



BRT



Agenda

Context

- BRT flavours
- Adding urban development into the mobility story
- BRT in Denmark and Movia-land
- BRT requirements in Movia-land
- Feasibility study results

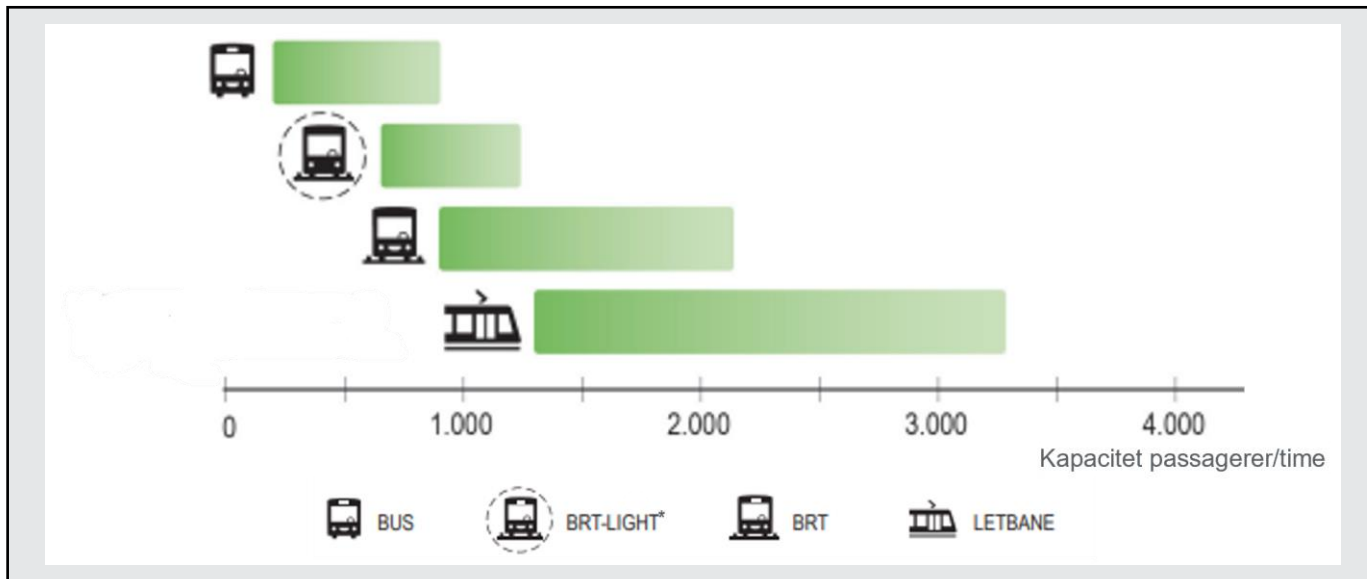
Why does it take ten years ?

- Process and organizational high-risk innovation

Risk mitigation BRT Creep

BRT Transport solutions

- New concept in DK
- Fill demand gap between 1000-2500 passengers pr hour between LRT and bus services



Conceptual illustration

BRT FLAVOURS in DK

	Full BRT Separated bus-lane Signal priority High-quality passenger experience ('LRT standard') Attractive multi-function stations	BRT light Separated bus-lane, when congestion Signal priority, if feasible Better service than BAU
Suburban BRT	High quality service to connect to mass transit in low to medium density urban sprawl. Alternative to LRT.	Higher quality service that connects 2nd tier nodes.
Stadt BRT	Cost-efficient alternative to metro. Large cities in medium income countries. Not relevant in DK	Back-bone higher quality transit service in medium sized cities, often connects to rail mass transit, alternative to LRT

High (some places in France/NL)



Stadt
BRT



SUB-URBAN

BRT Light

"BRT implementation"

