

# **„Guidelines and Case Studies for Energy Efficient Communities“ Annex 51 (2009 – 2012)**

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Karlsruhe**

# Project work structure

Lead: France

Subtask A:  
conventional local  
energy planning

Lead: Sweden

Subtask B:  
Case studies  
advanced  
neighborhoods

Lead: The Netherlands

Subtask C:  
Case studies  
towns/cities

Subtask D:  
•Guidebook  
•C-ECA  
•Dissemination

Lead: Germany

... main deliverables:

- „Guidebook on Successful Urban Energy planning“
- District Energy Concept Adviser (D-ECA)

# Main Annex results:



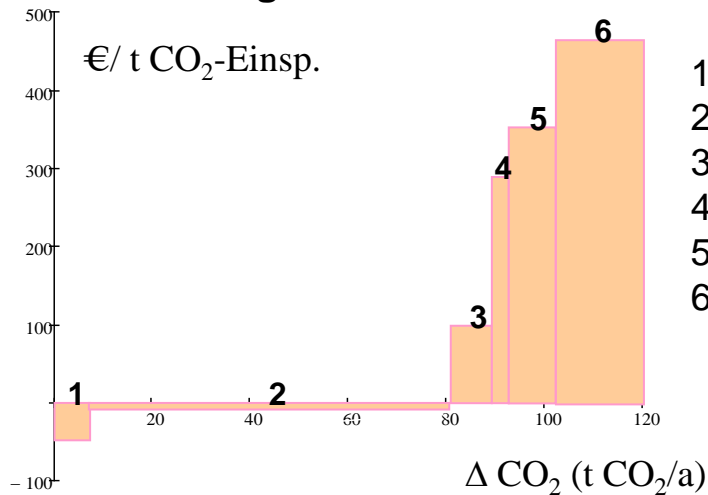
→ Target: **- 80 % GHG?** →

- Building stock → whole Cities!
- EE technologies
- Renewables

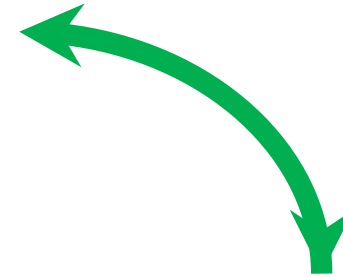
Stuttgart downtown



## GHG savings vs additional costs:

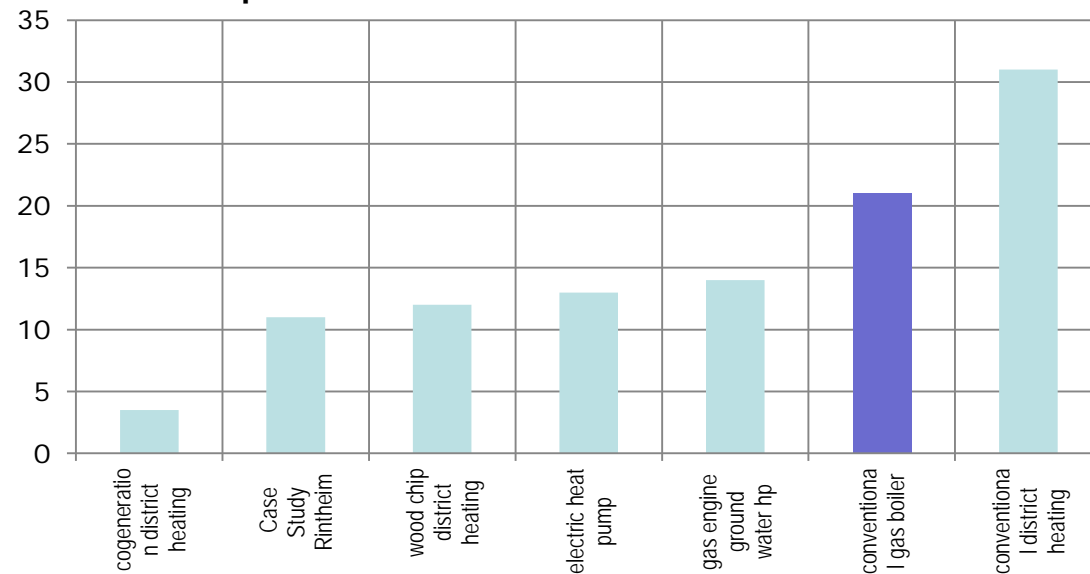


- 1: room control
- 2: envelope retrofit (incl. windows)
- 3: ventilation / heat recovery
- 4: PV panel (6,5 kWp)
- 5: Solar collectors
- 6: Passivhaus standard



**Multi-family building: 50 years, 230 kWh<sub>PE</sub>/m<sup>2</sup>**  
 (36 flats, 9 floors)

## Specific GHG emissions of DH alternatives





## 1st conclusion:

- not technical maximum but economic optimum



## Investment costs of „city energy transition“?

- building energy retrofit    ~ 300 €/m<sup>2</sup>
- DH infrastructure                ~ 80 €/m<sup>2</sup>
- City of 300.000: ~ 11 mio. m<sup>2</sup> (e.g. Karlsruhe)
- **3,6 billion €** total investments over ~ 30 years (120 mio. €/a)  
( > 12.000 €/cap.)

