

P&D PROJECT IN ZURICH

PROF. DIETRICH SCHWARZ



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SCHWARZ | ARCHITEKTEN



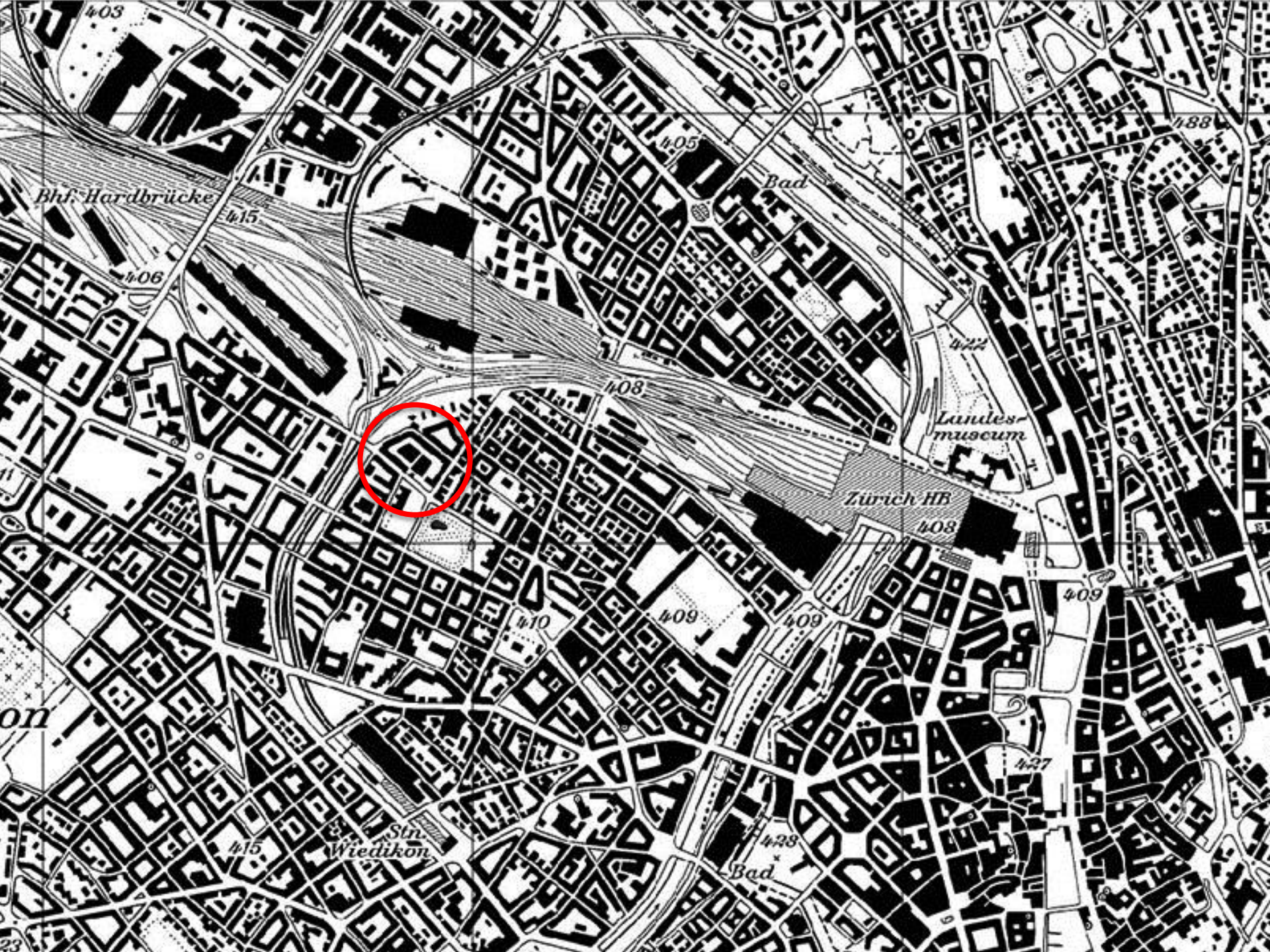
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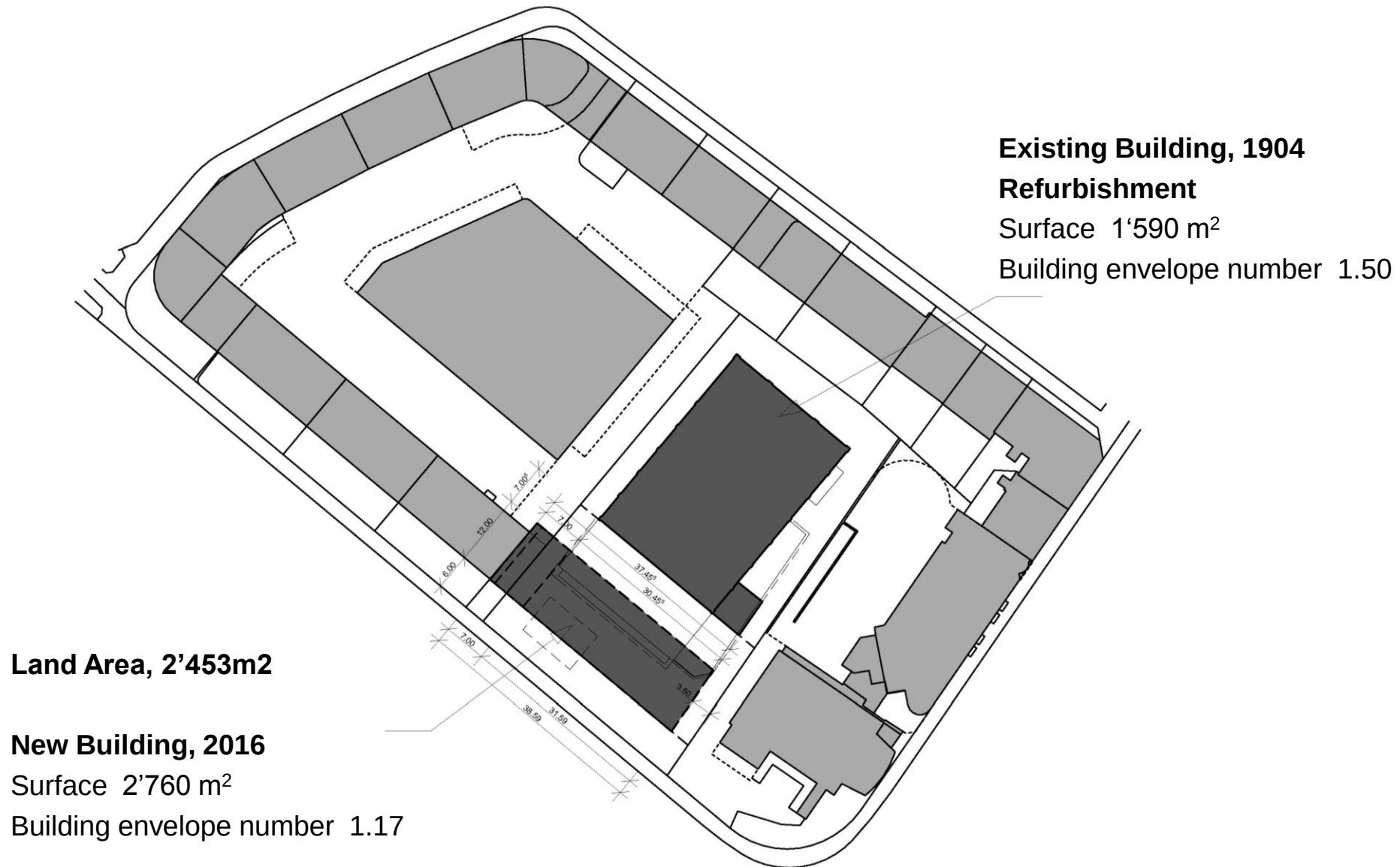
Bundesamt für Energie BFE



