

**HOSOYA
SCHAEFER
ARCHITECTS**
AG Zürich

WORKING HYPOTHESIS

a practitioners approach to the Urban Age

Questions related to energy and urban space:

Macro:

What is “urban” and what are its system boundaries?

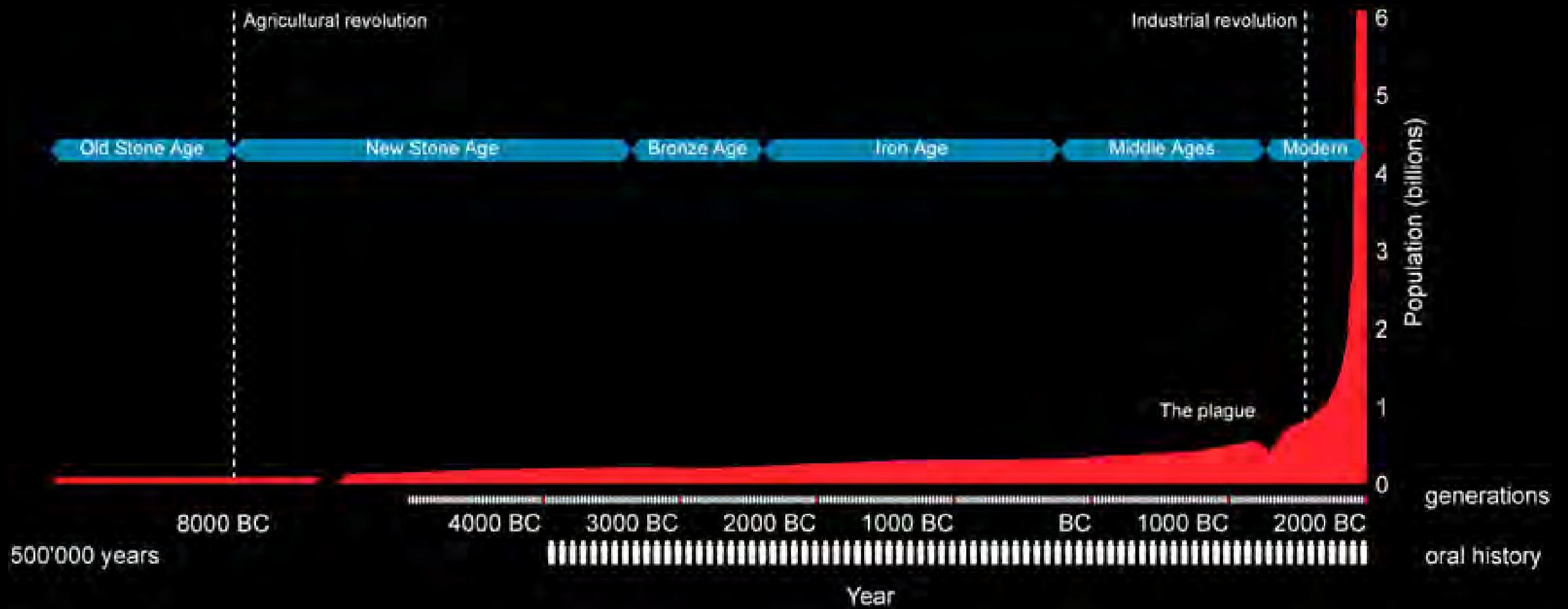
Meso:

What is “urban form” and what are its generators?

Micro:

What is the role of energy in shaping and organizing local urban areas?







10 Largest Cities: Today

Hosoya Schaefer / Chandler, Tertius: Four Thousand Years of Urban Growth: A Historical Census



10 Largest Cities: 1950 AD

Hosoya Schaefer / Chandler, Tertius: Four Thousand Years of Urban Growth: A Historical Census

CHICAGO
PHILADELPHIA
NEW YORK
MANCHESTER
LONDON
PARIS
ST. PETERSBURG
BERLIN
VIENNA
TOKYO

INHABITANTS
PERSONS IN MILLIONS



10 Largest Cities: 1900 AD

Hosoya Schaefer / Chandler, Tertius: Four Thousand Years of Urban Growth: A Historical Census



10 Largest Cities: 1800 AD

Hosoya Schaefer / Chandler, Tertius: Four Thousand Years of Urban Growth: A Historical Census



10 Largest Cities: 1500 AD

Hosoya Schaefer / Chandler, Tertius: Four Thousand Years of Urban Growth: A Historical Census



10 Largest Cities: 1000 AD

Hosoya Schaefer / Chandler, Tertius: Four Thousand Years of Urban Growth: A Historical Census



10 Largest Cities: 100 AD

Hosoya Schaefer / Chandler, Tertius: Four Thousand Years of Urban Growth: A Historical Census



10 Largest Cities: 1200 bc - 100 AD

Hosoya Schaefer / Chandler, Tertius: Four Thousand Years of Urban Growth: A Historical Census



10 Largest Cities: 1700 - 1200 bc

Hosoya Schaefer / Chandler, Tertius: Four Thousand Years of Urban Growth: A Historical Census



10 Largest Cities: 3000 - 1700 bc

Hosoya Schaefer / Chandler, Tertius: Four Thousand Years of Urban Growth: A Historical Census



Mesopotamia (Ziggurat of Ur) - consolidation of the urban elements

21st c BC, 6th c BC



Göbekli Tepe - origin of the urban?
ca. 8000 BC

Interaction

Social differentiation
Exchange
Society
Culture

Symbols /
Innovation

Transaction

Division of work
Value chains
Markets
Economy

Goods /
Added Value

Organisation

Control
Redistribution
Institutions
Civilization

Power /
Stability

Interaction

Social differentiation
Exchange
Society
Culture

Symbols /
Innovation

Transaction

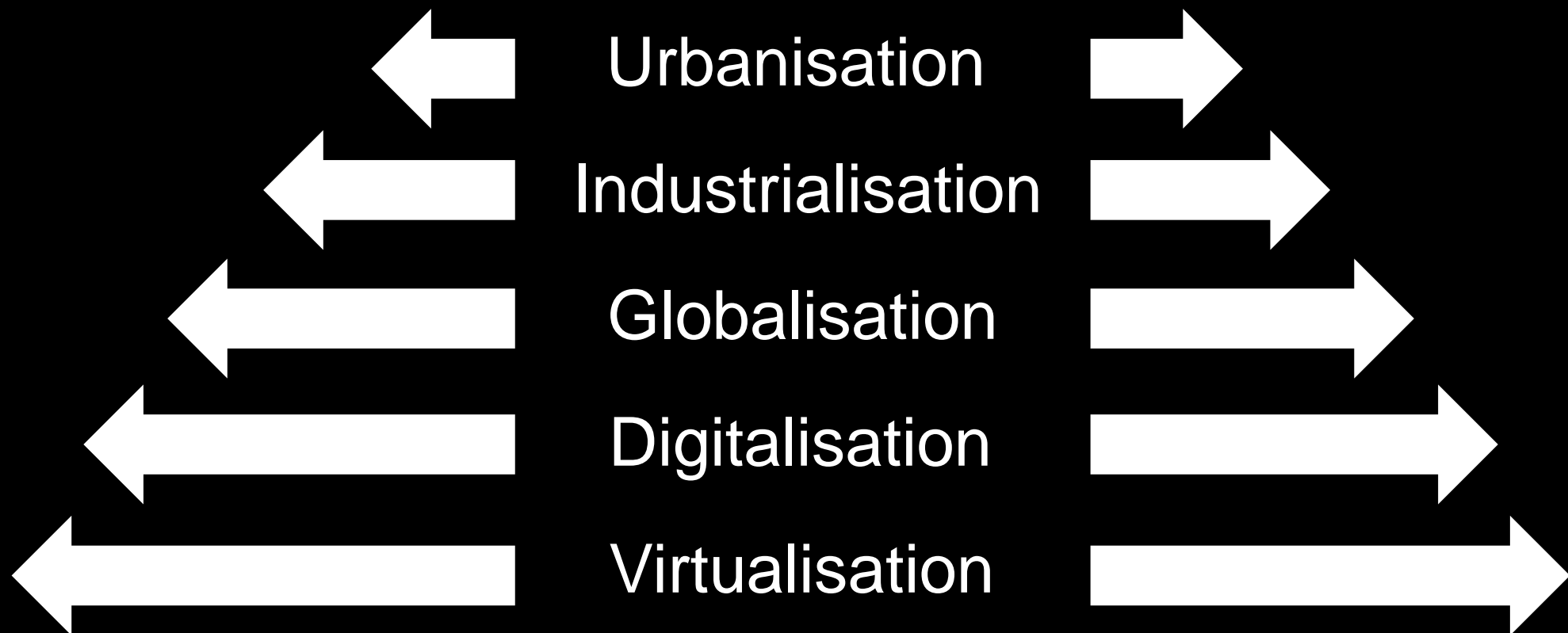
Division of work
Value chains
Markets
Economy