**Conclusion:    *Holistic system optimization!!***



## 2nd conclusion:

- do not optimize buildings,  
but „communities“ (towns, cities, ...)



## → ***Annex 51 / Guidebook:***

### **Community Energy Concepts**

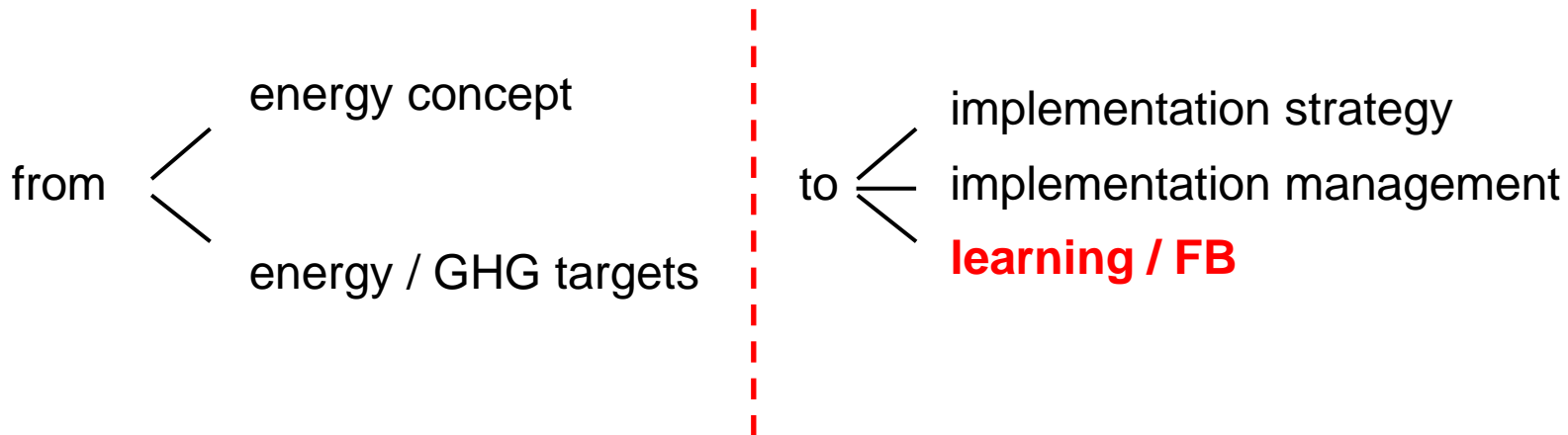
**Step 1:** energy and GHG inventory (sectors, city)

**Step 2:** long-term scenarios, target setting

**Step 3:** energy action plan

.... end of municipal energy policy ??

## ... where is the gap?



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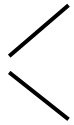
... systems approach to

