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Participative Foresight for Smarter Cities: From Vision-Seeds to the Development of Scenarios

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FNSNF Swiss National Science Foundation
energieschweiz

Content

Current status of governance and planning processes

Participative Foresight for Smarter Cities
- Thematic understanding
- Methodological approach

Case-studies
- Switzerland: Winterthur, Zurich
- Russia: Moscow, Kazan

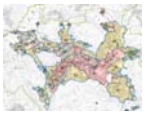
Current planning processes in Swiss cities

School of Engineering
INE Institut für Nachhaltige Entwicklung

4 main planning processes steer / drive future energy provision and city development in CH:

1. European Energy Award (audit, label)
2. Spatial energy planning (formal planning instrument)
3. Local energy concepts (concretization of 2000 watt society & reduction path)
4. Smart city projects

Energiestadt
european energy award



Aktualisierung der Ziele und Massnahmen der Energiestadt Gold Winterthur
Grundlagen Energiekonzept 2050

SMART CITY WINTERTHUR

➢ *Processes are intervened and contribute to emergence of broader local energy policies*

Thematic understanding: Smart Cities

Stadt Winterthur

From the European Energy Award GOLD…

1999: Winterthur becomes an «Energy City»
2007: Energy City with EEA®GOLD
2011, 2015: Re-Certification with EEA®GOLD

→ Goals for a sustainable energy policy
→ Comprehensive action plan for energy efficiency: Buildings, mobility, energy production, waste mananagement, water suply, etc.
→ Cooperation in the administration and with external partners

Energiestadt GOLD Winterthur european energy award

zh aw School of Engineering

Stadt Winterthur

… over Smart City Switzerland …

Smart City EnergieSchweiz für Gemeinden

Ref.: Smart City Schweiz (2015)

+ Relevance trans-sectoral cross-linking

- Lack of attention towards social aspects

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… to Smart City Winterthur (SCW)

«Smart City is…

… a **progressive, connected city** with a **high quality of life** and an **efficient use of resources**.»

Smart City Winterthur is contributing to…

… reaching the goals regarding the «2000 Watt Society» and reduction of CO_2 emissions.

… identifying the relevance of new technologies and approaches such as Big Data, Cloud Computing, Internet of Things, Open Government Data, 3-D printing, etc.

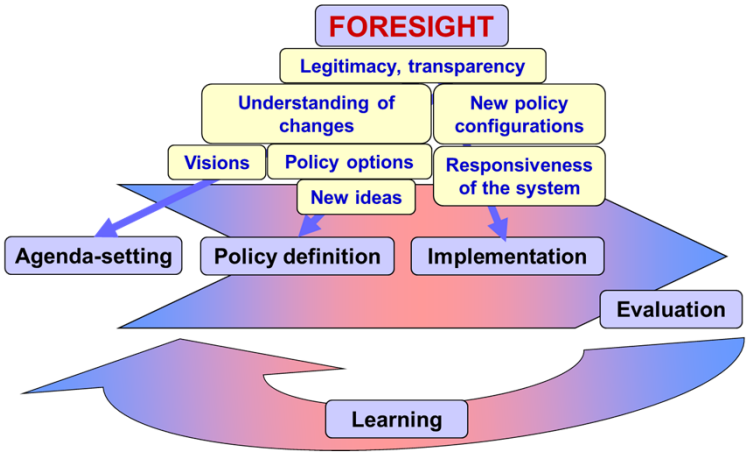
… connecting stakeholders, infrastructures, processes and data networking as a basis for effective and user-friendly solutions.

… implementing innovative projects in various areas (mobility, energy, housing, health, education, ICT, etc.) together with partners from research and industry.

