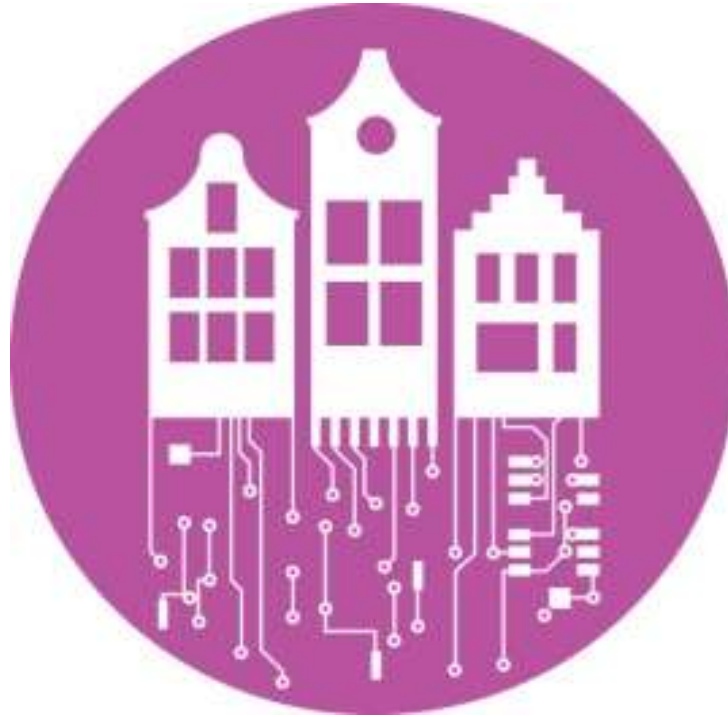



Smart Cities

A Spatial Planning and Design Approach



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The Digital Age



An Urbanizing World

UNAM, Mexico

- Connected campus
- Smart identification
- Smart transportation
- Smart public safety
- Smart administration
- eLearning

Skolkovo Technopolis, Russia

- Smart buildings
- Smart transportation
- R&D center

Meixi District, China

- Business district
- Renewable energy
- Smart transportation
- Smart buildings
- Smart city operations

Hwaseong Dongtan, South Korea

- Business district
- Smart traffic and transportation
- Smart buildings
- U-city framework

Songdo IBD, South Korea

- Global business district
- Renewable energy
- Smart transportation
- Smart buildings
- Smart city operations

São Paulo, Brazil

- Connected stadiums
- Smart buildings
- Sustainable hospitality
- Urban mobility
- Smart public safety
- Smart transportation

Masdar City, Abu Dhabi

- Sustainable city
- Renewable energy
- Waste management
- Economic zone
- Smart real estate

Lavasa, India

- New urbanism
- Eco-friendly planning
- Smart buildings
- Smart transportation
- eGovernment

- Existing city
- Noncity
- New city



Masdar

A Sustainable City in the Desert

Promoters of Masdar, a city under construction near Abu Dhabi, say that it will be the world's first carbon-neutral city. It will be home to a research institute focused on renewable energy and sustainability, and eventually, if all goes as planned, to various clean-technology companies, and to a projected 45,000 residents and another 45,000 commuters.

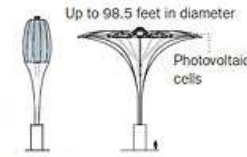
Complete this fall
 Under construction

The surrounding trees will help mitigate windblown dust and sand.

Computer rendering of the planned city



Neighborhoods will have distinct buildings and design elements. Masdar Plaza, for example, will have 54 sunshades that open and close automatically at dawn and dusk.



Streets are laid out at angles that optimize shading. Long, narrow parks catch and cool the prevailing winds, and assist in ventilating the city.

Phase 1 MASDAR INSTITUTE

The area being completed this fall has some design features common to the entire project.

The wind tower funnels wind to ventilate a public square at its base. The air is cooled with water sprays.

Narrow streets allow for some sunlight, but overhangs create shade

Photovoltaic panels power the buildings and provide shade to keep roofs cooler.

The city is surrounded by recreation areas, power generation facilities, parking garages and food production areas.

A light rail line will pass through the center of Masdar, linking it to downtown Abu Dhabi and providing transport within the new city.



Masdar Headquarters

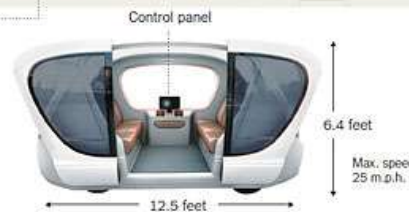
Photovoltaic panels on Masdar Headquarters, the city's biggest office building, are expected to produce more energy than the building consumes. It is scheduled to be finished in 2013.

Wind cones will provide natural ventilation and soft daylight to the building's interior.



Automated cars with room for four adults.

Automated transportation
Masdar will be using an automated system of electric vehicles, including passenger cars and freight trucks. The city's ground level was elevated 23 feet, and the vehicles will operate underneath.



