



Some thoughts about airport connections

Presentation in Iceland – 12th October 2023

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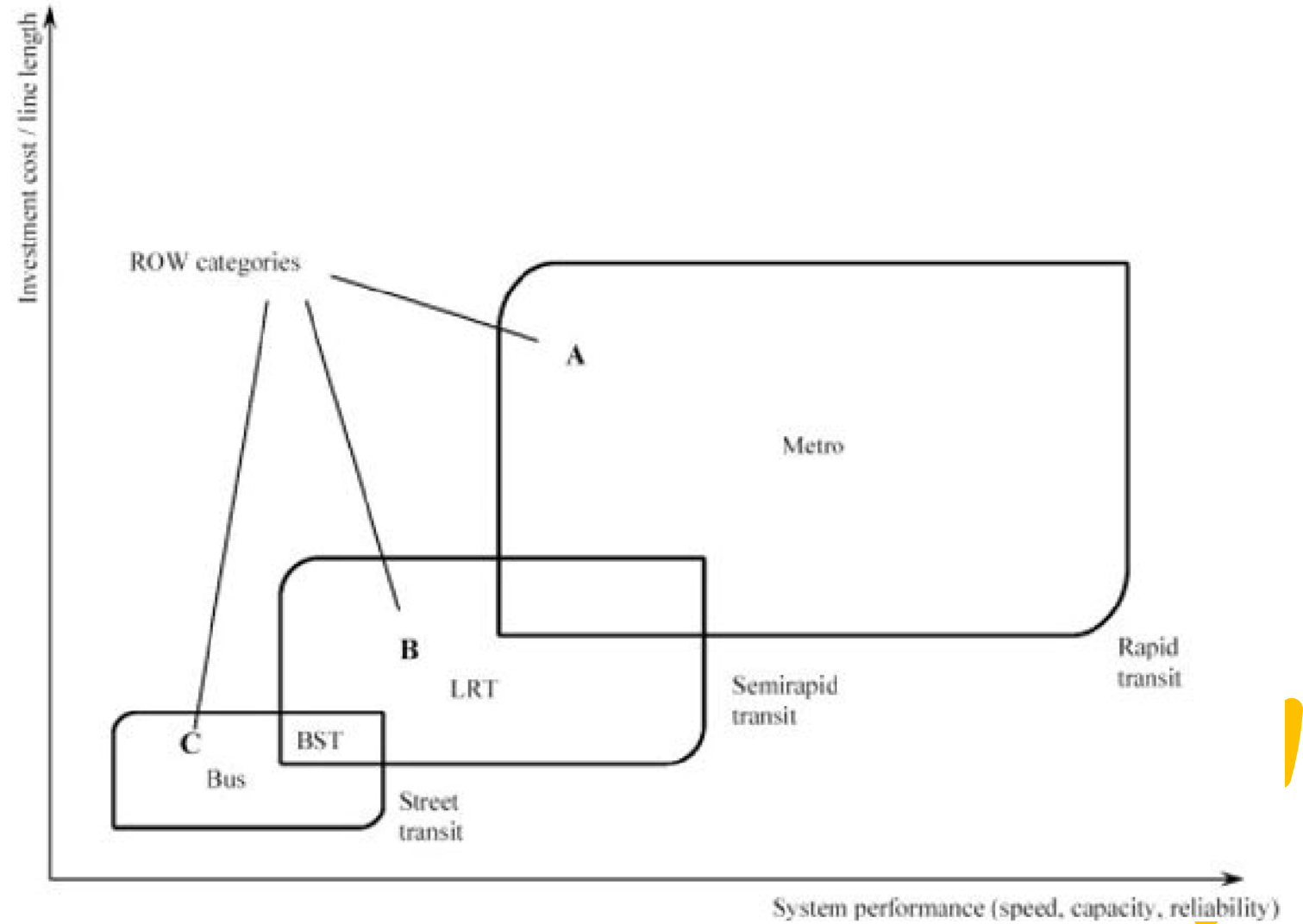
Former Chief Engineer, Bybanen

What is high-quality public transport

- Frequent
- Reliable
- Fast
- Convenient
- Accessible
- Legible
- Multiple transport possibilities

Characteristics of modes

classes of transit modes, defined in the next section.



