




Factsheet

Reichenauerstraße 62, 64, 66
6020 Innsbruck, Austria



SINFONIA stands for "Smart INitiative of cities Fully cOmitted to iNvest In Advanced large-scaled energy". This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 609019

PROFILE

Name and address	<p>Name of the demo site: NHT IN40</p> <p>Address of the demo site: Reichenauerstraße 62, 64, 66 in 6020 Innsbruck, Austria</p>		
Map	<p>City map highlighting the surface occupied by the demo site</p>  <p>Source: http://city-map.innsbruck.gv.at</p>		
Description	<p>NHT already finished the innovative overall building renovation, consisting of the thermal renovation of walls, ceiling, roof and windows with triple-glazing. Existing balconies were demolished and replaced with new thermally separated ones. A central, flat-specific ventilation with heat recovery was integrated. The heating system is connected to the district heating network of IKB and was newly installed.</p>		
Ownership	<p>NEUE HEIMAT TIROL (NHT)</p>		
Gross conditioned floor area (EPC¹)	<p>4,805 m²</p>	Treated floor area (PHPP²)	<p>3,500 m² (w/o groundfloor)</p>



Number of dwellings	49	
Heating demand (EPC¹)	<i>BEFORE RENOVATION</i>	54 kWh/m²*a
	TARGET/AFTER RENOVATION	22 kWh/m²*a
Heating demand (PHPP²)	<i>BEFORE RENOVATION</i>	81 kWh/m²*a
	TARGET/AFTER RENOVATION	17 kWh/m²*a
Overall savings	Current state (before completion of ventilation & heating system)	> 60%
	After completion of ventilation & heating system	> 80%

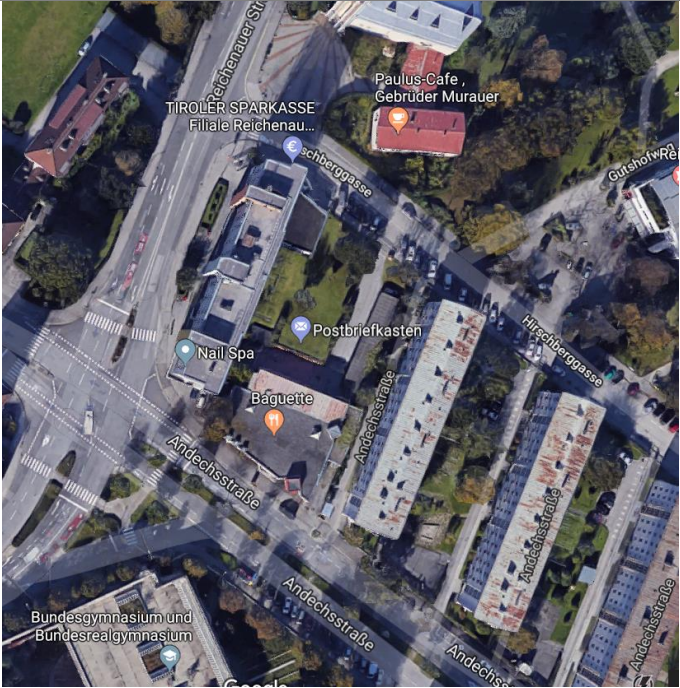

1 - DESCRIPTION BEFORE REFURBISHMENT

Detailed characteristics of building	All objects are patched via 1 long complex.
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¹ Energy Performance Certificate according to the Austrian Institute of Construction Engineering


² Passive House Planning Package



<p>Plot map</p>	 <p>Source: Google maps</p>
<p>Building envelope</p>	 <p>IN40 stock is a typical building block constructed in the second half of the 20th century with related challenges regarding insulation, electric cables, low performing windows, uninsulated roofs and cellars.</p>
<p>Technical system</p>	<p>Connected to the district heating network</p>
<p>Energy performance certificate</p>	<p>Category C</p>
<p>Other relevant technical aspects</p>	<p>Not applicable</p>



