

# Climate Change Mitigation in a Port City

– Potentials and Orientation –

Conference „Ports and the City“  
12/13 April 2018, Nijmegen, The Netherlands

Astrid Jochum, City of Duisburg  
Klaus Krumme, University of Duisburg-Essen

# Agenda



- Setting
  - Background
  - Duisburg Challenge
  - Challenge as a Chance
- Strategic Context
  - Facilitating a Circular Economy
  - New Logistics and Supply Chain Services
- Measures
  - ...
- Urban Transition Management

# Agenda

- Setting
  - Background
  - Duisburg Challenge
  - Challenge as a Chance
- Strategic Context
- Measures
- Urban Transition Management



# Background



- Local climate mitigation strategy with respect to harbour and city logistics as well as industrial production processes
- In collaboration with the Centre for Logistics and Traffic (ZLV) at the University of Duisburg-Essen
- Funded by the National Climate Initiative (German Federal Ministry for the Environment)
- Portfolio of various measures
- Different concepts, such as Planetary Boundaries, Earth Overshoot Day, 10 Science Must Knows, but one conclusion:  
**effective and immediate climate action is absolutely essential!**

# Duisburg Challenge



- Focus not only on local energy consumption and greenhouse gas emissions
- Considering contributions to climate change mitigation particularly as **industrial production site** and as **international logistics hub**
- Nevertheless, freight traffic (trucks, ships) attracted by harbour activities poses specific problems, i.e. traffic jams or climate unfriendly modal split, emissions of carbon dioxide, nitrogen oxides and fine particulate matters

# Challenge as Chance



In a port city – strengthen what is good and improve what is negative

## + Port of Duisburg

- trimodal infrastructure
- shifting cargo to rail
- connects to 80 destinations in Europe and Asia with 360 freight trains a week

## - Status Quo of Logistics and Consumerism

- more primary resources are mined or harvested, transported, used in production processes, sold as diverse products,
- used by consumers and disposed on a “cradle to grave” basis or other climate unfriendly distribution ways → global distribution of waste”)
- **Logistics provides a powerful lever to improve climate change mitigation!**

# Agenda

- Setting
- **Strategic Context**
  - Facilitating a Circular Economy
  - New Logistics and Supply Chain Services
- Measures
  - ...
- Urban Transition Management



# Facilitating a Circular Economy Networks, Synergies and new Services



- Strategically important for climate change mitigation: connecting the circular economy with emerging logistics services and structures
- Facilitating a systems change from a linear *take, make & dispose* model into a circular economy **with support from logistics actors and services**
- Opportunity for the logistic sector **to pool their knowledge about the metabolisms of the city to design and distribute products in a circular economy**