Kanton Zürich
Baudirektion

LOCATION AND BOUNDARY CONDITIONS





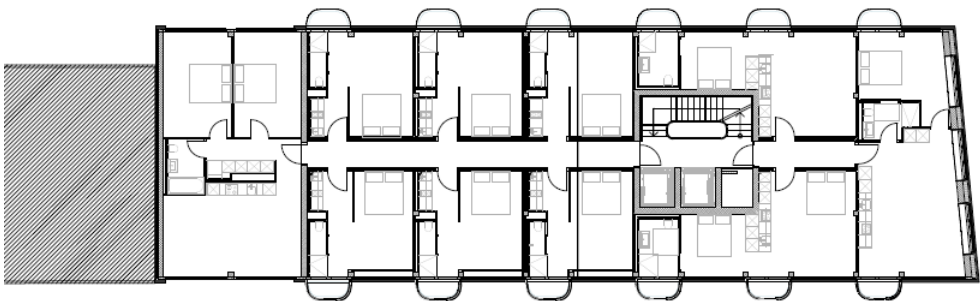
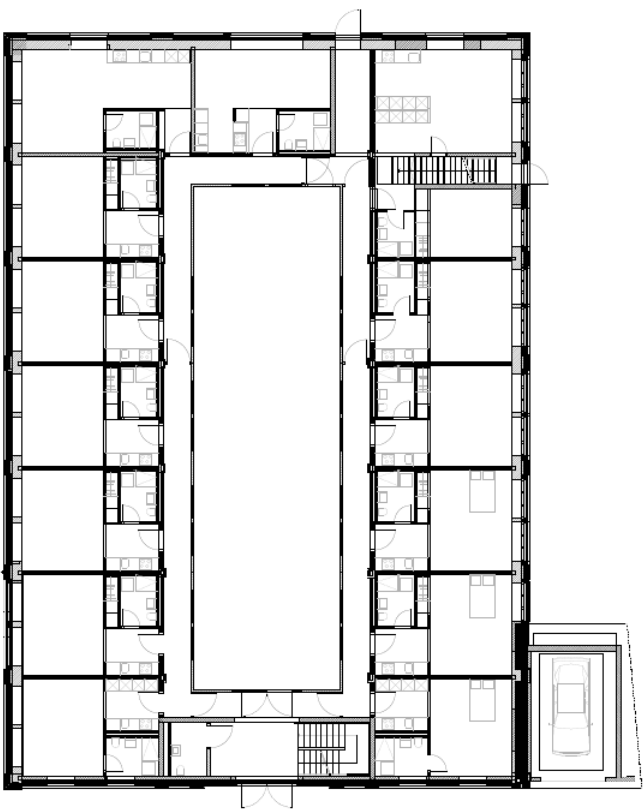