2 - REFURBISHMENT CONCEPT

Concept	 <p>Thermal renovation of the walls, the ceiling, the roof and the windows with triple-glazing. Balconies were completely replaced by new thermal bridge-free ones. Decentralised, flat-specific ventilation with heat recovery was integrated.</p>
Energy solutions	<ul style="list-style-type: none">• The attics are insulated with additional 18cm XPS to the already existing 8cm-thick insulation,• The facade is additionally insulated by 14 cm of mineral wool to the existing mineral wool of 6cm,• Ceiling above the elevators is insulated with 18cm XPS to the already existing 5cm insulation,• Balconies are completely replaced by a new thermal bridge-free construction,• Distribution of the air via flat-specific, decentralised ventilation systems with heat recovery is designed in cascade-ventilation chain. 11 of the 49 flats are already equipped with the ventilation systems, the rest of the flats is prepared to be equipped with these systems in the event of a change of residence.• The supply of space heating is handled by a central connection to the district heating of IKB. Within the apartments, radiators along with manually operated thermostats distribute the room heating.• Old and inefficient DHW-boilers were replaced with modern well-insulated ones.



	<ul style="list-style-type: none"> The PV system was designed as a "tenant flow model". This means that the generated electricity is not only used by the residents individually in their flats but also serves to power the shared spaces of the property. Any remaining surplus is fed into the public grid. This model started in January 2018 - as a pilot project in the state of Tyrol.
Performances targets	Target is to achieve a calculated energy consumption per m ² of total used energy per conditioned floor area of about 34.8 kWh/m ² *a (Space heating via district heating and DHW with electric hot water boilers).
Financing model	The refurbishment is financed via a mix of reserves as well as local/ regional/ national/ EU funding and includes an increase of the monthly rent.

Envelope details	
Roof to wall insertion section (thermal bridge)	<ul style="list-style-type: none"> Insulation of the attic floor by using additional 18cm XPS (HFKW and HO free) Insulation of the ceiling above the elevators with additional 18cm XPS (HFKW and HO free)
Ground to wall section (thermal bridge)	<ul style="list-style-type: none"> Ceiling to unheated basements additionally insulated
Wall to fenestration section (thermal bridge)	<ul style="list-style-type: none"> Thermal insulation of façade (14cm of mineral wool in addition to the existing 6cm of mineral wool) Balconies are completely replaced with thermal-bridge-free new ones Partly replacing new triple glazed windows (55%) with app. 70 % better thermal performance. The rest are 10-year-old triple glazed windows (which are already equipped).

Technical system	
Mechanical ventilation	11 of the 49 apartments are equipped with flat-specific, decentralised ventilation systems with heat recovery. 22% of the building users are connected to the systems. All other apartments will be upgraded in the event of a change of residence.



Thermal renewable integration	None	
Electric renewable integration	Nominal power of PV IN 13:	35.91 kWp, 240m ² SOLARWATT modules
	Mounting type:	Roof mounted parallel
	Elevation:	574 m a.s.l.
	Tilt:	10°
	Azimuth angle:	199°
	Financial model:	"tenant flow model" - a pilot project in the state of Tyrol

3 - IMPLEMENTATION

Stakeholders involved	
Contracting authority	NHT Neue Heimat Tirol
Project manager	Gerda Maria Embacher
Architect	Architekt Vogl-Fernheim
Envelope designer	Architekt Vogl-Fernheim
Technical system designer	Klimatherm GmbH, Büro Ing. Obwieser Ges.m.b.H.
Construction company	KPS-Ötztal Putz, C. Günther, Strabag, Bodner, Rohner, Opbacher,



Windows supplier	Alutherm
Energy consultant, scientific support	University of Innsbruck and Passive House Institute – Department Innsbruck

Costs and financing	
Refurbishment costs	Total investment of € 3,36 Mio.
Financial resources	See financing model above

Work progress	
Important points of refurbishment process and short description	<p>The challenges during the refurbishment of residential buildings are complex and multi-layered. Financial and social aspects and challenges need to be considered, because the tenant has to co-finance some parts of the renovation, which requires the implementation of persuasion and tenant engagement activities. Furthermore, legal challenges also have to be solved. The most intensive persuasion is to be done in the field of nearly zero energy house renovation and especially in cases where tenants are living in the flats during the time of ventilation system installations and other intrusive renovation activities.</p> <p>Within SINFONIA, NHT has pushed the installation of controlled ventilation with heat recovery in IN40. For the time being, 22% of the building users have agreed to implement this measure. Further extension is expected according to the fluctuations of the building users and corresponding rental contracts with new tenants.</p>