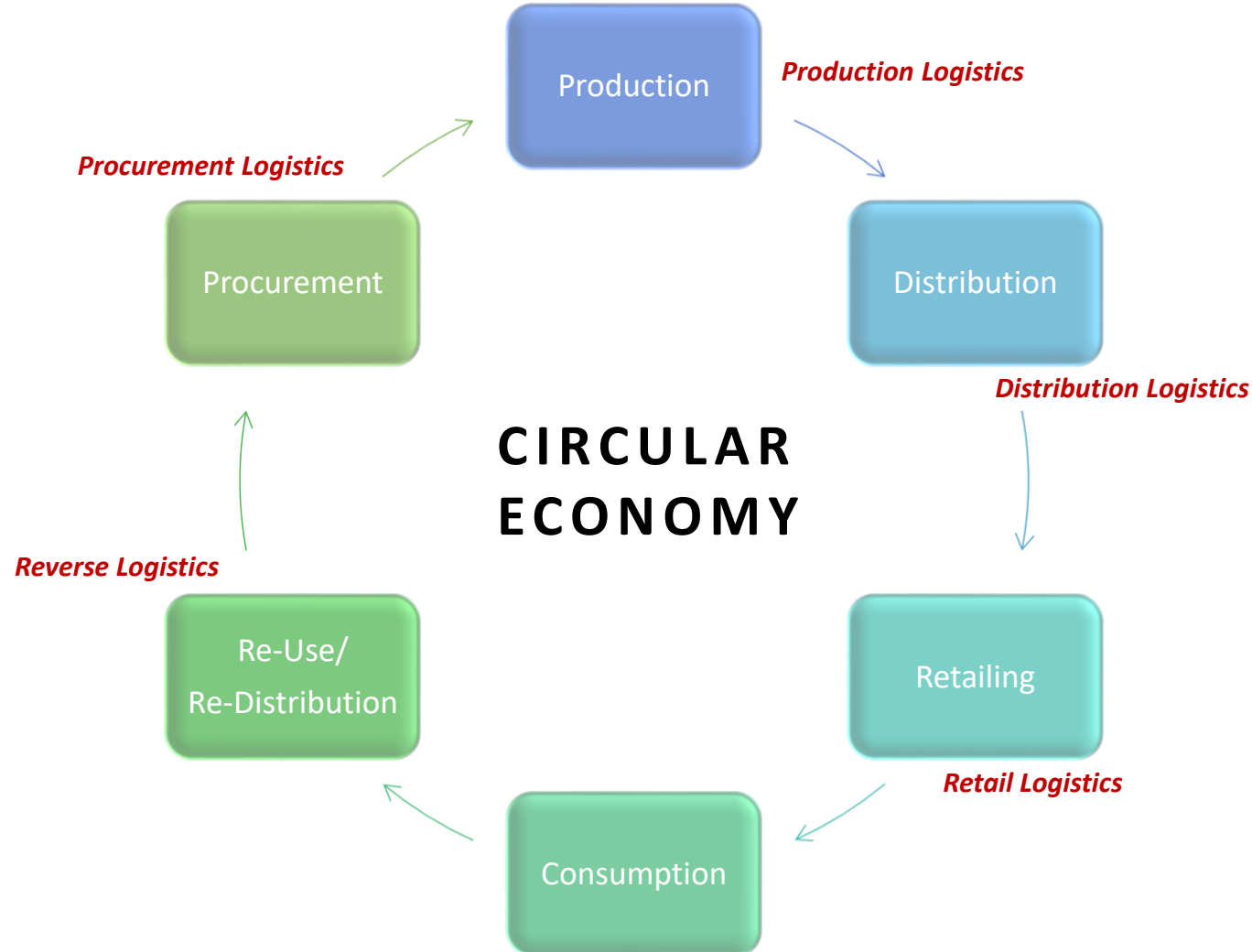
# Facilitating a Circular Economy

## Shifting towards Closed Loop Supply Chain Management in new Value Circles



### „Modern“ Logistics Domains

- PLANNING
- CONTRACTING
- VALUE ADDING SERVICES



### „Classic“ Logistics Domains:

- TRANSPORT
- STORAGE
- TURNOVER

# New Logistics and Supply Chain Services



- Logistical expertise is required for creating a circular economy
- A whole new range of specific, value adding services can be developed to support a circular economy → business opportunities
- This includes materials identifying & sorting or intermediate treatment to avoid unnecessary transport, depending on the type of resource or product