LOCATION AND BOUNDARY CONDITIONS

INNER-CITY LOCATION

- Program: Hotel, Café, 70 Apartments
- Energy Label: Minergie-P-A
- Photovoltaics: 110 kWp
- Beginning of construction: January 2015
- Realisation: autumn 2016



OVERVIEW PILOT AND DEMONSTRATION PROJECT «HOHLSTRASSE 100, ZURICH»

- Façade system with high efficiency insulation
 - > Maximise utility surface
- Phase Changing Material (PCM)
 - > Storage of solar energy
- Vacuum insulation glass
 - > Pilot application of a new technology
- Monitoring of warm water consumption
 - > Measurement of every day consumption
- Monitoring of building technology equipment
 - > Optimization of the relevant building technology installations
- Battery storage
 - > Increase of self-consumption rate and relief of electricity grid

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FUNDING PARTNERS

Bundesamt für Energie BFE
Sektion Cleantech



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Bundesamt für Energie BFE

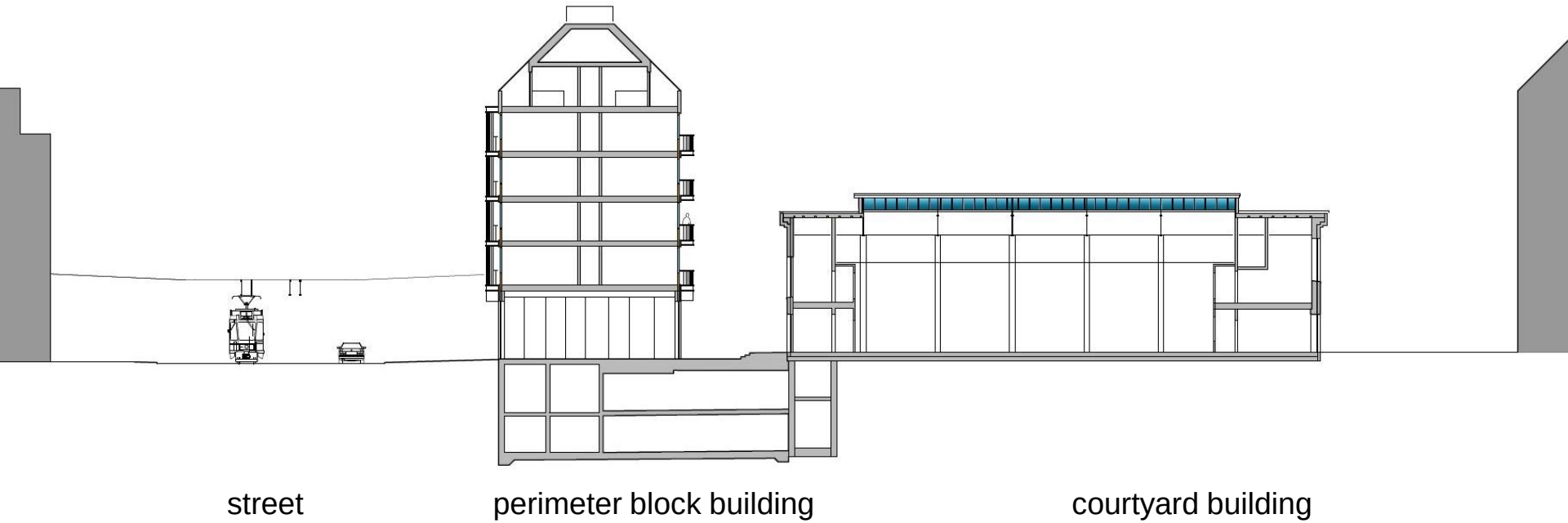
Amt für Abfall, Wasser, Energie und Luft AWEL
Abteilung Energie