Full BRT

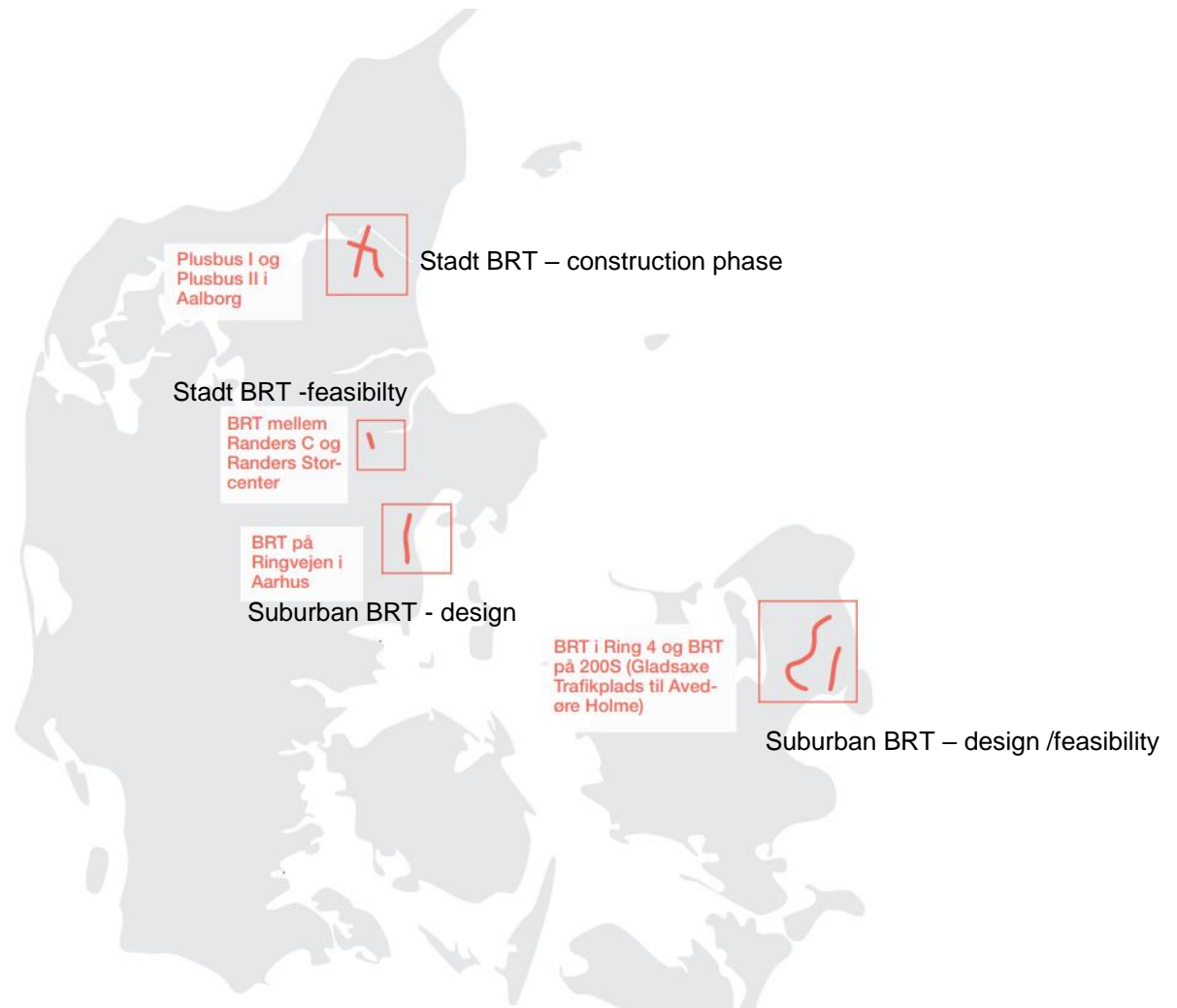
"urban INTEGRATION"



Low (US-style)



DK BRT MAP



Stadt BRT in Movialand

WHY ?

- New HS rail infrastructure in service by 2025 needs to connect to local hubs (schools, shopping centres, sports arenas, etc)
- Potential identified in eight medium-sized cities with increasing car congestion