neighborhood  
plans



energy concept

from



energy / GHG targets

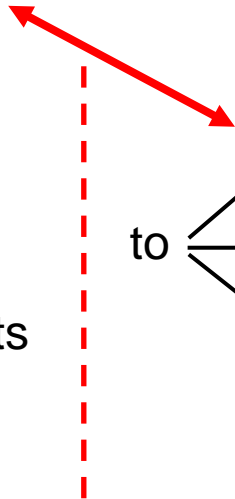
to



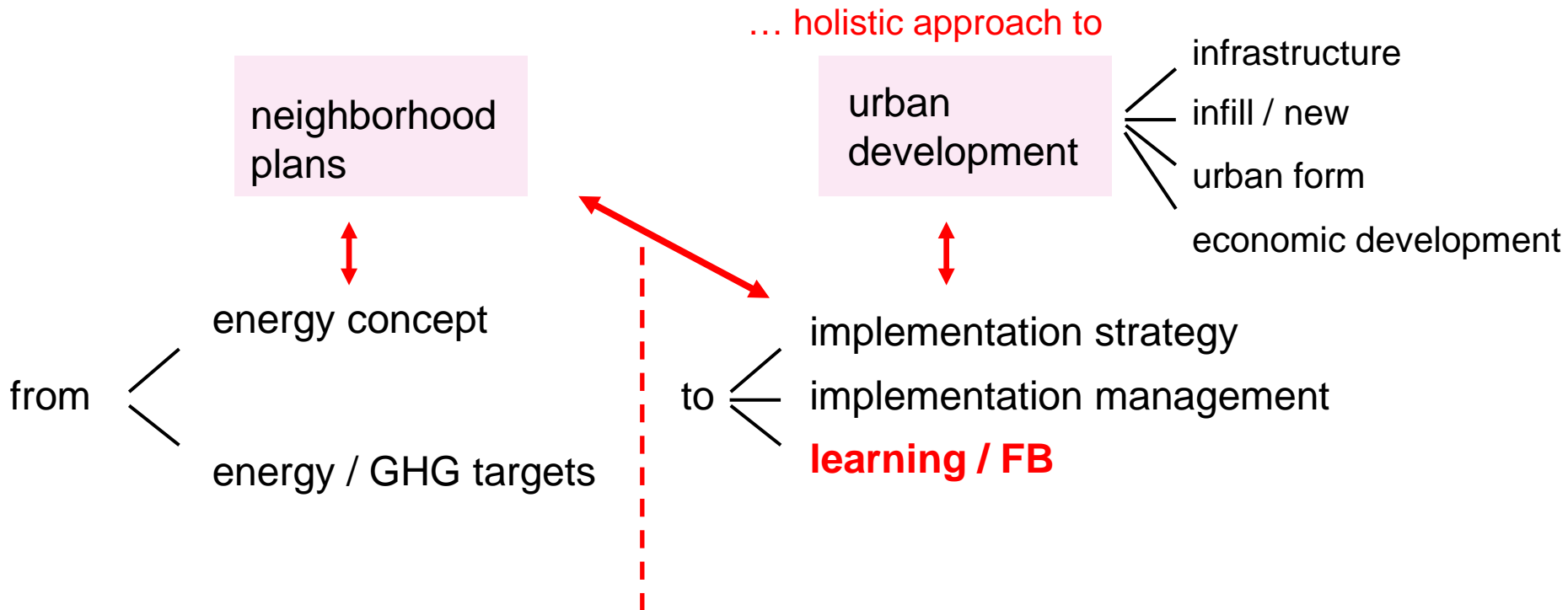
implementation strategy

implementation management

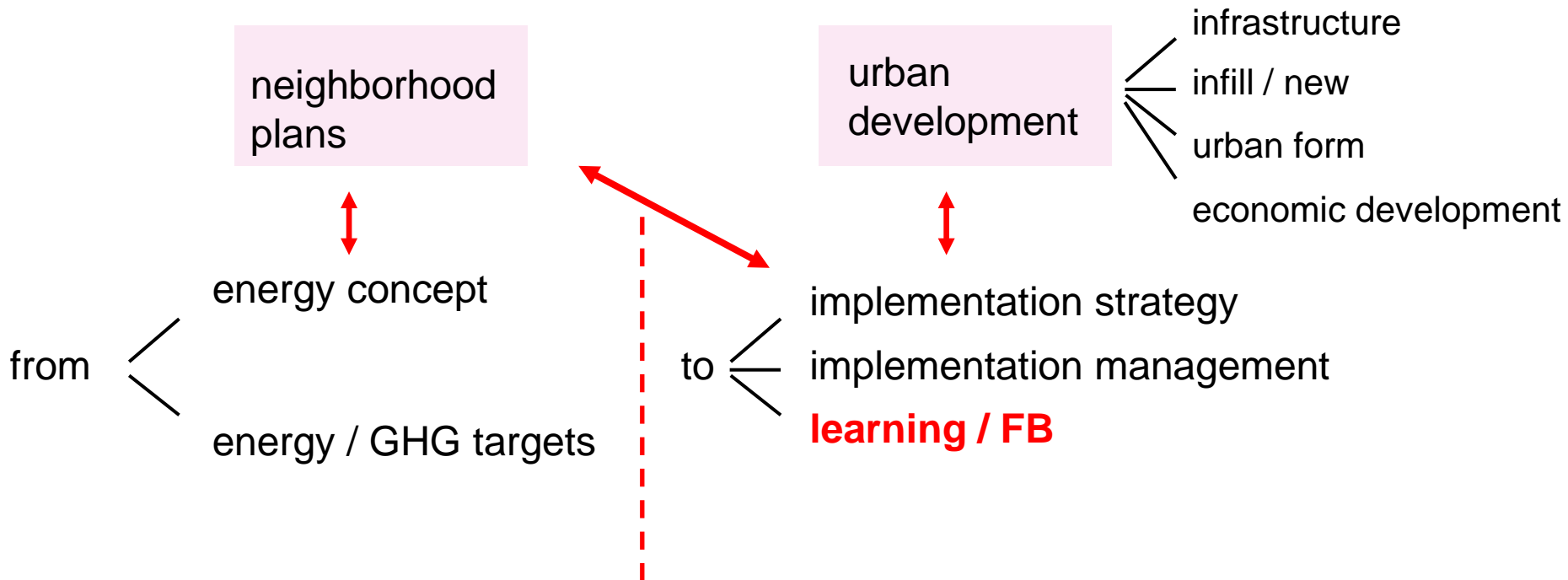
