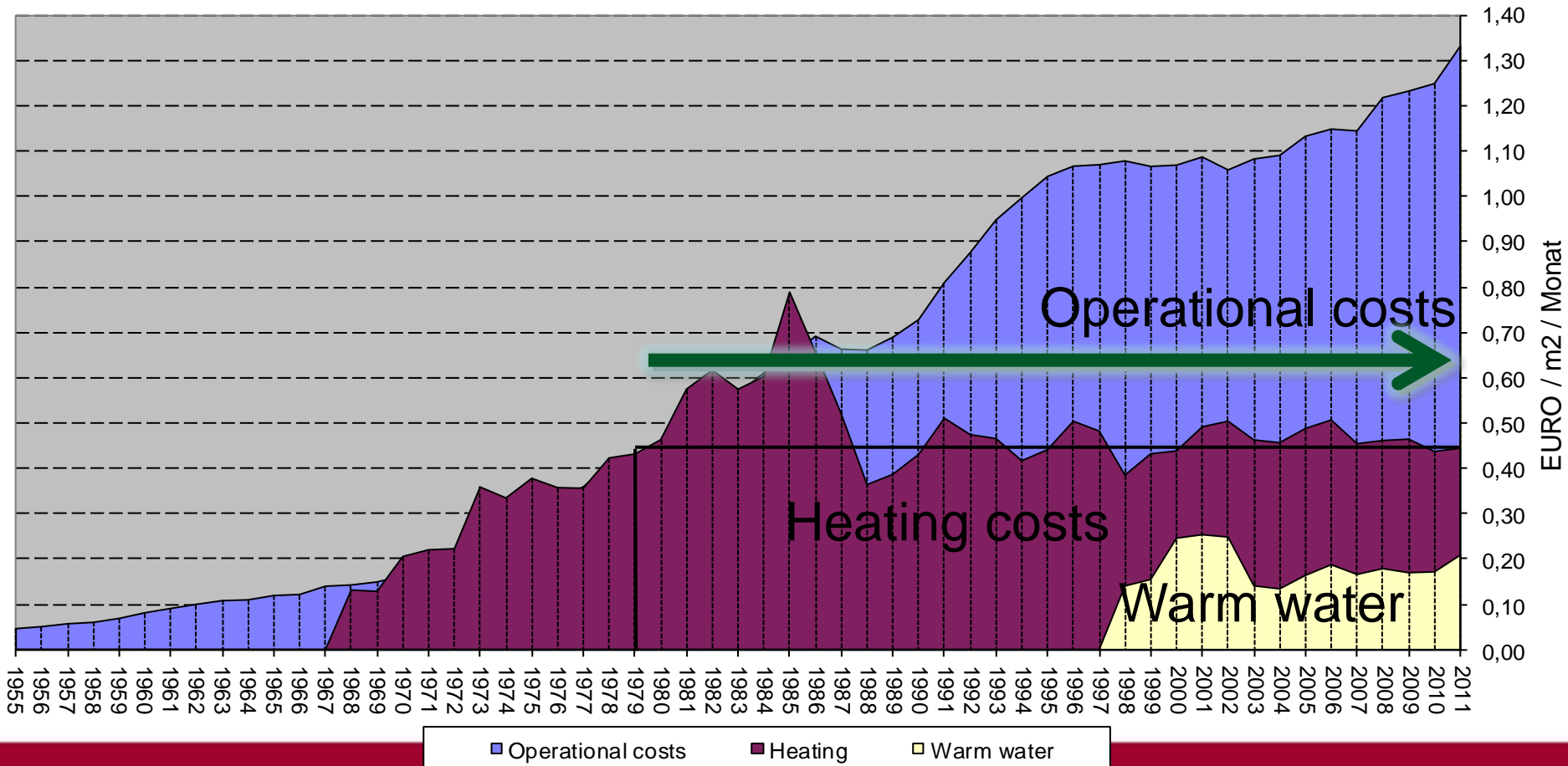




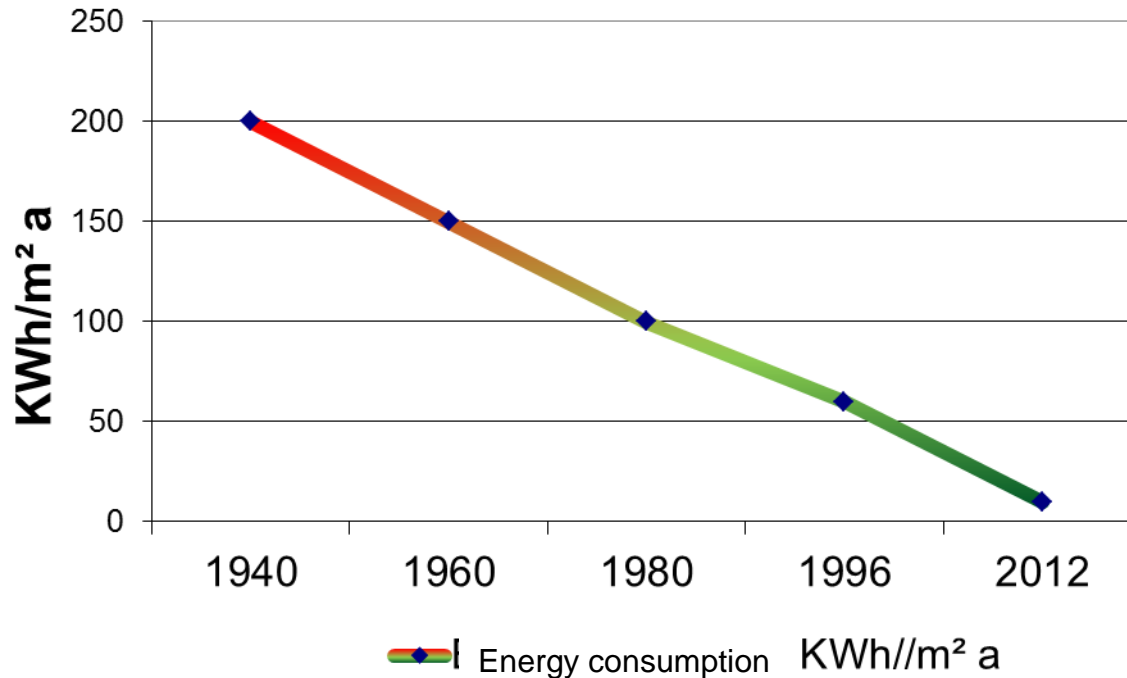
Despite increasing energy costs – stable heating costs per m² throughout 25 years

Result for the customer / tenant : same heating costs per m2 for 25 years!!!

Betriebs- und Heizkosten



Real development of energy consumption in residential housing in the Tyrol



Legal basis

Housing subsidy 2012: annual heating requirement ca. 20 kWh/m² a

Passive house: HWB < 10 kWh/m² a

Why does NHT Neue Heimat Tirol focus on Passive Houses?



Energieausweis für Wohngebäude

gemäß ÖNORM H6665 OIB
und Richtlinie 2002/91/EG Österreichisches Institut für Bautechnik

Gebäude	O3 Innsbruck / Haus B 091214		
Gebäudeart	Mehrfamilienhaus	Erbaut im Jahr	2009
Gebäudezone	Wohnen	Katastralgemeinde	Innsbruck
Straße	Generak-Eocher-Straße	KG - Nummer	81113
PLZ/Ort	6029 Innsbruck	Einlagezahl	nicht bekannt
		Grundstücksnr.	1236/6
Eigentümerin	Neue Heimat Tirol Gumpfstraße 47 6023 Innsbruck		

SPEZIFISCHER HEIZWÄRMEBEDARF BEI 3400 HEIZGRADTAGEN (REFERENZKLIMA)

HWG-ref = 6,1 kWh/m²a

