Designing Energy Neutral Cities

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Outline

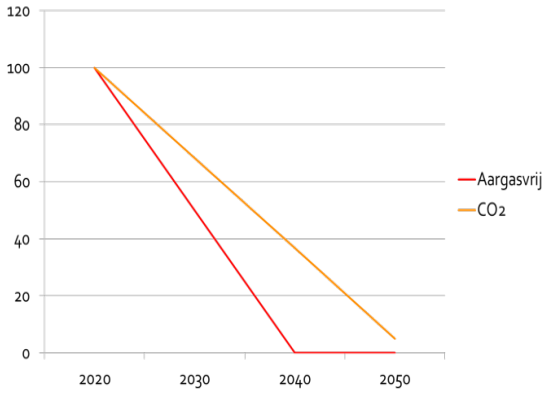
- The challenge
  - From a societal perspective
  - From a transition studies perspective
- Meeting the challenge: an example
- Designing solutions:
  - method and conditions
  - corollary insights on urban systems

THE CHALLENGE

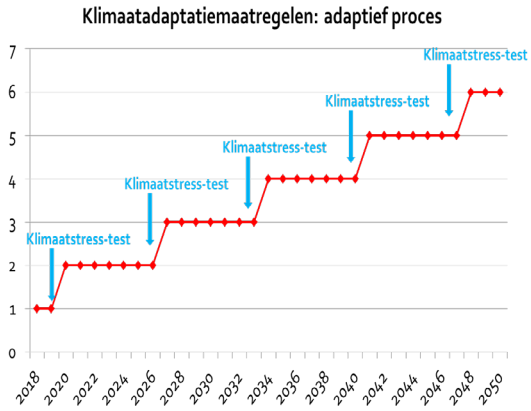
Contemporary challenges to cities

- Each task requires major changes, different nature & temporalities
- Sub-soil alreadyu overcrowded
- Strong concerns on affordability for population

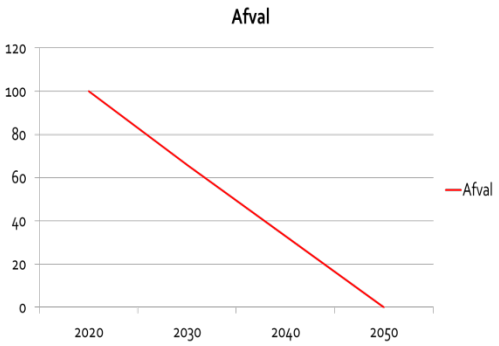
Energietransitie



Klimaatverandering



Circulaire economie



Digitale stad



Solution: multiple value creation

- Create synergy between different systems of provision
  - Example: Koppelkansenproject