**learning / FB**



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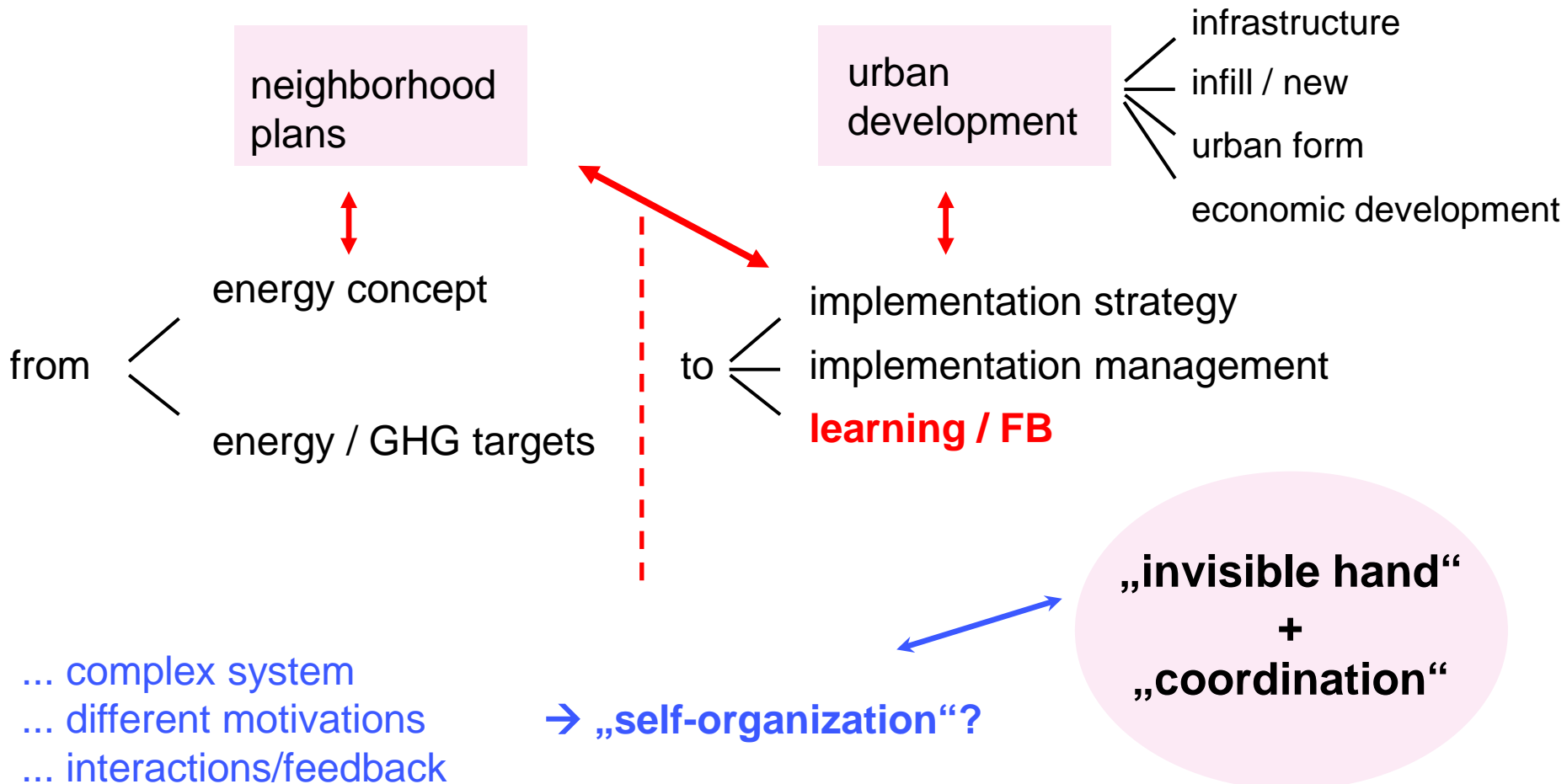


... complex system  
... different motivations  
... interactions/feedback

→ „self-organization“?