Goods /
Added Value

Organisation

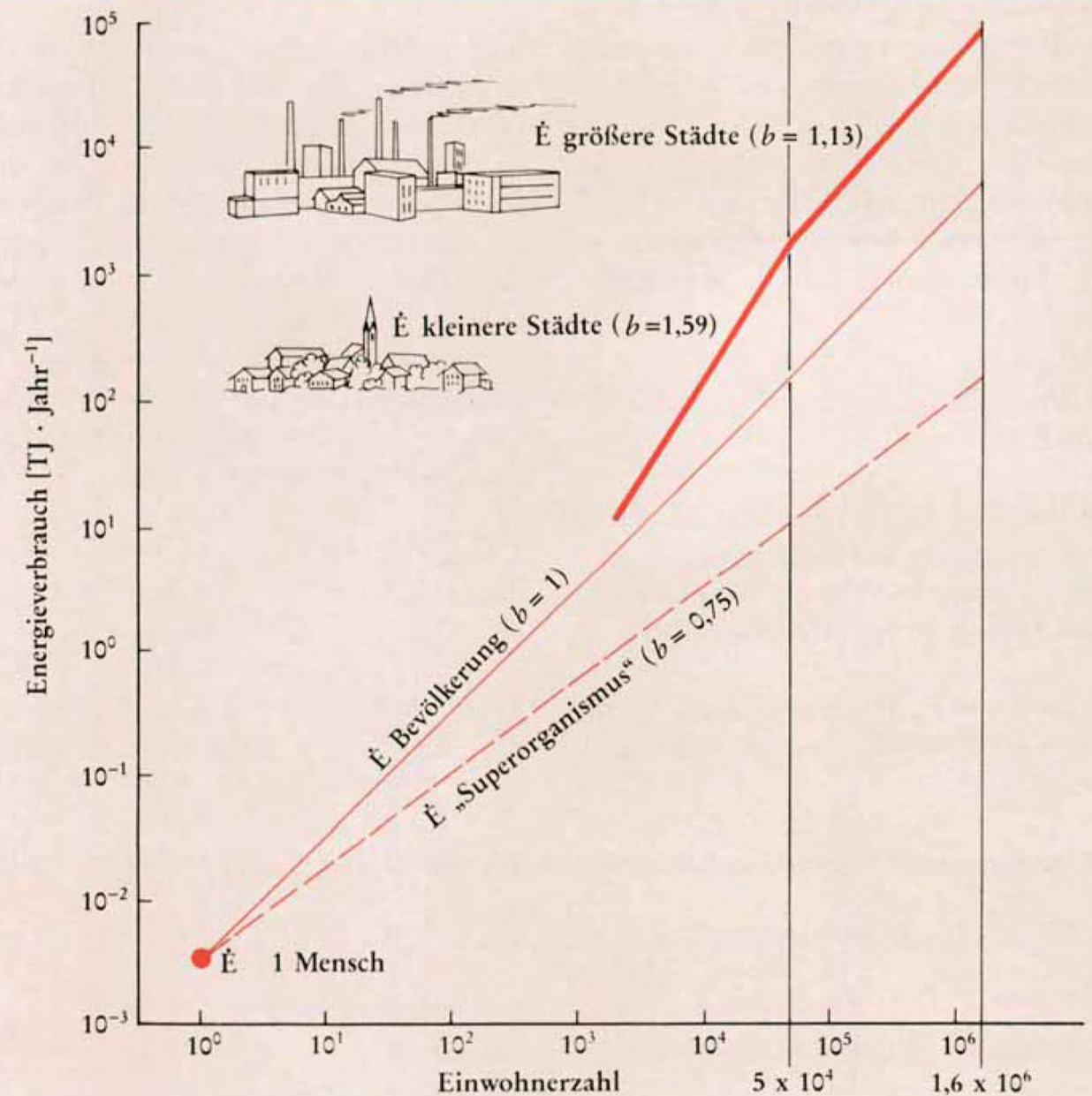
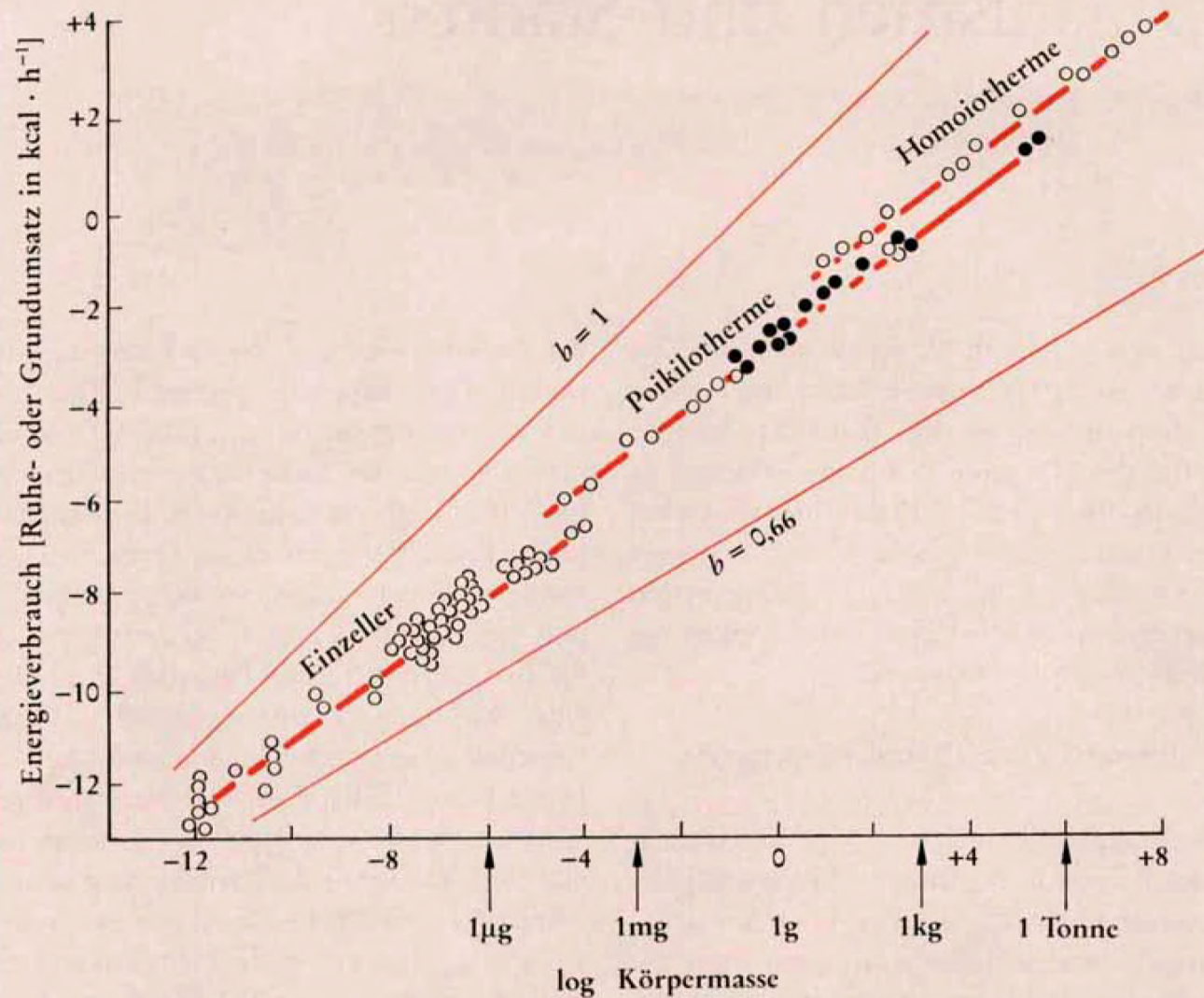
Control
Redistribution
Institutions
Civilization