4 - DESCRIPTION AFTER REFURBISHMENT

**Photo to show
architectonic concept**



**Envelope
characteristics**

See above

Technical system

See above

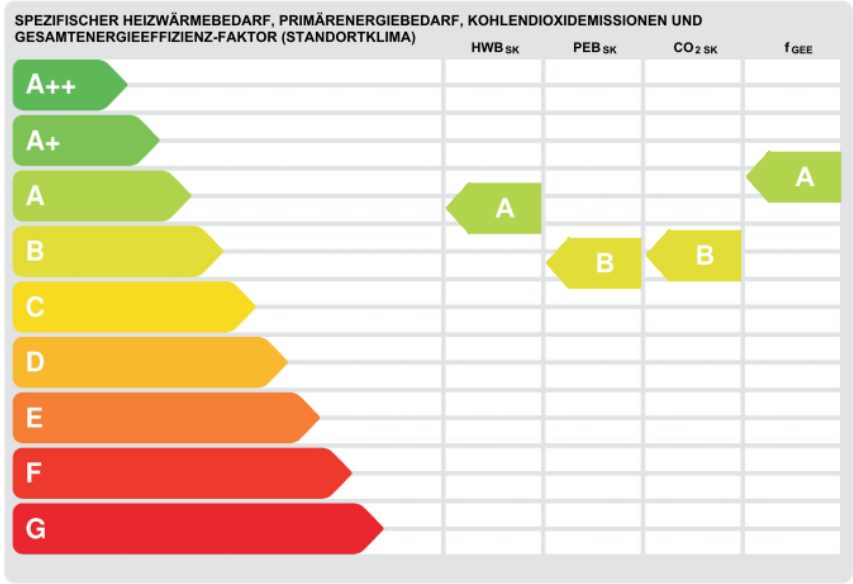
**Renewable energy
sources**

Prognosis of the yearly yield:
37,741 kWh/a

End-Energy use

Calculated with 69,40 kWh/m²*a



(EPC³)																																																			
Energy efficiency certificate (EPC⁴)	 <p>The chart displays energy efficiency levels (A+++ to G) for four metrics: HWB_{sk}, PEB_{sk}, CO₂_{sk}, and f_{GEE}. The levels are indicated by colored arrows pointing to the right, with the highest efficiency level (A) shown for each metric.</p> <table border="1"> <thead> <tr> <th>Efficiency Level</th> <th>HWB_{sk}</th> <th>PEB_{sk}</th> <th>CO₂_{sk}</th> <th>f_{GEE}</th> </tr> </thead> <tbody> <tr> <td>A+++</td> <td>Yes</td> <td>Yes</td> <td>Yes</td> <td>Yes</td> </tr> <tr> <td>A+</td> <td>Yes</td> <td>Yes</td> <td>Yes</td> <td>Yes</td> </tr> <tr> <td>A</td> <td>Yes</td> <td>Yes</td> <td>Yes</td> <td>Yes</td> </tr> <tr> <td>B</td> <td>Yes</td> <td>Yes</td> <td>Yes</td> <td>Yes</td> </tr> <tr> <td>C</td> <td>Yes</td> <td>Yes</td> <td>Yes</td> <td>Yes</td> </tr> <tr> <td>D</td> <td>Yes</td> <td>Yes</td> <td>Yes</td> <td>Yes</td> </tr> <tr> <td>E</td> <td>Yes</td> <td>Yes</td> <td>Yes</td> <td>Yes</td> </tr> <tr> <td>F</td> <td>Yes</td> <td>Yes</td> <td>Yes</td> <td>Yes</td> </tr> <tr> <td>G</td> <td>Yes</td> <td>Yes</td> <td>Yes</td> <td>Yes</td> </tr> </tbody> </table>	Efficiency Level	HWB _{sk}	PEB _{sk}	CO ₂ _{sk}	f _{GEE}	A+++	Yes	Yes	Yes	Yes	A+	Yes	Yes	Yes	Yes	A	Yes	Yes	Yes	Yes	B	Yes	Yes	Yes	Yes	C	Yes	Yes	Yes	Yes	D	Yes	Yes	Yes	Yes	E	Yes	Yes	Yes	Yes	F	Yes	Yes	Yes	Yes	G	Yes	Yes	Yes	Yes
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EnerPHiT pre-certificate for stepwise refurbishment (PHI⁵)	EnerPHiT certification is foreseen shortly																																																		

³ Energy Performance Certificate according to the Austrian Institute of Construction Engineering

⁴ Energy Performance Certificate according to the Austrian Institute of Construction Engineering

⁵ According to the rules of the international Passive House Institute