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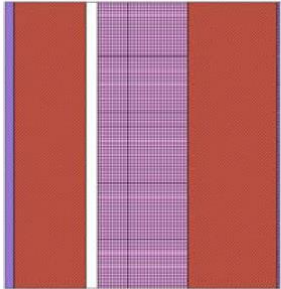
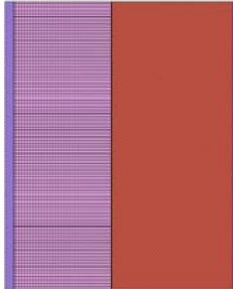
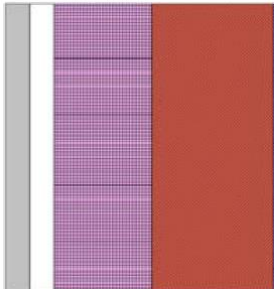
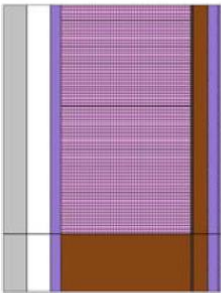
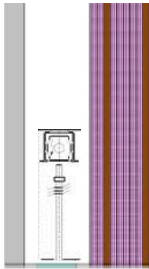
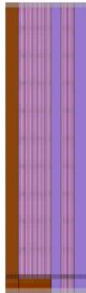
FACADE SYSTEM WITH HIGH EFFICIENCY INSULATION

> MAXIMISE UTILITY SURFACE



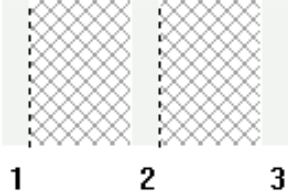
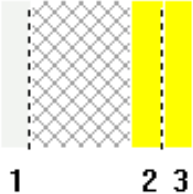
FACADE SYSTEM WITH HIGH EFFICIENCY INSULATION

> MAXIMISE UTILITY SURFACE

façade with many layers and insulation in the middle  46 cm	compact façade with insulation outside  38 cm	ventilated façade with insulation outside  44.5 cm
prefabricated wood element façade  36.5 cm	façade system with aerogel , incl. shading  24 cm	façade system with aerogel , plastered  12.5 cm

VACUUM INSULATION GLASS

> PILOT APPLICATION OF A NEW TECHNOLOGY

triple insulation glazing (2 Low-E, Ar)	vacuum insulation with additional glass (Low-E, Ar)	vacuum insulation glass
		
$U_g < 0.5 \text{ W/m}^2\text{K}$	$U_g < 0.4 \text{ W/m}^2\text{K}$	$U_g < 0.5 \text{ W/m}^2\text{K}$
Glass thickness 46 mm	Glass thickness 31 mm	Glass thickness 11 mm