Power /
Stability



Technological progress & the abstraction from physical reality

Hosoya Schaefer Architects



Comparison of allometric laws in animals and cities

Wieser W: Der Energieverbrauch von Organismen und Städten. Biologie in unserer Zeit, 15. Jahrg. 1985, Nr. 1

Table 1. Scaling exponents for urban indicators vs. city size

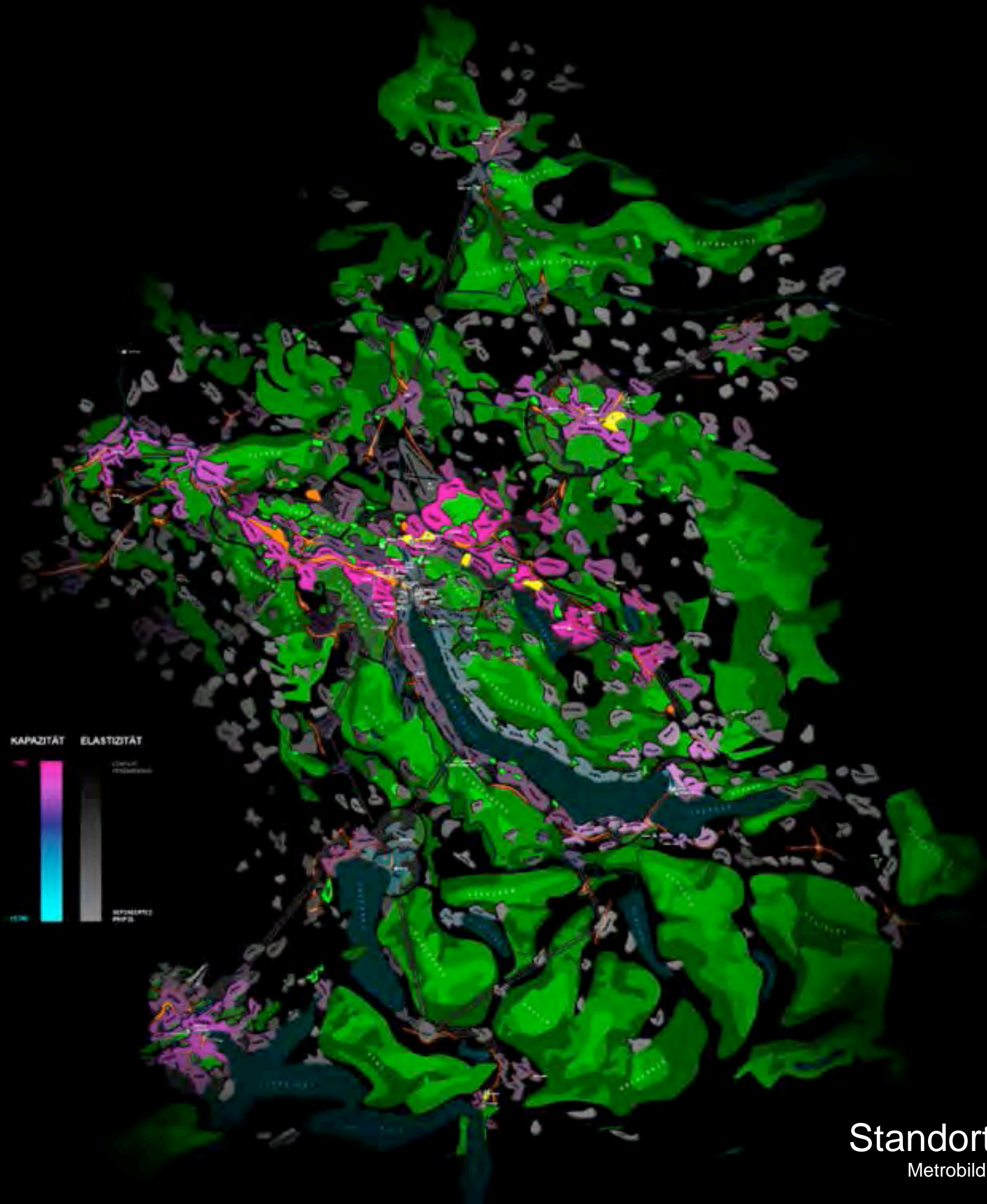
Y	β	95% CI	Adj- R^2	Observations	Country-year
New patents	1.27	[1.25,1.29]	0.72	331	U.S. 2001
Inventors	1.25	[1.22,1.27]	0.76	331	U.S. 2001
Private R&D employment	1.34	[1.29,1.39]	0.92	266	U.S. 2002
"Supercreative" employment	1.15	[1.11,1.18]	0.89	287	U.S. 2003
R&D establishments	1.19	[1.14,1.22]	0.77	287	U.S. 1997
R&D employment	1.26	[1.18,1.43]	0.93	295	China 2002
Total wages	1.12	[1.09,1.13]	0.96	361	U.S. 2002
Total bank deposits	1.08	[1.03,1.11]	0.91	267	U.S. 1996
GDP	1.15	[1.06,1.23]	0.96	295	China 2002
GDP	1.26	[1.09,1.46]	0.64	196	EU 1999–2003
GDP	1.13	[1.03,1.23]	0.94	37	Germany 2003
Total electrical consumption	1.07	[1.03,1.11]	0.88	392	Germany 2002
New AIDS cases	1.23	[1.18,1.29]	0.76	93	U.S. 2002–2003
Serious crimes	1.16	[1.11, 1.18]	0.89	287	U.S. 2003
Total housing	1.00	[0.99,1.01]	0.99	316	U.S. 1990
Total employment	1.01	[0.99,1.02]	0.98	331	U.S. 2001
Household electrical consumption	1.00	[0.94,1.06]	0.88	377	Germany 2002
Household electrical consumption	1.05	[0.89,1.22]	0.91	295	China 2002
Household water consumption	1.01	[0.89,1.11]	0.96	295	China 2002
Gasoline stations	0.77	[0.74,0.81]	0.93	318	U.S. 2001
Gasoline sales	0.79	[0.73,0.80]	0.94	318	U.S. 2001
Length of electrical cables	0.87	[0.82,0.92]	0.75	380	Germany 2002
Road surface	0.83	[0.74,0.92]	0.87	29	Germany 2002

Data sources are shown in [SI Text](#). CI, confidence interval; Adj- R^2 , adjusted R^2 ; GDP, gross domestic product.



