

# From Building of Tomorrow to City of the Future

**Volker Schaffler**  
Austrian Ministry for Transport, Innovation and Technology



> 15 national applied research calls

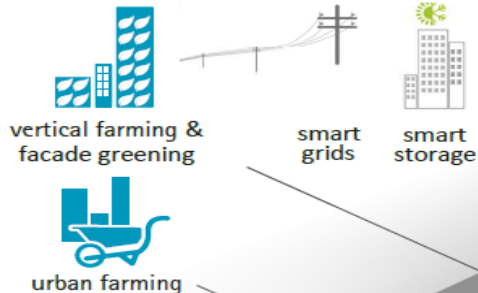
> 77 Demonstration Buildings

> 600 Research Projects

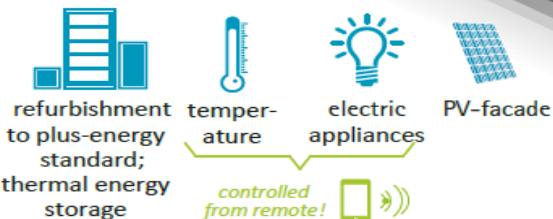
> EUR 120 Mio. Funding

Working on Smart Cities Since 1999

SMART FARMING SMART ENERGY SYSTEM



SMART BUILDING



SMART SERVICES



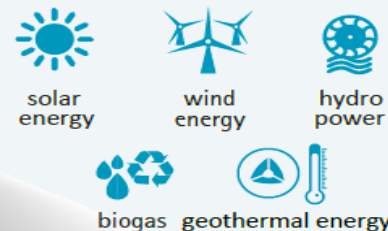
SMART GOVERNANCE



SMART MOBILITY



SMART ENERGY



SMART SENSORS



SMART WASTE







– 450 Research Projects

From 1999 until 2013

– EUR 80 Mio. Funding



Zero/Plus-Energy-Districts

High Efficient Building-Cluster



PLUS-Energy Buildings

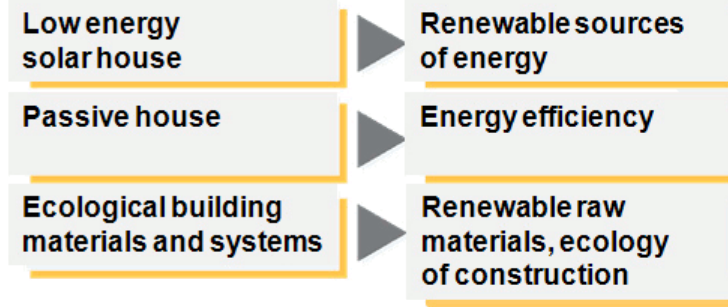
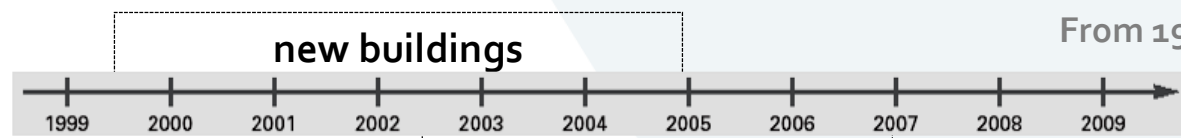
Passivhouse / Zero-Energy Buildings



since 2013

– 113 Research Projects

– EUR 40 Mio. Funding



Service and use aspects

**Building of Tomorrow**

Comparable costs

▶ Launched in 1999

▶ Established in two programme phases

▶ Building of tomorrow was Starting from the **low-energy solar building approach** and the **concept of the passive house buildings**, innovative, sustainable concepts for new buildings and for renovating existing ones have been developed and implemented.

▶ Programme Evaluation – economic effect:

- 204 Mio. EUR of additional GDP + additional mass income of 88 Mio. EUR and 1.643 newly created or secured jobs

# Flagship (Demonstration) Projects

- ▶ Implementation of results in demonstration projects paving the way towards future building → The idea was to realize a bundle of projects as a '**flagship project**'
- ▶ integrative overall management in addition to several projects that are all integrated in a clear strategy and are dedicated to the realization of a clear goal.
- ▶ At the end of a flagship project a demonstration buildings – to be fully used for working or living – as visible lighthouse of innovation.