FACADE SYSTEM WITH HIGH EFFICIENCY INSULATION AND VACUUM INSULATION GLASS

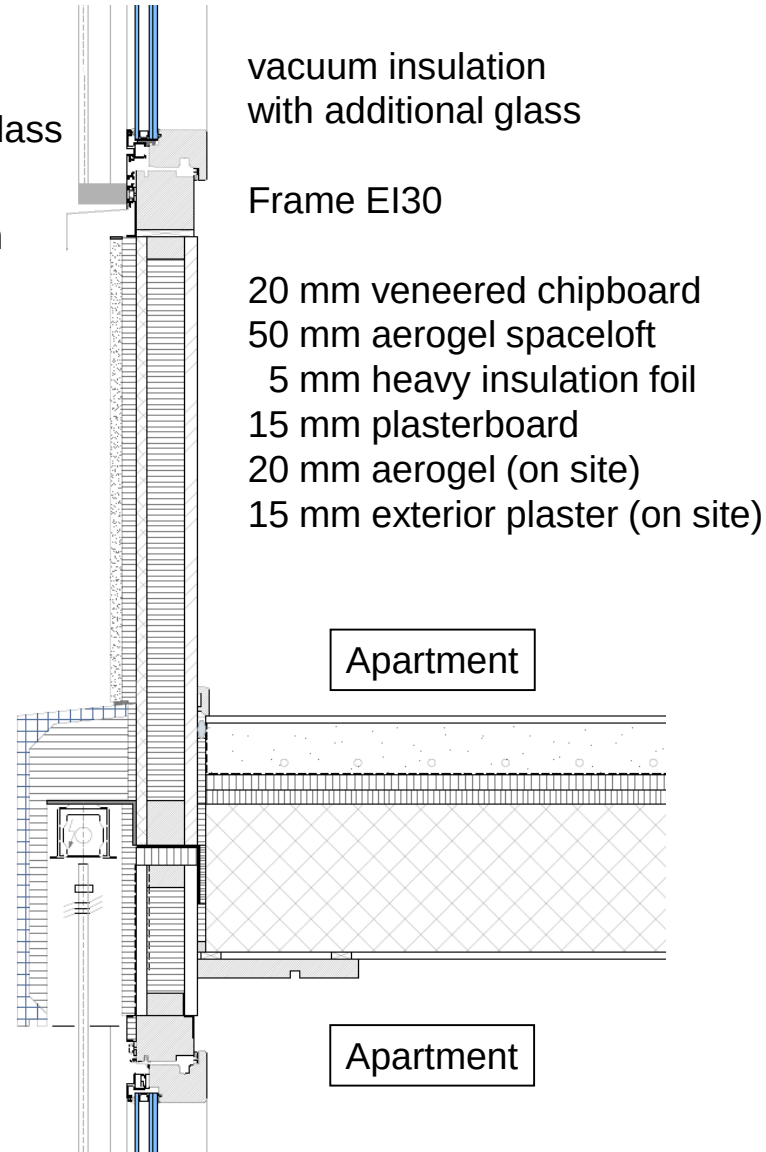
Vacuum insulation

	just VIG	VIG with additional glass
Glass thickness	11 mm	32mm
Ug-Value	$< 0.5 \text{ W/m}^2\text{K}$	$< 0.3 \text{ W/m}^2\text{K}$ möglich
g-Value	> 0.5	> 0.4
Weight	25 kg/m^2	$> 35 \text{ kg/m}^2$
Sound proofing	Rw 37 dB	Rw 45 dB
Glass edge connection	> 0.04	0.04

Prefabricated façade system with aerogel

total thickness	12.5 cm
U-Value	$0.20 \text{ W/m}^2\text{K}$
Weight	25 kg/m^2
Sound proofing	R'w $> 40 \text{ dB}$