Zürich Today - Functional Urban Area

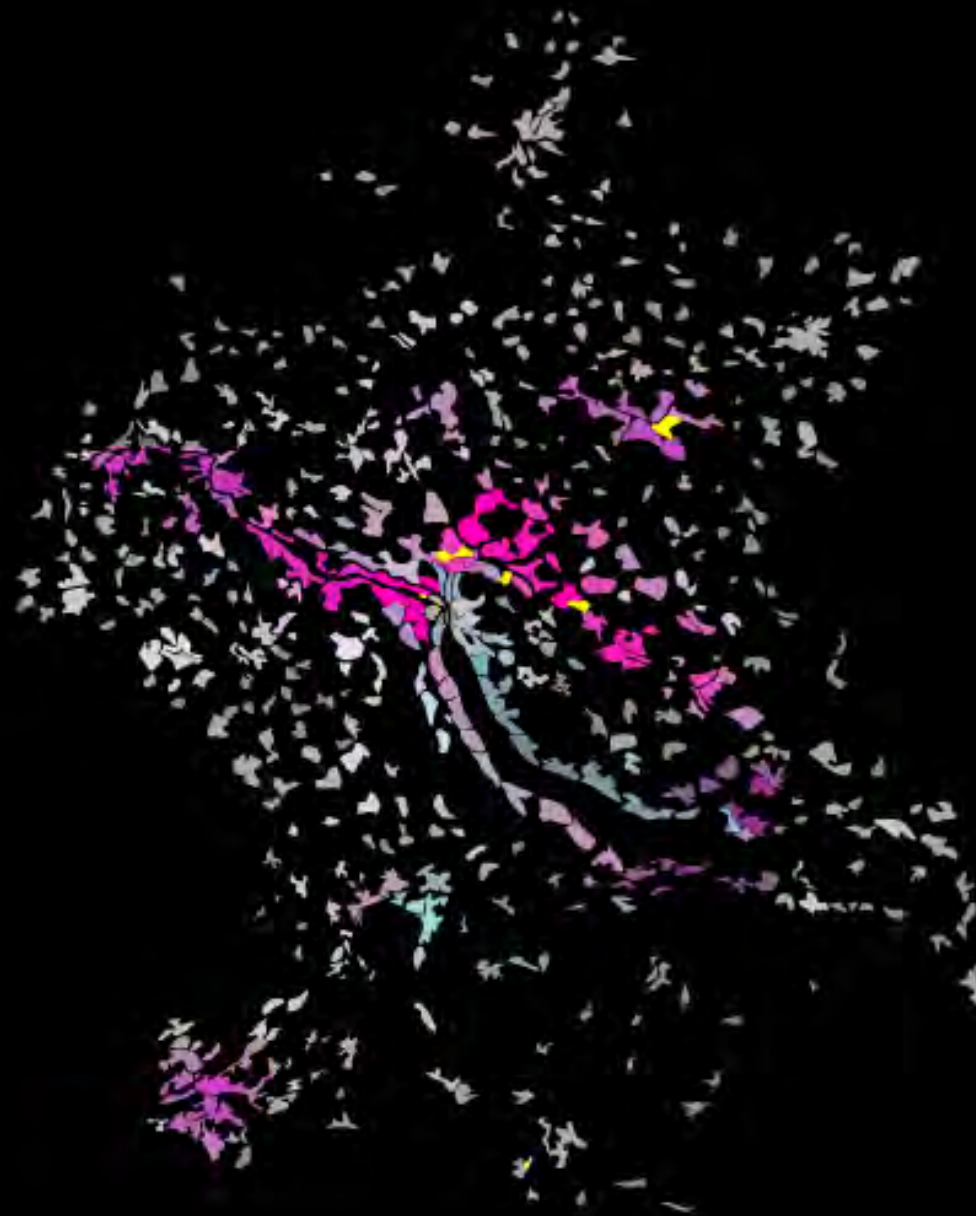
Copyright Luftbild Schweiz, 2006





„Standortmosaik“ - a term from plant sociology

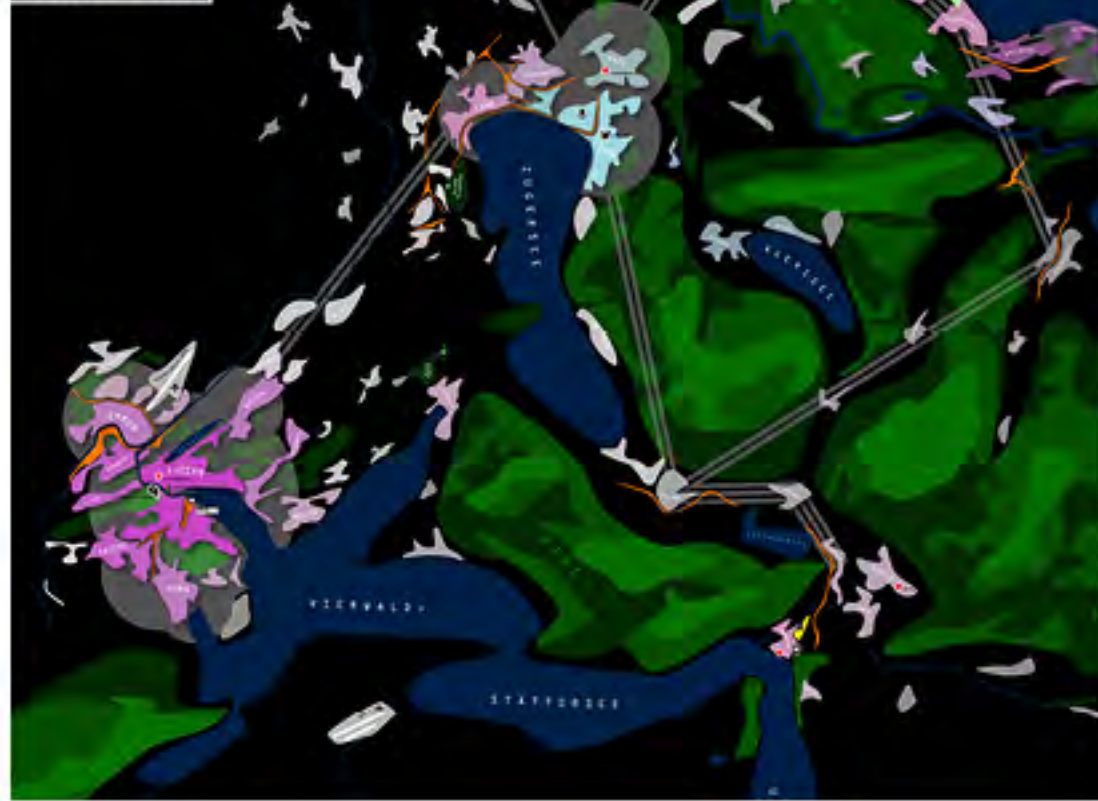
Standortmosaik



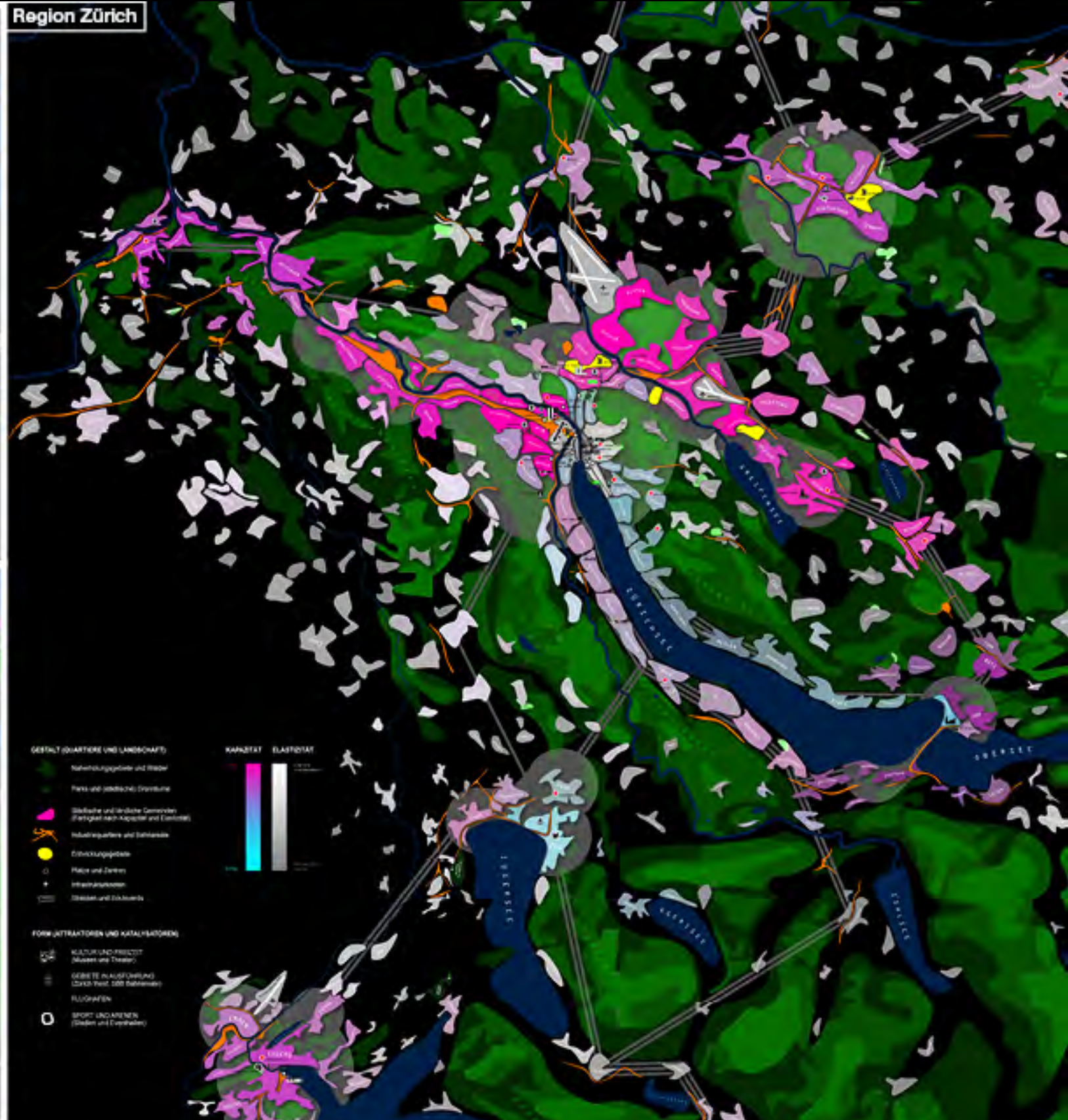
Schaffhausen, Frauenfeld



Zug, Luzern



Region Zürich



- GEOSTRUKTUR (QUARTIERE UND LANDSCHAFT)
- Naherholungsgebiete und Wälder
 - Parks und (öffentliche) Grünräume
 - Städtische und ländliche Gemeinden (Farbgebung nach Aspekt und Elastizität)
 - Industriequartiere und Zentren
 - Entwicklungsgebiete
 - Plätze und Zentren
 - Infrastrukturachsen
 - Strassen und Zufahrten



- FORM (ATTRAKTOREN UND KATALYSATOREN)
- KULTUR UND FREIZEIT (Museen und Theater)
 - GEWISSE AUSSTELLUNG (Zoo, Kunst, Sport, etc.)
 - FLUGHAFEN
 - SPORT UND FREIZEIT (Stadion und Events)