Liander

Gemeente Amsterdam

waternet

De Universiteit van Amsterdam UvA

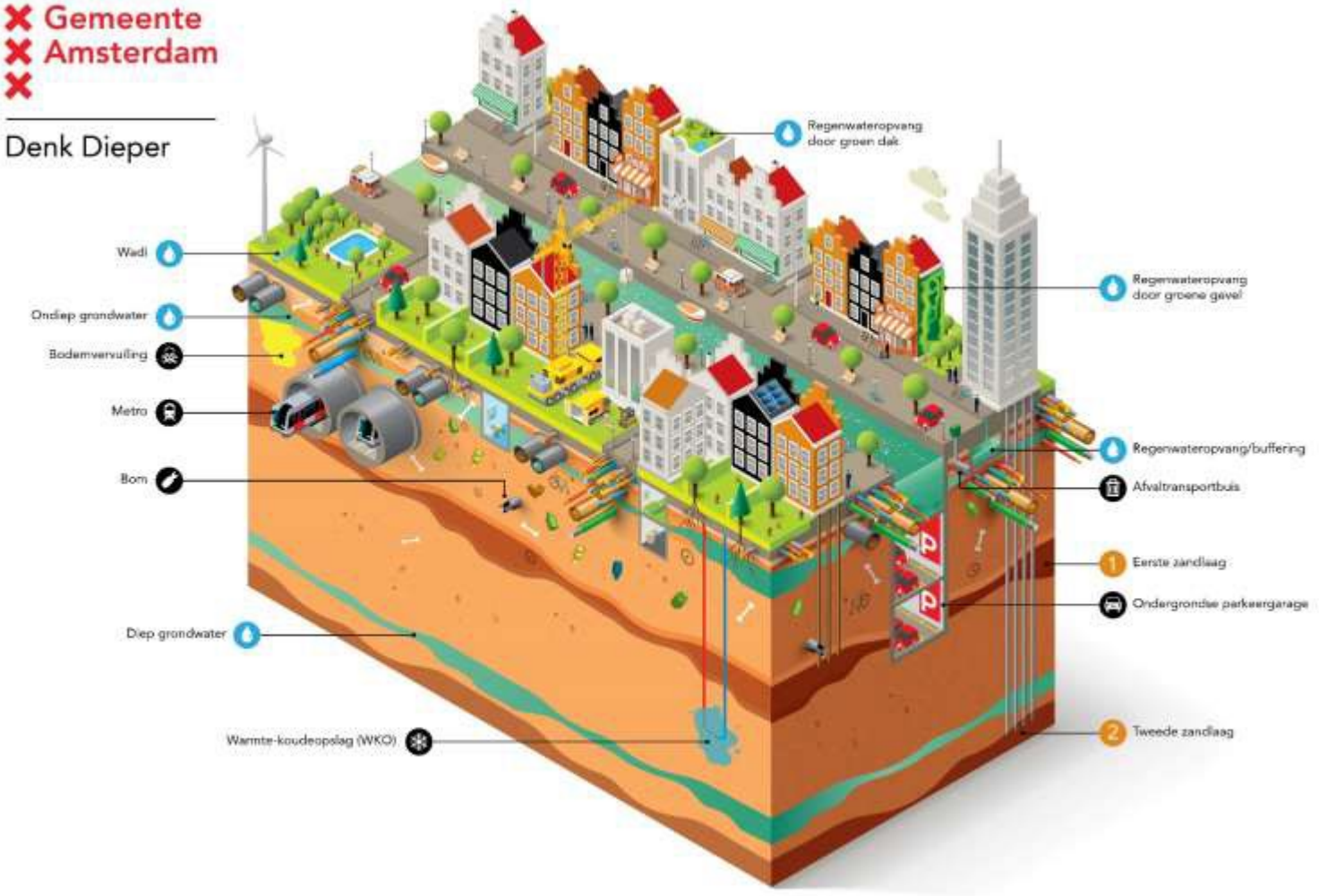
Objective: meeting the challenge through place-based multiple-value creation

- E.g. in Negen Straatjes








Gemeente
Amsterdam
Denk Dieper
Regenwateropvang
door groen dak
Wadi
Ondiep grondwater
Bodemvervuiling
Metro
Bom
Regenwateropvang
door groene gevel
Regenwateropvang/buffering
Afvaltransportbuis
Eerste zandlaag
Ondergrondse parkeergarage
Diep grondwater
Warmte-koudeopslag (WKO)
Tweede zandlaag

Implications include

- From functional differentiation between systems of provision to synergy
- Efficiency: from economy of scale to multiple value creation
- Costs: investments & returns are distributed in space and time
- Different technologies and infrastructures
- Different governance arrangements
- Different user practices
- Fro universal solution towards a *repertoire* of place-based solutions

- Thus:
  - Institutional innovations: rules, relations and logics
  - Technical innovations
  - Social innovations
- In other words: a *system innovation*

The challenge from a transition studies perspective

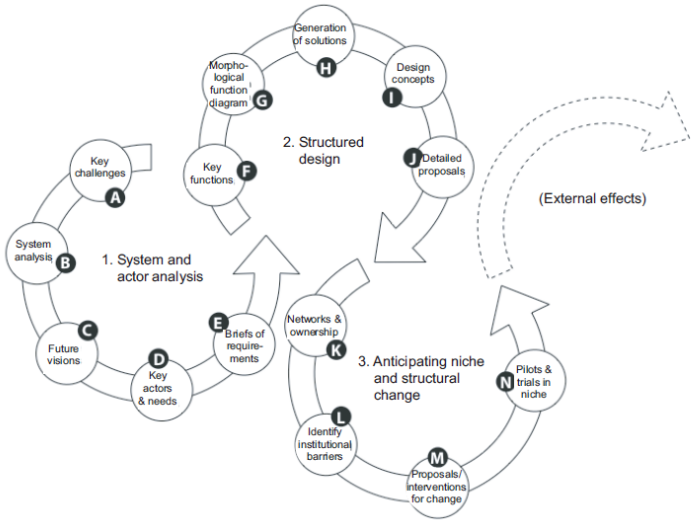
- A system innovation:
  - novel mutually coherent practices of production, distribution, consumption, governance,…
  - change in associate structures:
    - institutional
    - discursive
    - material
- In earlier transition literature:
  - experiments in niches
  - connect niches and experiments to ongoing dynamics in system & context (MLP)
- Here:
  - Pilot projects in heart of incumbent system