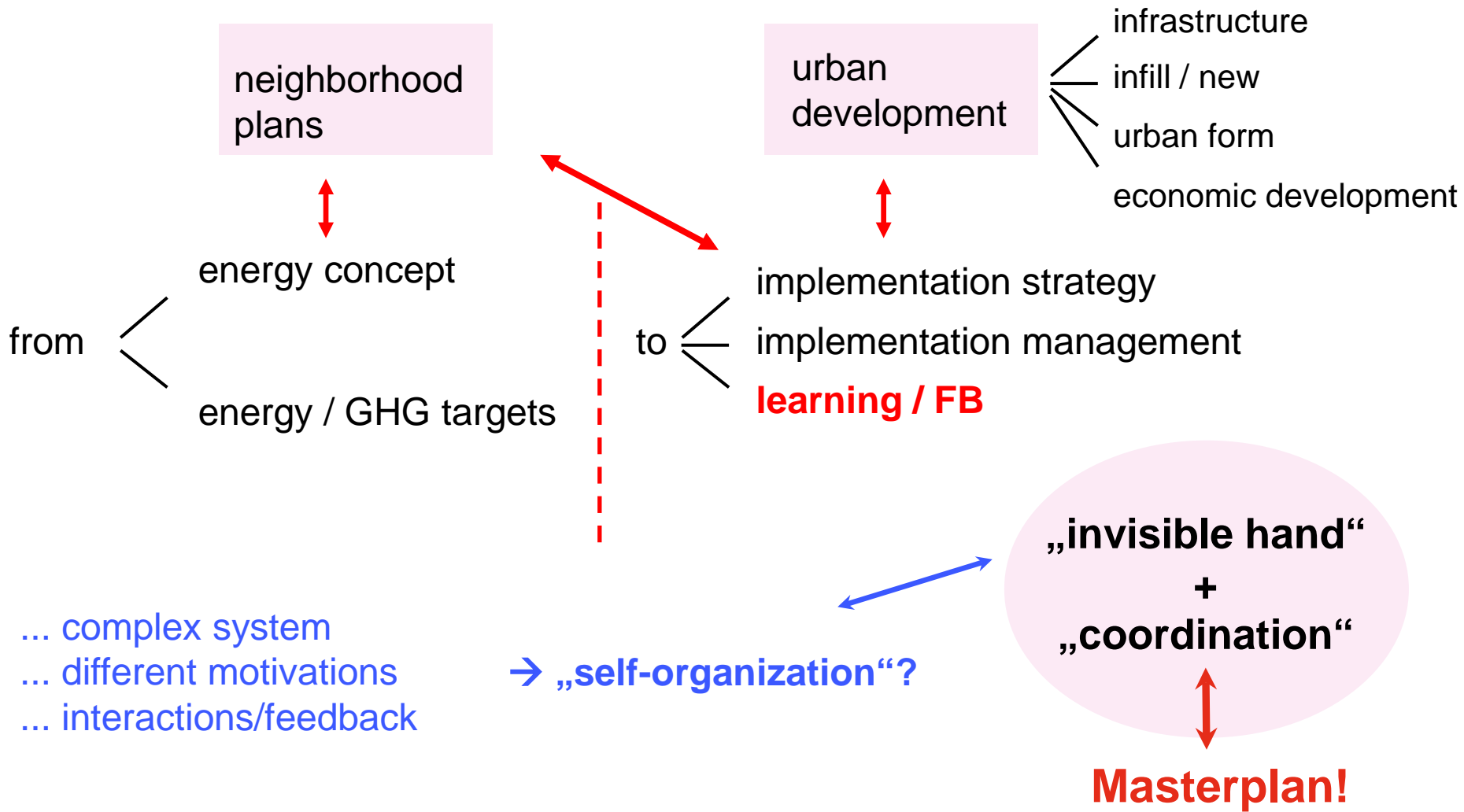


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