Making existing cities more efficient

ENERGY

gebouwen gebruiken 40%
van de mondiale energie

16:44
29/10/2013

MATERIALS

75% bedrijven vreest negatieve
effecten grondstoffentekort

SERVICES

13% van BBP gaat
naar zorgkosten. In
2040: 30 tot 45 %

TRANSPORT

27% van de
vrachtwagens
rijdt leeg

DE BIJENKORF

WATER

Ruim 3 miljard liter drink-
water lekt jaarlijks weg

MOBILITY

fileproblematiek kost Europa
jaarlijks €100 miljard

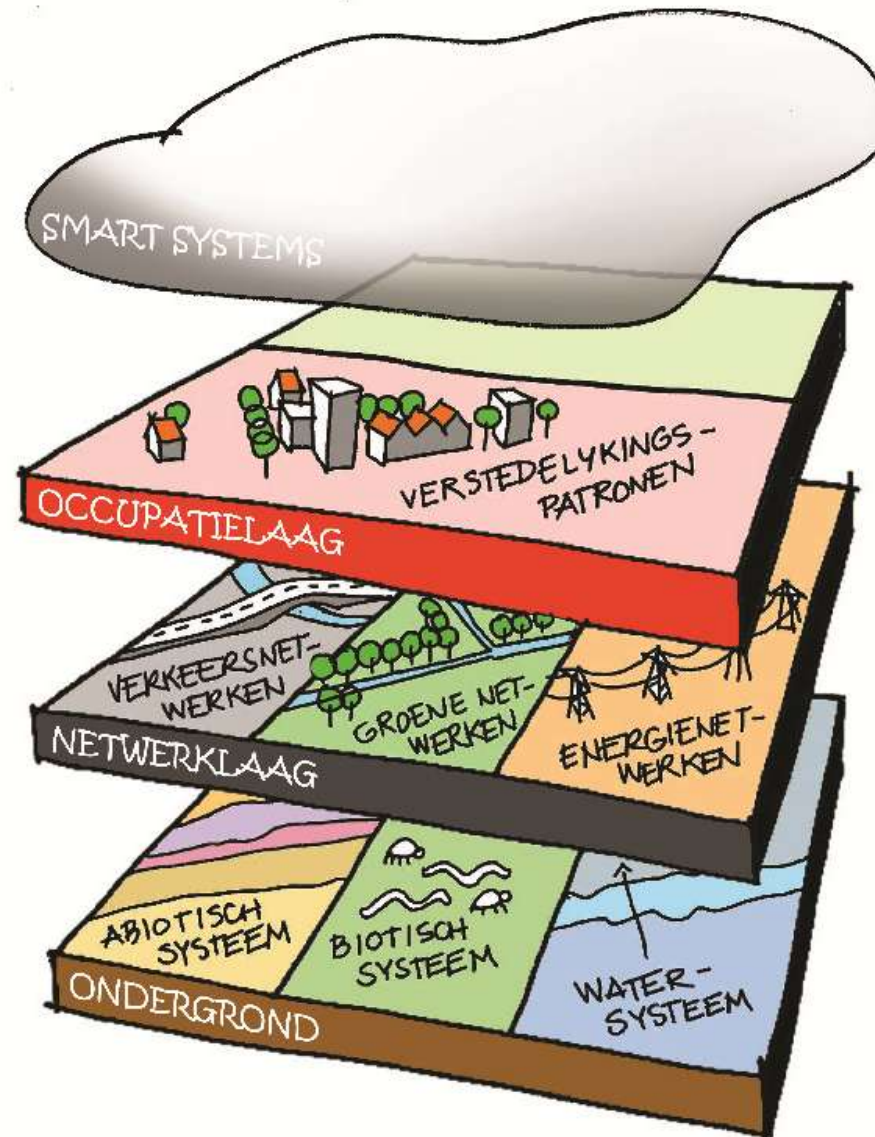
FOOD

per persoon gooien we
74 kg bruikbaar voesel weg

The Importance of Spatial Planning and Design

- Innovation between the silos, through a locationbased, comprehensive approach
- Smart Cities = smart technology + smart citizens + smart governance
- Design needed as interface between technology and user experience
- Location based approach needed to implement technology, to relate to local needs and stakeholders





'Smart innovatie'
 0-4 jaar
 flowmanagement, www,
 open source, eco technologie
 apps, cloud, mapping,
 e-commerce en connectivity

'Ruimtegebruik'
 10-40 jaar
 wonen, werken, recreatie,
 demografie
 Sociaal culturele structuur
 zorg en welzijn

'Infrastructuur'
 20-80 jaar
 wegen, waterwegen, energie,
 vervoer & bereikbaarheid

'Landschap'
 >1000 jaar
 bodem, water, natuur, landschap
 cultuurhistorie

Smart cities – a new layer

Goals ambitions
sustainable, social /
economically vital,
livable, healthy, etc.