# Agenda

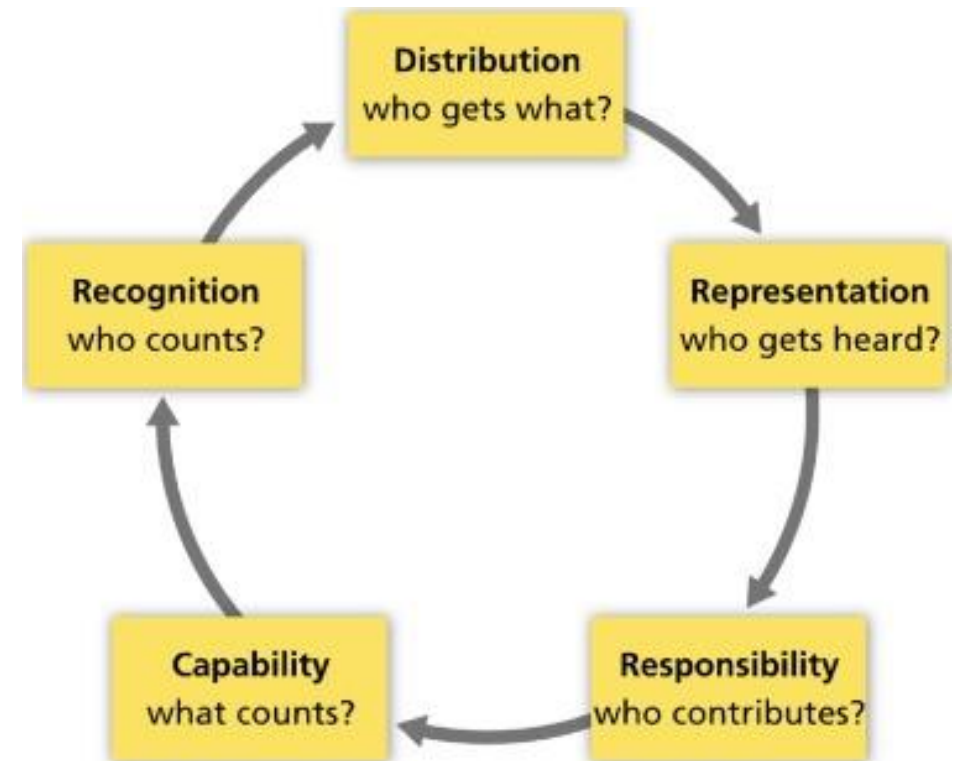
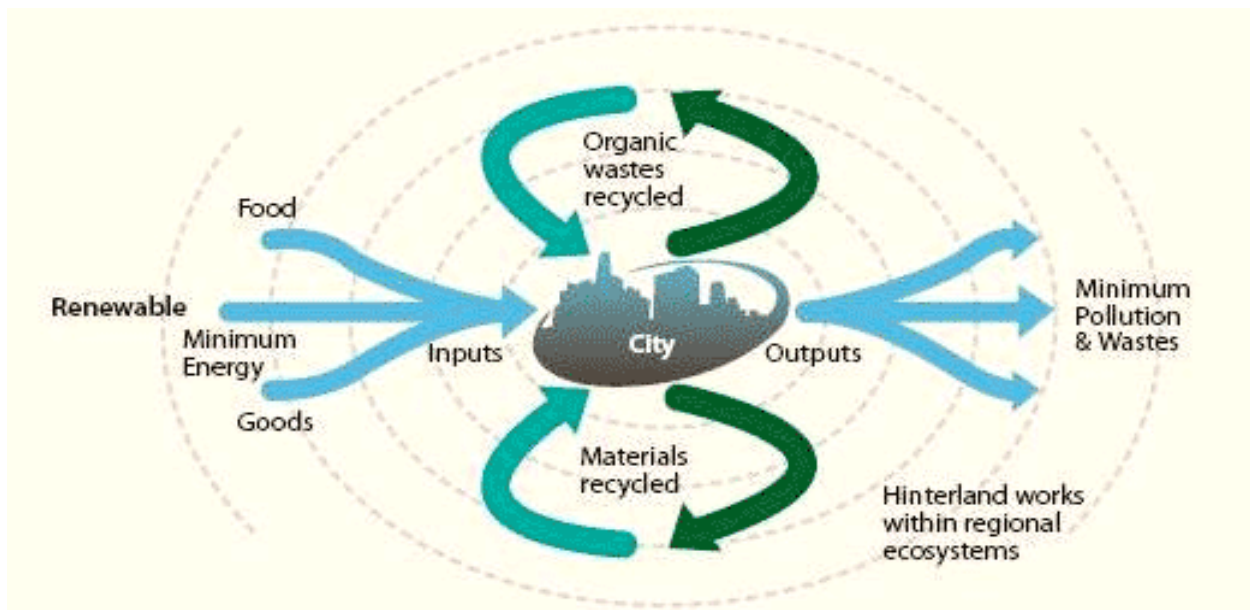
- Setting
- Strategic Context
- **Measures**
  - Urban Metabolism Approach
  - Subcentral Consolidation Hubs
  - Efficiency Parks
  - Local Renewable Energy Supply
  - Digitalization: Intermodal Hub Control
  - Communication: Round Tables
  - Ecosystem Services Accounting
- Urban Transition Management