City of Zug: 27'537 inhabitants

Interaction density and innovation - V-Zug

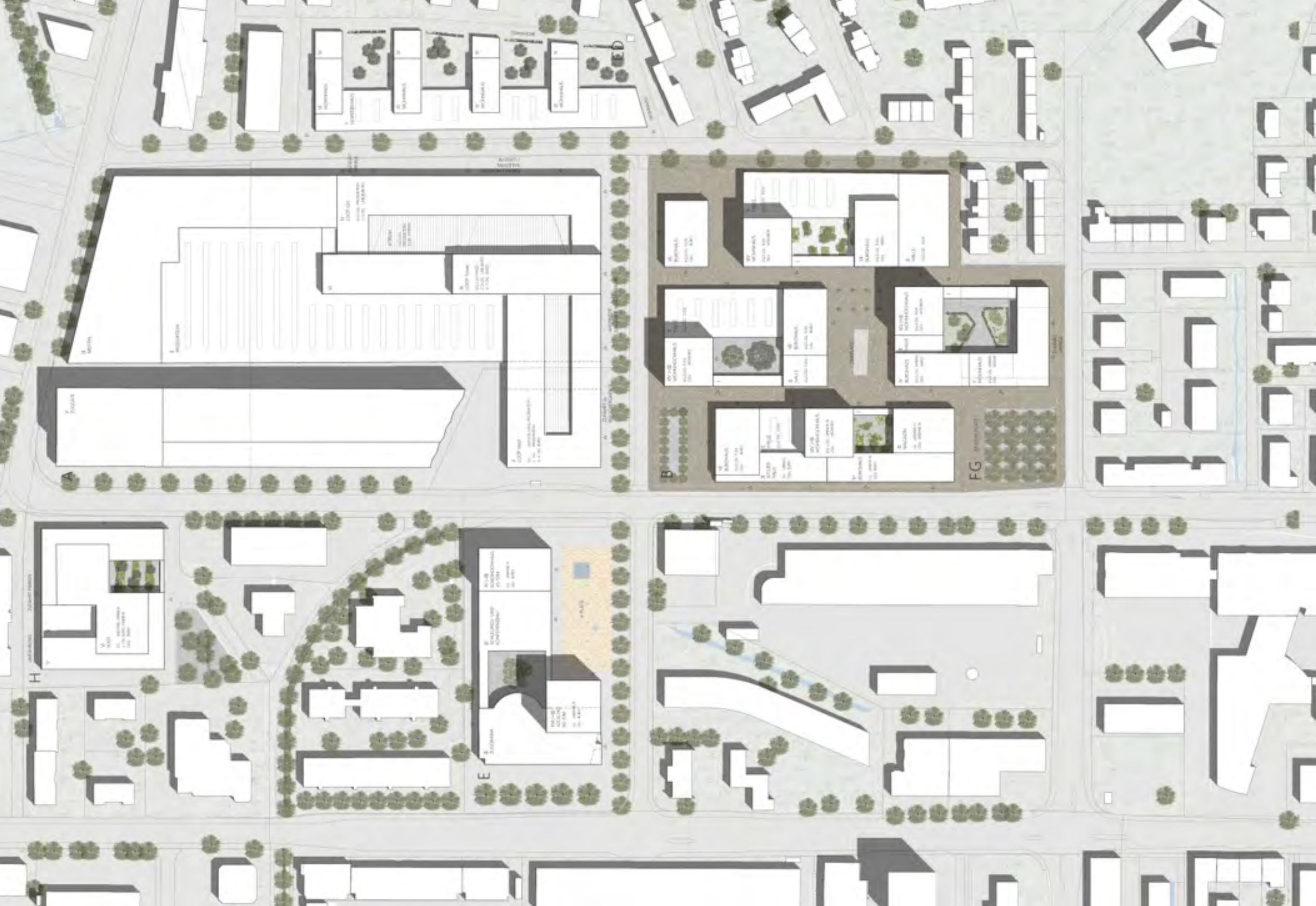
Hosoya Schaefer Architects

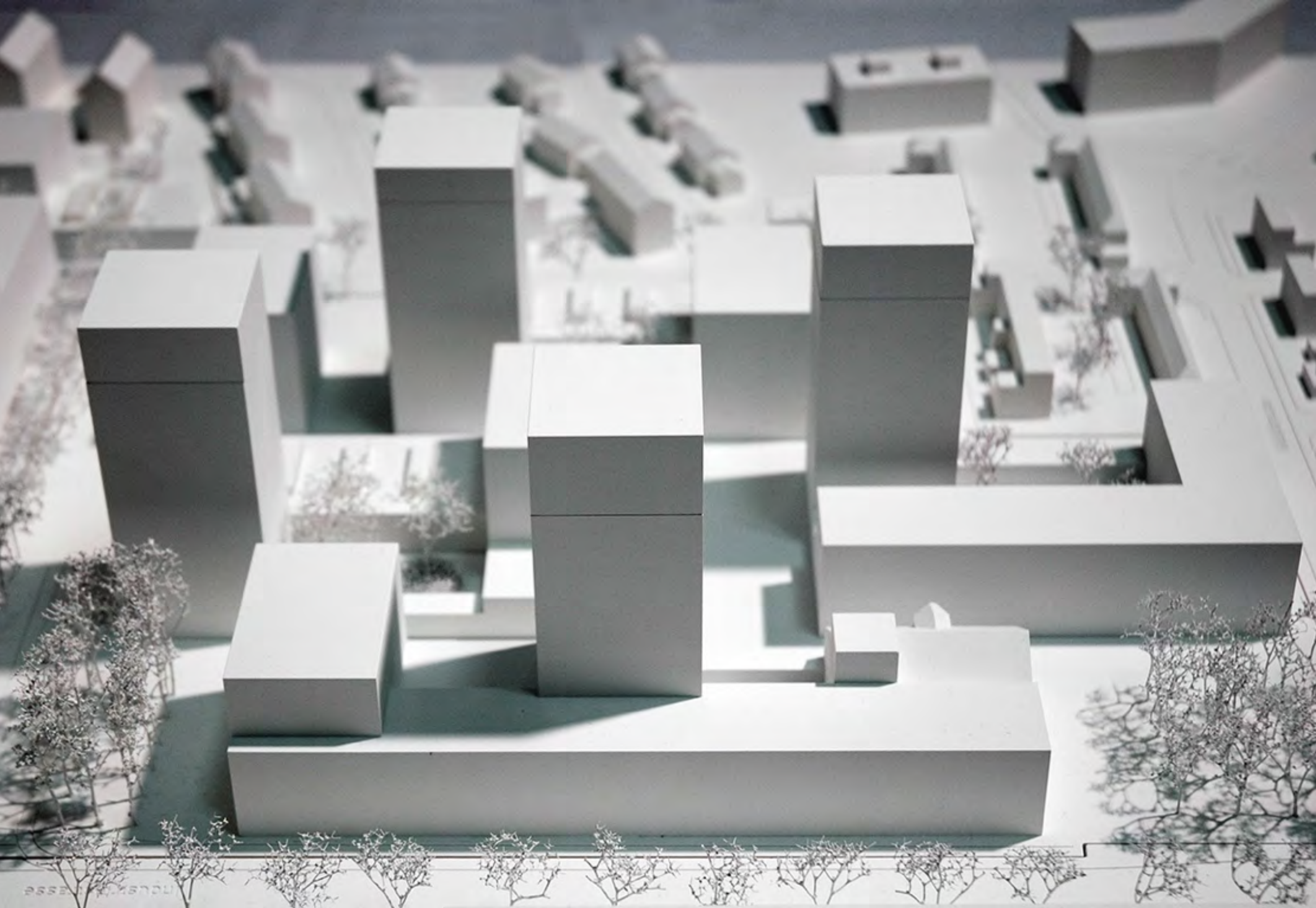


Interaction density and innovation - V-Zug
Hosoya Schaefer Architects