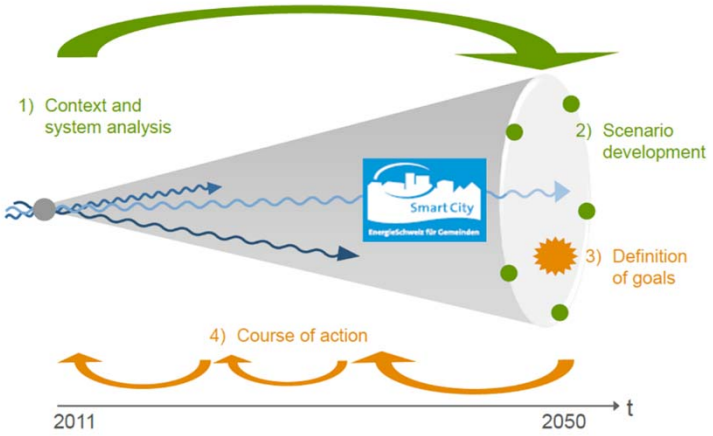
… informing the public and raising awareness for the sustainable development of the city in environmental, economic and social terms.

… positioning Winterthur as an innovative pioneer town.

Methodological approach: Visions



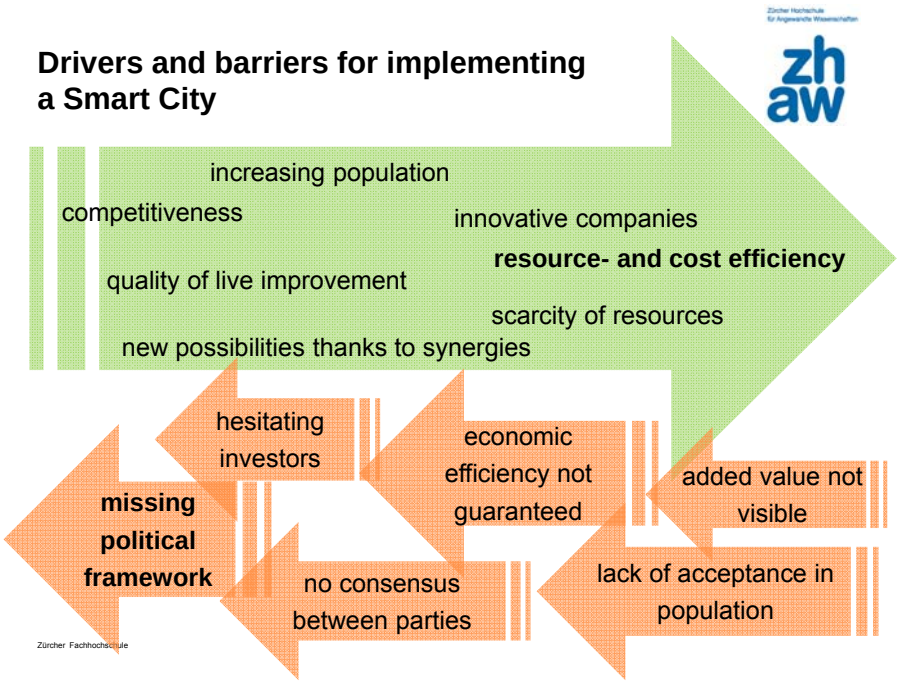
Methodological approach: Scenarios



Methodological approach: Planning

1. Vision	2. Plan	3. Design	4. Build	5. Deliver	6. Operate
Develop the Smart City strategy and business cases.	Develop the project plans and quality objectives.	Gather business requirements and design smart city services.	Implement and test smart city services.	Prepare business transition for smart city services.	Actual operation and support of smart city services.

