

# Unpacking and re-assembling the 'urban nexus': a socio-technical perspective on urban infrastructures

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# Nexus thinking



## Aspirations:

- Highlight & reframe connectivity between water, energy, food
- Promote policy integration for more sustainable development
- Reduce trade-offs, generate co-benefits
- Advance resource security
- Expectation: Better knowledge of connectivity >>> more integrated policies
- Broad appeal of the nexus: used as a concept, policy approach, paradigm, buzz word, way of thinking, ...

## Critical questions:

- What kinds of interactions are addressed? Which ones aren't?
- What should be integrated, by whom, for whom, how and where?
- What is meant by 'integration'? What consensual assumptions underpin nexus thinking?
- What is new to nexus thinking?

# Urban nexus

## Meanings:

1. Urban-rural nexus
2. Water-energy-food nexus in urban areas
3. Integrated approaches to urban metabolism

# Urban infrastructure as nexus

## Connections:

Meanings of urban nexus	Role of urban infrastructure
1. Urban-rural nexus	Connecting areas of extraction and treatment to areas of use
2. Water-energy-food nexus in urban areas	Interactions between different infrastructure sectors
3. Integrated approaches to urban metabolism	Interdependencies of resource flows; provider/user relations

## Limited infrastructural coupling:

- Basic interdependencies: e.g. electricity for water supply systems, water to cool power plants, general reliance on telecommunications
- Little attention paid in policy and research to issues of inter-sectoral connectivity and comparison: e.g. exploring interdependencies of transitions to energy and water transitions

# Nexus in socio-technical perspective

## Hybridisations:

- Infrastructures are much more than material artefacts and technologies....
- Today, conceived as socio-material:
  - Complex configurations, comprising multiple material and human entities
    - Jane Bennett: “The electrical grid is a volatile mix of coal, sweat, electromagnetic fields, computer programs, electron streams, profit motives, heat, lifestyles, nuclear fuel, plastic, fantasies of mastery, static, legislation, water, economic theory, wire, and wood – to name just some of the actants” (2005:446)
  - Dynamic configurations, involving continuous processes of adaptation, resistance, renewal etc.
    - “disassembling” / “reassembling”
  - Hybrid configurations, reflecting spatially and temporally specific circumstances
    - E.g. Urban energy transitions playing out in different ways in different cities

## An example



### Re-assembling the wastewater-energy nexus:

- The initiative:
  - To use treated wastewater on degraded land to grow energy crops in the Berlin-Brandenburg region
- The nexus aspirations:
  - a) to connect wastewater disposal to energy provision
  - b) to connect urban modes of wastewater production to rural modes of energy production
- Some socio-technical challenges encountered:
  - Physical: Finding land close enough to sewage treatment plants, unsuitable for food crops and with no risk of groundwater pollution
  - Institutional: Coping with distinct structures, practices and cultures of infrastructure governance (no 'wastewater transition' to match 'energy transition')
  - Spatial: Dealing with territorial jurisdictions unfavourable to a reordering of urban-rural metabolisms of wastewater and energy
  - Political: Unequal distribution of costs and benefits of water reuse >>> local opposition & conflict