Interaction density and innovation - V-Zug
Hasoya Schaefer Architects



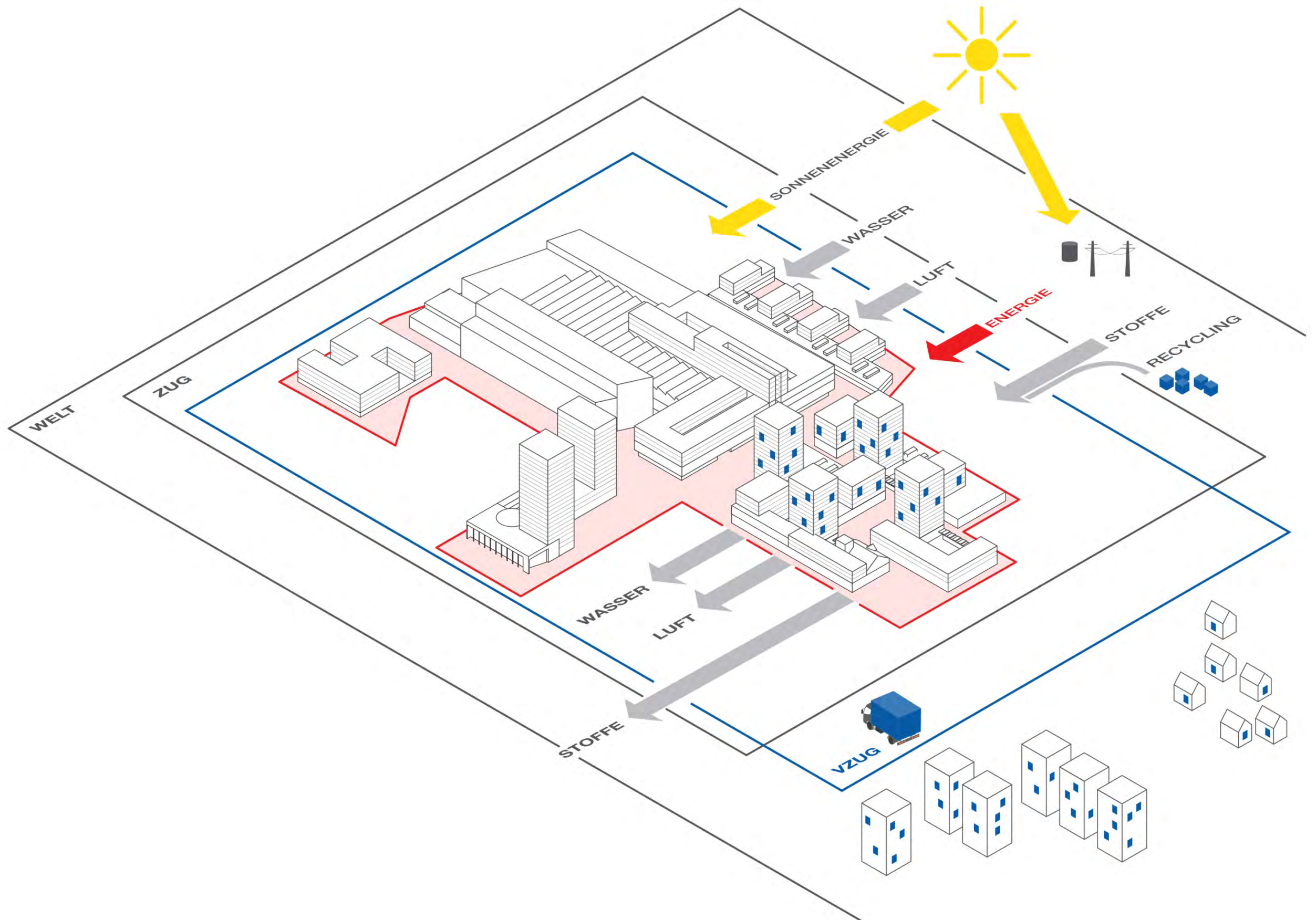


Interaction density and innovation - V-Zug
Hosoya Schaefer Architects

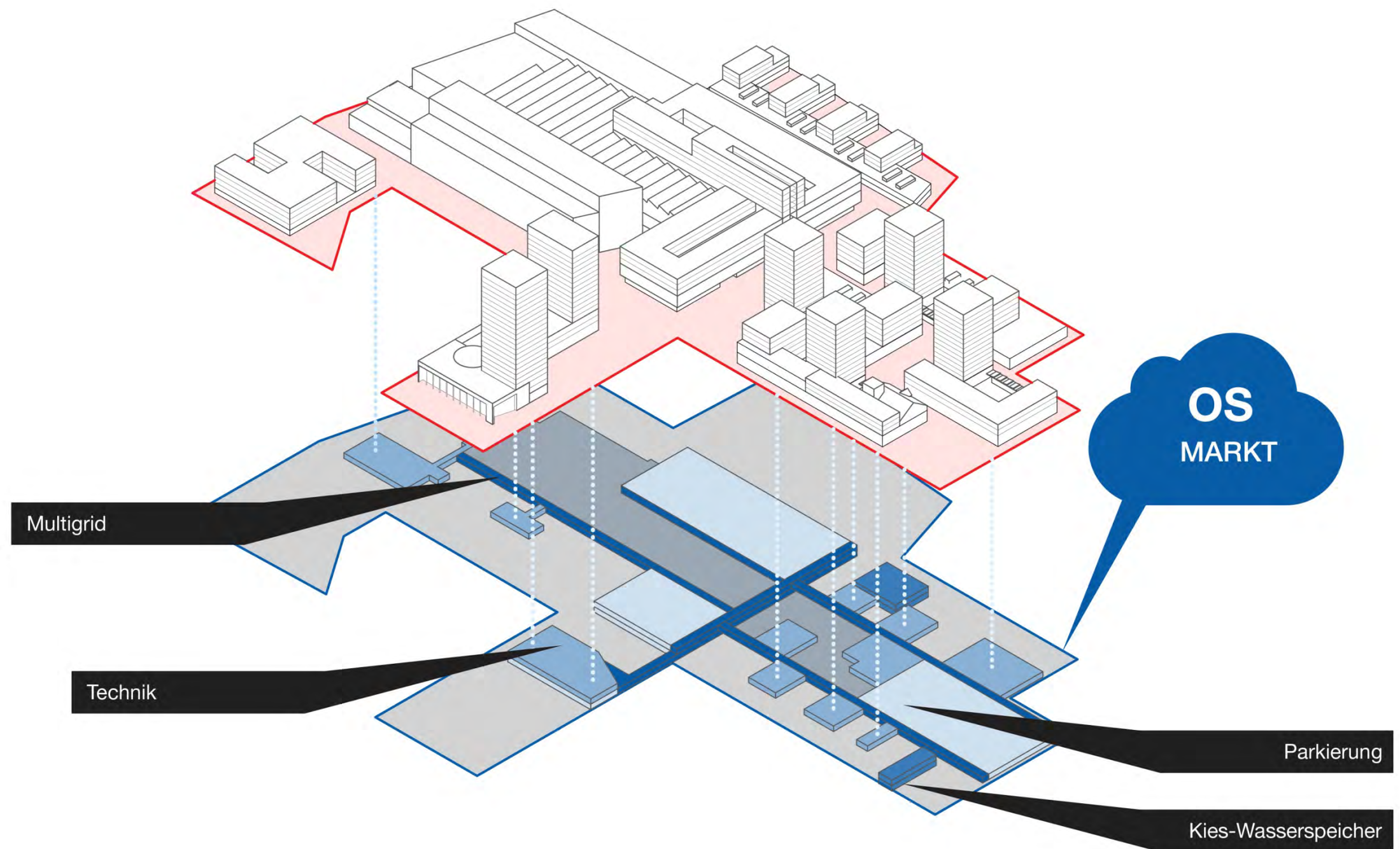