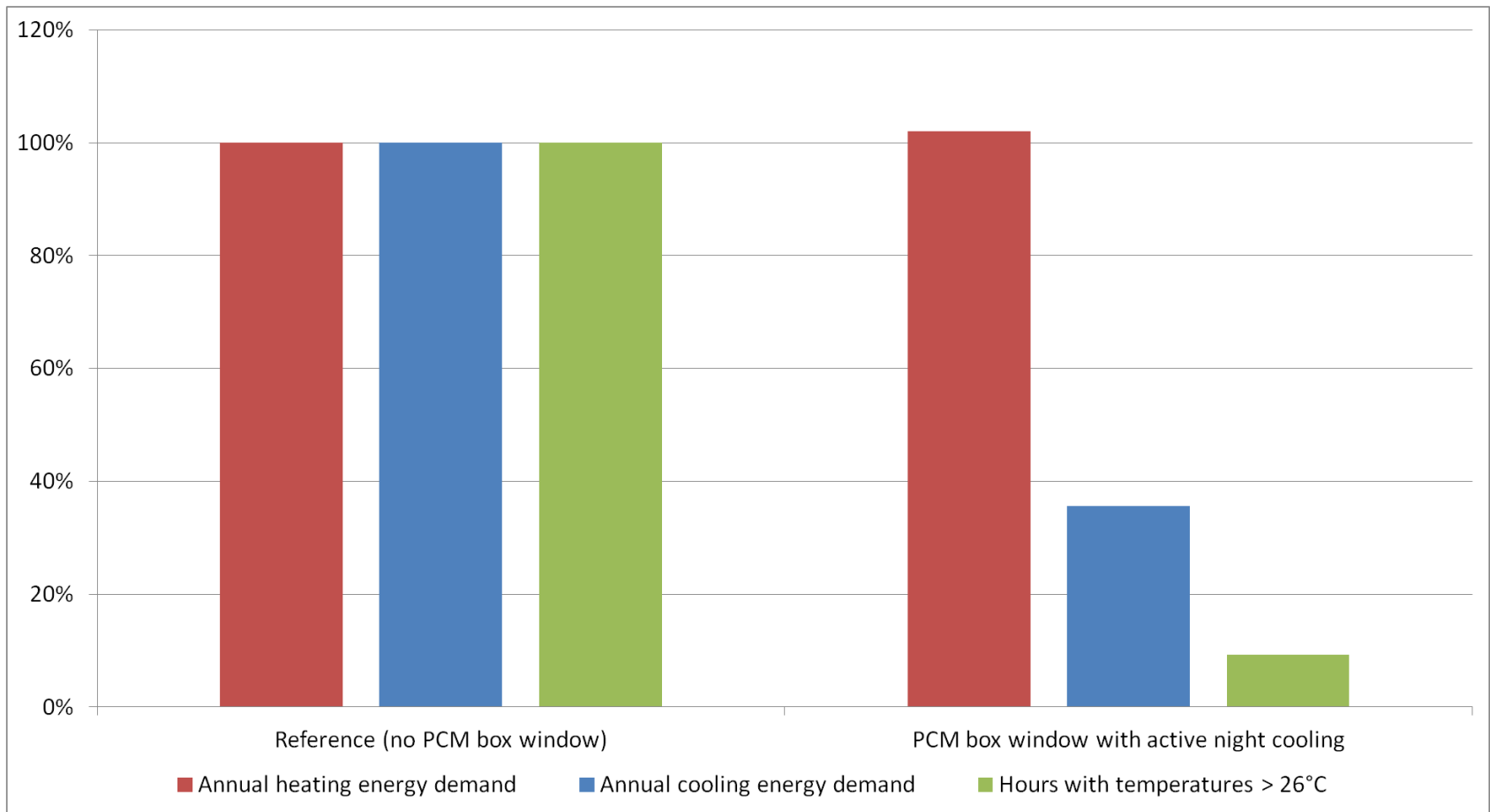
outside



PHASE CHANGING MATERIAL (PCM) STORAGE OF SOLAR ENERGY

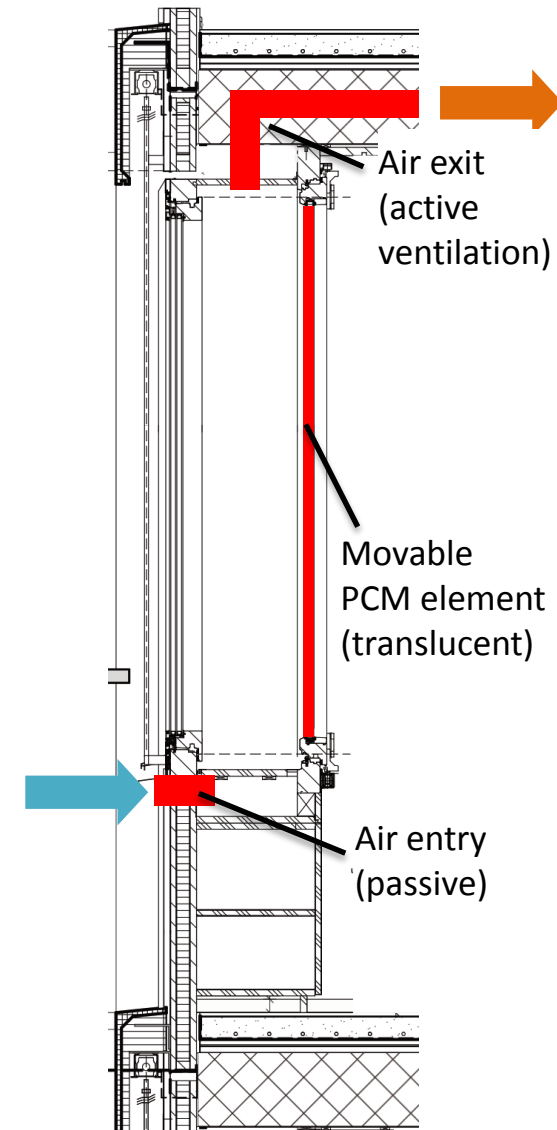


PHASE CHANGING MATERIAL (PCM) STORAGE OF SOLAR ENERGY



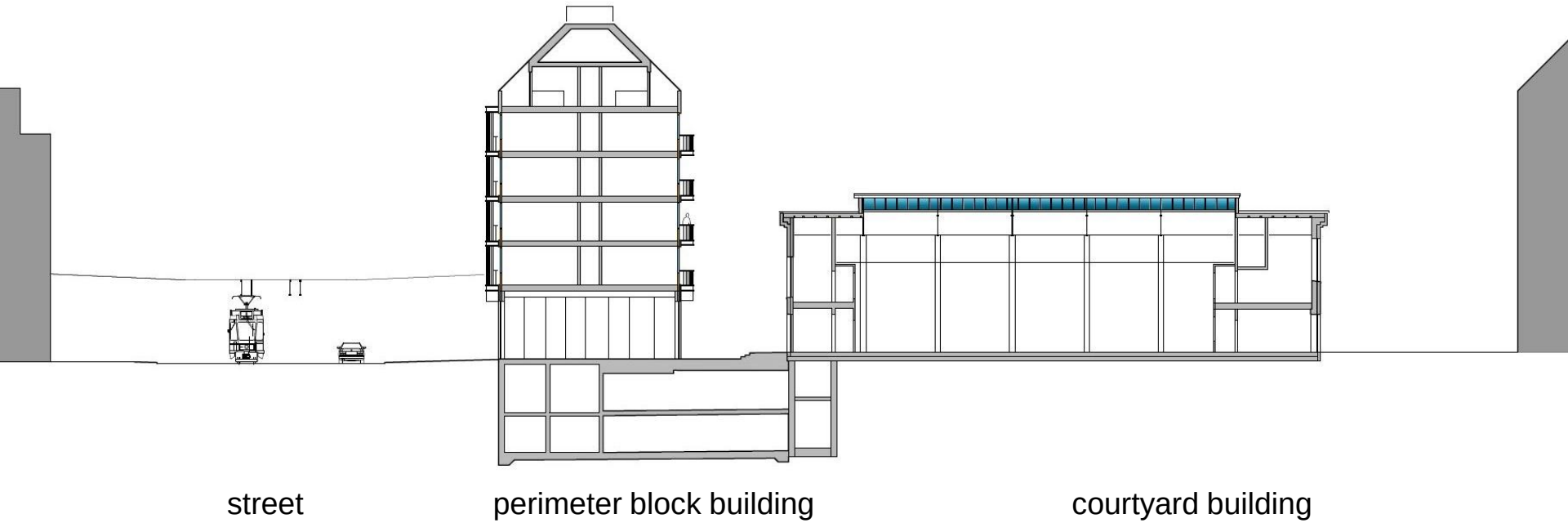
PHASE CHANGING MATERIAL (PCM) STORAGE OF SOLAR ENERGY

- Box window with PCM element at the inside
- 4 m² PCM per apartment
- Elements are movable
- In closed condition > box window