DE RIO METHOD

The RIO method

- A design method:
  - iterates between analysis and shaping an innovation
  - constructs matching problem-solution
  - contextual
- Reflexive: incumbent structures not taken for granted
- Solutions comprise novel socio-technical practices and associate structural adaptations
- Developed in collaboration with Wageningen-UR, drawing on
  - Interactive technology assessment (Grin et al, 1997) & vision assessment (Grin & Grunwald. 2000)
  - Method Sustainable Technological development Ontwikkeling (DTO, 1993-2000)
  - Diverse methods en techniques (Feenberg, Kroonenberg etc)
- Actually used, tested and developed in livestock, crop production, port of Amsterdam and long-term care

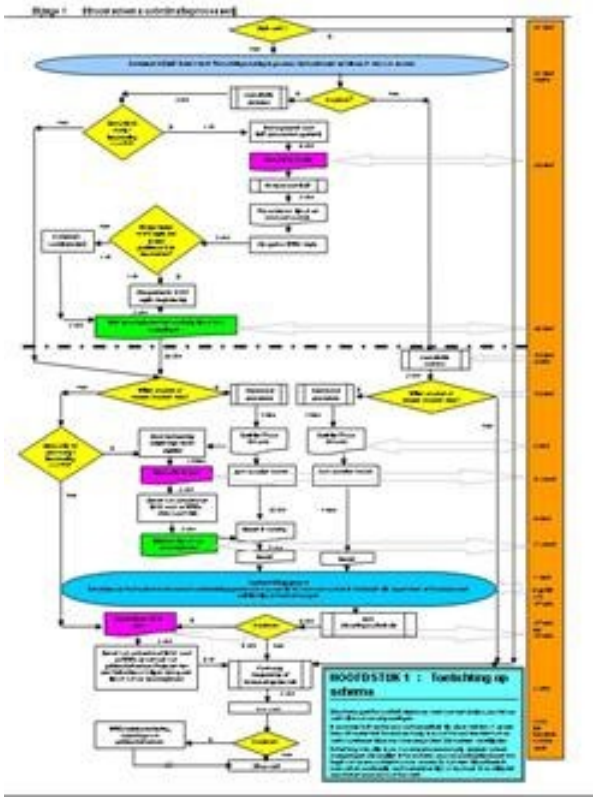
Creating innovative room in three main activities



- System and actor analysis focused on understanding & overcoming problem reproduction:
  - Requirements > needs
  - Past-based expectations > vision
- Re-designing the system:
  - re-considering relations needs – functions – solutions
- Understanding the system based on attempts to change it
  - Barriers > structural change

Conditions (1)

- A niche
  - Beyond standard rules for mutual collaboration ('coordinatiestelsel')
  - direct access to strategic decision makers =>
    - (inter-) organizational novelties (e.g. novel mode of tendering; 'shared wallet'; etc)
    - Consider wider system changes, e.g. in legislation



Conditions (2)

(Central in NWO project with Merit-UM)

- Already in early stage: articulate and reach closure on key discursive changes and relate to material and institutional dimensions
  - Functional differentiation > synergy
    - Different logic on efficiency / cost effectiveness of infrastructure
    - Different governance arrangements
  - Business models for shared value creation (distributed in time and space)
  - From classical-modernist urban planning and design > place-based, inductive modes of design

- Develop this as a shared understanding asap
- On that basis, do further system analysis => better system understanding
- Adaptation of RIO being elaborated for and through training professionals

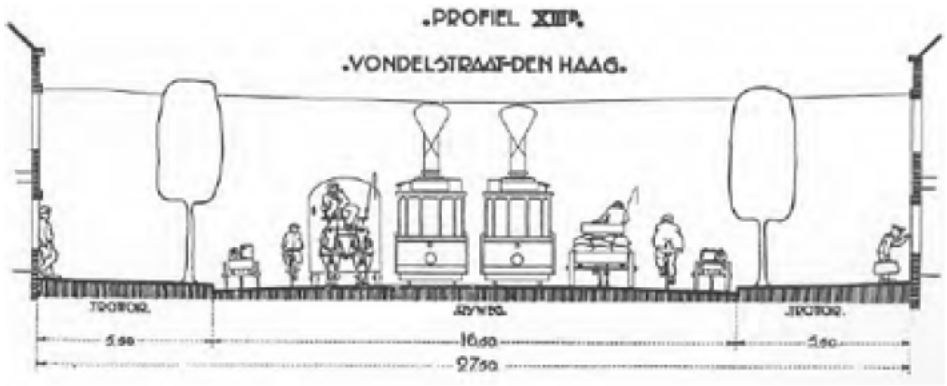
Streetplan: Berlage's Plan Zuid, version 1915 Stadsarchief Amsterdam.

http://beeldbank.amsterdam.nl/afbeelding/B00000008320



Evolution of streetprofielen (1)