# Urban Metabolism Approach



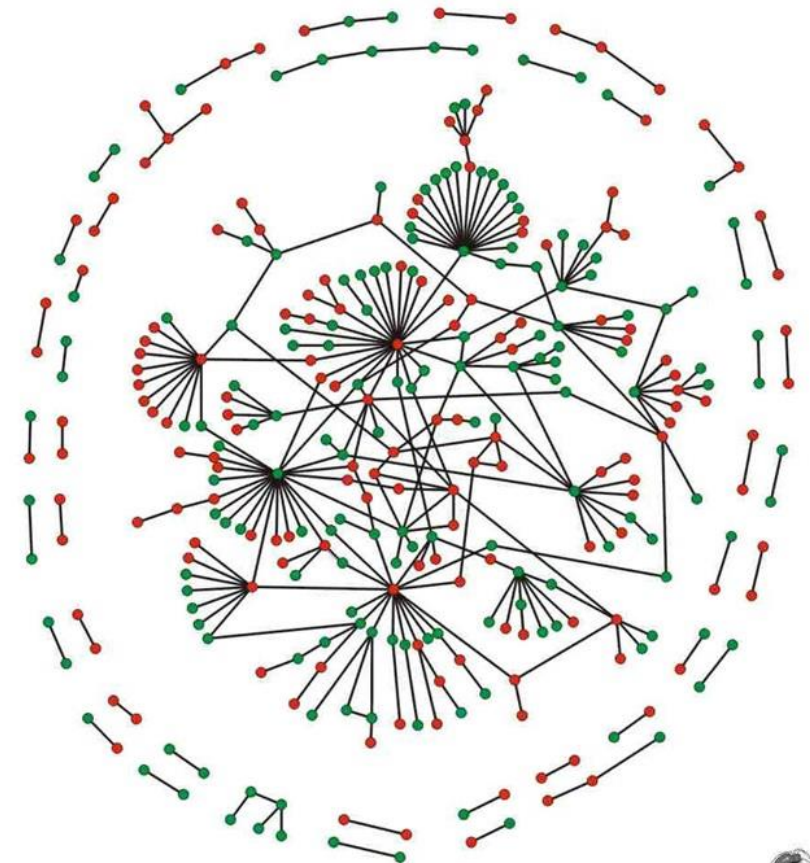
- Scientific project to enhance data about urban metabolism
- Modeling flows of resources and goods
- Actively integrating stakeholders



# Subcentral Consolidation Hubs



- Scientific feasibility study on establishing a “polycentric urban hubs” infrastructure
- Tri-modal train depots in the outer parts of Duisburg are actively used for delivering goods for industrial production, logistical enterprises and business parks
- Using those tri-modal sites for last mile fine distribution (retailing, household consumption) with local e-mobility/ freight bikes
- Make use of high and diverse logistical competence on site for researching on city logistics and delivering a sustainable best-practice model to be implemented elsewhere