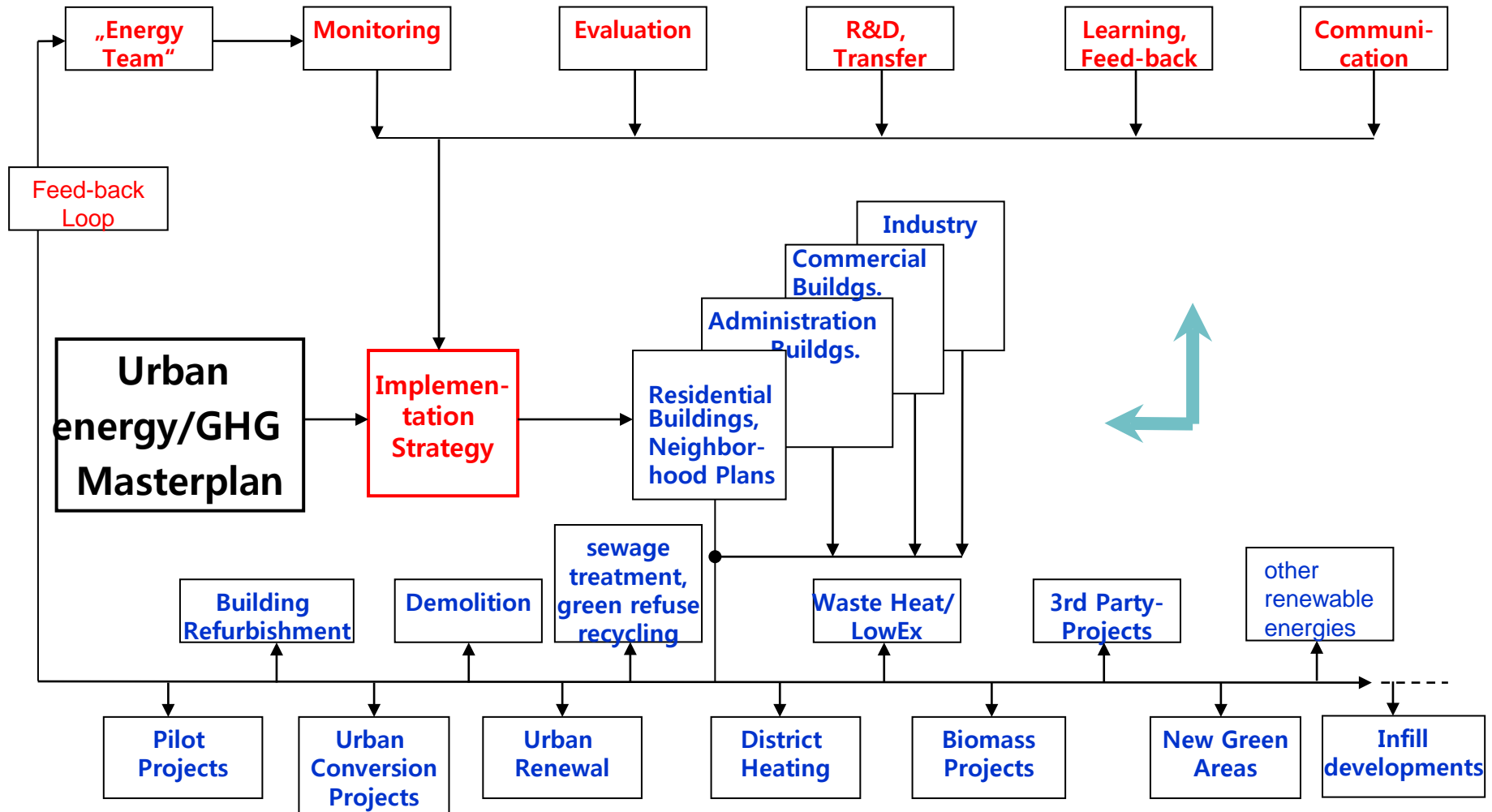