Drivers and barriers for implementing a Smart City



Most important task of a City →political framework

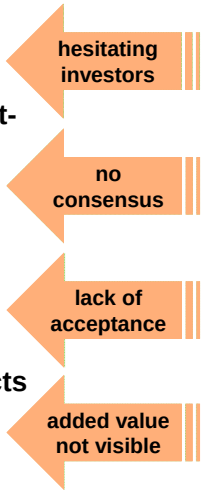
preform exemplary function
→stronger participation on Smart-City-Projects

ensure cooperation of most important actors in Smart-City-Projects
→Lead & Coordination

destruct bureaucratic barriers
→optimisation of administrative processes

ensure acceptance of Smart-City-Projects
→Information campaigns for the population

active involvement of population in Smart-City-Projects
→offer discussion platform

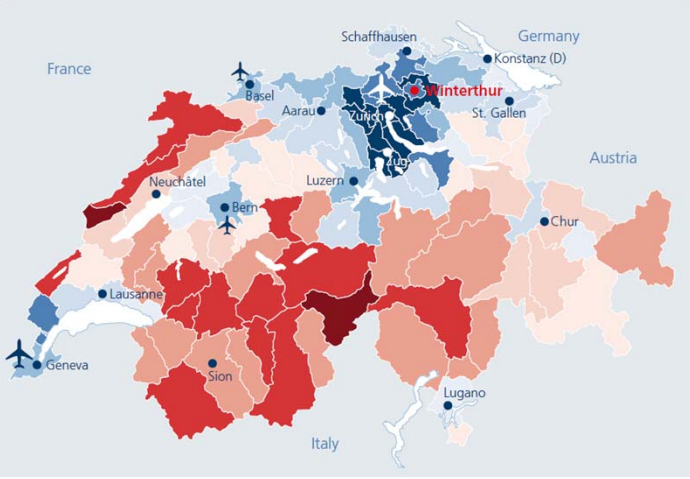


Which technologies are suitable for the design of a Smart-City?

E-Mobility	Vehicle-to-Grid	Sharing platforms	Smart Meter
Smart Phone as passe-partout	Smart Home functions	optimised matching of electricity supply & demand	traffic management systems

Stadt Winterthur

The Cities of Winterthur and Zurich



Quality of Location of the Swiss Economic Regions

- 1.4 to 2.4
- 1.0 to 1.4
- 0.6 to 1.0
- 0.3 to 0.6
- 0.0 to 0.3
- 0.3 to 0.0
- 0.6 to -0.3
- 1.0 to -0.6
- 1.4 to -1.0
- 2.4 to -1.4

Synthetic index CH = 0

At a glance

- Proximity to airport – 15 minutes from Winterthur to ZHR Airport
- Education center: ZHAW Zurich University of Applied Sciences, first International Congress on Vocational and Professional Education and Training
- Competence Center for high-tech engineering and machine industry
- City of Culture with international reach