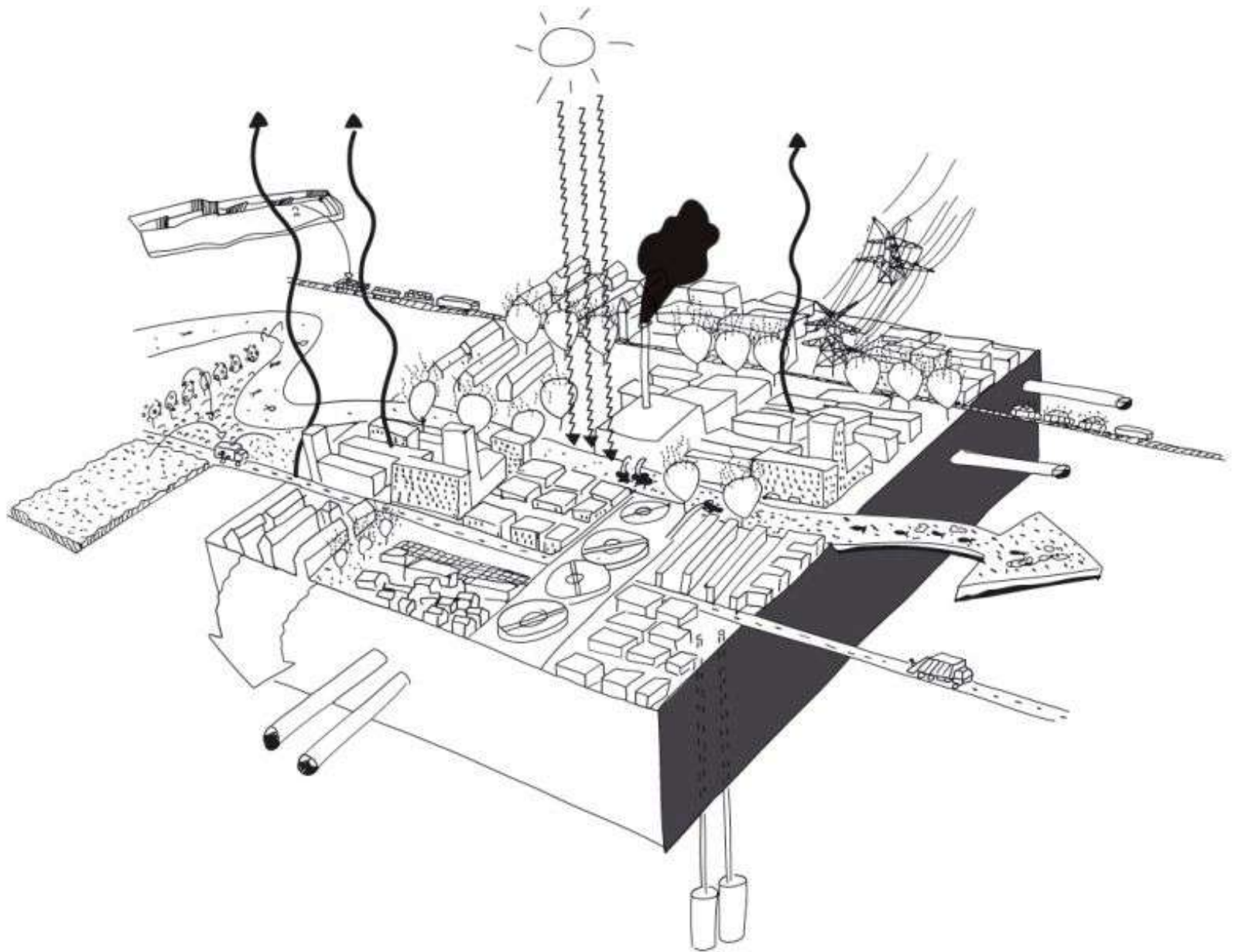
**Innovative
Components**
Smart Grids
Open Data

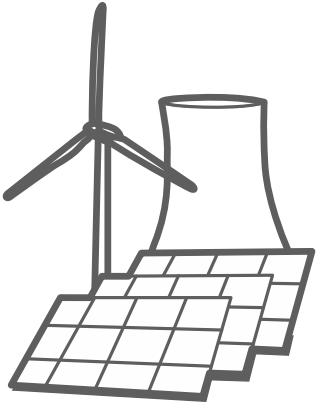
**Energetic Society
Alliances,**
Governance,
credit cooperations
etc.

