

# LINKKER

## Future Moves



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- **Benefits Potential**
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- **Case Espoo**



# LINKKER

## Quality of Life in Cities



# Linkker provides



**Electric bus vehicles**



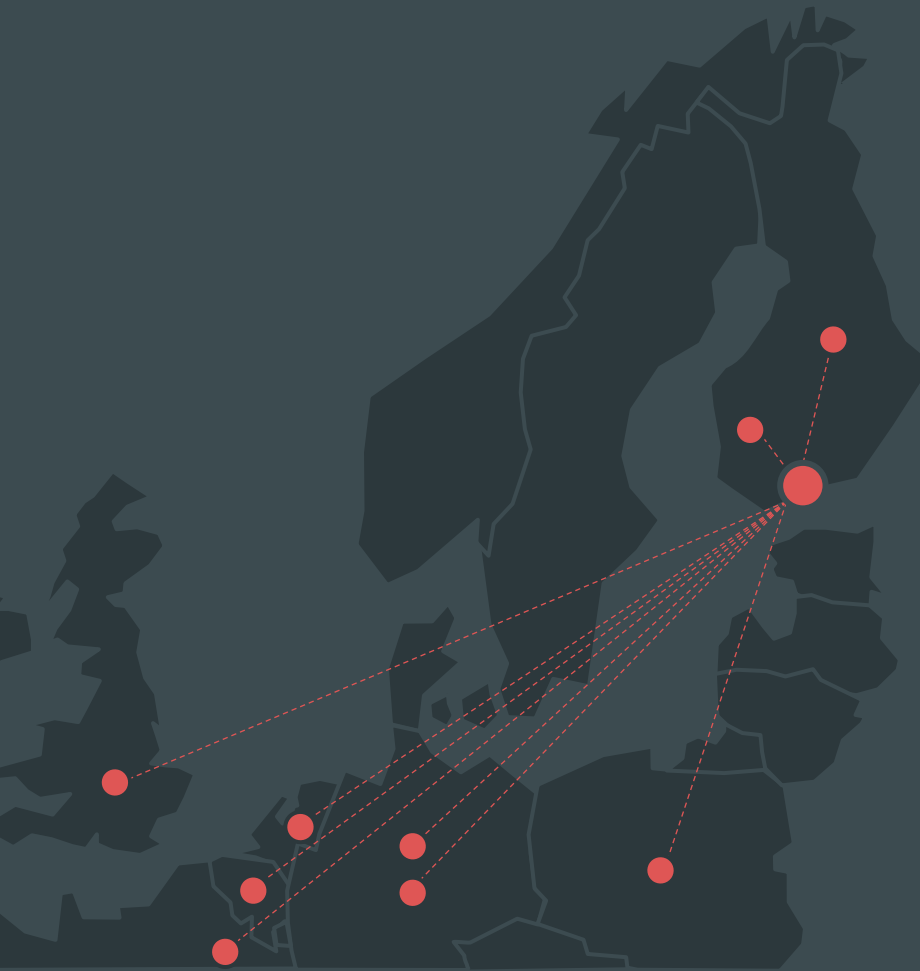
**Complete electric bus systems**

# Our background

| HQ in Finland

| +10 years of eBus  
R&D

| Ecosystem of best  
partners



# Potential With eBuses



Environment



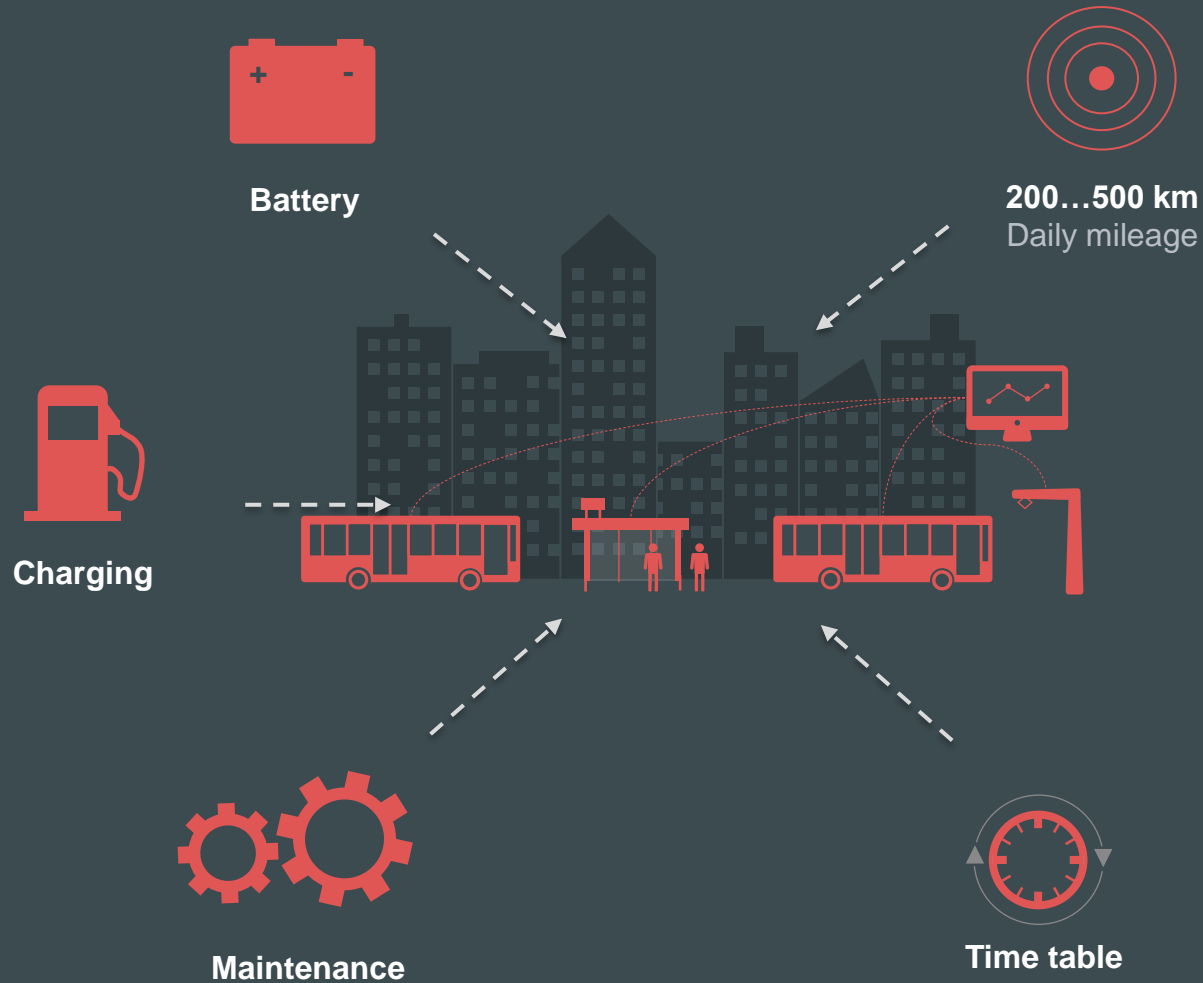
Economy



Experience

# What are the Challenges?

Accelerate Transition to Emission Free Public Transport



# Linkker Recipe

## 1 Lightweight construction

Full aluminum body and chassis based on years of R&D



## 2 Energy optimized drive line

Energy optimized components, control and opportunity charging



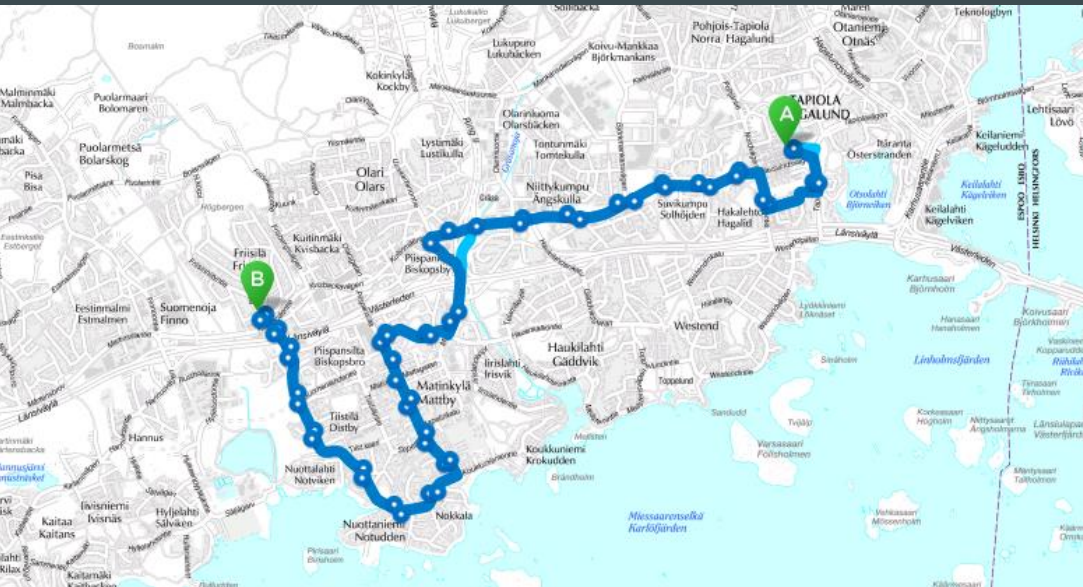