© Location Promotion Winterthur Region

© Stadt Winterthur

The City of Winterthur

Green City

(Former) Industry City

Insurance City

Ancient City

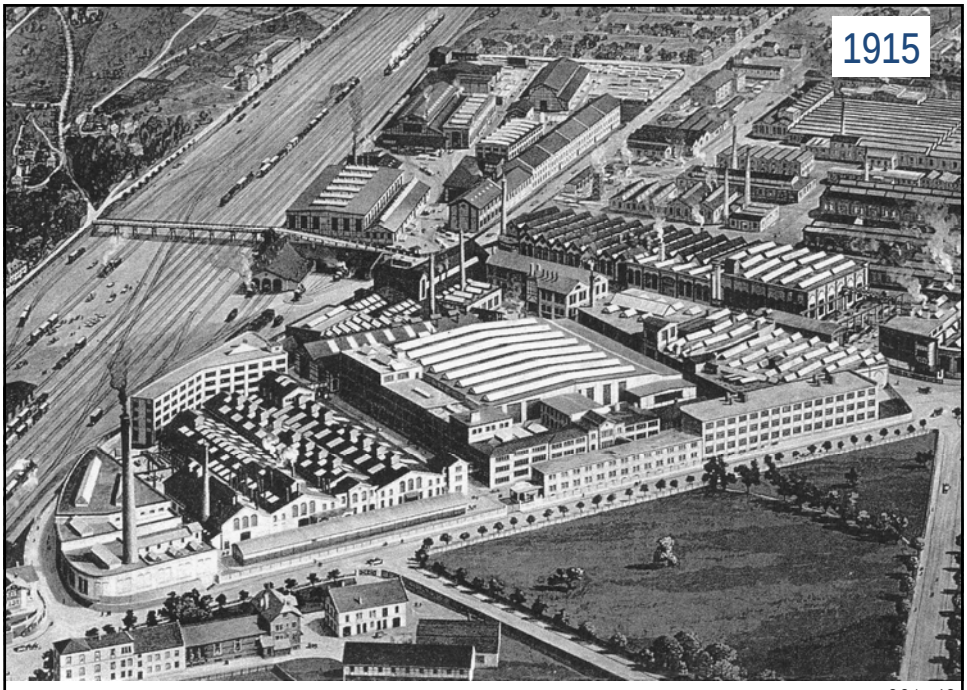
Culture City

Bicycle City

Student City

Motivation for «Smart City Winterthur»
→ Drivers… and actors

Quelle: Bernath (2014/15)



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Smart City Winterthur: Sub-projects

Stadt Winterthur
Energiestadt GOLD Winterthur
STADTWERK WINTERTHUR

Smart City Winterthur
Coordination and Communication

zhaw
energie bewegt winterthur

DACH Energieeffiziente Stadt

- Seasonal storage of waste
- Smart retrofitting of coop. housing
- Analysis of Electricity Consumption
- Basics BiCar Test Fleet
- SOCIAL POWER

→ **Infos on www.smartcitywinterthur.ch**

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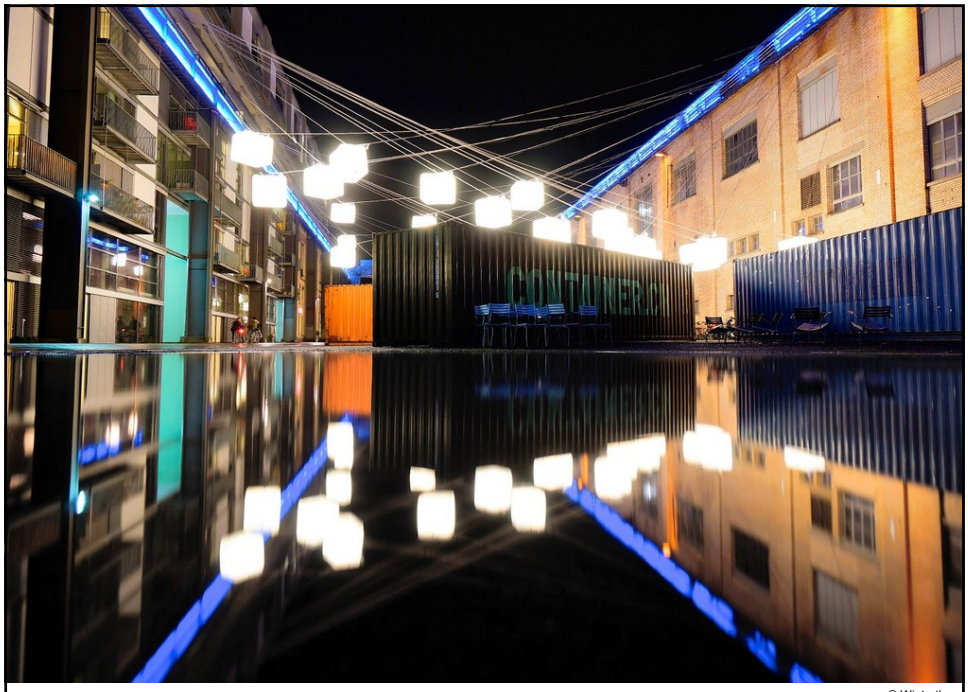
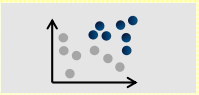


© Winterthur

Normative narrative scenarios (backcasting approach)

Vision germs



Determine key aspects of scenarios

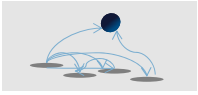
- Whereof shall the scenarios be about?
- How do the principle assumption about the future look like?
- Which visions or vision germs shall been taken up?