ERSTELLT	Organisation	Spektrum GmbH
Erstellerin	Ausstellungsdatum	14.12.2009
Erstellerin-Nr.	Gültigkeitsdatum	13.12.2019
GWR-Zahl		
Geschäftszahl		

Unterschrift _____

Dieser Energieausweis entspricht den Vorgaben der Richtlinie 2002/91/EG "Energieeffizienz und Informations" des Österreichischen Instituts für Bautechnik in Umsetzung der Richtlinie 2002/91/EG über die Gesamtenergieeffizienz von Gebäuden und des Energieausweis-Vorgabe-Gesetzes (EAGV).

68-01-2007-0914 EA-WG 25.06.2007

SPEKTRUM Zentrum für Umwelttechnik und -management GmbH | Luttenauer Straße 64 | 6850 Dornbirn | www.spektrum.co.at
GEQ von Zaherlmayer Software GmbH www.geq.at
Version 2009,07014 REPAIR.61 - Tirol Projekt: 209 14.12.2009 15:43

Seite 1

Example Passivhaus-condomnium „LODENAREAL“ - Innsbruck

NHT



354 rental apartments

„Lodenareal“ FACTS Energy system

- Annual heating demand 9 kWh/ (m²a)
- Floor heating
- Controlled domestic ventilation with low air exchange
- Solar energy for warm water (goal: 55 %)
- Ground-water heating pre-heating of air



