Arcadis on Smart CITIES

Erik van Jaarsveld

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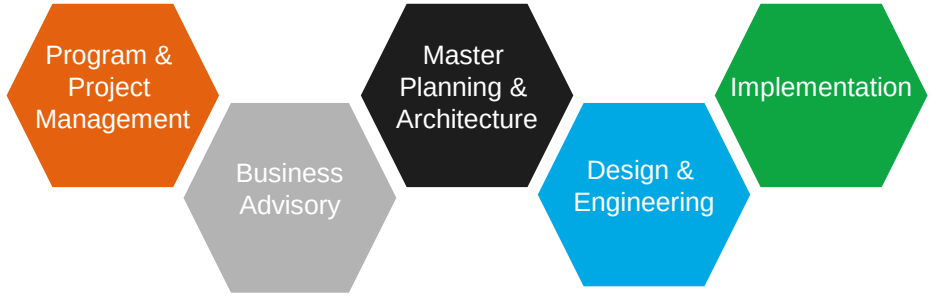
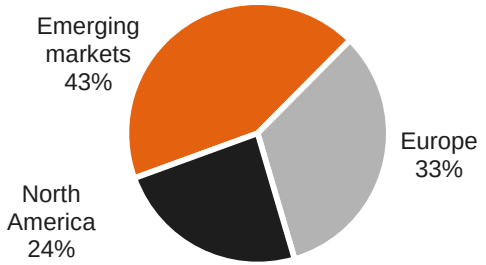
Arcadis at a glance

PROPOSITIONS



GEOGRAPHY*



*staff

BUSINESS LINES (gross revenues)

**Q1 2015 incl. Hyder and Callison*

infrastructure

water

Environment

buildings

KEY STATISTICS

gross revenue

>€3 BILLION

people worldwide

28 THOUSAND

Leading global natural and built asset design & consultancy firm working in partnership with our clients to deliver exceptional and sustainable outcomes through the application of design, consultancy, engineering, project and management services

ranking

#6 WORLDWIDE

Cities with projected 2030 population >10 million

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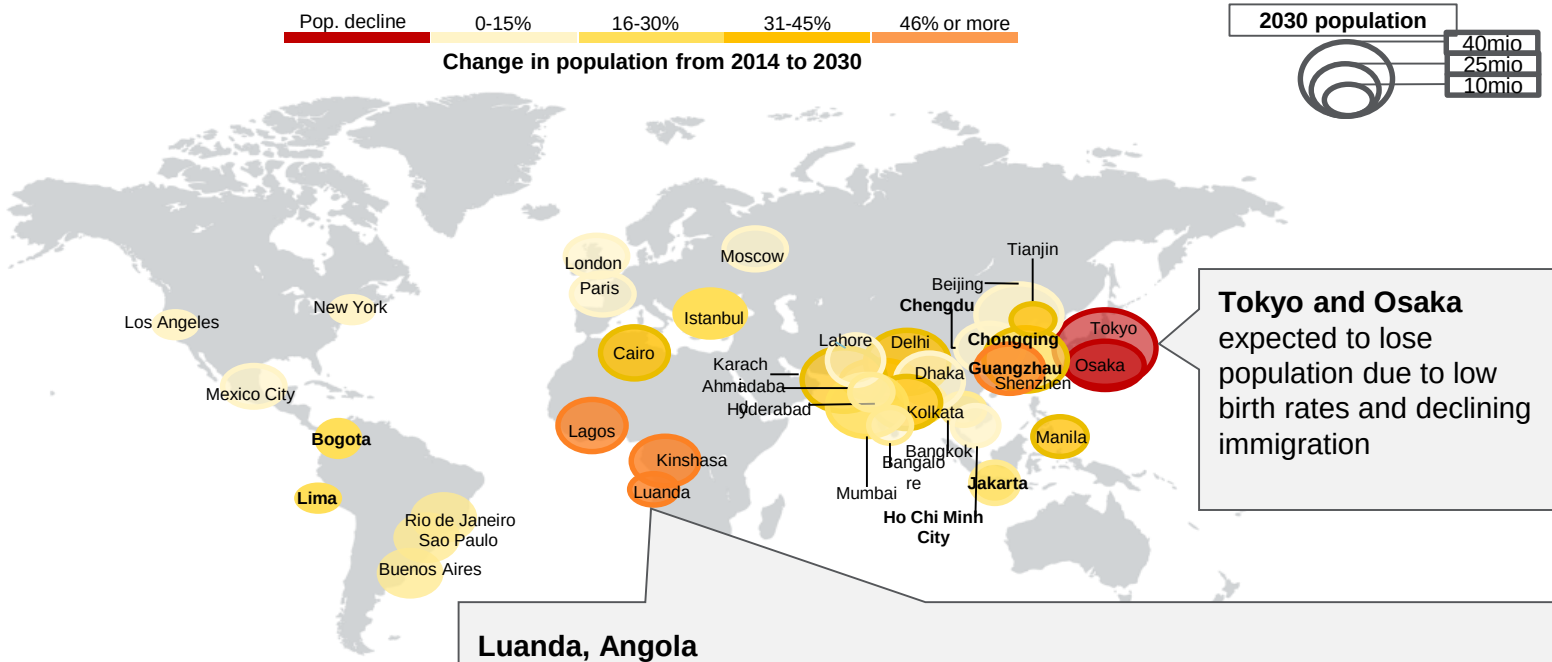
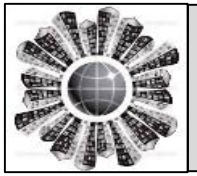