## ... where is the gap?



## → municipal energy transition?

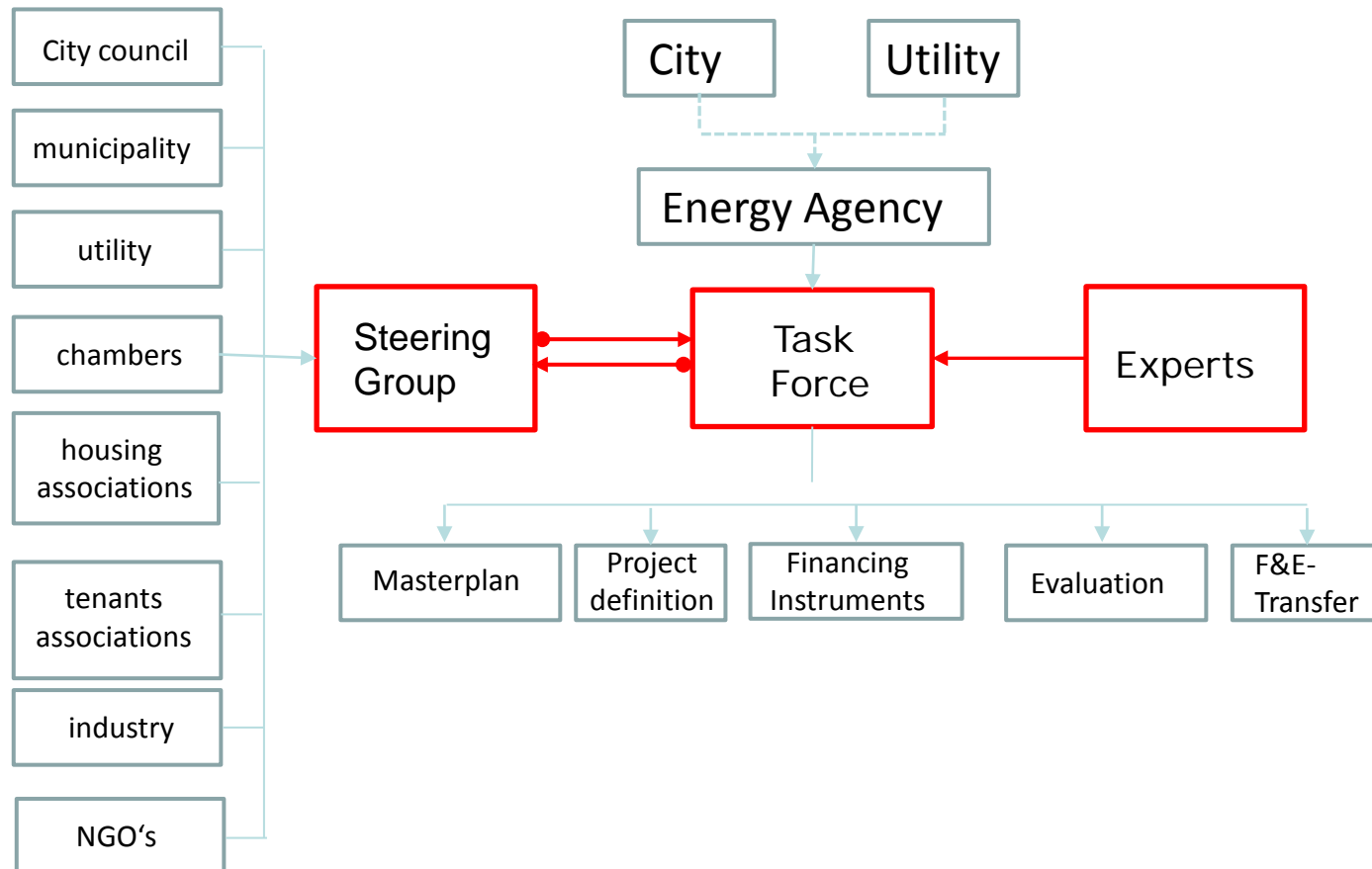




## 3rd conclusion:

- establish a steering and management system

## Implementation management:



(example of Karlsruhe)

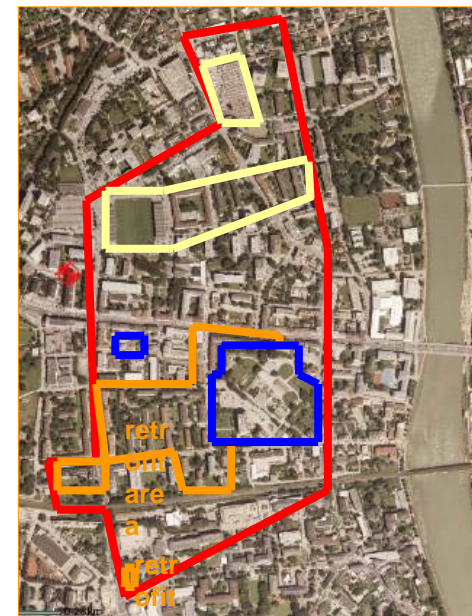
## 4th conclusion:

- merge energy plan with urban planning framework
- link with ongoing city developments  
(infrastructures, urban form, industry, infill, greenfield developments, ...)

→ Annex 51 case study examples....

# Conversion project Lehen, City of Salzburg (Annex 51 case study Salzburg-Lehen)

Masterplan for re-development of a neighborhood with structural problems:  
new buildings AND existing building stock around



Pilot project funded by EU (Concerto), Building of Tomorrow-Programm (BMVIT), Land Salzburg