STATUS

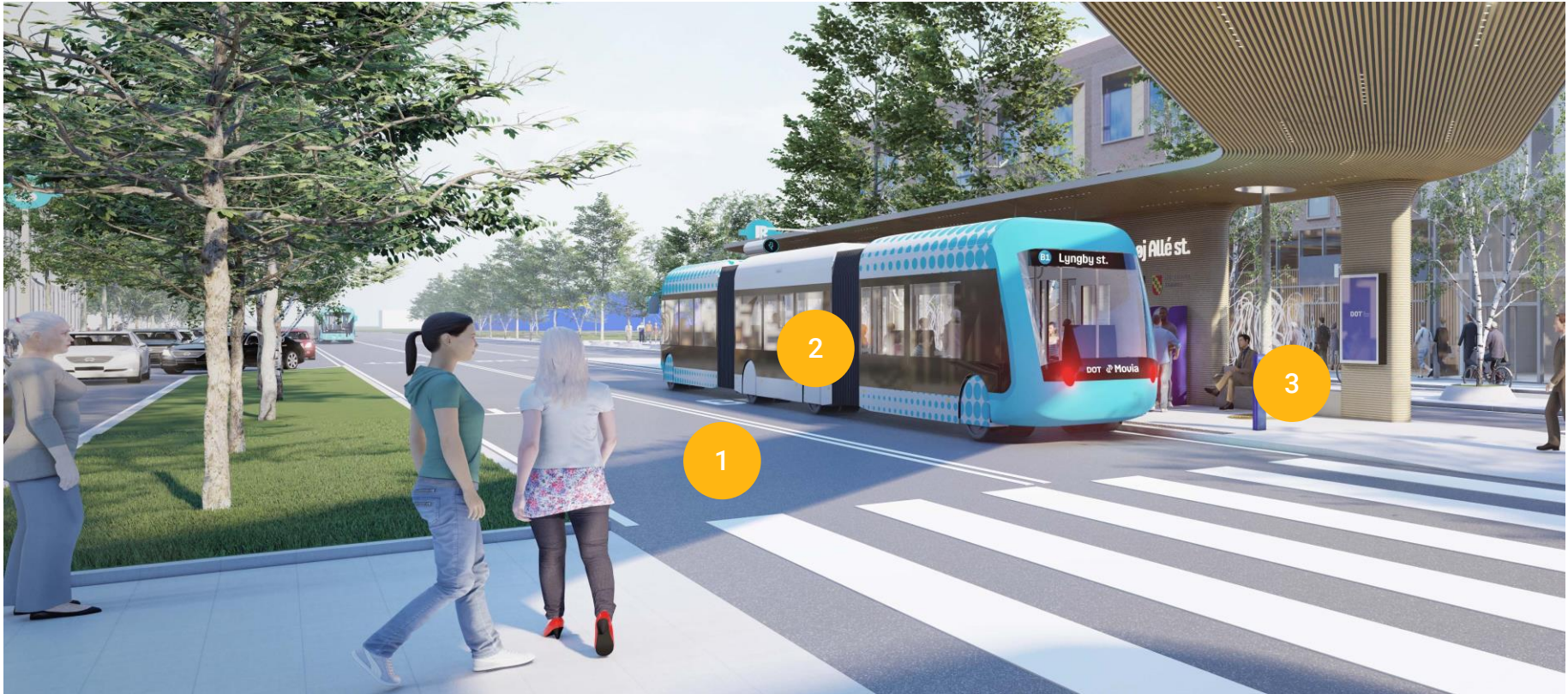
- Three projects partly funded for construction (incremental)



Stadt-BRT design example



Suburban BRT example



1

Tracé and signal prioritization

2

High frequency service and high comfort vehicles

3

Attractive stations that integrates and support urban development

Stadt vs Suburban BRT

Parameter (recommended level)	BRT Stadt	Suburban BRT
Frequency peak	8	12+
Frequency night	2	4+
Stations	Three levels – 5 mDKK top level	Three levels – 25 mDKK top level
Vehicles	Standard requirements Focus on corridor, not line,	Comfort requirements
Tracé and signals	Mixed traffic, if light congestion. Bus priority if feasible	Seperate tracé Comfort requirements Signals replacement during construction Intelligent signalling Operations: road maintainance, stations, signals
Identity	Identity, but not vehicles	Global Identity - locally flavored
Investment	10-25 mDKK per km	50-70 mDKK pr km

Recommended requirements to be adopted to local conditions

Results feasibility BRT RING 4

Mobility effects

% 15-20

Passenger growth ca 2,6t - 3,0 t
= 15 -20%

Little effect on congestion

50% of passenger growth from
motorists

Investment

1,9-2,2_{Bil}

50 -70 mio.kr. pr km

Risk: motorway ramps and bridges

P/L operations

+12_{Mio}

= 0,5 bil kr (discounted cash-flow)