## 4 action lines:

1. Key technologies and concepts for buildings of the future
2. Industrial implementation of innovative technologies
3. Flagship projects: on the way to demonstration projects
4. Strategies, networking and education



New Building



## Science Tower Graz

- ↳ Facade with Dye Sensitized solar cells
- ↳ DC-grid & appliances + smart Storage system
- ↳ Cogeneration incl. small wind turbines
- ↳ 24 floors, 2,800 m<sup>2</sup> office space

## Vienna University Office Building

- ↳ First worldwide Plus Energy Office Building
- ↳ Biggest facade integrated PV facility in Austria
- ↳ Automated night ventilation for cooling
- ↳ Energy demand reduced by 88%

Refurbishment

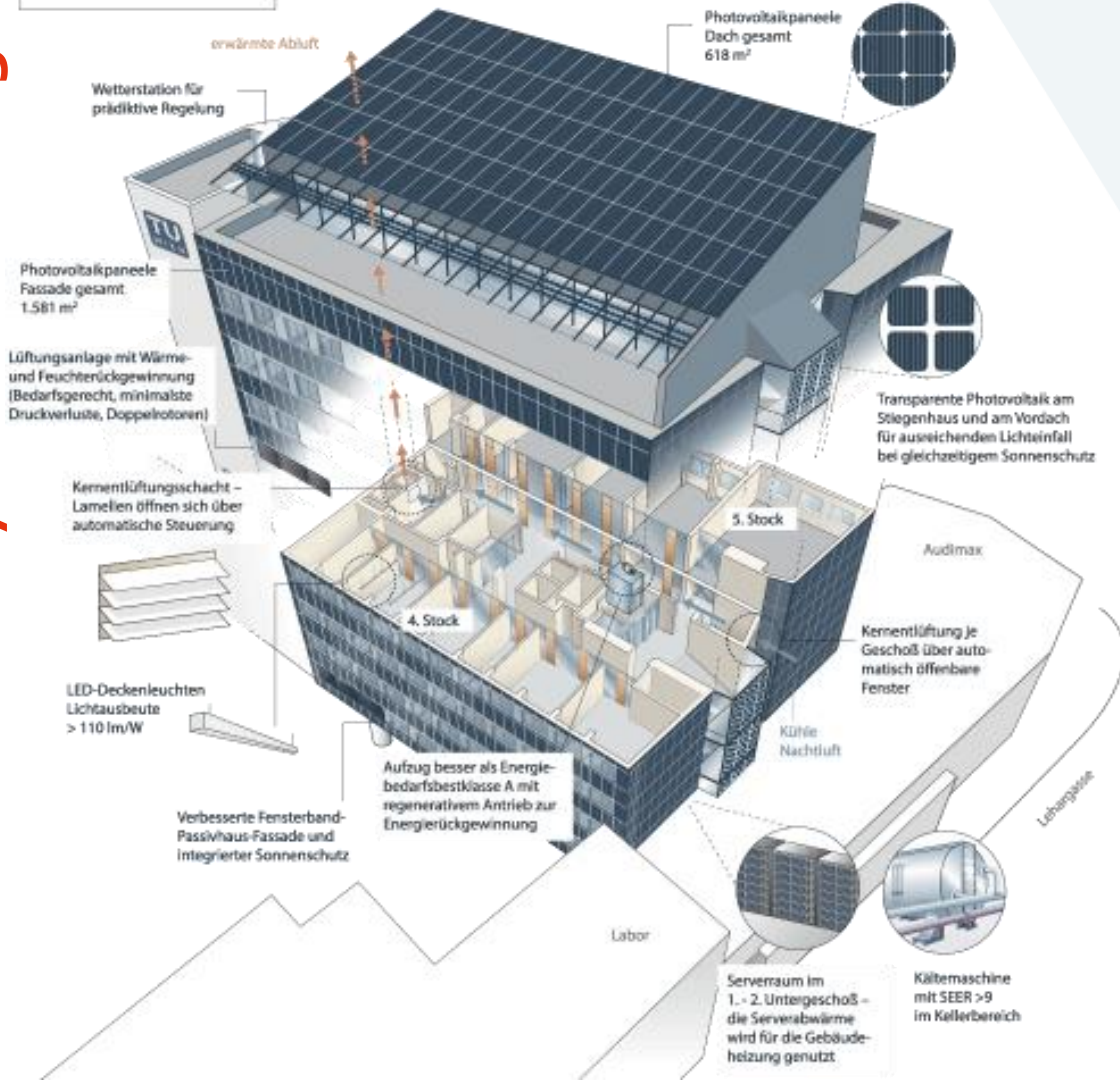


# Science Tower Graz





# Vienna University Office Building





- ▶ **City of Tomorrow** puts emphasis on the built infrastructure in connection with urban (energy) systems on a city or district level
- ▶ Six Calls since 2013 with more than 40 Mio. EUR Funding