## 3 Opportunity charging

Minized battery size  
Optimized battery life time





# Case Espoo Line 11



## First electrified line by HRT

- Tapiola – Matinkylä - Friisilänaukio
- 19,2km line
- Average speed 20 kmh
- 48 stops

## Electric Bus System

- 2 x 12m Linkker buses (conversion)
- 1x 350kW end-stop charger
- 1 x charge event end of route

# System Performance Data Espoo

## Accelerate Transition to Emission Free Public Transport



### Charging cost

- Daily mileage 156-230km (different schedules)
- Consumption 0.78-0.98kWh/km
- Charged energy 14.9-18.82kWh
- SoC 50%-80%
- Charging time 4-5min
- Charging power average 275kW, peak 340kW
- Operating hours 07:00 – 18:00/22:00



**200...500 km**  
Daily mileage



### Battery cost

- Charge cycles/day 7-11 cycles
- Daily energy need 140-195kWh
- Battery life 7-10 years

# System Performance Data Espoo

## Accelerate Transition to Emission Free Public Transport



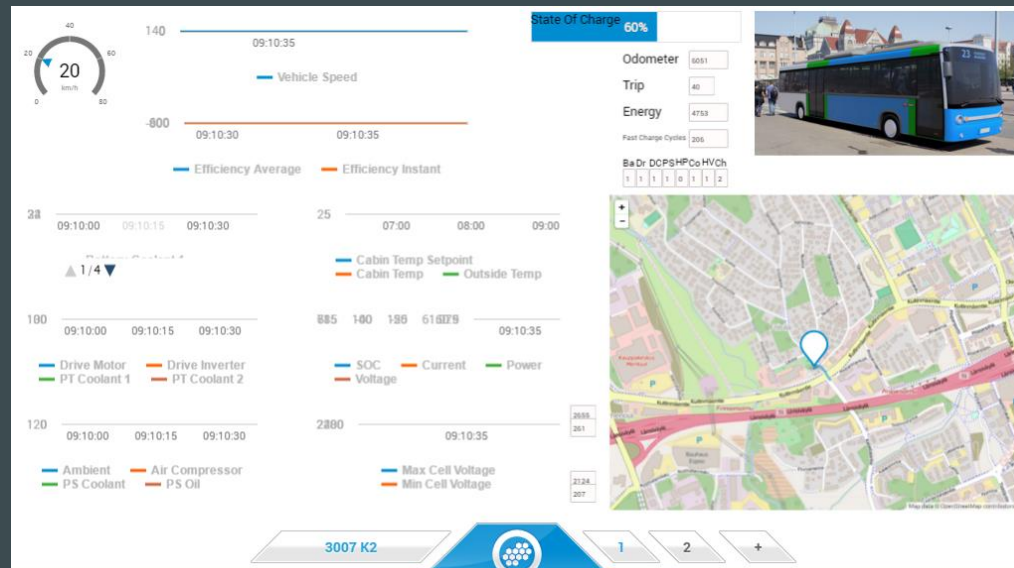
Time table

- Charging per cycle 4-5min during idle time
- Operation with existing time table possible
- 24/7 operation possible



Maintenance

- No depot charging required for operation
- No battery balancing in depot required
- No expensive maintenance infrastructure or tooling required.



# Linkker – Reliability



Mastering Tough Conditions

- 26° C  
30 cm snow  
Ice on pantograph  
Cold bus

# Benefits for a City are there Today



## Environment

- 0% local emissions
- Low noise
- Long life span
- Low energy consumption



## Economy

- Low energy cost
- Low battery cost
- Low charging cost
- 24/7 operation
- High reliability



## Experience

- Low noise
- Comfort
- Design
- Quality

# LINKKER

## Quality of Life in Cities