LOW CARBON STATIONS
4 LOW CARBON CITIES
RESEARCH PROGRAM FOR DESIGN/RENOVATION OF INTERCHANGES AND THEIR ENVIRONMENT

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4A sustainable stations

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Hierarchy of cities – hierarchy of interchanges

Basic:
- clean station, well kept toilets, correct service information
- parking lot
- a couple of trains and busses per day
- station in remote areas

Low intermediate:
- regular train service
- regular bus service
- small retail, cafeteria
- main station in non-capital cities

High intermediate:
- a hub for different transport modes on city level
- regional train service
- quality retail
- quality services
- urban station in regional capitals

Top:
- a hub for different transport modes on regional and international level
- large scale retail retail
- integrated city functions
- main national and international station
Why this research?

- 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

- 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

- 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
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

- 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:

- life cycle approach for materials & producers
- BREEAM
- LEED
- ASHRAE
- BUT: standard assessments may lack local relevancy
Translink’s “Transit Passenger Facility Design Guidelines

- 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

- 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:

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

- **City/authority**
  - congestion charging
  - funding of green vehicle purchase
ICT Passengers & Operations

- 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