**Optimising
Flow
management**
waste, energy, water,
people, goods, etc.

**Integrated
planning**



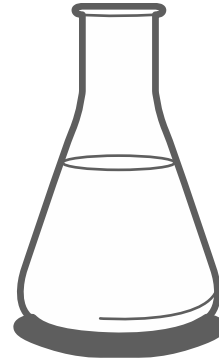




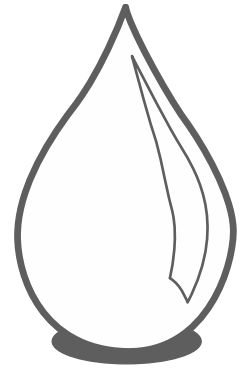
ENERGY



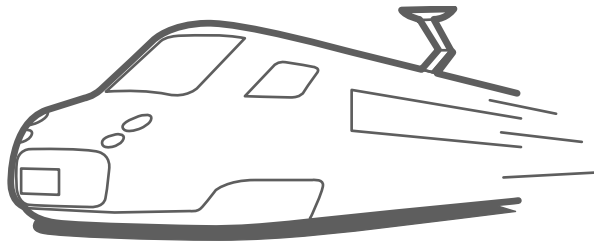
FOOD



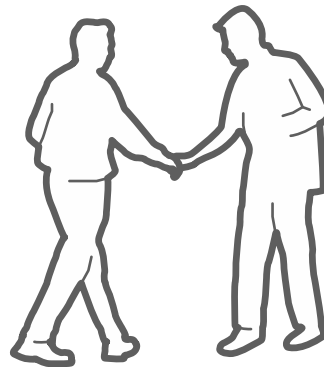
MATERIAL



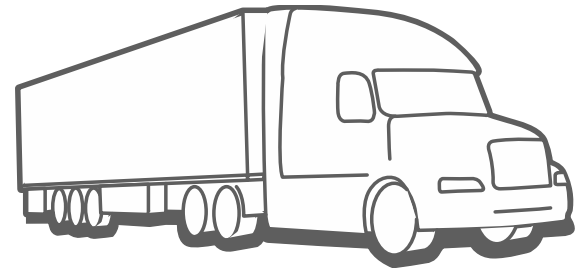