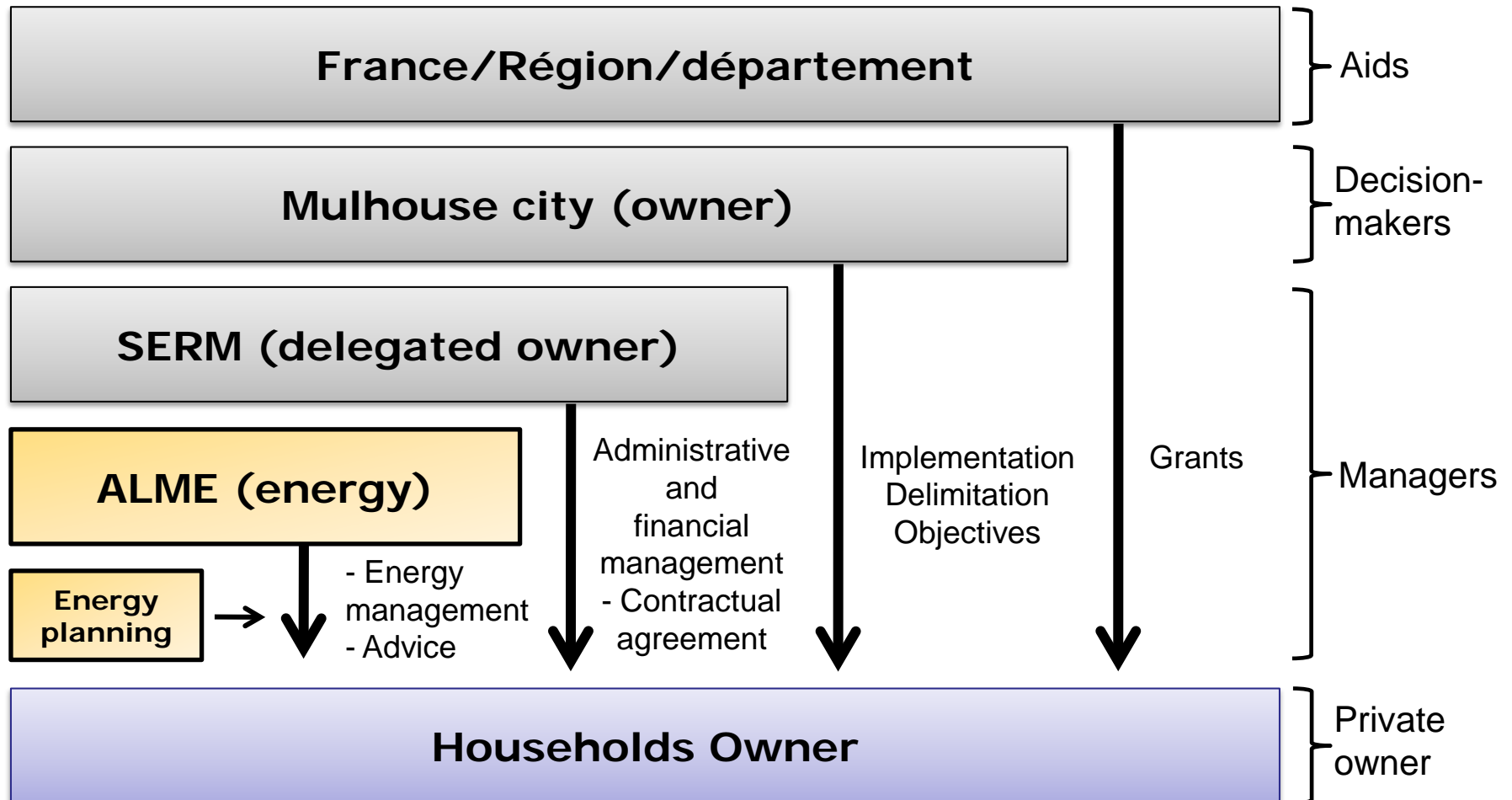


# Annex 51 case study « Quartier Franklin » Mulhouse, France



Source: SERM

# Mix of instruments:



# Process design

## Challenge:

## Process design with mandatory targets and a lot of players

- Signed quality agreement (performance criteria, minimum requirements), mandatory for all partners
- Steering group with all signing partners (monthly meetings)
- Working groups (energy supply, renovation)
- Information Centre, Information activities

... can only be answered on neighborhood scale!

## Citizen participation days in Salzburg-Lehen





## 5th conclusion:

- to provide concrete planning results,  
focus on neighbourhood planning!

# Summary

## → Optimization of Communities

### **Energy transition for cities needs**

- **integrated strategies (supply/demand)**
- **coordinated action over long time**
- **co-operation between stakeholders**
- **mix of public and private efforts (including grant systems)**
- **integration into overall planning framework**
- **holistic approach**

## F&E issues? *(beyond individual buildings)*

- **technology:**  
(neighborhood scale)
  - » neighborhood scale **low exergy applications**
  - » **monitoring** and **operation optimization**
  - » smart metering → smart homes →  
→ smart grids → **smart neighbourhoods**
- **modelling:**  
(city and neighborhood scale)
  - » **3D neighbourhood modelling** by digital territory information systems and remote scanning methods
  - » **interface** to
    - building models
    - energy system models
  - » outreach to **practical application**
- **transition process:**  
(city scale)
  - » management structures
  - » urban planning framework integration
  - » **financing models** (→ business cases?)
  - » appropriate **participation models**
  - » evaluation / **learning**