Tokyo and Osaka expected to lose population due to low birth rates and declining immigration

Luanda, Angola
Its population is expected to grow to 10,4 million in 2030, from 5.3 million in 2014, the fastest growth rate among the 2030 megacities. Lagos and Kinshasa are close behind


Urbanization trend

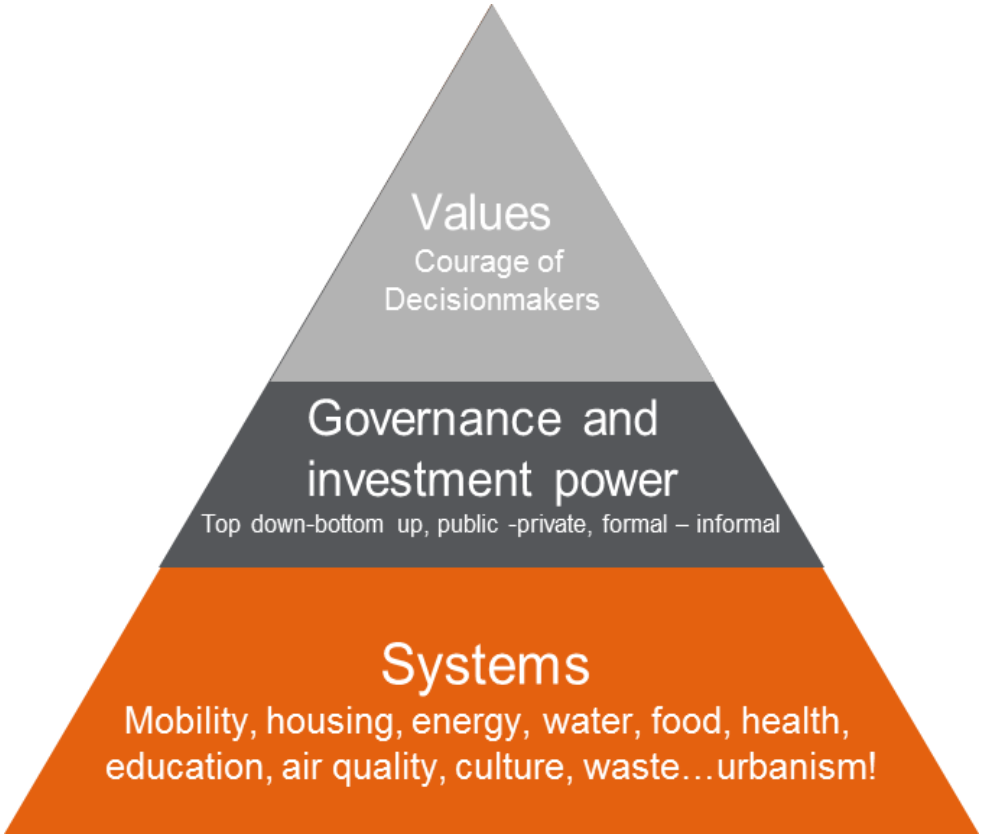

Cities are in competition


Cities are business hubs


Cities are emotional attachment areas

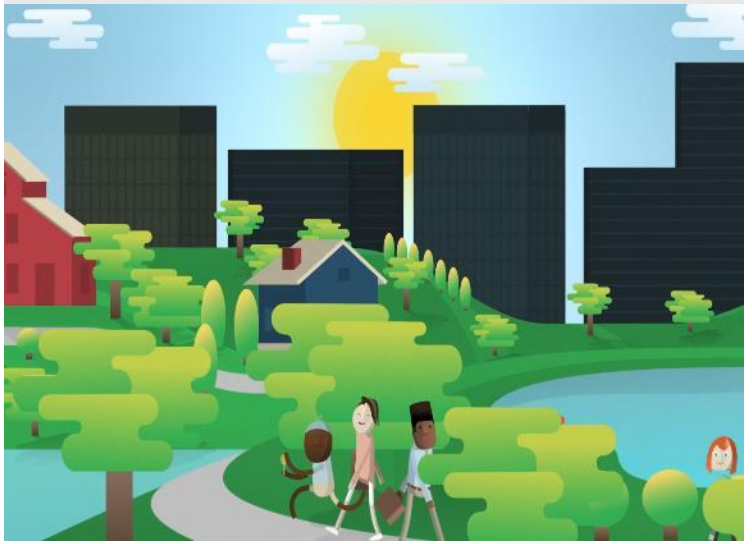
Source: NY times

City pyramid model: systems within a city ecosystem



Arcadis' city approach is primarily designed to improve the quality of life.

To do so, we need to have knowledge on the characteristics of the city ecosystem.



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A Smart City, is a resilient, efficient and innovative city which uses technology innovations and new business models to improve quality life.

Our approach to create smart and sustainable urban areas

Ours is an era of unprecedented opportunity: advancements in technology, communication, data mining, cognitive computing and three-dimensional design present tremendous potential to effect change in the urban environment. Decision makers and planners can do more with less, addressing community needs with design solutions that are both beautiful and high-performance. And while change is never without risk—infrastructure can be difficult to modify, community members justifiably hesitant, political structures limiting and challenging to navigate—change is also inevitable; so why not proactively anticipate and drive it?