WATER



MOBILITY



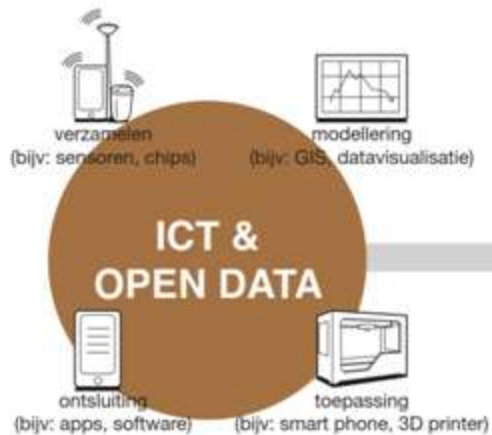
SERVICES



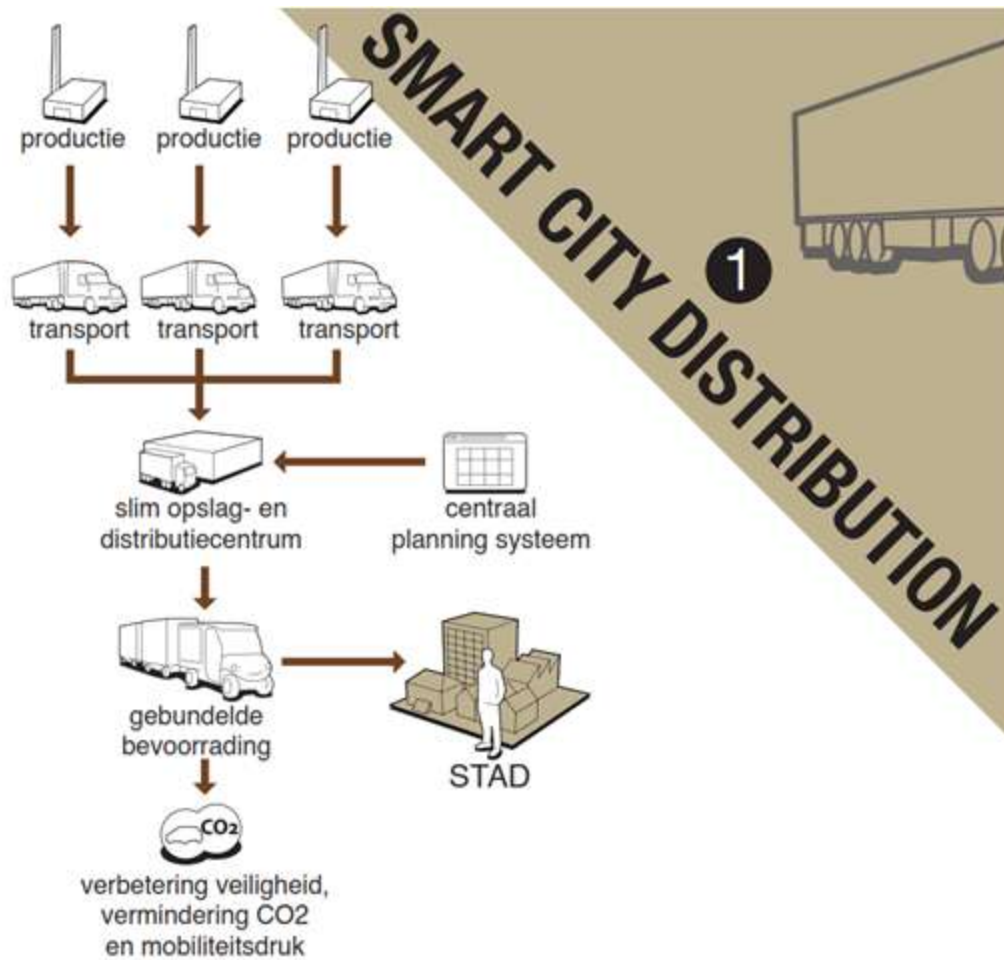
TRANSPORT



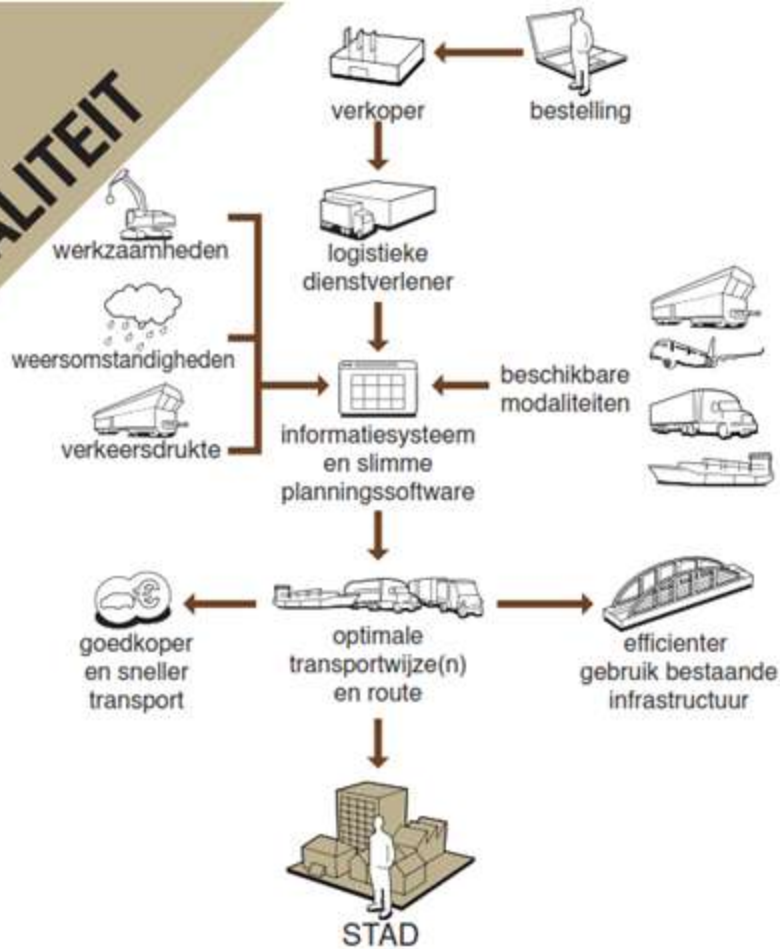
TRANSPORT

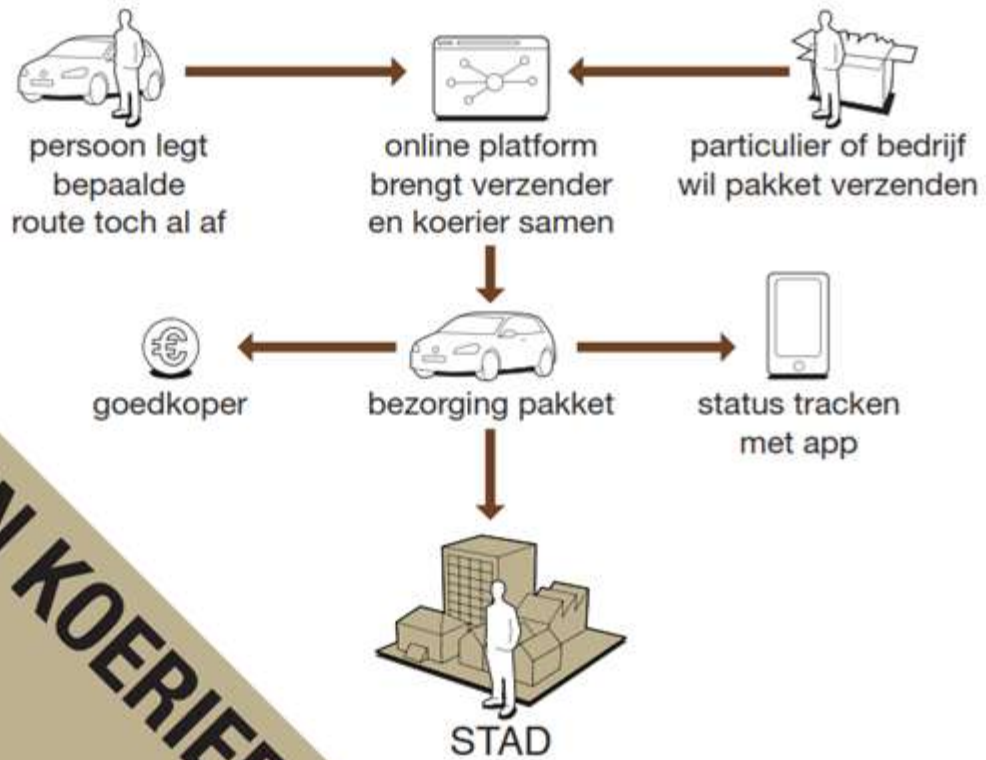




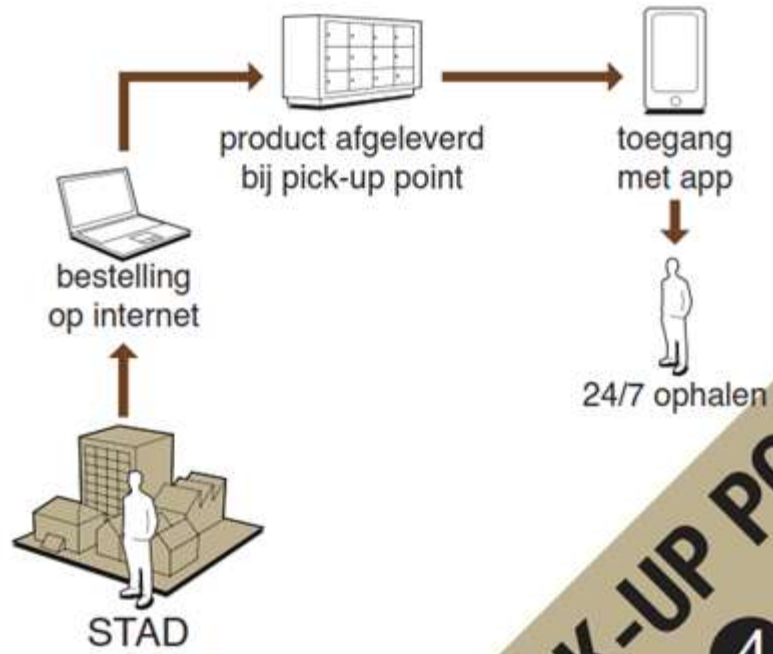


2 SYNCHROMODALITEIT





3
IEDEREEN KOERIER

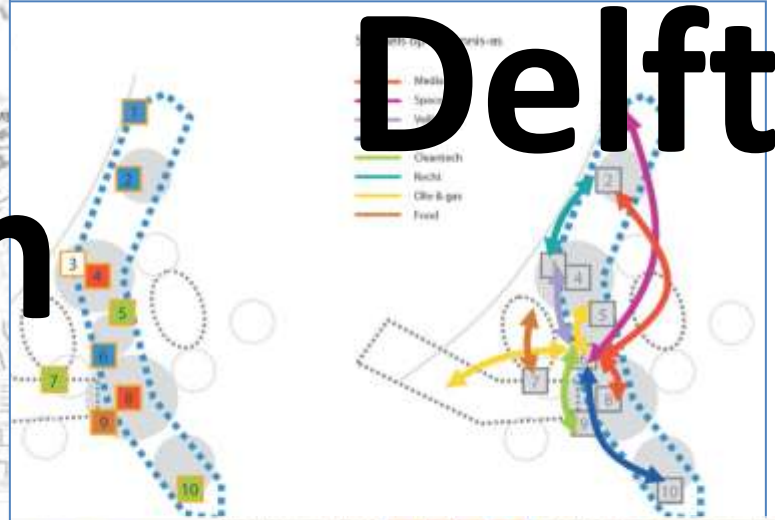