Annual account 2010

Warm water	€ 0,10
Heating	€ 0,08
Electricity ventilation	€ 0,04
Maintainance ventilation	€ 0,10
Total	€ 0,32 per m ² and month

Economic reality „Lodenareal“

- Cost-development: instead imported fossile energy main focus on domestic renewable energy sources – pellets and thermal solar
- Higher maintenance costs „eat away“ parts of energy savings
- 7 % higher building costs due to improved technical demands. These get nearly completely subsidised by public authorities
- NHT € 13 Mio. own resources subsidise rents, otherwise rents would be € 10,44 je NM² = + 44 % rental cots
- Rents € 7,50 incl. additional costs (heating, warm water, parking garage)
- Example: 50 m² 2-rooms cost € 375,- incl. additional costs (instead of € 522)

Advantage for customers/tenants

- ❑ Low energy need (-75% compared to legally determined building standards for new constructions)
- ❑ Self-sufficiency in energy
- ❑ Economical in operation -> high energy prices do not affect tenants.
- ❑ Comfortable atmosphere in rooms (warme walls and window surfaces, no draft effects, good ambient air quality)
- ❑ Environmental friendly it ist use – climate protection

Astrid (34), tenant „Lodenareal“



„During the last – very cold – winter, I haven’t heated. Strangely, I did not realise this before winter actually had ended and when we, due to maintenance check, discovered that our pump hadn’t worked. **Heating is in fact only psychological!**“

Neue Heimat Tirol (NHT) and its engagement in research

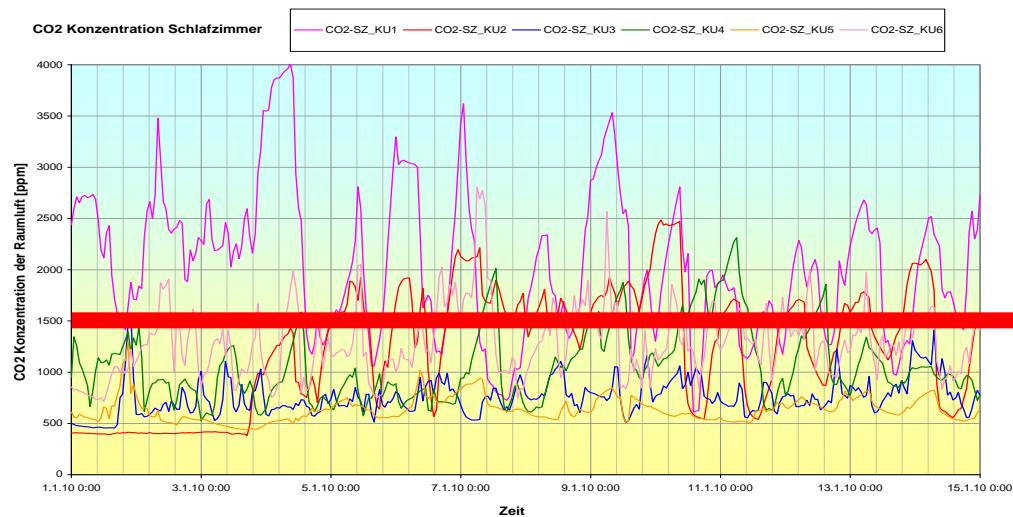


CARBON DIOXID (CO₂)

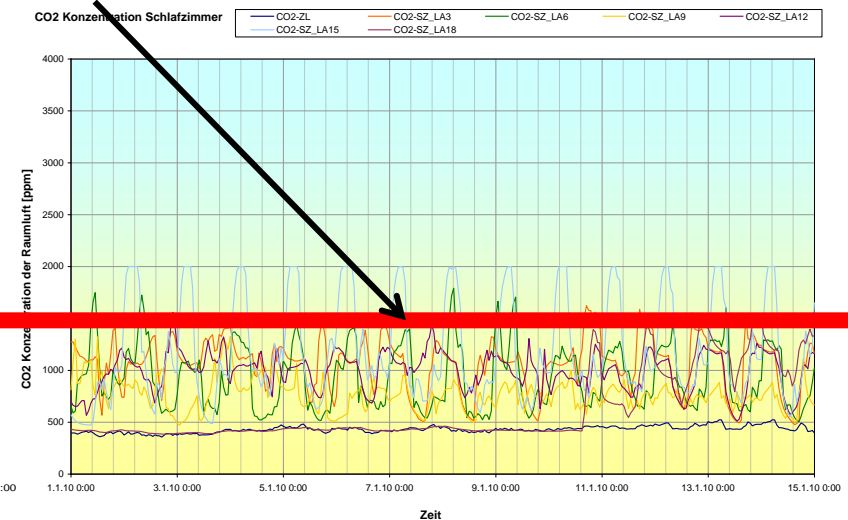
Advantage of controlled domestic ventilation

