

# Comparative analyses: urban quality, living standard, sustainability.

## Modernist housing estates vs 21st century city

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Organisers:



International Co-owners:



# Introduction



Organisers:



International Co-owners:



- the building industry is responsible for about 40% of total energy consumption \*
- nearly ZEB energy standard set for all new buildings starting from year 2020 \*

\* European Commission, <http://ec.europa.eu/energy/en/topics/energy-efficiency/buildings>



Organisers:



International Co-owners:



Sustainable Buildings and Climate Initiative  
Promoting Policies and Practices for Sustainability



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# Modernist housing estates



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# Construction period 1945-1990



## Problems

- bad visual identity
- lack of urban quality
- high energy consumption



Organisers:



International Co-owners:



# Germany

## Former East Germany – DDR

- Berlin – 191000 living units
- Rostock – 53500 living units
- Halle – 40600 living units
- Chemnitz – 31300 living units

## West Germany – BRD

- Berlin – 48900 living units
- Munich – 20100 living units
- Nuremberg – 40600 living units
- Cologne – 31300 living units

most well-known estates:  
 Marzahn (Berlin), Grünau (Leipzig),  
 Nordweststadt (Frankfurt),  
 Hoyerswerda, Neustadt (Halle)

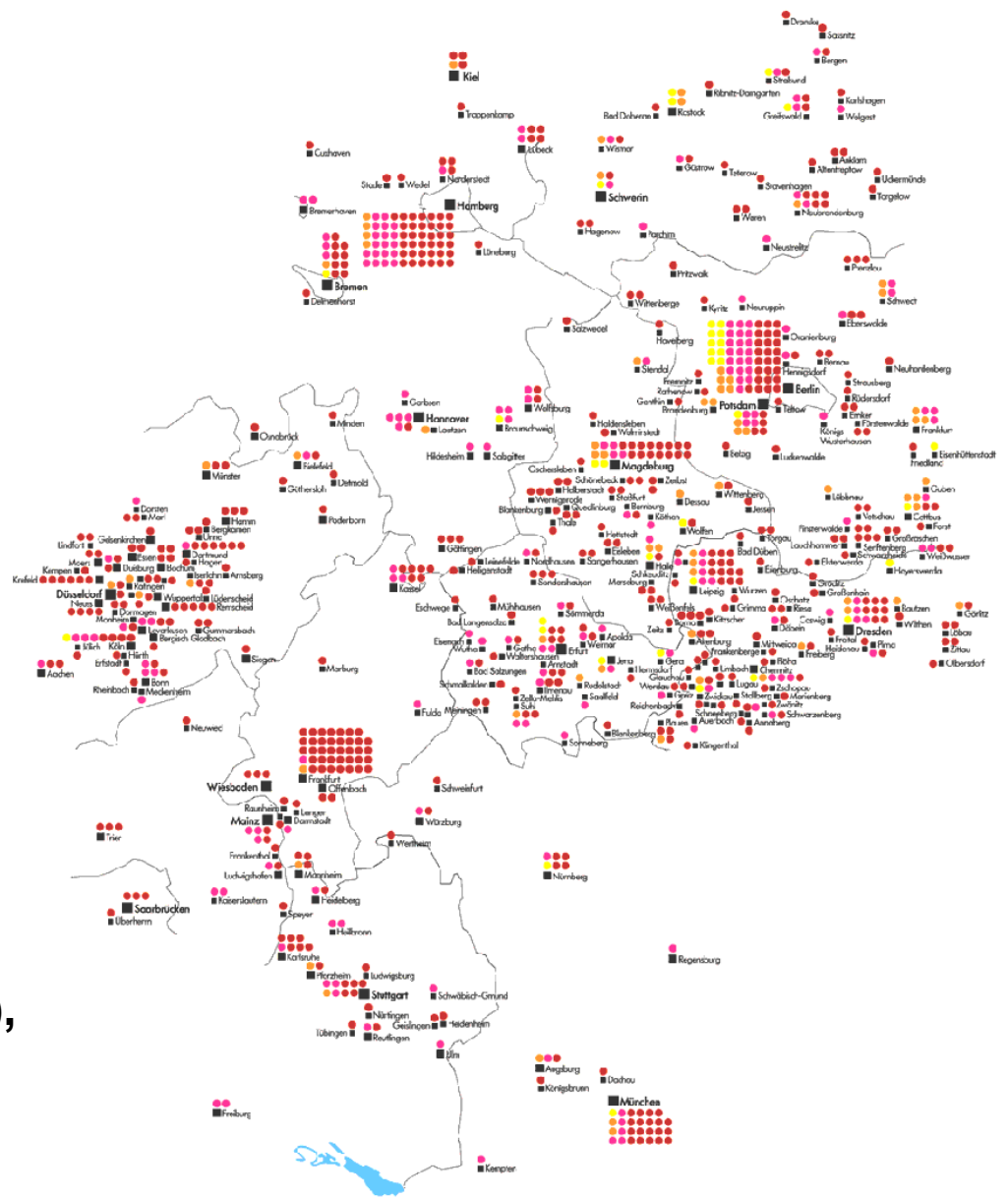


image source: www.archplus.net © ARCH+ Verlag GmbH



Organisers:



International Co-owners:



# Dominating tendencies

## Refurbishment

Park Hill estate, Sheffield UK