- In the summer: ventilation of the in between space during the night by an active ventilation with heat recovery



INNER-CITY LOCATION – NOISE

> BAY WINDOW WITH SILENCING CAPACITY

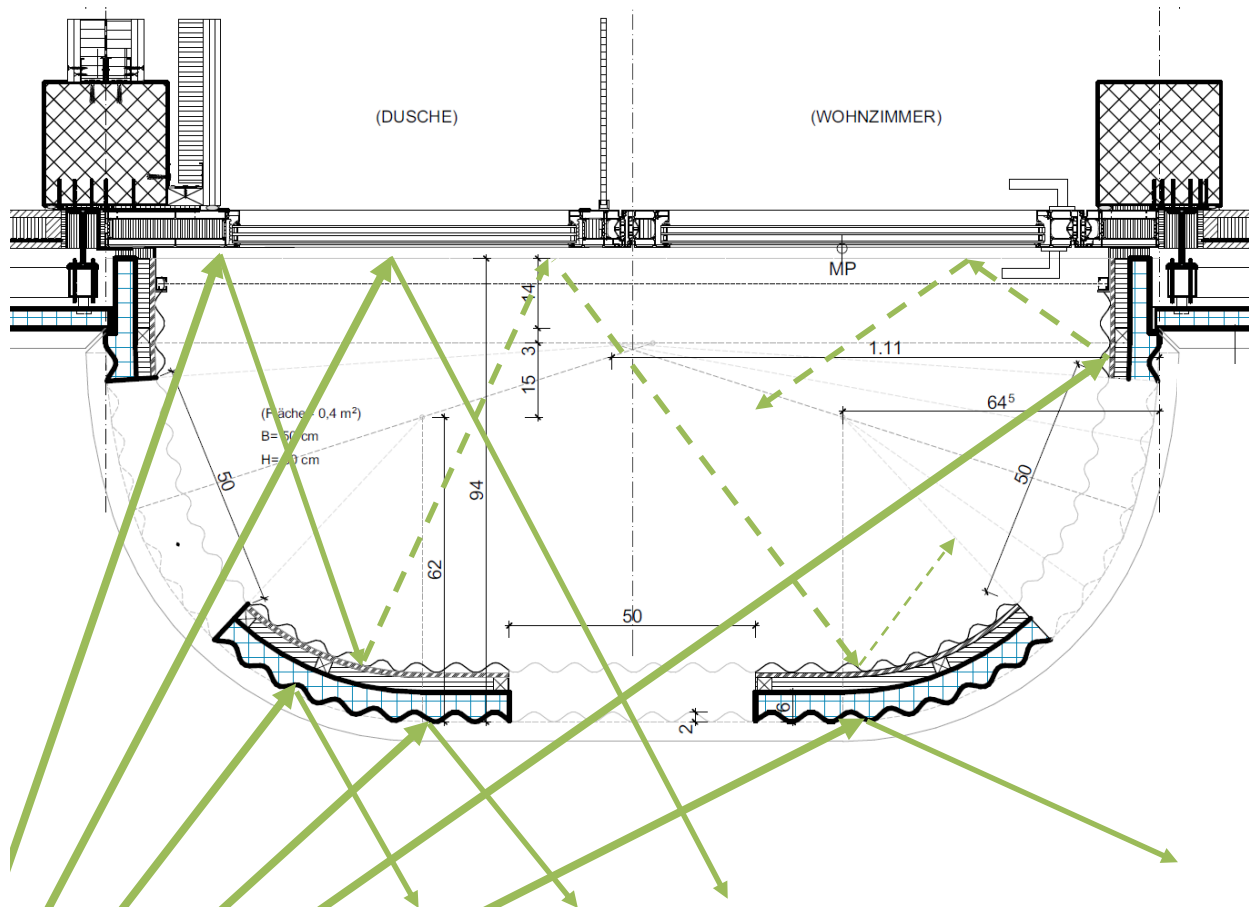


INNER-CITY LOCATION – NOISE > BAY WINDOW WITH SILENCING CAPACITY

- Reduction by 10 dB necessary (65 dB to 55 dB)
- Design of a facade element > bay window with silencing capacity
- Efficacy of 5 types were tested simulated
- 3 types tested at EMPA