Comparing low-energy house (window airing) with Passiv-house „Lodenareal“ (controlled domestic ventilation)

CO₂ in ambient air
1200 ppmV



Low-energy house – window airing



„Lodenareal“ – controlled domestic ventilation

AIR HUMIDITY

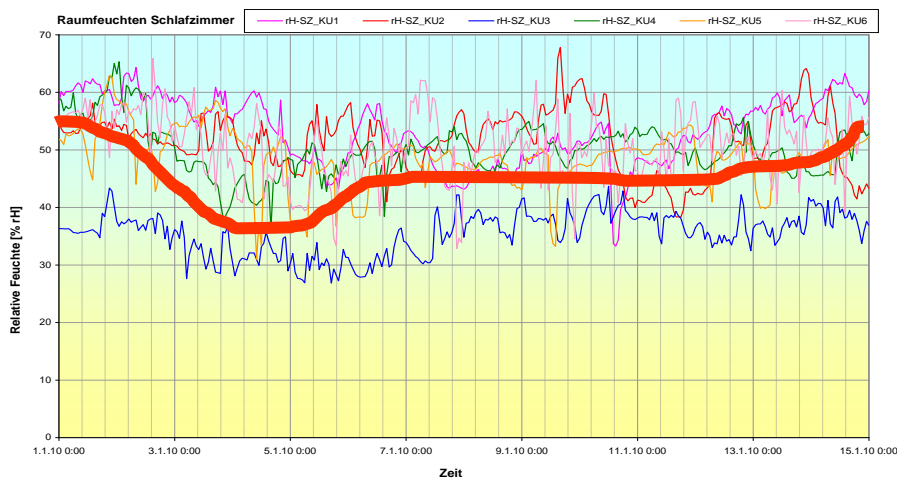
Advantage of controlled domestic ventilation

Comparing low-energy house (window airing) with Passiv-house „Lodenareal“ (controlled domestic ventilation)

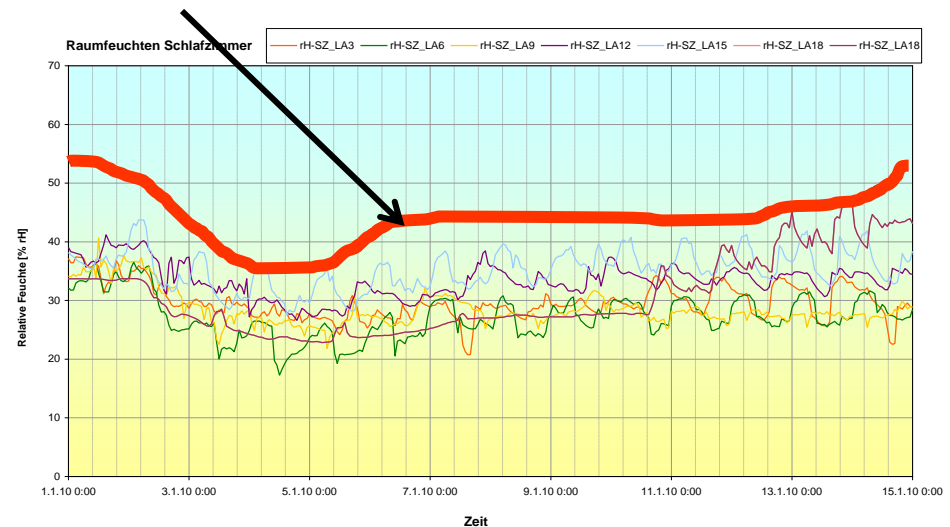
NHT

Limit B 8110-2

Mould risk – never exceeded



Low-energy house – window airing



„Lodenareal“ – controlled domestic ventilation

Example „O3“– Innsbruck Olympic Village YOG 2012

NHT



444 apartments

Project facts „O3“



NHT

- 444 apartments, police station
- 509 underground parking-lots
- Gross floor area 41.000 m²
- Net useable living area 29.600 m²
- Property area 26.300 m²
- Enclosed space 200.000 m³
- Net building costs € 61.600.000
- Building time 12/2009 bis 10/2011
- YOG Young Olympic Games 13-22.01.2012



Art in the building

NHT



Exterior planning



Improvements compared to „Lodenareal“:

Project goals

- Less and more simple technology..
- Environmental responsibility
- Comprehensive quality management
- Reducing costs of passive house components
- Comprehensive information of tenants