image source: [www.dezeen.com](http://www.dezeen.com)

©RIBA Library Photographs Collection (up): Keith Collie (down)

## Demolition

Robin Hood gardens, London UK



image source: [www.dezeen.com](http://www.dezeen.com)

©Luke Hayes (up): Picture plane (down)

# 21st century city



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# Carbon neutral cities

Masdar city, UAE



image source: [www.dzb.de](http://www.dzb.de) © Abu Dhabi Future Energy Company/Masdar

Dongtan Eco-city, China



image source: [www.bee-inc.com](http://www.bee-inc.com) ©ARUP



Organisers:



International Co-owners:



# Active house solutions

HHS Architekten, Frankfurt, GER



image source: [www.hhs-architekten.de](http://www.hhs-architekten.de) ©HHS Architekten

Nussmüller Architekten, Kapfenberg, AUT



image source: [www.nussmüller.at](http://www.nussmüller.at) ©Nussmüller Architekten



Organisers:



International Co-owners:



# Case study projects



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# Case study projects

**Nordweststadt, Frankfurt - GER**  
1961-1972



image source: [www.cadmapper.com](http://www.cadmapper.com) ©Cadmapper LLC

**Hafencity, Hamburg – GER**  
2001-2025

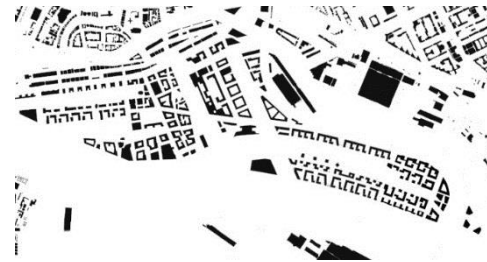


image source: [www.hafencity.com](http://www.hafencity.com) ©HafenCity Hamburg GmbH

**Seestadt Aspern, Vienna - AUT**  
2007-2030



image source: [www.aspern-seestadt.at](http://www.aspern-seestadt.at) ©Wien 3420 AG

**Nordhavn, Copenhagen - DK**  
2012-2060

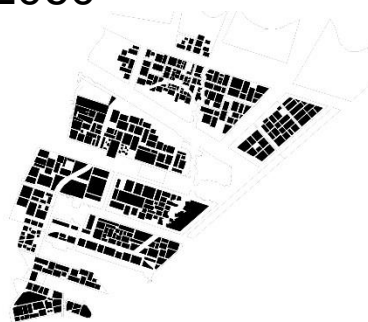


image source: [www.nordhavnen.dk](http://www.nordhavnen.dk) ©By & Havn



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International Co-owners:



# Comparative analyses



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# Tab.1 Masterplan features

Location	Seestadt Aspern, Vienna*	Hafencity, Hamburg**	Nordhavn, Copenhagen***	Nordweststadt, Frankfurt****
<b>Facts &amp; Figures</b>				
Year of construction	2007-2030	2001-2025	2012-2060	1961-1972
Area size (ha)	246	155	350	170
Total built area GFA (m <sup>2</sup> )	2 600 000	2 500 000	2 875 000	1 150 000
Population	20 000	14 000	40 000	17 000
Workplaces	26 000	45 000	40 000	n/a
Population density (person/ha)	100	110	87.5	106
Plot ratio	2-3	3.7 - 6.1	1.8	0.78
Building density (m <sup>2</sup> /ha)	10 569	16 129	8 215	6 765
Distance to center (km)	13	2	4	8

\* Data provided by: Wien3420 GmbH Aspern Development AG, [www.wien3420.at](http://www.wien3420.at)  
ÖVV Bauträger GmbH, [www.oevw.at](http://www.oevw.at)

\*\* Data provided by: Hafencity Hamburg GmbH, [www.hafencity.com](http://www.hafencity.com) and  
Unibail-Rodamco Germany GmbH, [www.unibail-rodamco.de](http://www.unibail-rodamco.de)

\*\*\* Data provided by: By & Havn, Copenhagen, [www.nordhavnen.dk](http://www.nordhavnen.dk)

\*\*\*\* Data provided by: Stadtplanungsamt Frankfurt am Main, [www.stadtplanungsamt-frankfurt.de](http://www.stadtplanungsamt-frankfurt.de)  
ABG Frankfurt Holding Wohnungsbau- und Beteiligungsgesellschaft mbH, [www.abg-fh.de](http://www.abg-fh.de)



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# Tab.2 Urban design concept

Location	Seestadt Aspern, Vienna*		Hafencity, Hamburg**		Nordhavn, Copenhagen***		Nordweststadt, Frankfurt****	
<b>Urban structure</b>								
<b>Mixed use (GFA)</b>		%		%		%		%
<b>Housing (m<sup>2</sup>)</b>	1 202 038	51	800 900	32	1 700 000	66	1 016 400	89
<b>Office/Commercial (m<sup>2</sup>)</b>	686 135	29	1 639 200	65	726 000	28	98 000	9
<b>Social Infrastructure (m<sup>2</sup>)</b>	70 040	3	54 700	13	65 000	2.5	14 670	1
<b>Culture/Education (m<sup>2</sup>)</b>	27 036	1			74 000	3		
<b>Sport facilities (m<sup>2</sup>)</b>	39 141	2			10 000	0.5		
<b>Industry (m<sup>2</sup>)</b>	341 364	14	n/a	/	n/a	/	18 200	1
<b>Greenery (m<sup>2</sup>)</b>	653 044	/	274 000	/	330 000	/	230 500	/
<b>Water (m<sup>2</sup>)</b>	52 225	/	281 000	/	300 000	/	n/a	/
<b>Transportation concept</b>								
<b>Metro line</b>	provided		provided		provided		provided	
<b>Bus line</b>	provided		provided		provided		provided	
<b>Cycle pathways</b>	provided		provided		provided		none	
<b>Electro car/ car sharing</b>	provided		provided		provided		provided	
<b>other</b>	n/a		boat		boat		n/a	
<b>Distance to station(m)</b>	250		350		400		300	
<b>Parking places</b>	25 000		6 700		15 000		5 000	
<b>Energy concept</b>								
<b>Heating</b>	district		district		district		district	
<b>Cooling</b>	none		none		sea/groundwater		none	
<b>Renewable energy</b>	solar		solar		solar/wind		none	
<b>Geothermal energy</b>	used		used		used		not used	
<b>Energy standard</b>	passive house		DGNB gold		passive house		not defined	

# Mixed use districts

## Nordweststadt, Frankfurt - GER



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## Seestadt Aspern, Vienna - AUT



image source: [www.aspern-seestadt.at](http://www.aspern-seestadt.at) ©Wien 3420 AG

## Hafencity, Hamburg – GER



image source: [www.thecityateyelevel.com](http://www.thecityateyelevel.com) ©Tanja Nagelsmeier