Raw scenarios

Development of raw scenarios (scenario exposé) to clarify how the vision germs will be integrated in a closed concept

- Selection of represented vision germs
- How does all fit together?
- What is the most exiting core topic (leading theme / title)?

Full scenarios



Development of narrative scenarios by putting together important aspects such as visions, environment…

Which conditions are needed, so that visions have a realisation chance?

- Which wishes and goals are driving?
- Which actors work how together?
- What is about mobility, health….?
- What means this for public utilities?
- Chronology of development

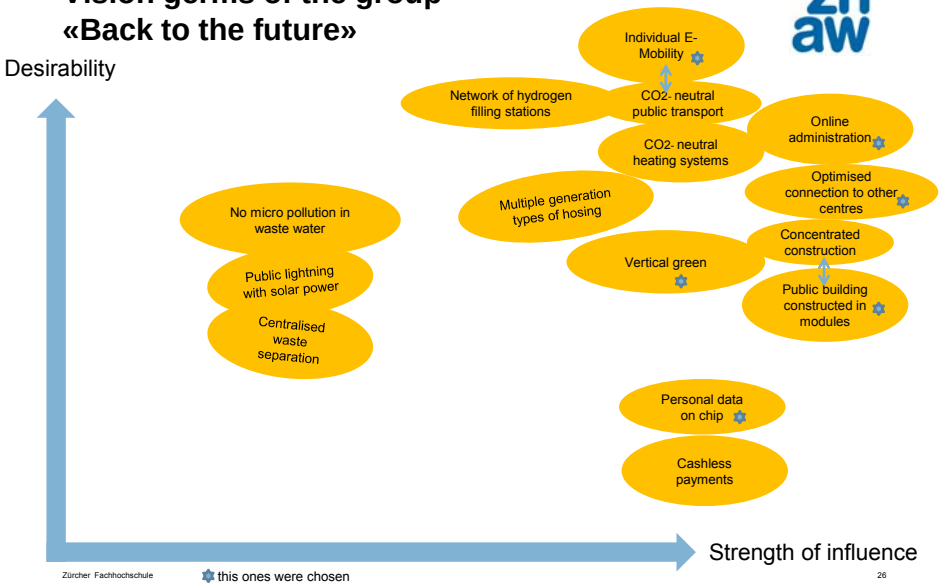
Illustration & Interpretation

Enrichment and differentiation with additional visionary ideas, concrete application or implication to make the scenarios clearer and more consistent

- fictive interviews
- fictive article such as in "Winterthurer Landboten"

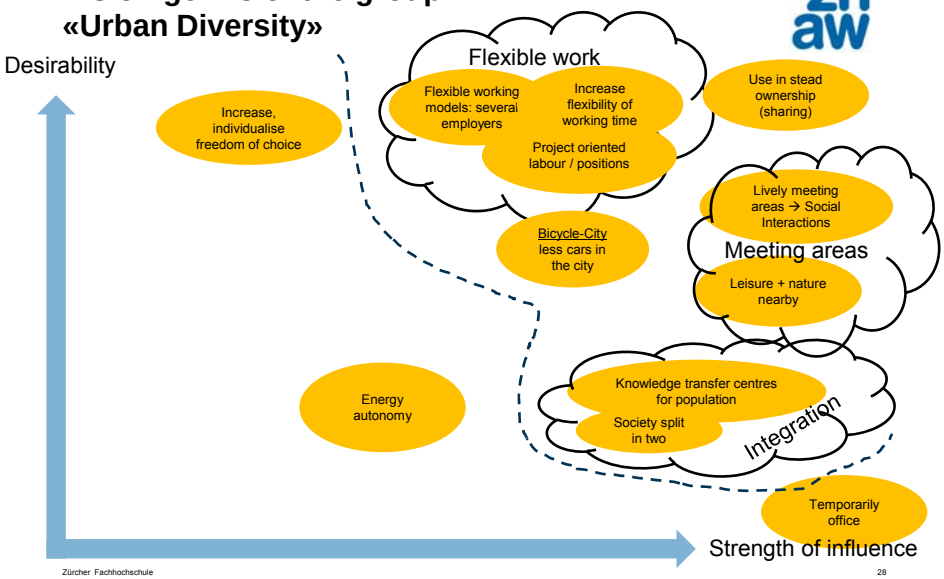
Analysis of chances and risks, theme, blind spots, options for action