PICK-UP POINT
4

Amsterdam



Delft

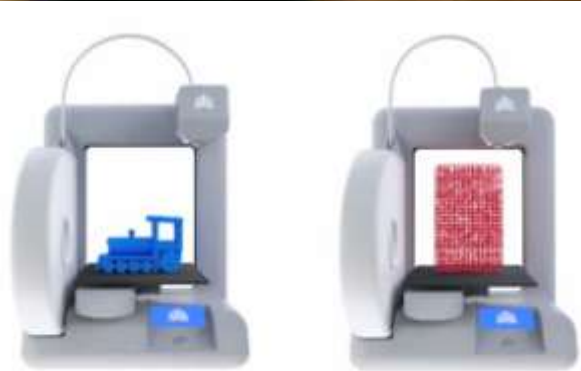


Eindhoven



Assen

SMART CITY



Activities are less and less location based

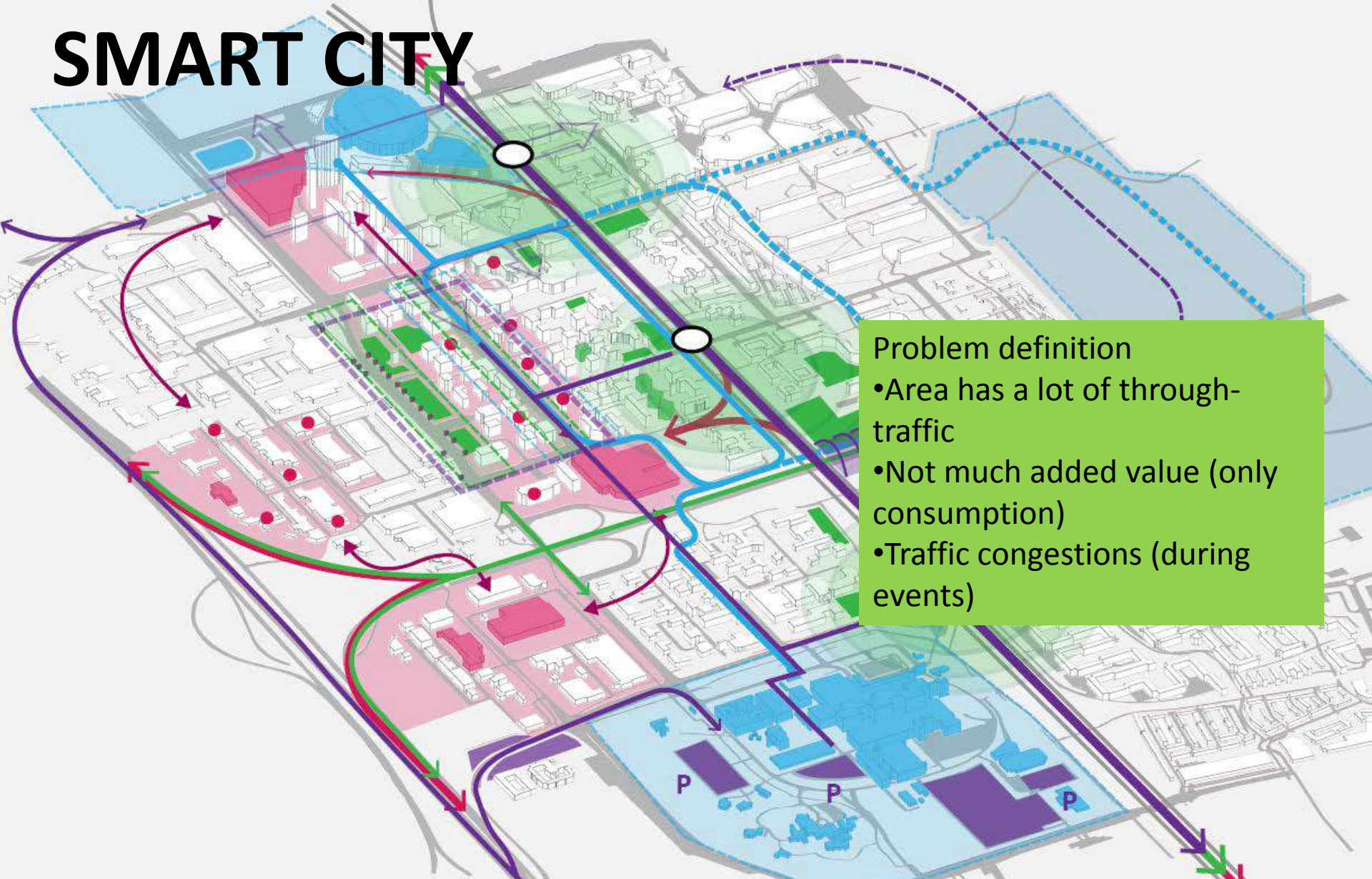
SMART CITY



Optimalisation of costs through the reduction of use of space and resources, by means of sharing goods and data/knowledge