## Nordhavn, Copenhagen - DK



image source: [www.nordhavnen.dk](http://www.nordhavnen.dk) ©By & Havn



# Cycle pathways

## Nordweststadt, Frankfurt - GER



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## Hafencity, Hamburg – GER



image source: [www.hafencity.com](http://www.hafencity.com) ©ELBE&FLUT

## Seestadt Aspern, Vienna - AUT



image source: [www.wienerzeitung.at](http://www.wienerzeitung.at) ©Stefan Doleschal

## Nordhavn, Copenhagen - DK



image source: [www.nordhavnen.dk](http://www.nordhavnen.dk) ©By & Havn

# Pedestrian pathways and orientation

## Nordweststadt, Frankfurt - GER



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## Hafencity, Hamburg – GER



image source: [www.hamburg.de](http://www.hamburg.de) ©R.Hegeler

## Seestadt Aspern, Vienna - AUT



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## Nordhavn, Copenhagen - DK



image source: [www.nordhavnen.dk](http://www.nordhavnen.dk) ©By & Havn

# Energy concept

## Nordweststadt, Frankfurt - GER

Heating – district „power to waste“ plant

Cooling – none

Electricity – district

## Hafencity, Hamburg – GER

Heating – district

Cooling – none

Electricity – district

## Seestadt Aspern, Vienna - AUT

Heating – district geothermal energy

Cooling – none

Electricity – district

## Nordhavn, Copenhagen - DK

Heating – district, geothermal energy, solar thermal energy, seasonal thermal storage

Cooling – ground water cooling + seasonal cooling storage, sea water cooling

Electricity – district, wind power, solar cells



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# Tab. 3 Residential block concept

Location		Seestadt Aspern, Vienna*	Hafencity, Hamburg**	Nordhavn, Copenhagen***	Nordweststadt, Frankfurt****
<b>Residential block structure</b>					
<b>Block typologies</b>	<b>Housing</b>	23%	22.5%	90%	90%
	<b>Housing + commercial ground floor</b>	67%	43.75%	10%	10%
	<b>Housing + commercial (25-50%)</b>	6%	18.75%	/	/
	<b>Housing + commercial (50-75%)</b>	3%	15%	/	/
<b>Mixed use</b>		yes	yes	yes	no
<b>Housing typologies</b>	<b>single-family</b>	/	/	/	14%
	<b>terraced</b>	/	/	5%	
	<b>multi-family</b>	100%	100%	95%	86%
<b>Apartment structure</b>	<b>1-room</b>	4%	13%	5%	5%
	<b>2-room</b>	37%	39%	15%	20%
	<b>3-room</b>	40%	33%	50%	60%
	<b>4+ room</b>	19%	15%	30%	15%
<b>Ground floor height (m)</b>		4.5	4.5-7	4	2.5
<b>Ground floor function</b>		mix use	mix use	mix use	residential
<b>Green area function</b>		public/private	public/private	public/private	public
<b>Parking facilities</b>		park garage	park garage	park garage	park garage

# Public spaces

## Nordweststadt, Frankfurt - GER



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## Hafencity, Hamburg – GER



image source: www.hafencity.com ©ELBE&FLUT

## Seestadt Aspern, Vienna - AUT



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## Nordhavn, Copenhagen - DK



image source: www.nordhavnen.dk ©By & Havn

# Children playgrounds

## Nordweststadt, Frankfurt - GER



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## Hafencity, Hamburg – GER



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## Seestadt Aspern, Vienna - AUT



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## Nordhavn, Copenhagen - DK



image source: [www.nordhavnen.dk](http://www.nordhavnen.dk) ©By & Havn

# Tab. 4 Residential building concept

Location		Seestadt Aspern, Vienna*	Hafencity, Hamburg**	Nordhavn, Copenhagen***	Nordweststadt, Frankfurt****	
<b>Housing unit structure</b>						
Average apartment size (m <sup>2</sup> )	1-room	38	45	30	32	
	2-room	58	65	60	58	
	3-room	75	110	95	72	
	4+ room	98	130	110	84	
<b>Vertical circulation</b>		stairs/elevator	stairs/elevator	stairs/elevator	stairs/elevator	
<b>Barrier free</b>		yes	yes	yes	partly	
<b>Heating system</b>		district geothermal	district geothermal	district geothermal	district powerplant	
<b>Cooling system</b>		none	individual	district cooling	none	
<b>Mechanical ventilation</b>		provided	provided	provided	provided	
<b>Natural ventilation</b>		provided	provided	provided	provided	
<b>Energy production</b>		none	exceptionally	solar	not provided	
<b>Energy consumption (KWh/m<sup>2</sup>a)</b>		15 (heat)	40 (overall)	20 (heat)	160-170 (heat) <sup>1</sup>	80-95 (heat) <sup>2</sup>