Vision germs of the group «Back to the future»



this ones were chosen

Vision germs of the group «Urban Diversity»

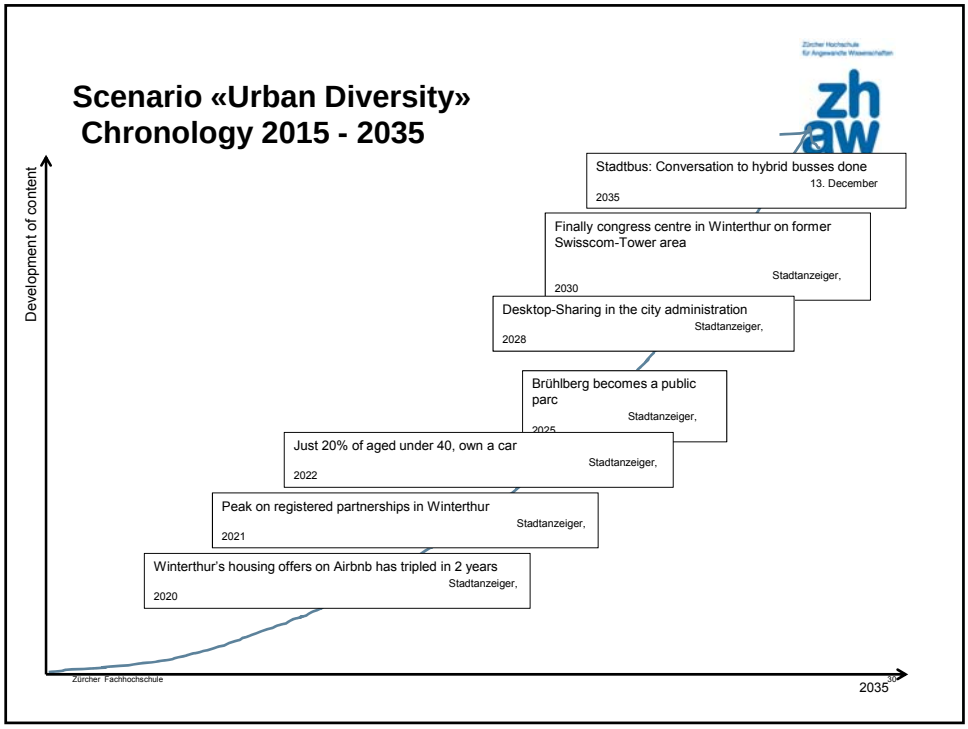


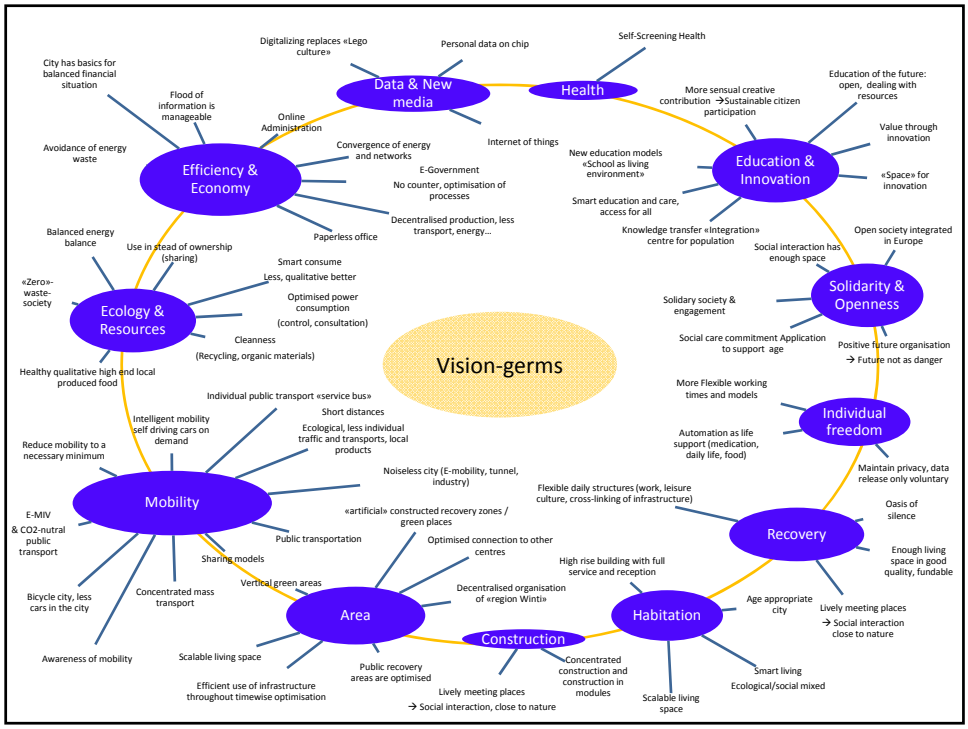
Scenario «Urban Diversity»

Urban Diversity

Vision germs
- Integration (knowledge transfer education)
- Mobility awareness (Traffic jams, infrastructure cost, environmental pollution)
- Make work more flexible
- Sharing models
- Real meeting areas → social interaction

Theses
- Ways of life become diversified
  - Multicultural
  - Types of housing
  - Increase flexibility
- Ways of work undergo a strong change, permanent in other constellations, project oriented, multiple employers
  - Increase flexibility of employee / employer
  - Network as important resource
- Mobility
  - Slow mobility is prioritised
  - Sharing models (combination of pedestrian, bicycle, public transportation and car sharing)
- CVs show inter alia a lot of changes in career, continuing education
- For social life in the city real meeting areas are supported
- Creative industry, several microenterprises work cross linked together


Scenario «Urban Diversity»
Chronology 2015 - 2035
Development of content
Stadtbus: Conversation to hybrid busses done
13. December
2035
Finally congress centre in Winterthur on former Swisscom-Tower area
Stadtanzeiger,
2030
Desktop-Sharing in the city administration
Stadtanzeiger,
2028
Brühlberg becomes a public parc
Stadtanzeiger,
2025
Just 20% of aged under 40, own a car
Stadtanzeiger,
2022
Peak on registered partnerships in Winterthur
Stadtanzeiger,
2021
Winterthur's housing offers on Airbnb has tripled in 2 years
Stadtanzeiger,
2020
Zürcher Fachhochschule
2035