Access more important than ownership

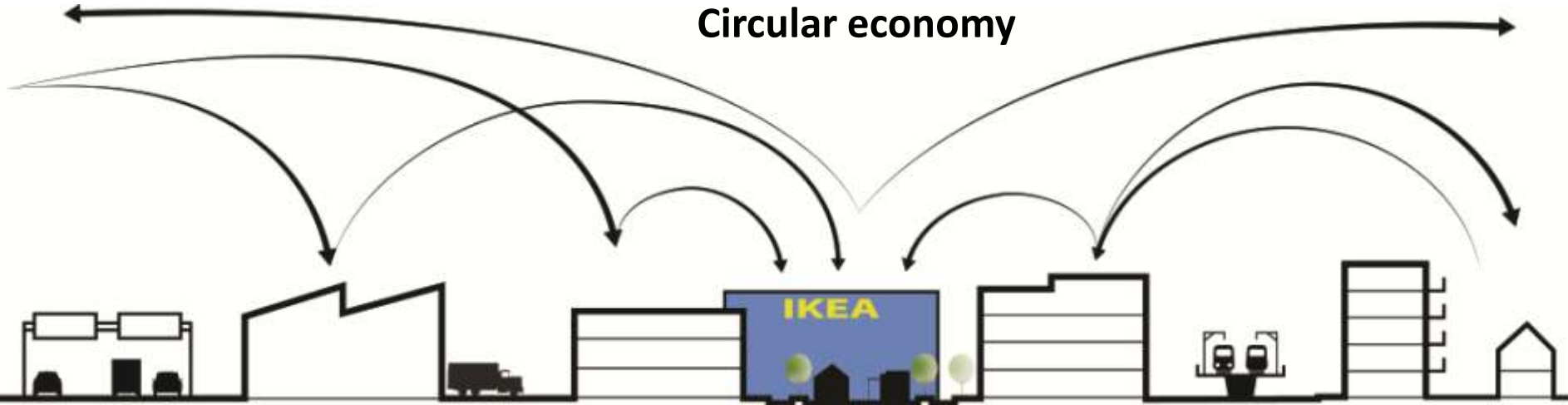
SMART CITY



Optimalisation through mapping demand and supply and flows

Solution: creating a local value chain | Home&living district

Local metabolism
Circular economy



A2/A9
Utrecht
Eindhoven
Schiphol
Almere

DISTRIBUTIE
packaging
data centra
logistiek
stadslogistiek

UPCYCLING
2e hands
kringloopwinkels
werkplaatsen
repaircafe's

SHOPPING
winkels
pop-up stores
galleries
marketing

DESIGN
prototyping
3d printing
fablabs
customizing

OV
trein
metro
bus
pickup points

HR
lokale ondernemers
werknemers
studenten HES / ROC



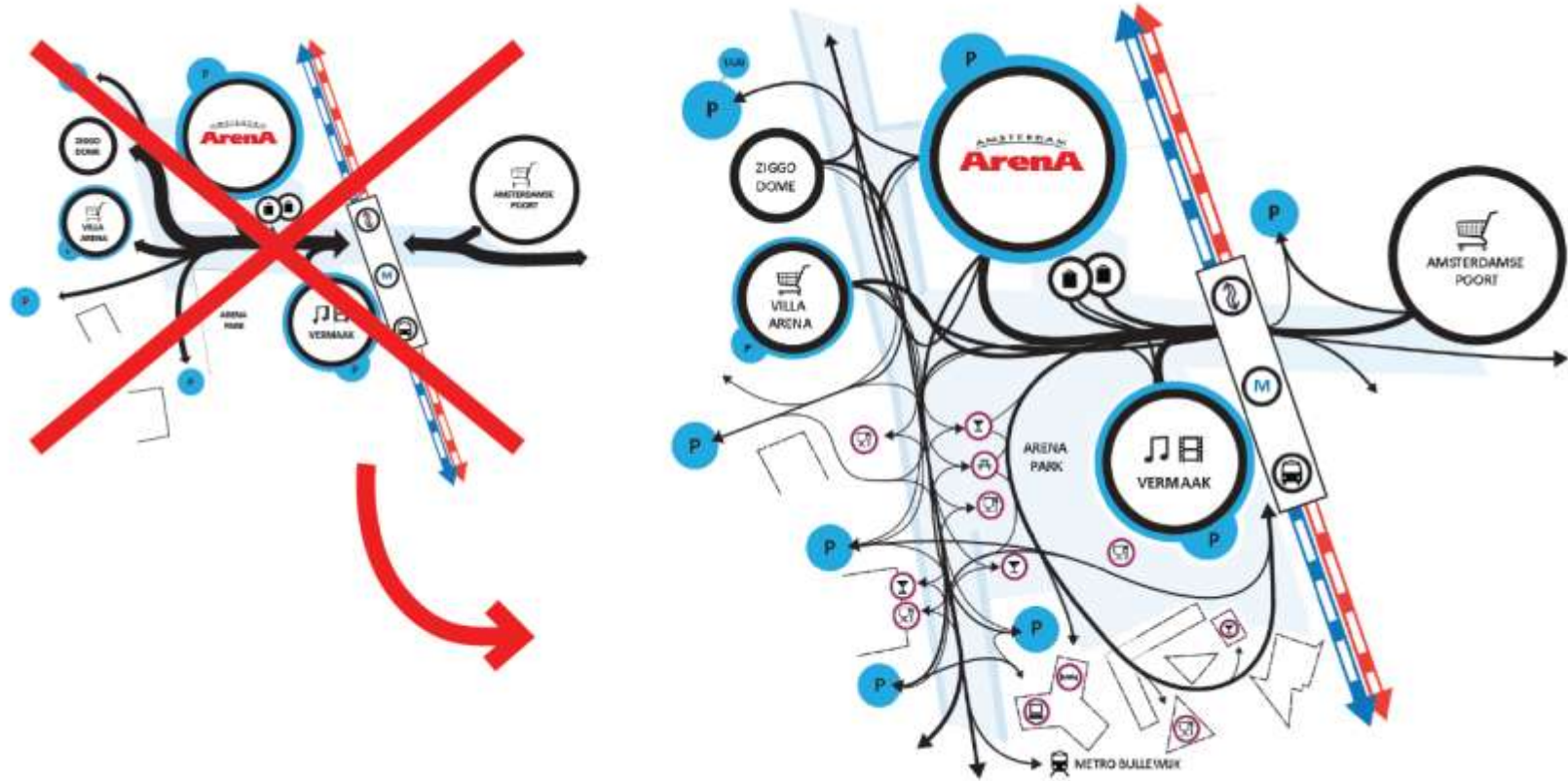
Smart mobility: components of location based smart solutions



- Robust infrastructure (with buffering capacity) •