# Efficiency Parks

## Collaboration and Business Community Building

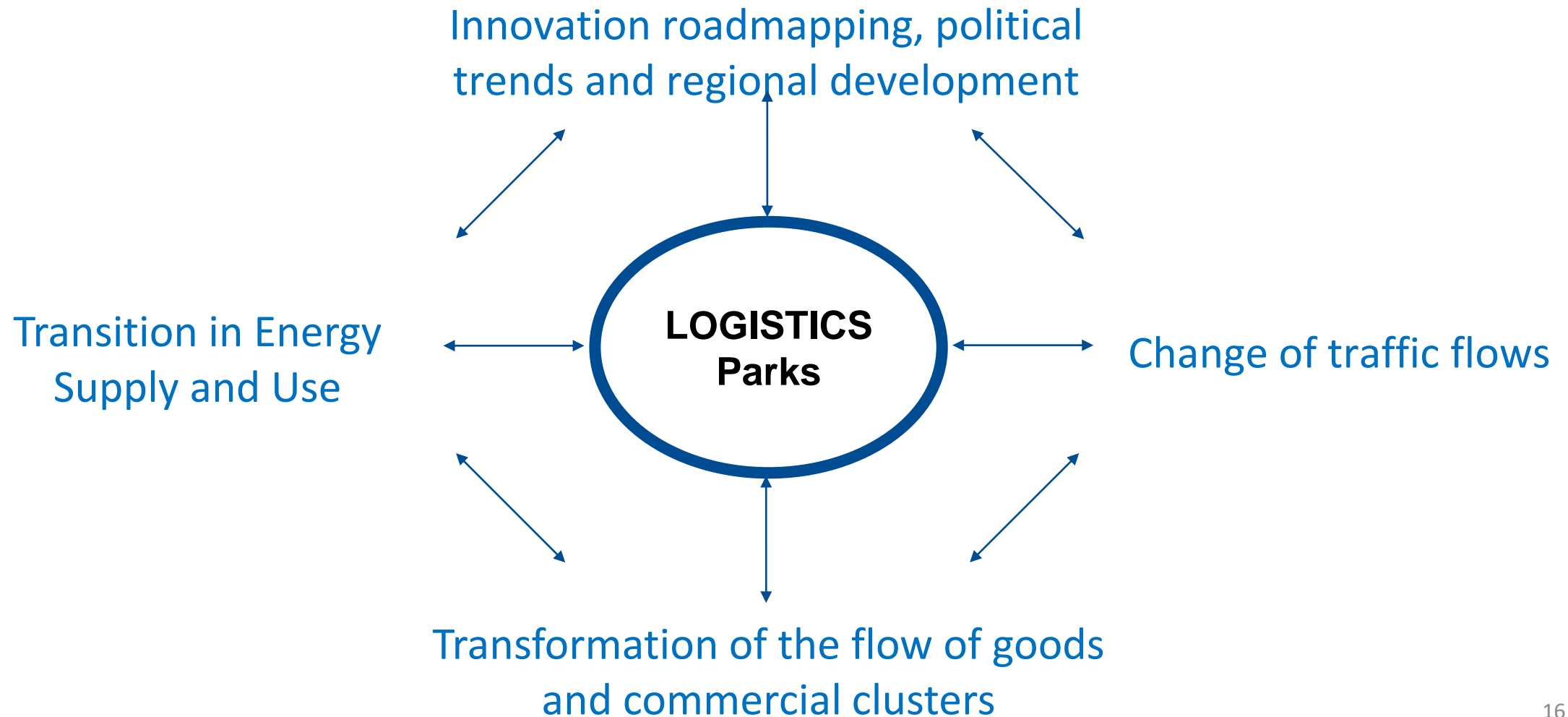


- Collaboration in developing solutions is key to successful climate change mitigation action
- Setting free a creative process that encompasses a more diverse and interconnected setting
- Realizing climate mitigation targets by pooling diverse parts of the operation management of different businesses in a business park, e.g.
  - transports and mobility
  - energy supply for buildings and vehicles
  - IT



# Efficiency Parks

## Transforming Logistics Parks



# Local Renewable Energy Supply



- Flat roof surface area of warehouses (Duisburg's port facilities add up to an area of 2 million square meters of storage area that is roofed over)
- Vast potential for regenerative energy production by photovoltaic
- Existing warehouses can be retrofitted with ultrathin photovoltaic membranes
- For raising new storage facilities, these membranes could be integrated in the rooftop layers
- In addition, a range of other applications is possible (e.g. storefronts or prefabricated building units)
- New ways of organizing energy supply needed for processes in warehouses or for port/ logistics park operations