Resilience

New York after Hurricane Sandy: City Resilience

Flexible and tailor made multipurpose flood protection in Manhattan: landscaped, spacious integrated green dikes, adding quality and value to the urban environment

The NYC Green Infrastructure Program

Further increase of resilience with large scale implementation of green infrastructure

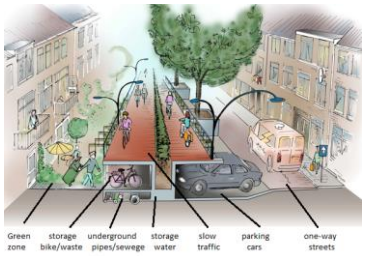
The Climate Proof City 2050

The climate proof city 2050 is prepared against floods, extreme precipitation, drought and heat by the interaction between spatial planning and urban watermanagement using all available techniques, innovations and knowledge about climate adaptation in urban environment.

Urban regeneration

BROWNFIELD (CONTAMINATED) SITES

INFRASTRUCTURE



WATERFRONT DEVELOPMENT

UNDER PERFORMING ASSETS

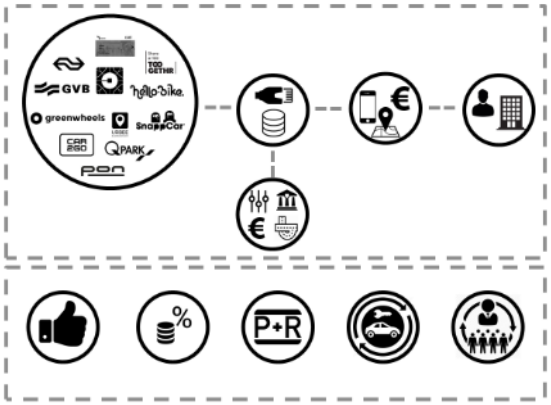
ENVIRONMENTAL RESTORATION

The new heart of Orlando

- Commuter rail station
- Bike share program
- Performance Venue
- Thousand residential units and office spaces
- New stadium

(Smart) Mobility

Mobility as a Service



MAAS, short for Mobility as a Service, brings all means of travel together. It combines options from different transport providers into a single mobile service, removing the hassle of planning and one-off payments. MAAS is a carefree, environmentally sound alternative to owning a car.