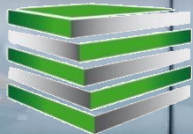
**City of Tomorrow** aims to:

- (1) Support resilient cities / districts with high resource and energy efficiency, an increased use of renewable energy production and a high quality of life
- (2) Optimise and adapt urban infrastructure in light of ongoing urbanisation and the associated increase in resources and energy
- (3) Develop and secure the technological leadership and international competitiveness of Austrian companies and research institutions

# Programme Management Support & Dissemination



# Funding & Enabling Innovation Labs



**GRÜNSTATTGRAU.AT**  
INNOVATIONSLABOR  
BAUWERKSBEGRÜNUNG



New RDI  
Instrument



Project  
Office

RDI Infra-  
structure



max.  
10 years



Know-how  
Transfer



Max.  
5 Mio.

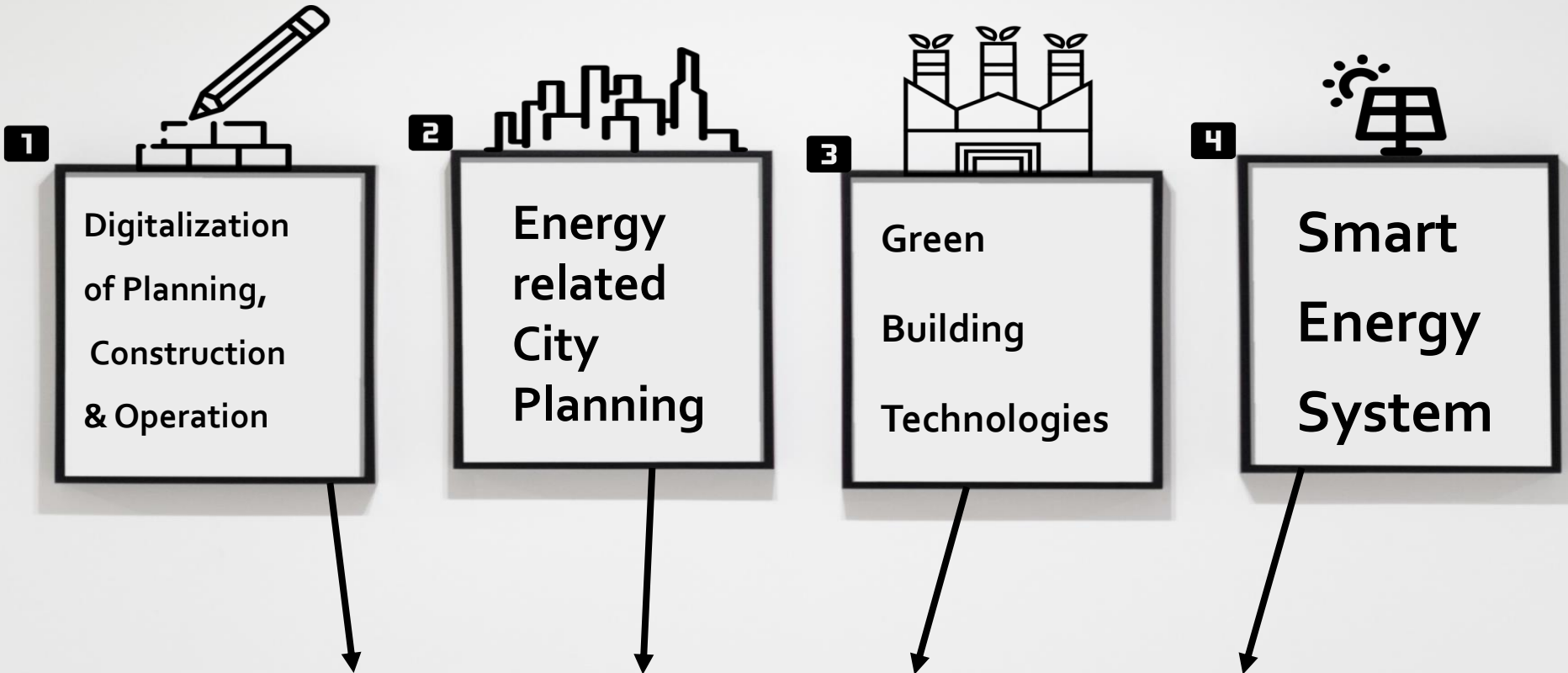
Up-Scaling  
for Projects



Building  
a Network







1

Digitalization  
of Planning,  
Construction  
& Operation

2

Energy  
related  
City  
Planning

3

Green  
Building  
Technologies

4

Smart  
Energy  
System

**Towards Plus-Energy-Districts**



## Smart City Aspern – Urban Lakeside

- ↳ urban district of 240 ha for 20,000 residents and 20,000 additional jobs
- ↳ Holistic and sustainable district & open space development
- ↳ Energy supply & consumption cross-linked
- ↳ Demonstration buildings as “lighthouse projects” and ongoing monitoring

## Smart City Graz

- ↳ urban district of 12,7 ha for 3.000 residents with 920 apartments next to 50 commercial spaces
- ↳ Retrofitting-area of a former industry zone
- ↳ Smart heat grid incl. solar heating & cooling
- ↳ Holistic and sustainable district development & smart mobility services