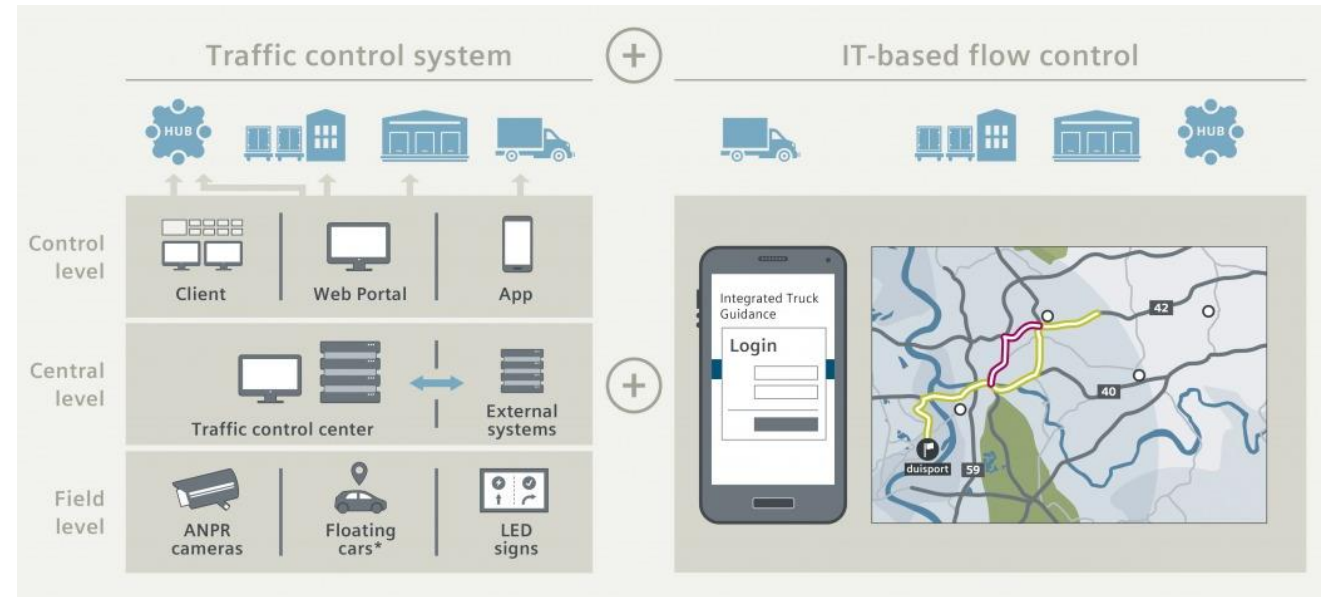


# Intermodal Hub Control (IHC)

## Digitalisation in Transport



- To be expanded to broader scale and transport modes
- Vision: Integrating any information and any intermediate function relevant to delivering or picking up goods, e.g. arrival of ships and trains and the state of the traffic on roads
- Providing these information to the different actors that are part of the turnover business, e.g. forwarder, truck driver, terminals
- Reducing emissions as well as greenhouse gases by keeping the traffic in an optimized flow
- Integrating all parties involved into the information system



# Round Table on Logistics Communication



- Actors from transport, logistical services and the city planning institutions
- Deliberating solutions to shared aspects, like
  - efficiency in transport capacity,
  - data sharing,
  - capacity for enhancing shifts to rail traffic,
  - minimizing negative effects of transport for the urban surroundings
- Finding out about what needs to be done by improvement



# Agenda

- Setting
- Strategic Context
- Measures
- **Urban Transition Management**



# Urban Transition Management

## Framing all Measures



- Integrating all measures of all action fields (including logistics, traffic, industrial production, etc.)
- Initiate measures to generate follow-up projects → replicated projects as well as concrete measures following a general project as a “step by step”
- Establishing an atmosphere of transition: getting all stakeholders on board to be able to achieve our goals – in all spheres of the city: life, work, economy and consumption ...
- Urban transition management approach to make this accomplishable  
(see [drift.eur.nl](http://drift.eur.nl) for details)

# Continuous Circular Management Process



Urban Transition Management is a continuous circular process with the following steps:

1. Orienting about the status quo
2. Setting the agenda(s)
3. Integrating actors, activating new stakeholders, implementing measures
4. Reflecting on activities



# Sustainability Alliance Duisburg Core of Urban Transition Management



- Sustainability Alliance Duisburg as a central platform and hub
- Information, communication, cooperation and collaboration system (both, real and virtual)
- Overall brand (affiliation with Sustainability Alliance)
- Overview of all projects (also projects that are not run by or with municipality)
- Common event calendar
- Platform to suggest, discuss and develop new ideas
- Individuals, civil society, science community, economy, public administration contribute





Thank you for your attention!