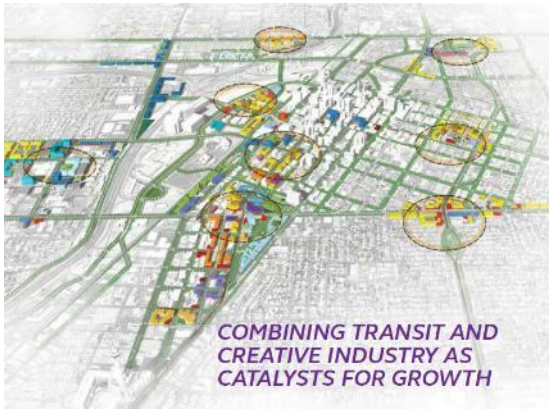
Currently, Amsterdam is working on MAAS at business district

Autonomous vehicles

Policy advice for cities:

1. Leverage technology to enhance mobility.
2. Prioritize and modernize public transit.
3. Implement dynamic pricing.
4. Plan for mixed-use, car-light neighborhoods.
5. Encourage adaptable parking.
6. Promote equitable access to new jobs and services.

Mobility Oriented Development



Masterplan for Los Angeles
Whether it's rethinking the morning commute, providing mobility as a service or linking transit choice to personal health, alternatives to automobiles are cropping up everywhere and having a noticeable impact on the design of our streets and parking infrastructure.

Connected & Autonomous

Autonomous Vehicle

Operates in isolation from other vehicles using internal sensors

Connected Vehicle

Communicates with nearby vehicles and infrastructure

Connected Automated Vehicle

Leverages autonomous and connected vehicle capabilities

Vehicle to Vehicle (V2V)

Vehicles communicating with each other

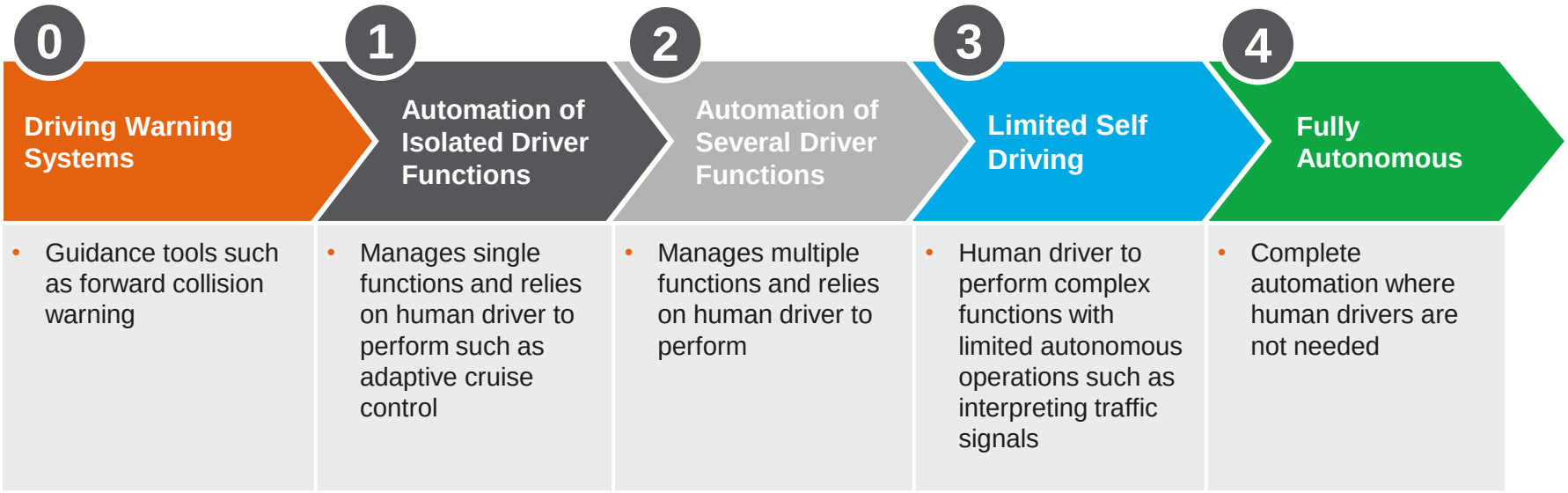
Vehicle to Infrastructure (V2I)