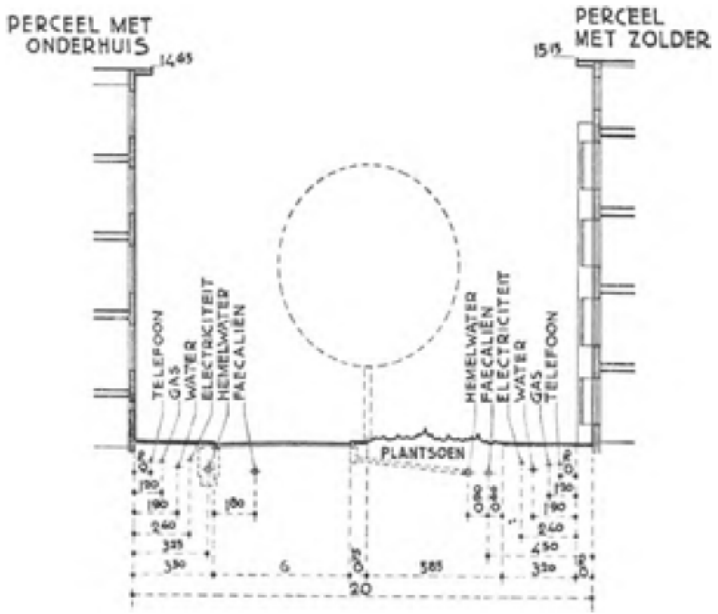
Source: H.W. Lintsen e.a, Techniek in NL, 20e eeuw, deel 6, p. 66



Dit dwarsprofiel van de hand van P. Bakker Schut uit 1926 toont de retorische kracht van het profiel als planningsinstrument. Naar zijn inzichten zou een verbreding van de Haagse Vondelstraat de veiligheid dienen vanwege de mogelijkheid tot scheiding van snel en langzaam verkeer op aparte banen. In de verbrede straat is voor iedereen een ordelijk plaatsje ingeruimd, zelfs voor de lanterfanter.

Evolution of streetprofiles (2)

Source: H.W. Lintsen e.a, Techniek in NL, 20e eeuw, deel 6, p. 54

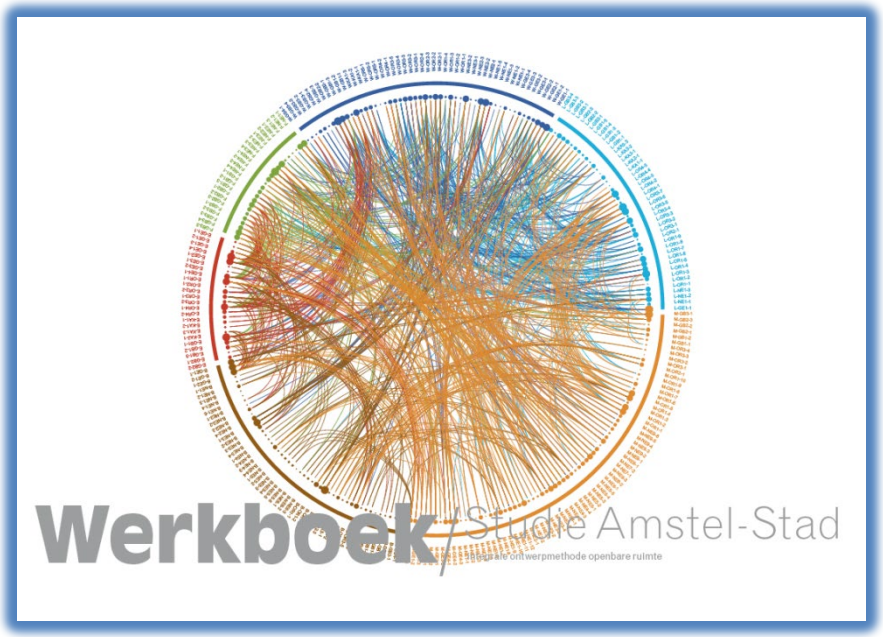


Een dwarsprofiel zoals dit, uit het uitbreidingsplan Bosch en Lommer (1937), werd in het Interbellum steeds complexer: het bepaalde de relaties tussen een toenemend aantal systemen, ook onder de grond. Op die manier bood het dwarsprofiel een rationeel kader voor de aanleg van ondergrondse systemen als riolering en telefoon.

New problem definition, new approach

- No longer:
  - Systems of provision follows design of neighbourhood / street
  - Subsurface follows surface
  - Rolling out universal principles

- Develop synthesis of RIO and urban design methods <-> do it <-> train professionals



Conditions (3)

(Central in NWO project with Department of Management in the Built Environment - TUDelft)

- Better academic understanding of and well-designed learning & design environments for
  - Reflexive learning, across
    - different societal domains
    - different disciplines
  - behavioural change of end users (living labs) and professionals