Building costs / rent

Net building costs

per m² living space ~ € 1.505

Subsidy passiv house ~ € 150

Costs per underground parking-lot ~ € 15.660

Property costs ~ € 374

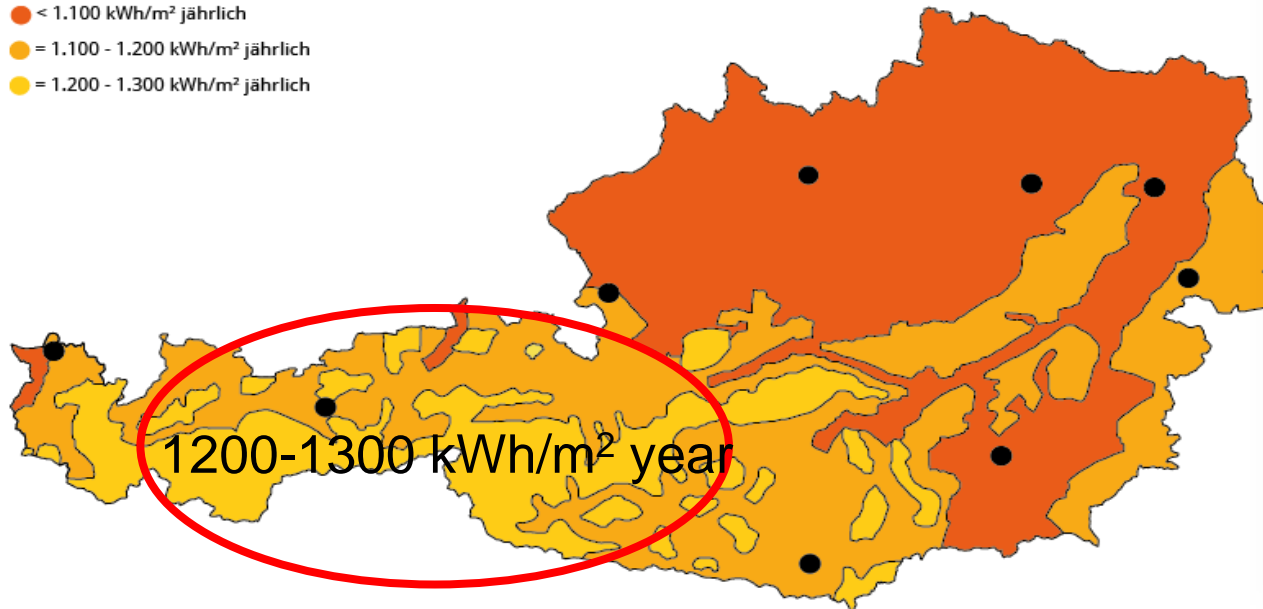
Rental costs reconstruction ~ € 7,80

Apartment with 50 m² / per month ~ € 390

(inkl. VAT / parking lot, operating costs, heating costs, warm water)

Using local energy resources – sun and timber

- < 1.100 kWh/m² jährlich
- = 1.100 - 1.200 kWh/m² jährlich
- = 1.200 - 1.300 kWh/m² jährlich

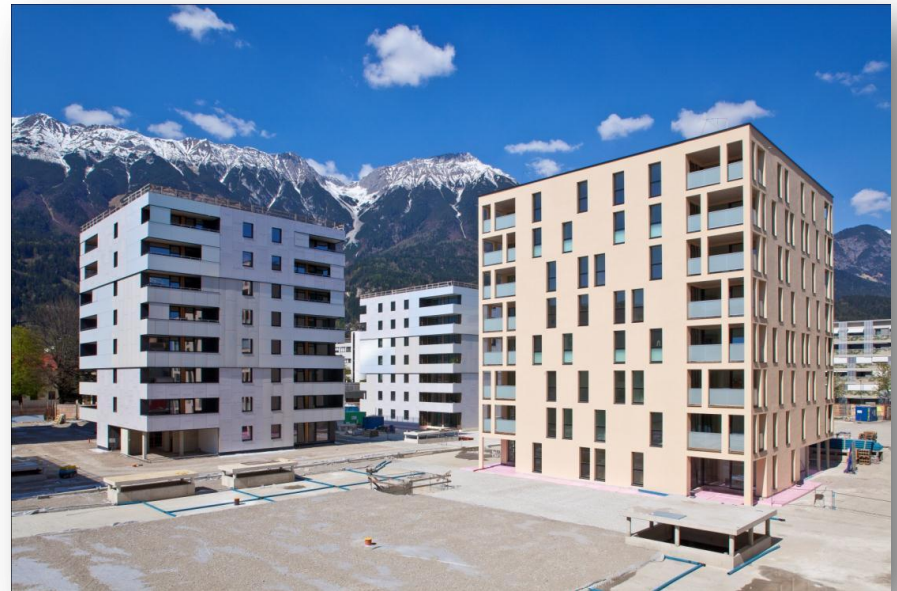


Solar system 1.100 m²



Building concept

- Massive construction
- Steel-concrete-skeleton with pre-fabricated wood-facade
- Highly insulated air-tight building envelope
Blower Door values approximately 0,26
- PHPP – calculation



