



LOW CARBON STATIONS 4 LOW CARBON CITIES

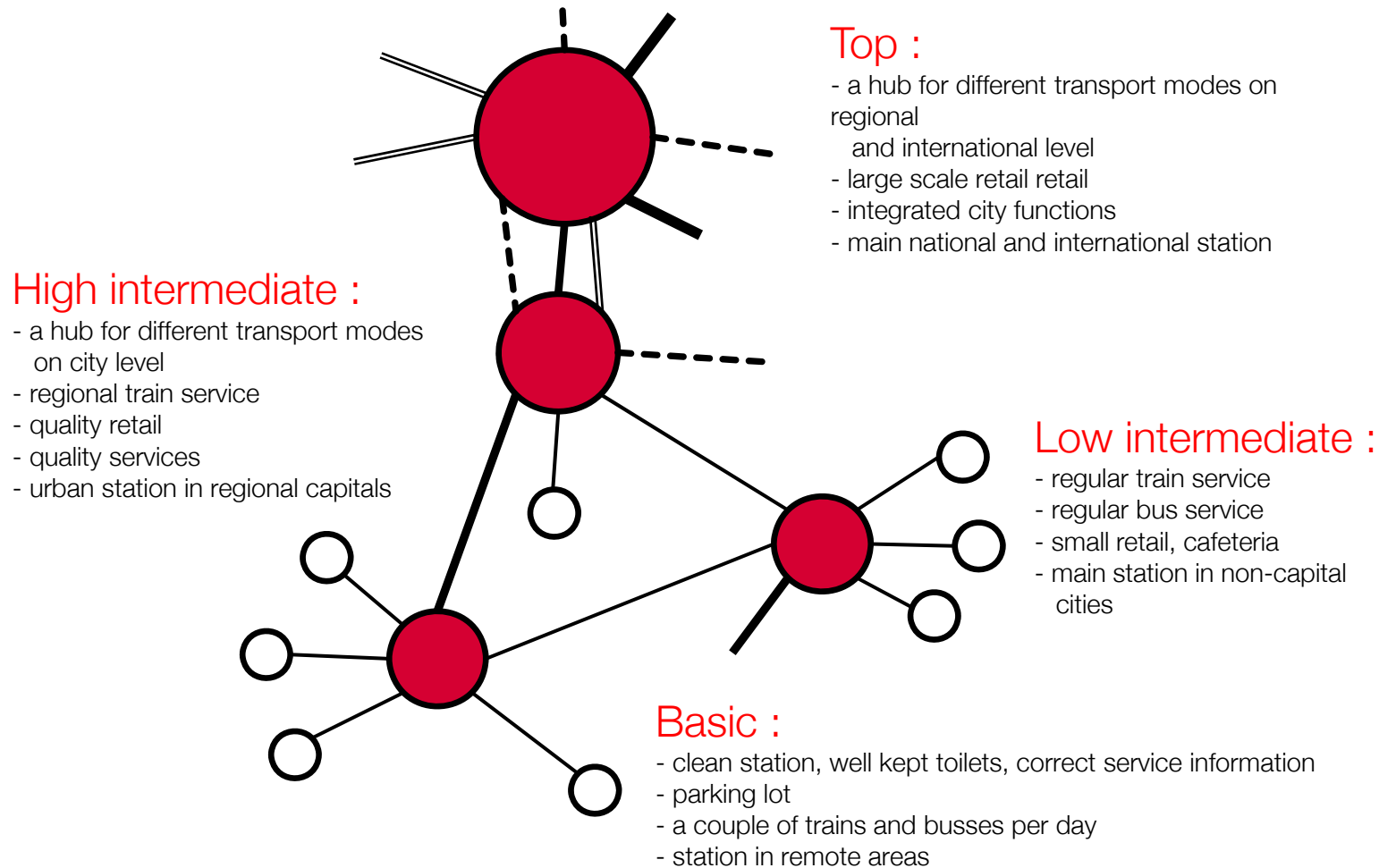
RESEARCH PROGRAM FOR DESIGN/RENOVATION OF
INTERCHANGES
AND THEIR ENVIRONMENT

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4A sustainable stations

Hierarchy of cities – hierarchy of interchanges

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Why this research?