\* Data provided by: Wien3420 GmbH Aspern Development AG, [www.wien3420.at](http://www.wien3420.at)  
ÖVW Bauträger GmbH, [www.oevw.at](http://www.oevw.at)

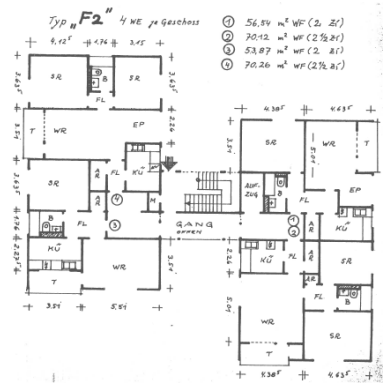
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Unibail-Rodamco Germany GmbH, [www.unibail-rodamco.de](http://www.unibail-rodamco.de)

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# Residential buildings and apartment structure

## Nordweststadt, Frankfurt - GER



## HafenCity, Hamburg – GER

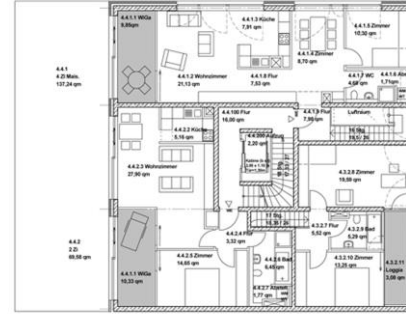


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image source: [www.architec24.de](http://www.architec24.de) ©MLVR Architekten (left) Dirk Wilhelmy (right)

## Seestadt Aspern, Vienna - AUT



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## Nordhavn, Copenhagen - DK



image source: [www.havnekanten.dk](http://www.havnekanten.dk) ©Vilhelm Lauritzen Arkitekter



# Examples of the energy performance and visual identity improvement



image source: [www.mappe.de](http://www.mappe.de) © Arc Architekturkonzept

image source: [www.detail.de](http://www.detail.de) © Lacaton & Vassal

image source: [www.dezeen.com](http://www.dezeen.com) © LAN Architecture



Organisers:



International Co-owners:



# Conclusions:

Disadvantages and problems	Qualities and potentials
<ul style="list-style-type: none"> <li>• mono-functional use of quarters, absence of social spaces</li> </ul>	<ul style="list-style-type: none"> <li>• relatively low building density and silent character of the residential quarters</li> </ul>
<ul style="list-style-type: none"> <li>• high energy consumption and non-use of renewable energy sources</li> </ul>	<ul style="list-style-type: none"> <li>• good solar exposure and possible integration of solar energy concepts</li> </ul>
<ul style="list-style-type: none"> <li>• not disabled-friendly residential quarter</li> </ul>	<ul style="list-style-type: none"> <li>• apartments with good functional floorplan</li> </ul>
<ul style="list-style-type: none"> <li>• visual identity problem</li> </ul>	<ul style="list-style-type: none"> <li>• durable construction</li> </ul>
<ul style="list-style-type: none"> <li>• treatment of public spaces and green areas</li> </ul>	<ul style="list-style-type: none"> <li>• big green areas which could be easily transformed</li> </ul>

# Prospectives and future work:

- Design proposals and strategies for introduction of mixed use neighbourhood concept
- Design proposals and strategies for the increased energy efficiency and renewable energy usage, on a urban quartier and building level
- Application of barrier free concept and increase of the apartment flexibility
- Visual identity improvement
- Public and green space treatment



Organisers:



International Co-owners:



# Thank you

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