Capacity of modes

TRANSPORTATION SYSTEM	CAPACITY (P/H/D)
Bus	2.000-4.000
Tram	2.000-6.000
Commuter Train	5.000-15.000
Light Rail System	10.000-20.000
Metro	20.000-60.000
Regional Metro	40.000-80.000

Airport connections — modal choices

- Dedicated heavy rail - airport express train
- Part of national or local rail network
- Light rail – usually extension of system
- Airport bus service
- City bus service
- Exotic: Monorail, Mag-lev, helicopter
- Express boats
- Auto-based (private cars, taxi, Über, rental cars)

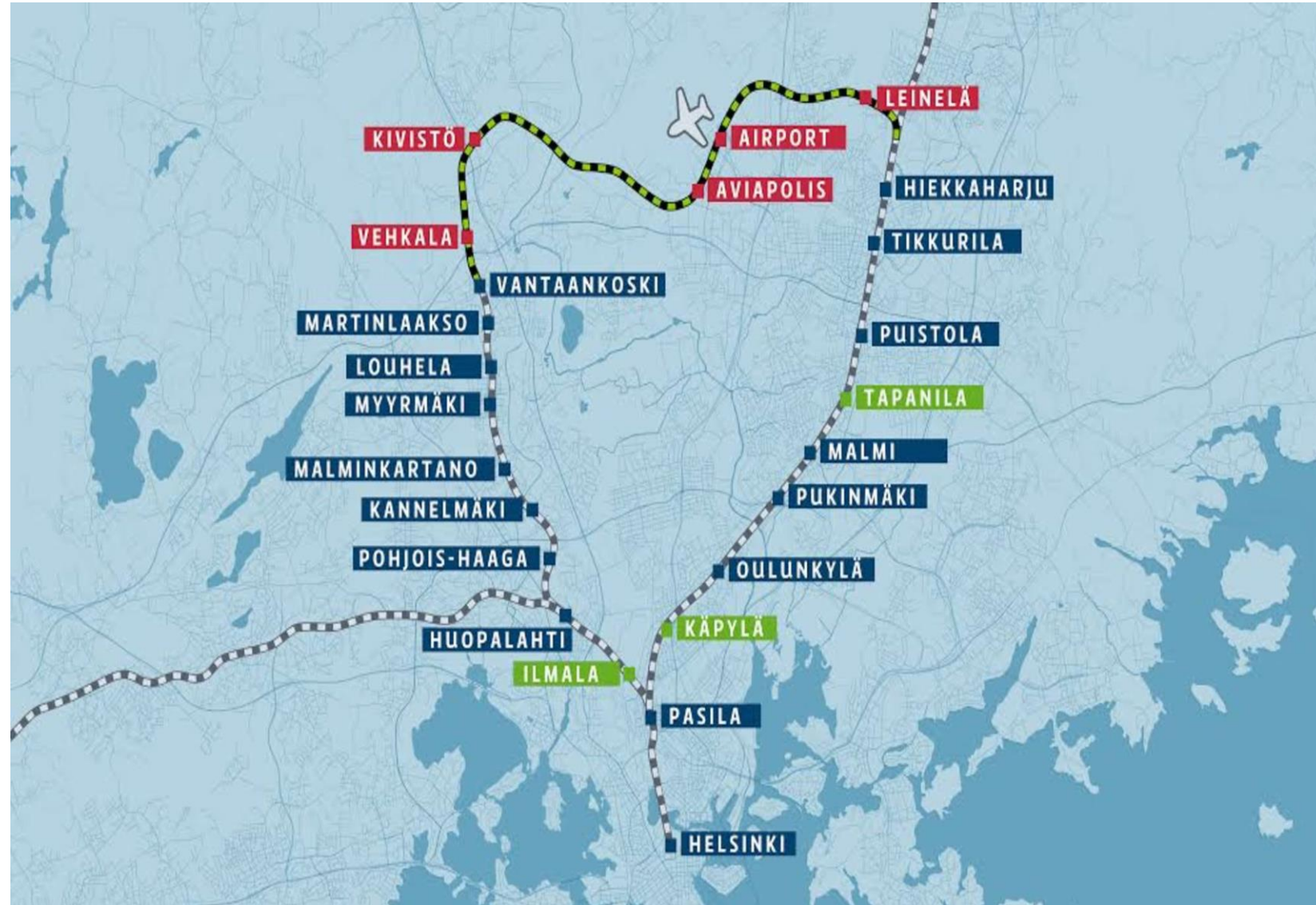
Decision factors

- Total demand
- Demand over time
- Competitiveness vs other alternatives

Example – Heavy rail

- Airports located near railway lines
 - Extension into airport
 - Many examples
- National network
- Local network (S-Bahn)
- Few examples of isolated express rail systems