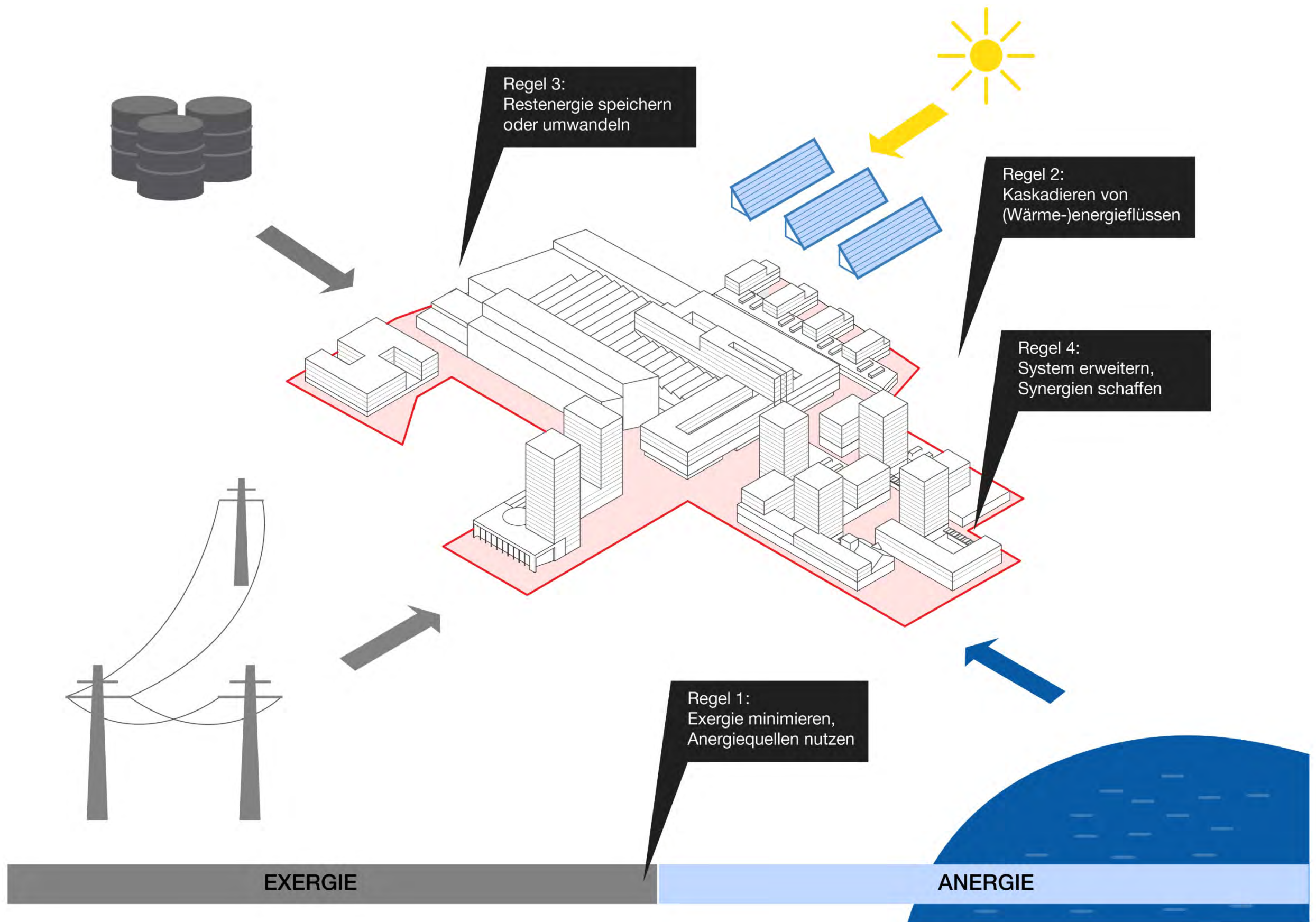
Interaction density and innovation - V-Zug

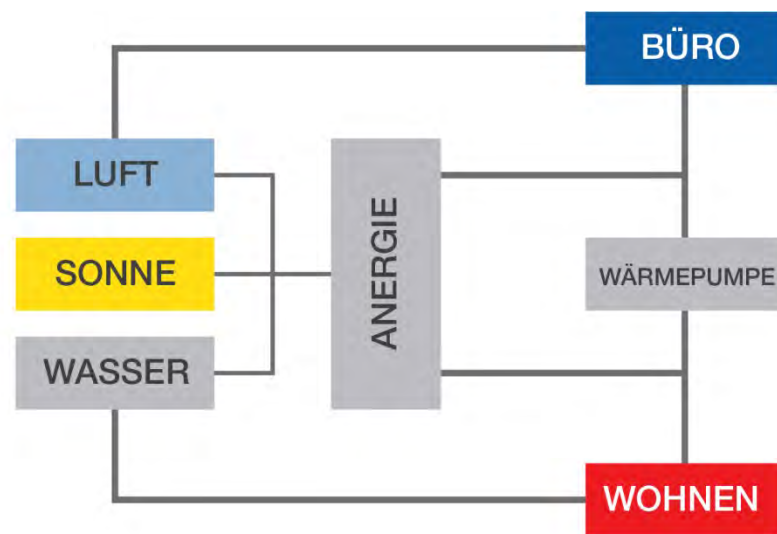
Hosoya Schaefer Architects



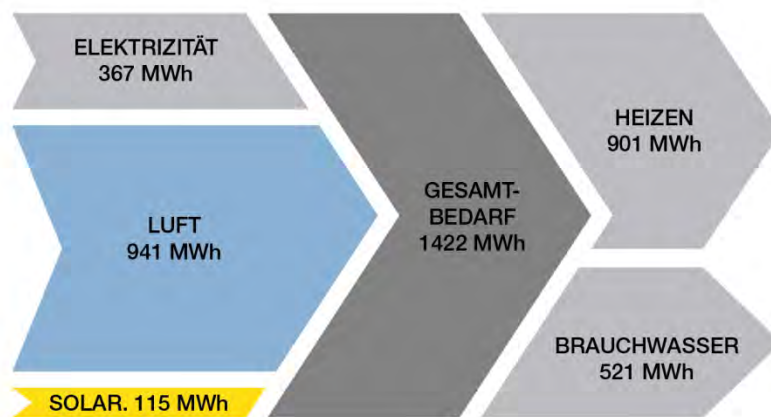
**Motherboard =
Multigrid + Technik + Betriebssystem/ Markt**