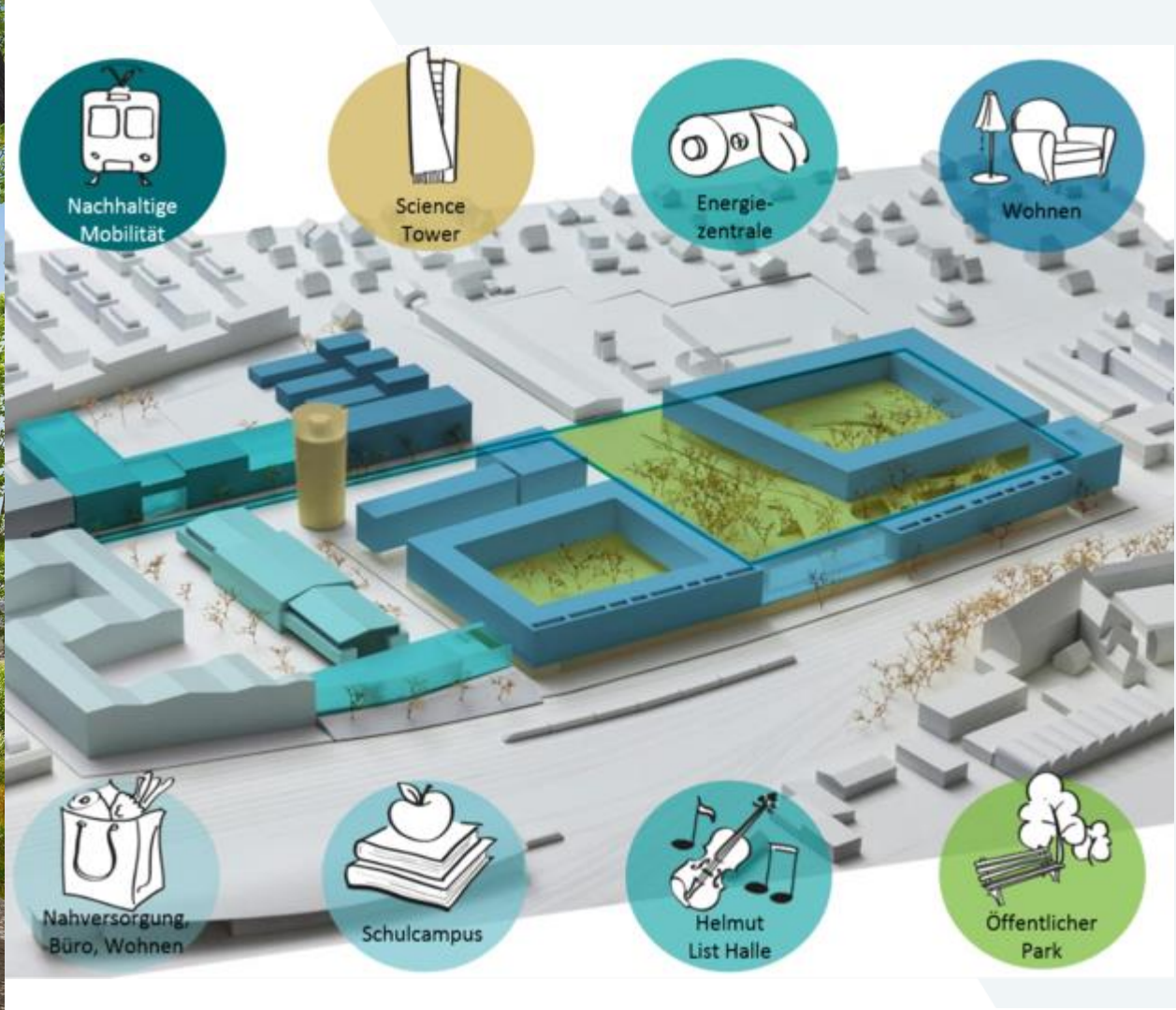


# Smart City Aspern





# Smart City - Graz Mitte



# Plus-Energy-Districts

are leading us towards excellence in terms of

- (1) Urban (energy-oriented) planning,
- (2) implementation of construction technologies / urban technologies ,
- (3) a new approach of open and transparent processes in planning, construction, operation and re-use,
- (4) System-integration of energy technology in technical systems and grids
- (5) Energy coupling for peak, demand and production response
- (6) Improve quality of life / living with the help of smart services and technologies (e.g. climate adaption)





# SET-Plan TWG 3.2

## Smart Cities and Communities

### GOALS

“Enhance capacities of cities, industry and research to make Europe a global role model and market leader

- ◆ in technology integration for and deployment of Positive Energy Districts taking into account aspects of inclusiveness
- ◆ with the aim by 2025 to have at least 100 successful Positive Energy Districts synergistically connected to the energy system in Europe and
- ◆ with a strong export of related technologies.”

### 7 Ziele bis 2019

- (1) Mapping of cities with PED ambition and PED Labs
- (2) Establishment of the European Positive Energy Cities Network with 10-15 PED cities connected
- (3) Transnational joint actions on PEDs launched
- (4) Common European definition of PEDs and draft KPIs of PEDs
- (5) Action Plan for the development of tools and guides related to PEDs
- (6) Communication and dissemination strategy and website