Example – Helsinki Vantaa airport



Example – Light rail

- Bergen, Norway
- Lyon, FR
- Baltimore, USA
- Bremen, Germany (only 4 km from centre)
- Manchester, UK (also heavy rail)
- Zürich, CH (also heavy rail)

Multiple choices

- Manchester, UK (light rail and heavy rail)
- Zürich, CH (light rail and heavy rail)
- Stockholm, SE (express train and express bus)
- Bergen, NO (light rail, express bus and local bus)
- Trondheim, NO (heavy rail, express bus and local bus)
- Reykjavik, IS (express buses, local bus)

Bybanen: New light rail system in Bergen, Norway

- ▶ City of Bergen in the County of Hordaland
- ▶ Description of project .- ideal for light rail?
- ▶ Financing scheme: The Bergen Program
- ▶ Different strategies
- ▶ Vehicles and right-of-way
- ▶ Ongoing activities / Future plans
- ▶ Activities in Nordic countries

Dependable

Accessible

Quality



Description of project: Line 1

- ▶ Modern light rail system – backbone for high-quality public transport in Bergen
- ▶ Universal design
- ▶ High level of service and priority
- ▶ Visible
- ▶ Safe and secure
- ▶ Reliable
- ▶ Quiet and non-intrusive



Why?

- ▶ Nostalgia – rail is better
- ▶ Reduce the need for highway investment
- ▶ Desire for stability in public transport services
- ▶ Need for major improvements in level of service
- ▶ Desire for different development structure (densification)
- ▶ Reduce operating costs
- ▶ Reduce bus traffic in urban area
- ▶ Political need to support public transport

Attractive and exclusive right-of-way





Nye studentboliger, 77 leiligheter

Integration with other mode



Bus



Park & Ride

Light rail integrated in new airport terminal





Bergen lufthavn

bybanen

skyss

Why not?

- ▶ Nostalgia – rail is old technology
- ▶ Reduction of road capacity and investment
- ▶ Bus is better – asphalt is better
- ▶ Sceptical to a different development structure (planned denser development)
- ▶ Increase in operating costs
- ▶ Auto users do not like to pay for investment and possibly operations

Bergen program: Investment budget

- ▶ Total budget for 20 year period: 2003-2022
- ▶ €1500 million
 - ▶ 50% for road projects
 - ▶ 50% for public transport projects
- ▶ First two segment of light rail (13,4 km)
 - ▶ Budget: €400 million for infrastructure
 - ▶ Vehicles: €42 million
- ▶ Financing
 - ▶ 60% from tolls (€3 to enter central area)
 - ▶ 40% from national government (highway funds)

Construction strategy

- ▶ Traditional public works project
- ▶ Project divided in many parts:
 - ▶ Geographic for civil works
 - ▶ Technical installations: track, signals, power supply
- ▶ Bybanekontoret / **Bybanen utbygging** has overall responsibility for project management including interfaces between the different systems and sections.
- ▶ **Bybanen AS** owns the technical specifications for the system
- ▶ Passenger operation