Vehicles communicating with infrastructure

Vehicle to Everything Technology (V2X)

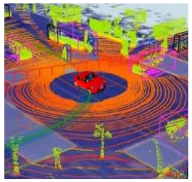
Vehicles communicating to all technologies

Levels of Autonomy



Connected - Autonomous Vehicles & Smart Cities

- Connected Vehicles
- Vehicle Automation



Connected-Automated Vehicles

- Internet of Things
- Machine Learning
- Big Data
- Mobility on Demand

Smart City

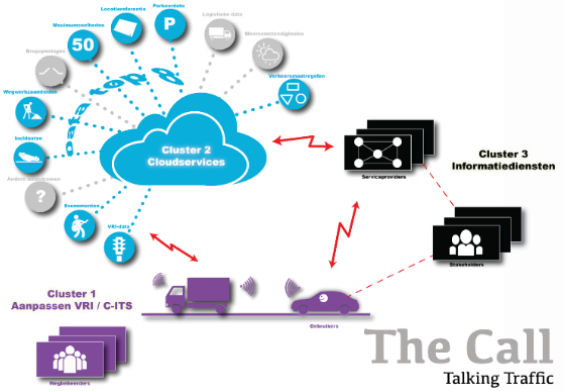
Source: U.S. Department of Transportation

Benefits

- Order of magnitude safety improvements
- Reduced footprint for driving and parking
- Reduced congestion
- Reduced emissions and use of fossil fuels
- Improved access to jobs and services
- Reduced transportation costs for gov't and users
- Improved accessibility and mobility
- Improved quality of life and strengthen communities

Talking Traffic

Talking Traffic is a national project *Optimising utilization* in which regions adjust their traffic lights to use them for C-ITS. This project is in cooperation with public authorities and companies.



ARCADIS assists in the implementation of C-ITS. Implementation, in the Arnhem-Nijmegen region. Following the nationwide call Talking Traffic, consists of three clusters:

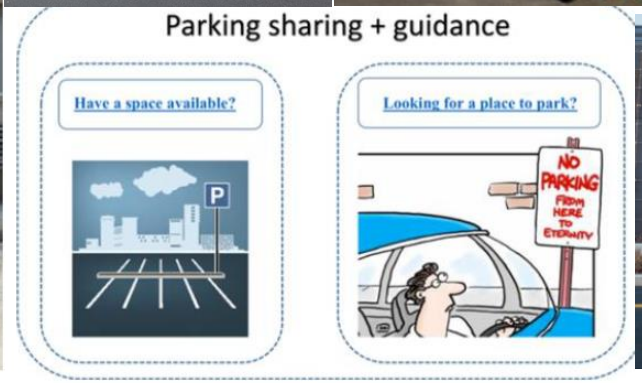
- Adjusting Existing traffic control: unlocking real-time data (iVRI) and new development schemes;
- Delivering cloud and data delivery;
- In the car and bike Services

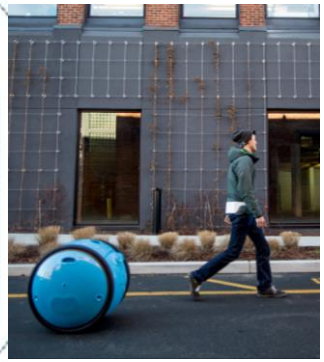
In the process, we cooperate with colleagues on innovation. This partnership assumes a close collaboration between business and co-financing and other road authorities. Arcadis represents the region in the core team and has to make sure that inventory deployment of Talking Traffic in the region is implemented as smoothly as possible.

New ways of transport

European Transport Innovation
Challenge 2017

Creating Mobility Solutions





Continued and daily development

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Arcadis.
Improving quality of life.