 - Flexible supply (both of mobility and other services), that can adjust to changes in the demand side
 - Smart programming of activities in space and time (spread the demand for mobility)
- Real-time flowmanagement using apps and sensing

Trias mobilica

1. 'Peak shaving' by creating buffer capacity in het network



2. Changing demand for mobility with apps



3. Sustainable mobility: electrification

General lessons for spatial planning and design

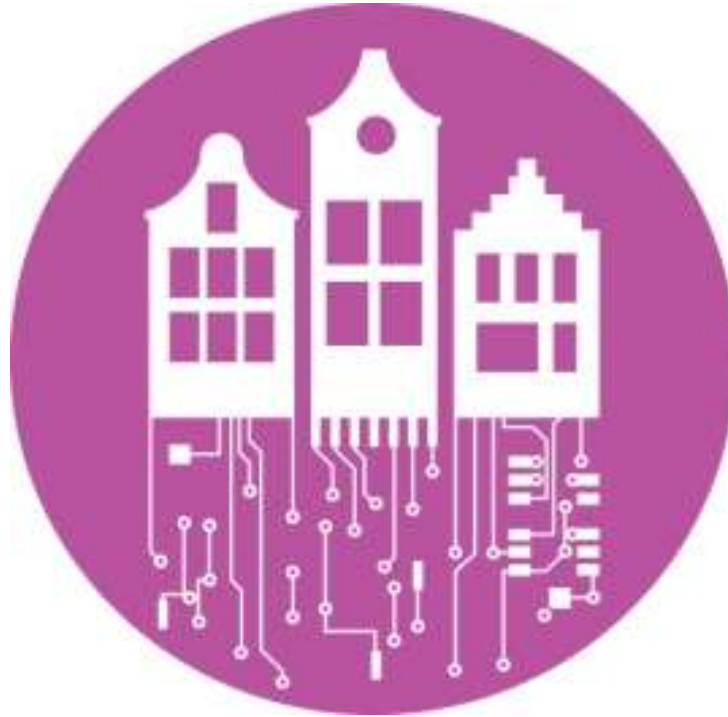
Growing need for:

- Multi-modality / connectivity / redundancy
- Mixture of functions (allowing for sharing and decentralized production)
- Flexibiliteit / adaptivity
 - *buildings*
 - *public spaces*
 - *urban structure*



Smart Cities

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