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- ❑ Promotion of PT
- ❑ Stations as transport/social/energy interchange
- ❑ Safe, convenient & pleasantly perceived quality public spaces
- ❑ Integration in city life
- ❑ Source of revenue – new financial model

Interchanges are more than transport hubs, there are also

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- ❑ Places to meet, great and agree
- ❑ Retail centers
- ❑ Urban heat islands
- ❑ Energy generation and recovery centers
 - Braking energy
 - Energy from recycling (waste, water, conservation, alternative use)
- ❑ Synergy hubs with neighboring stakeholders

Interchanges can become centers of energy and financial profit thanks to

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- ❑ Sustainable design and lay-out: avoid urban heat islands
- ❑ Combined rail operations & property management:
 - ❑ residential, office and retail centers
- ❑ Energy & resource efficiency (recovery, recycling, conversion)
- ❑ Balance between risk management & stakeholder engagement
- ❑ New financial model

Mobility & urban planning & design

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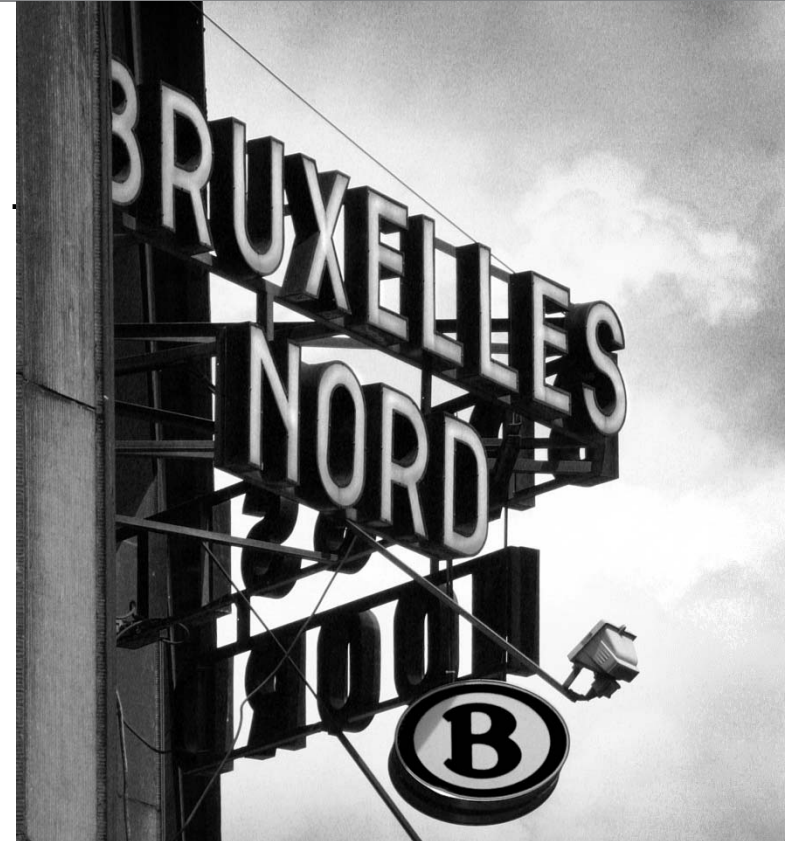


- ❑ Lanes for which modes, accessibility, walkability, where?
- ❑ Where hubs & interchanges?
- ❑ What facilities? Retail? Accessibility?
- ❑ How stimulate natural assets (trees, green roofs,..?)
- ❑ Signage, wayfinding & integrated passenger information
- ❑ Perceived & real security
- ❑ Use of sustainable materials (energy performance ratings, LEED, BREEAM) and lighting (LED, CFL, ..)

Building envelope

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- use of environmental zones
 - occupancy, dwelling time, relative comfort, ...
- green layers/roofs
 - insulation membranes
 - temperature regulators
- passive and low-energy lighting, cooling and heating, and use of sustainable materials.
- today only +/- 15% comes from non-fossil fuel sources
- development of smart grids!



Low carbon policy at station level:

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- life cycle approach for materials & producers
- BREEAM
- LEED
- ASHRAE
- BUT: standard assessments may lack local relevancy

Translink's "Transit Passenger Facility Design Guidelines

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- ❑ materials with minimum life-span
- ❑ no complicated repairs
- ❑ research recommended materials + good performance track
- ❑ avoid materials with (potential) negative environmental impact
- ❑ design for durability and (weather) resilience

Sensual perception vs behaviour

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- Thermal comfort: in & outside stations
 - ▣ Sunny or shady
 - ▣ Stay or leave
- Visual comfort: intuitive understanding of space
 - ▣ Day-light vs artificial light
 - ▣ Lines of sight
- Audio comfort: understanding of messages
 - ▣ Subjective evaluation of sound
 - ▣ Acoustic sound comfort
- Olfactory comfort
 - ▣ trust in environment

Management tools :

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- Operator
 - Metering
 - Monitoring
 - training “green driving”
 - follow-up
 - rewarding & communication

- City/authority
 - congestion charging
 - funding of green vehicle purchase

ICT Passengers & Operations

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- ❑ Information provision
 - ❑ digital signage and real-time information
 - ❑ customised travel planning
- ❑ Improved services
 - ❑ smart card ticketing
 - ❑ mobile services and access to internet
- ❑ Security – CCTV
- ❑ Automated operation systems