Window to the city

Modern 100% low-floor vehicles

Variobahn from Stadler







PAULUSSON
DESIGN & CONSULTING

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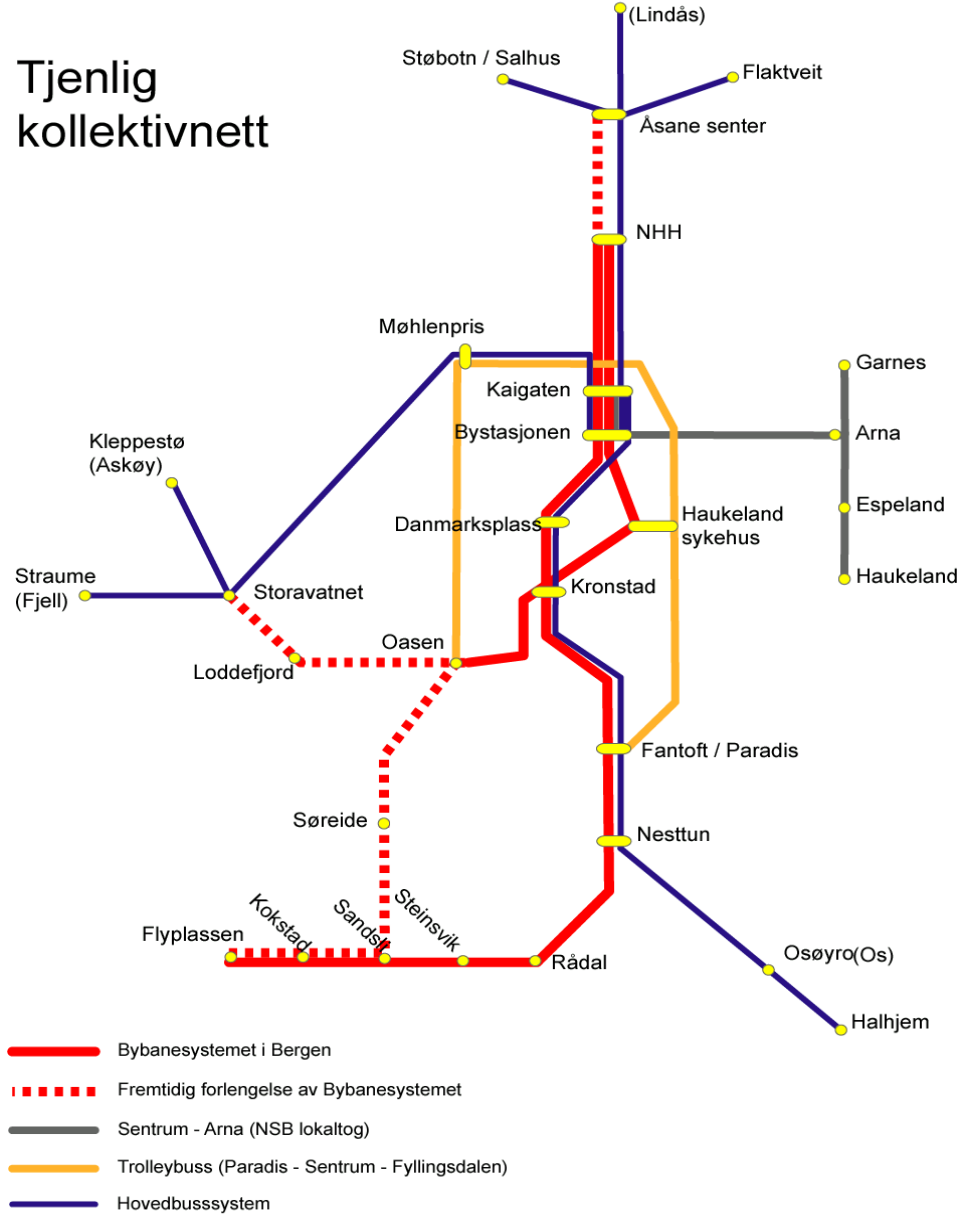




Long-term vision from the 1990s

A renewed and comprehensive high-quality public transport system based on bus, trolleybus, light rail and regional rail, as well as a coordinated feeder bus system and parking.

Tjenlig kollektivnett



Future plans

- ▶ Network in all directions
- ▶ 2nd stage of Line 1 opened in 2013
- ▶ 3rd stage to airport in 2016 / 2017
- ▶ 4th stage to Fyllingsdalen / Oasen opened in November 2022
- ▶ Financing is main challenge for further expansion
- ▶ New workshop near airport was built
- ▶ Parking in mountain hall for 18 vehicles near Oasen
- ▶ Fleet now 34 vehicles, all extended to 42 meters.



Lessons learned

- ▶ Too many passengers
 - ▶ Prognose, about 23000 pass / workday for first phase
 - ▶ Experience, over 45000 pass / workday
 - ▶ Prognose, about 45000 pass workday for extension to airport
 - ▶ Experience, over 80000 pass / workday (before Covid and now back to same level)
 - ▶ Slower commercial speed than planned
 - ▶ Unexpectedly high traffic on Saturday / Sunday
 - ▶ Need for supplementary express buses
 - ▶ Positive fare recovery ratio
- ▶ Basis for city development
- ▶ Stimulus for commercial investment
- ▶ New ticketing system concurrent with start up – bad idea
- ▶ Technical problems traced to lack of adherence to VDV standards
- ▶ Inexperienced organizations on all levels
- ▶ Safety concerns: 1st and only fatality in 2013

Thank you!

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