- (7) Activity Report 2019 of the SET-Plan Action 3.2





# Austrian R&D-Policy



Federal Research, Technology  
and Innovation Strategy 2011

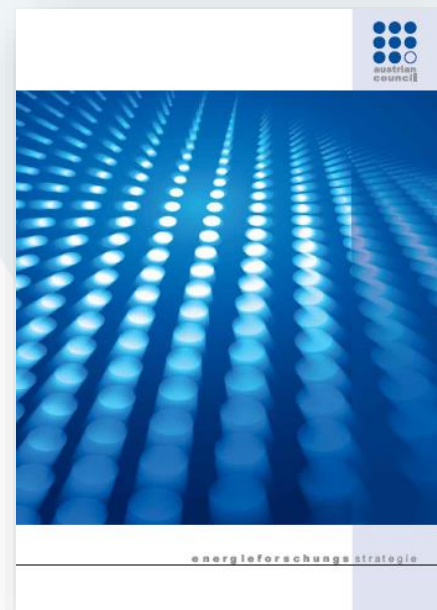


## #mission2030

Austrian Climate  
and Energy Strategy

### Austrian Climate and Energy Strategy

- Minus 36% CO<sub>2</sub> until 2030 (2005 base)
  - 100% Renewables until 2015
  - Decarbonization until 2050



Energy, Research and  
Innovation Strategy 2017



**bm**  
Bundesministerium  
für Wirtschaft,  
Innovation und Technologie

**HAUS**  
der Zukunft

**Innovative Gebäude in Österreich**  
Innovative Buildings in Austria  
Demonstrations- und Leitprojekte aus dem Forschungsprogramm „Haus der Zukunft“  
Austrian demonstration buildings and flagship projects within the research programme "Building of tomorrow"

**Technical Guide**

**Innovative Gebäude in Österreich**  
**Innovative Buildings in Austria**

Österreichische Demonstrationsgebäude und Leitprojekte aus dem Forschungsprogramm „Haus der Zukunft“  
Austrian demonstration buildings and flagship projects within the research programme "Building of tomorrow"

**HAUS**  
der Zukunft

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**KARTE / MAP**

**Demonstrations- und Leitprojekte**

**Legend:**

- 1. Demonstrations- und Leitprojekte
- 2. Demonstrations- und Leitprojekte
- 3. Demonstrations- und Leitprojekte
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- 100. Demonstrations- und Leitprojekte

# Further Information

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