More passengers

Greater capacity / fewer vehicles

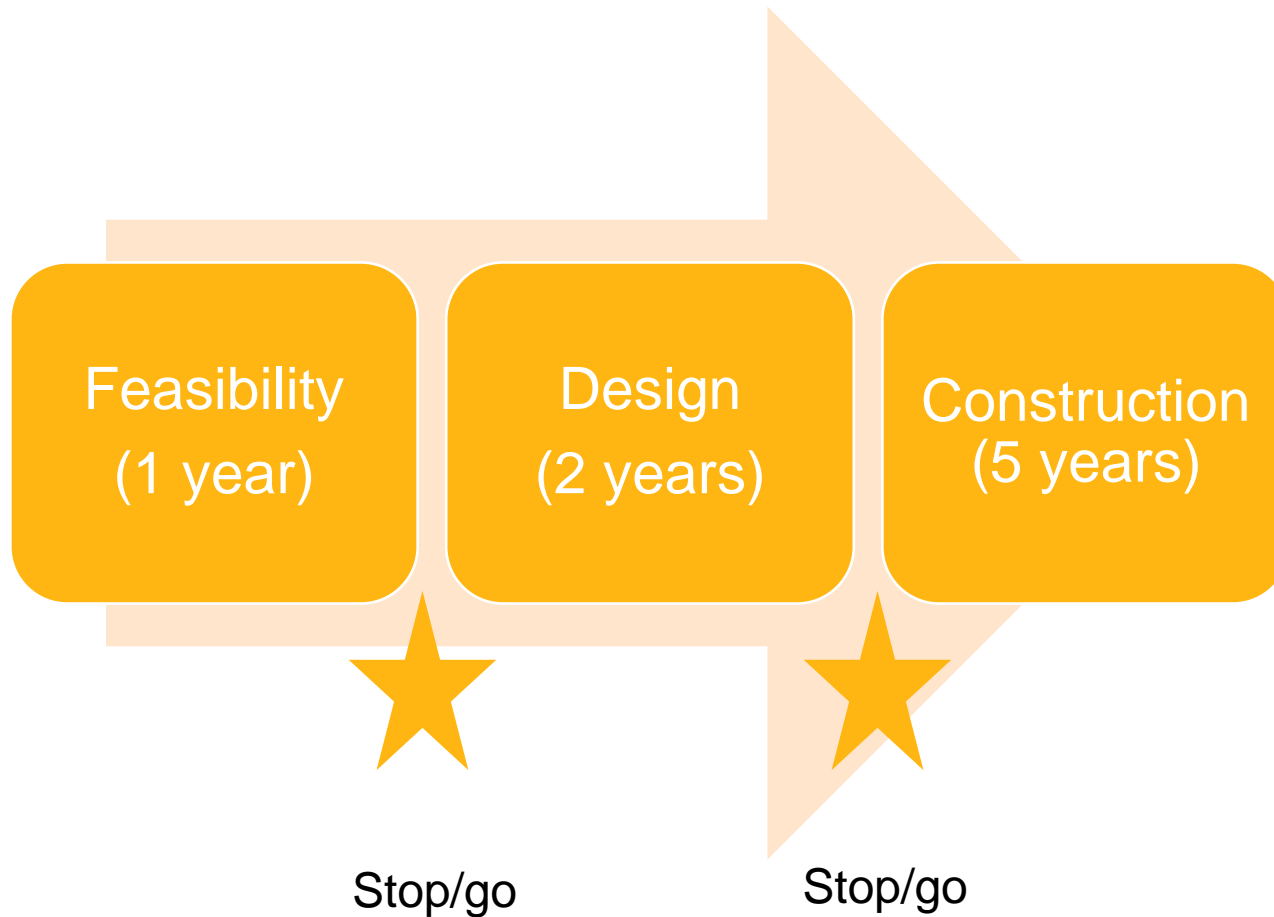
Societal ROI

% 1,8-2,7

Does not meet government
threshold – but great for a transit
project

Negligible CO2 reductions

Why does it take 10 years ?



Organizing BRT: lots of obstacles, innovation needed



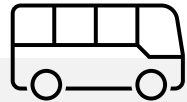
Construction

Financing – state / municipalities 50/50 %

Municipalities not aligned – benefit aligned cost distribution model needed

Transport Agency cannot participate in construction or own (part of) system

Regional level cannot participate in BAU municipal construction entity



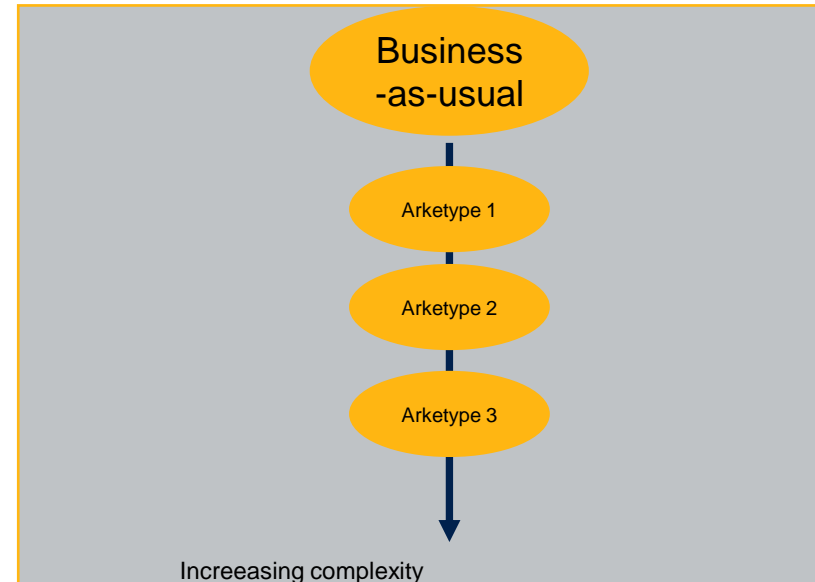
Operations

Regional level – pays for operations

Mixed state / municipality roads – mixed road authorities

No clear responsibility for O&M of stations

No history of successful signaling collaboration



Risk Management of BRT creep

Risk Management of BRT creep

- a) Permission to build denser urban development in connections to stations is dependent on Full BRT standard is implemented
- b) Larger project changes are assessed on total economy, i.e including impact on future operations
- c) Obtain long term operations funding up front – to protect investment
- d) Process and organizational transition costs are part of construction budget