House-technology

- Remote heating
- Heat emission through radiators
- Warm water /Solar system 1.100 m² – two-pipe system
- Insulated prefabricated chambers
- Controlled domestic ventilation / semi-central concept for each stairway / totally 13 pieces / acoustic protection at outlet approximately 20 db



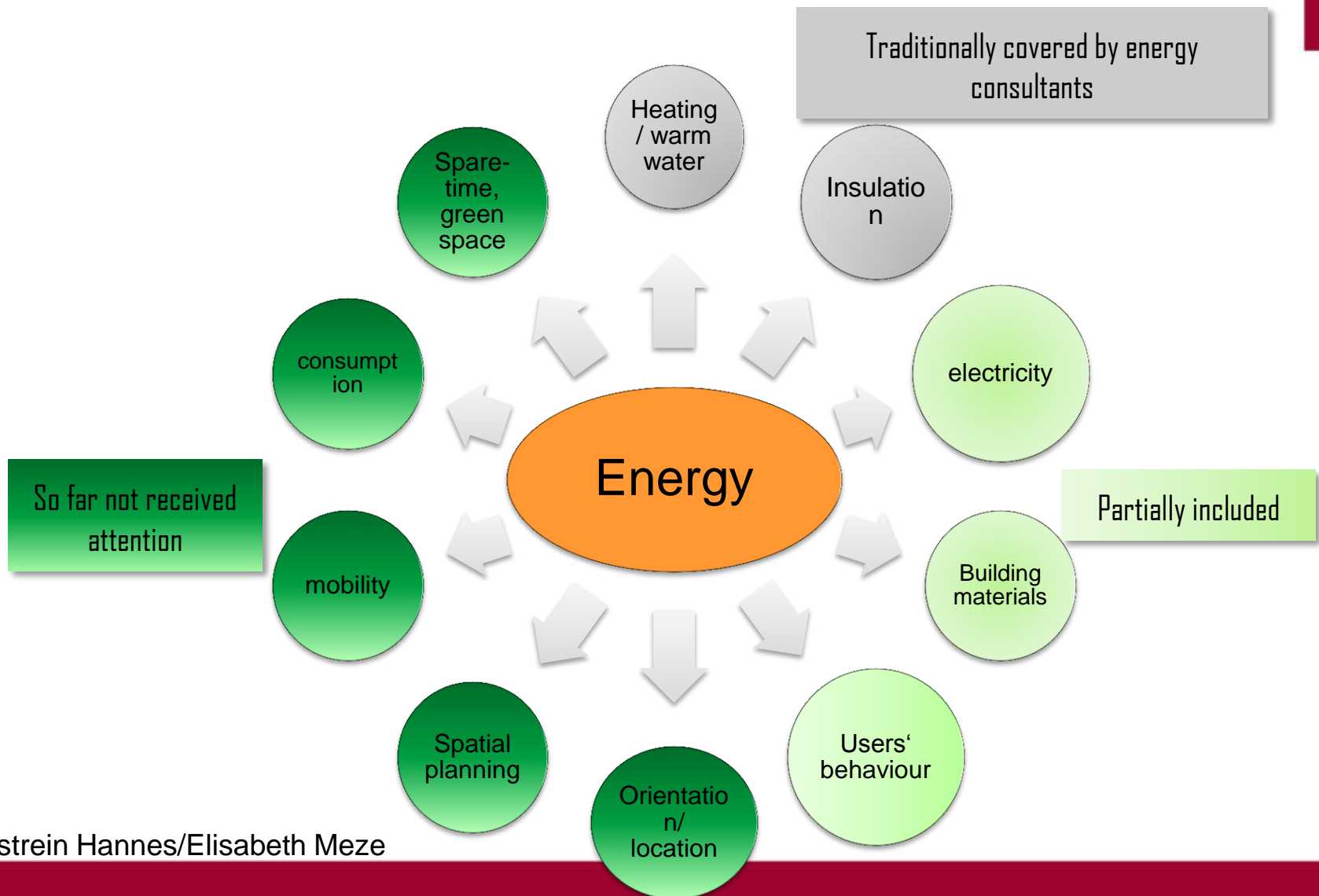
Pre-fabricated chambers



From Passive-house to sustainable estate buildings



Overall concept living and energy



Example apartment complex „Vögelebichl“ /Innsbruck- Integral planning

Goals:

- Developing passiv-house of the 2nd generation
- Energy efficiency within distribution system: HVAC-planning: simpler constructed controlled domestic ventilation (active overflowing zones /transfer zones), reduced lines, optimal insulation of lines/ conducts
- Building shell/external envelop – improving building ecology
- Zero-energy house
- Mobility – „car-sharing“, fewer underground parking lots
- Exterior space planning and energy



Building ecology – OI3 Index as guidance for sustainable buildings

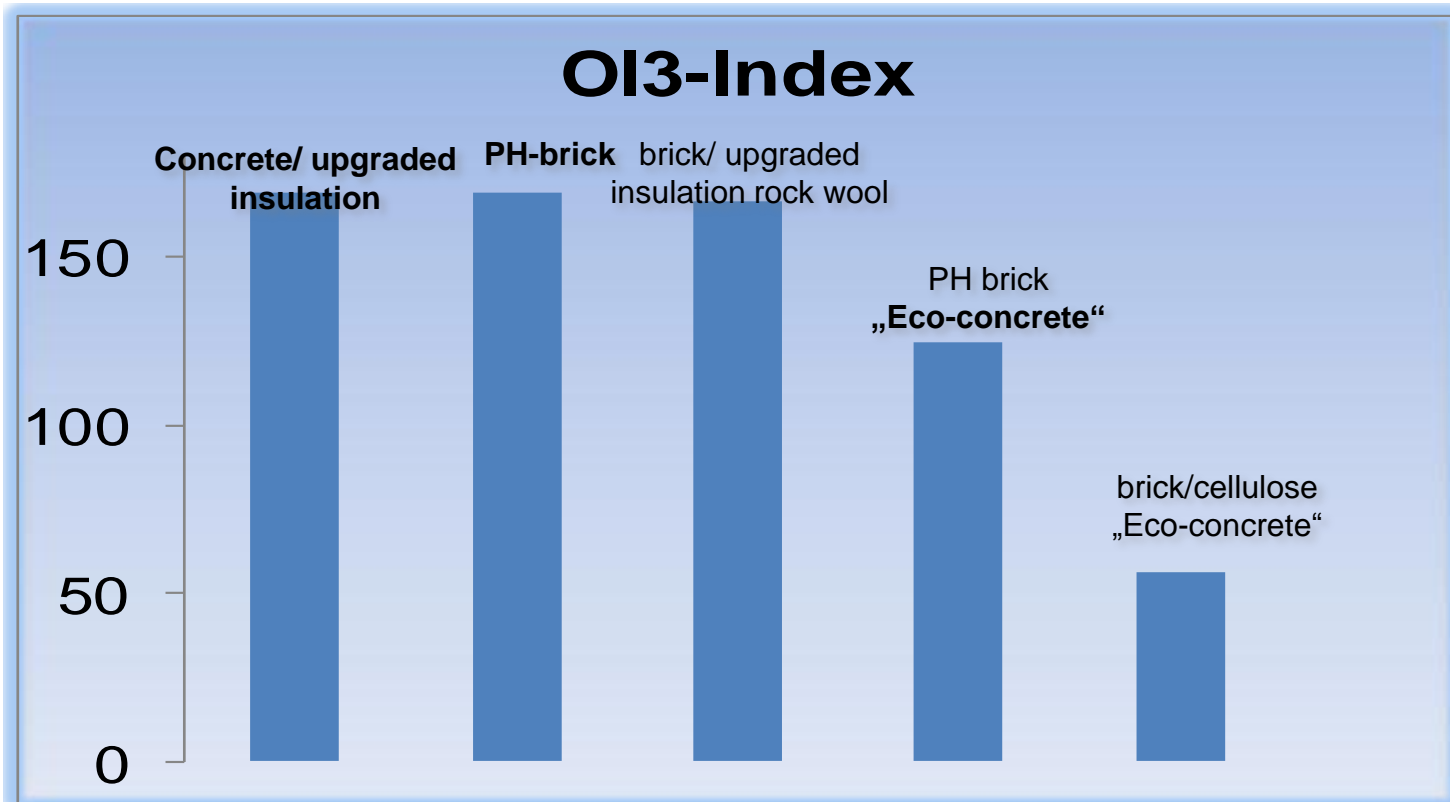
- The OI3- Index evaluates a building through its ecological stress of building materials on the environment

It is calculated by 3 indicators:

- ✿ **Primary energy level (PEI) -> energy**
- ✿ **Global warming potential (GWP) -> climate**
- ✿ **Acid potential (AP) -> soil**



Project Passivhouse „Vögelebichl“



Conclusion: In terms of building ecology there is no difference whether concrete or brick, as long as insulation is not made of biosources (renewable). Massive construction is only reasonable ecologically, if „eco-concrete“ (SLAGSTAR) is used in ceilings/floors, and roof is insulated with cellulose.