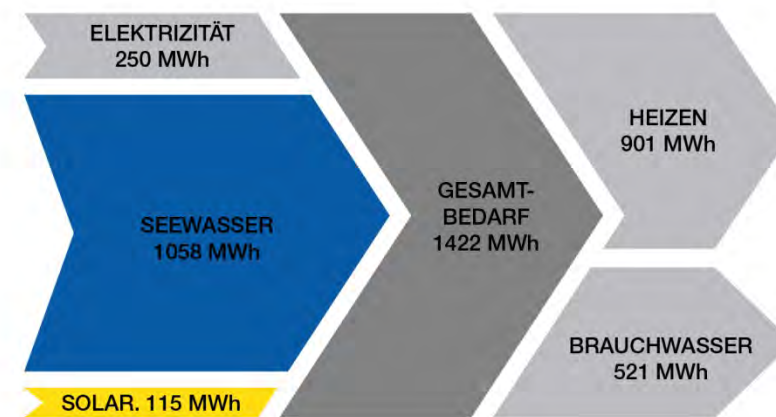




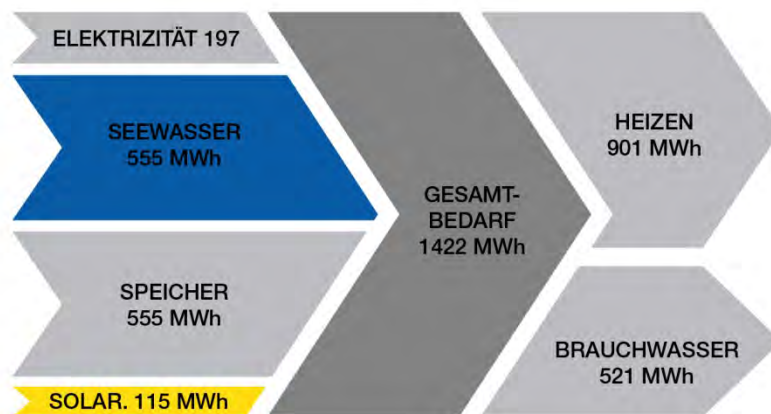
System I



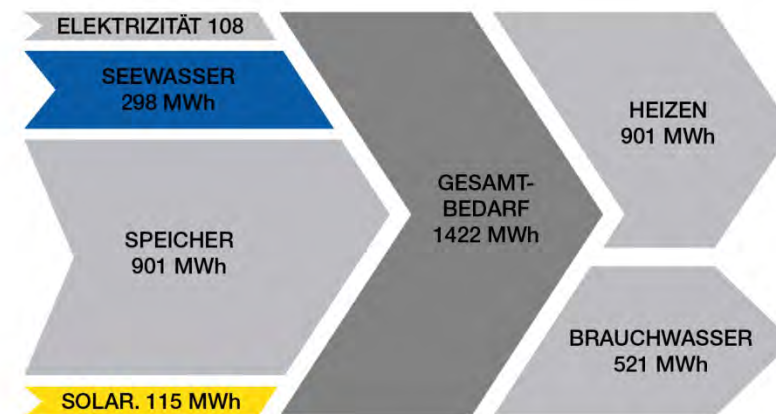
System II



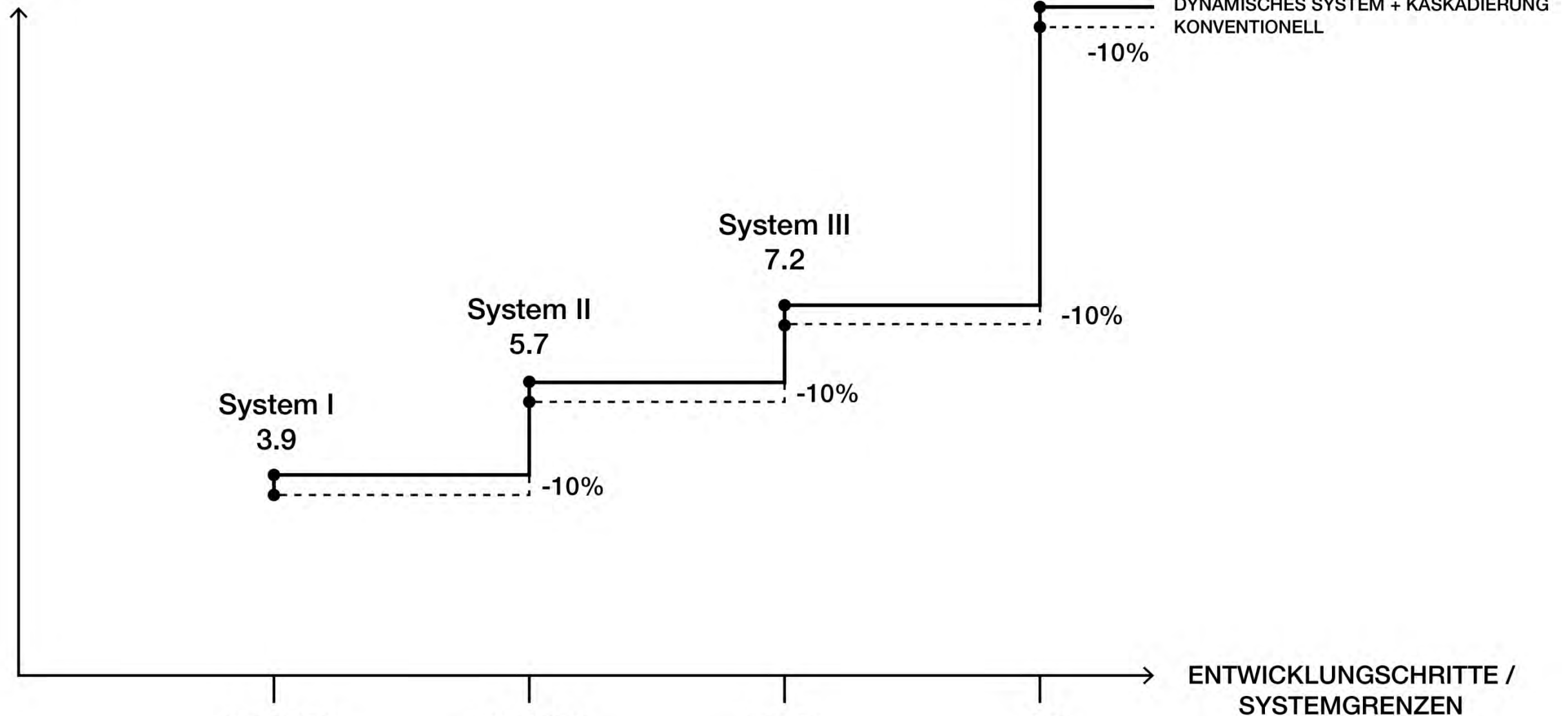
System III



System IV



HEIZENERGIE-
BEDARF
EXERGIE

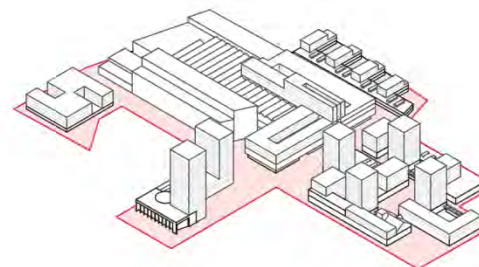
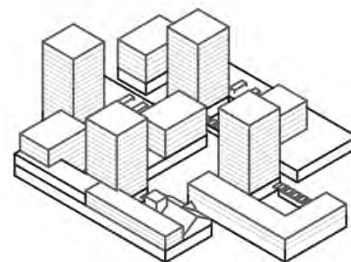
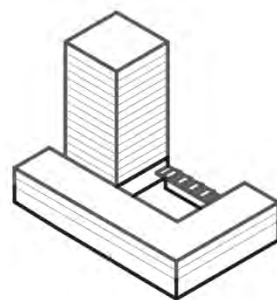


CLUSTER

IM WERK

AREAL
VZUG

ZUG



Conclusions

Historically energy shapes urban form in an almost physiological manner (prompting the necessity of a holistic and scientific understanding of cities).

Due to advances in technology the link between urban form and urban image has become increasingly less direct.

As energy has become increasingly abstract (fossil fuels, electricity, digital information) it is less form generative.

Locally the key issue is organization and infrastructure rather than resources, dynamics & autonomy rather than scarcity (biggest issue cooling).

As energy becomes cheaper, it becomes harder to spend money on energy features. How to achieve resilience?