INNER-CITY LOCATION – NOISE

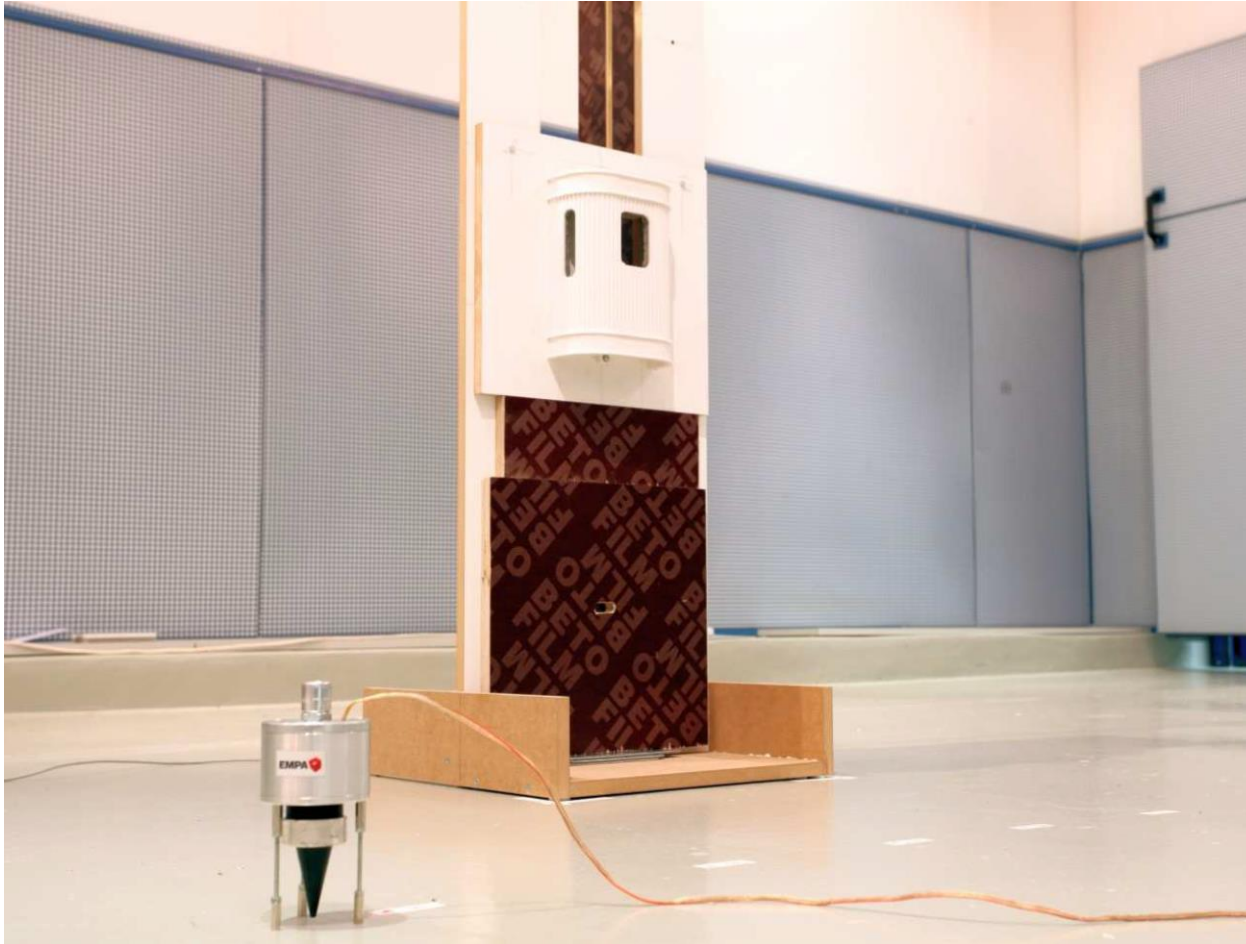
> BAY WINDOW WITH SILENCING CAPACITY



– 3 types tested at EMPA, modell scale 1:16

INNER-CITY LOCATION – NOISE

- > BAY WINDOW WITH SILENCING CAPASITY



– 3 types tested at EMPA, modell scale 1:16

INNER-CITY LOCATION – NOISE
> BAY WINDOW WITH SILENCING CAPACITY



– Version with one opening

RELATION TO FLUIDGLASS

– FLUIDGLASS substitutes functions:

Cooling

Heating

Shading

Collecting solar energy

- Thin facade (< 80 mm)

THANK YOU FOR YOUR ATTENTION

SCHWARZ | ARCHITEKTEN

Contact:
Dietrich Schwarz Architekten AG
ETH/SIA
Seefeldstrasse 224
8008 Zürich
+41 44 389 10 60
www.schwarz-architekten.com



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