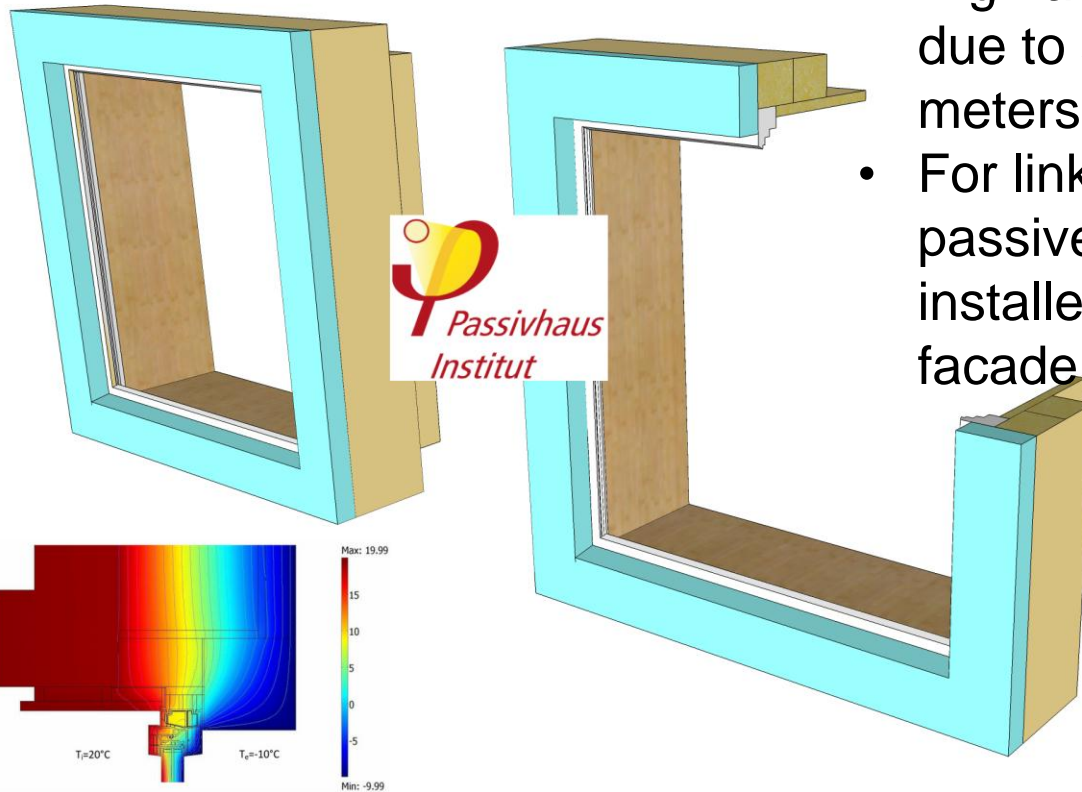
„Vögelebichl“ as Zero-Energy House

- Within property boundary as zero-energy house through producing electricity for heat pump (heating and warm water) through photovoltaic system at the building



Challenge – combining energy and acoustic insulation/ sound protection at „Vögelebichl“

- High acoustic insulation demands due to airport closeness – just 200 meters air-line distance to airstrip!
- For linking acoustic insulation with passive house standard \Rightarrow windows installed flush with the edge of facade



Apartments in passiv-house standard at Neue Heimat Tirol (NHT)

	apartments	Underground parking lots
Completed:	943	1115
Under construction:	550	707
Planned:	670	776
Total	2.163	2.598

Resumee

- Permanent development of knowledge – collaboration of building contractor with research necessary
- Passivhouse of the 2nd generation links innovative and minimized building service technology with ecological building and users' behaviour
- Integrated Planning – connecting know-how in a chain between project leader, planner, tenders, project supervisor and property manager through the whole process
- Construction development/Quality management on highest possible level
- Technical features must align to the customer needs – not the other way round!

Thank you for your attention!

**„The problem is not developing concepts for the future
but overcoming old ideas“**

(John Meynard Keynes)

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