Vision-germs
Data & New media
Digitalizing replaces «Lego culture»
Personal data on chip
Health
Self-Screening Health
Education & Innovation
Education of the future: open, dealing with resources
Value through innovation
«Space» for innovation
Solidarity & Openness
Open society integrated in Europe
Positive future organisation
→ Future not as danger
Individual freedom
Maintain privacy, data release only voluntary
Recovery
Oasis of silence
Enough living space in good quality, fundable
Habitation
Smart living
Ecological/social mixed
Area
Construction
Mobility
Ecology & Resources
Efficiency & Economy
City has basics for balanced financial situation
Flood of information is manageable
Online Administration
Avoidance of energy waste
Convergence of energy and networks
E-Government
No counter, optimisation of processes
Decentralised production, less transport, energy...
Paperless office
Internet of things
New education models «School as living environment»
Smart education and care, access for all
Knowledge transfer «Integration» centre for population
More sensual creative contribution →Sustainable citizen participation
Social interaction has enough space
Solidary society & engagement
Social care commitment Application to support age
More Flexible working times and models
Automation as life support (medication, daily life, food)
Flexible daily structures (work, leisure culture, cross-linking of infrastructure)
Lively meeting places
→ Social interaction close to nature
Age appropriate city
High rise building with full service and reception
Concentrated construction and construction in modules
Scalable living space
Optimised connection to other centres
Decentralised organisation of «region Winti»
«artificial» constructed recovery zones / green places
Public recovery areas are optimised
Lively meeting places
→ Social interaction, close to nature
Efficient use of infrastructure throughout timewise optimisation
Scalable living space
Vertical green areas
Sharing models
Public transportation
Noiseless city (E-mobility, tunnel, industry)
Individual public transport «service bus»
Short distances
Ecological, less individual traffic and transports, local products
Intelligent mobility self driving cars on demand
Reduce mobility to a necessary minimum
E-MIV
& CO2-nutral public transport
Bicycle city, less cars in the city
Concentrated mass transport
Awareness of mobility
Balanced energy balance
Use instead of ownership (sharing)
«Zero»-waste-society
Smart consume
Less, qualitative better
Optimised power consumption (control, consultation)
Cleanness (Recycling, organic materials)
Healthy qualitative high end local produced food

Smart City Zurich:
Evaluation of Basics and Potentials for a Smart City Zurich.

Thematic Areas

Presentation of options

- Energy & Environment
- Mobility, Constr. & Habitat.
- Health & Social, Security
- Location Promotion, E-Government, IoT

Vertiefung

- Health & Social, Security, Education
- Energy & Env., Mobility, Constr. & Habitat.
- Connection / IoT
- Open Data

Participation

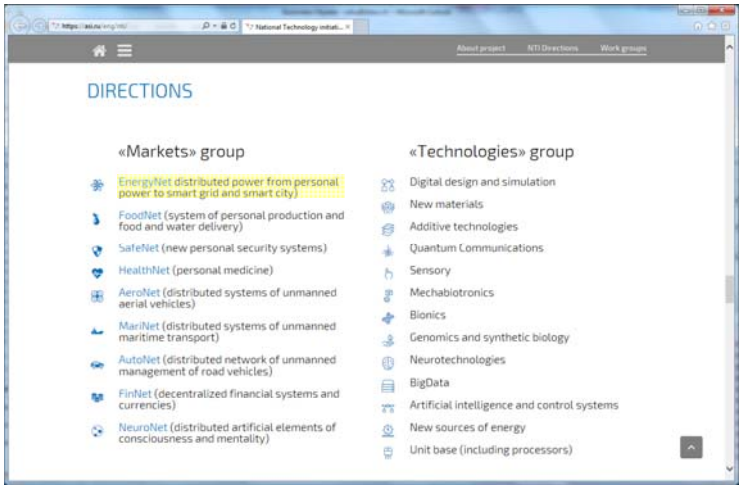
- Lead ewz/OIZ

  City Departments
- Key-Stakeholders from Industry, Universities and other relevant Organisations

48 potential Ideas developed

The Cities of Kazan and Moscow

National Technology Initiative (NTI) Russia



Outlook

- Finalising Delphi-expert-survey «Smart Cities 2035»
- Process support of cities towards a Smart City (Scenario development, Roadmapping)
  ➔ Participative Foresight for Smarter Cities (SNF)
- Design, implementation and evaluation of local case studies
  ➔ Smart Urban Isles (ENSCC)
- Big Data analysis
  ➔ Social Power Project (GRS)
- Lecture series AS2016/17 «Future of urban living spaces»
- Bundling of ZHAW-Competences for Smarter Cities & Regions

SWISS GREEN ECONOMY SYMPOSIUM 2016

INUAS International Network of Universities of Applied Sciences

Switzerland.

EXPO 2017 · Future Energy · Astana Kazakhstan

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Thank you for your attention!

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Energiestadt GOLD Winterthur