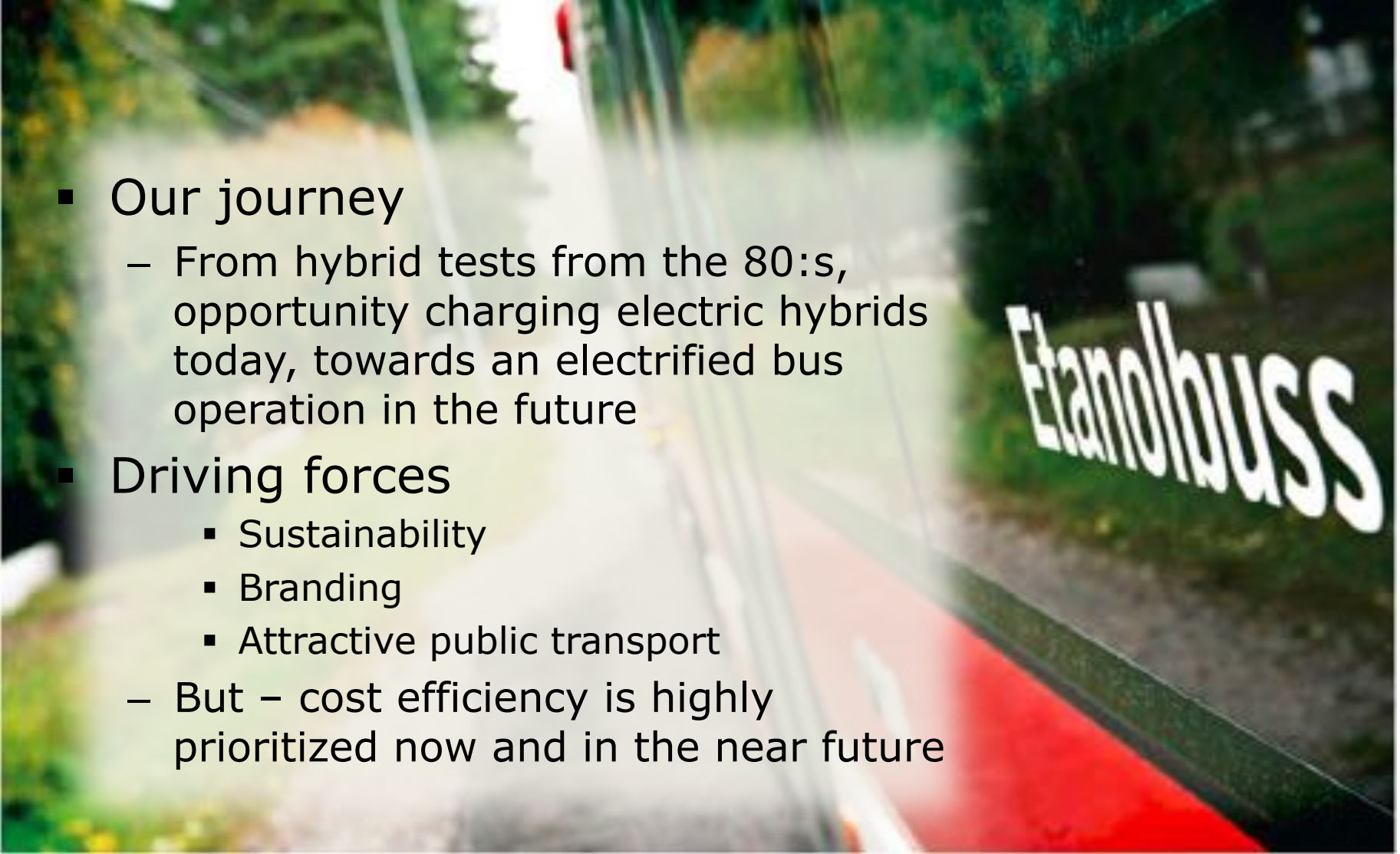


Migration to Electric Bus Operation in Stockholm County

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Transport Administration

- 
- Our journey
 - From hybrid tests from the 80:s, opportunity charging electric hybrids today, towards an electrified bus operation in the future
 - Driving forces
 - Sustainability
 - Branding
 - Attractive public transport
 - But – cost efficiency is highly prioritized now and in the near future

Stockholm County Council Transport Administration

Public Transport Authority for SL operation

**Traffic and
maintenance
around 8.5
billion euros per
year**

**More than
1 125 000
boarding buses
each day**

**2 200 buses
on biodiesel,
ethanol, biogas
and diesel**

**90 %
of buses
on renewable
energy**

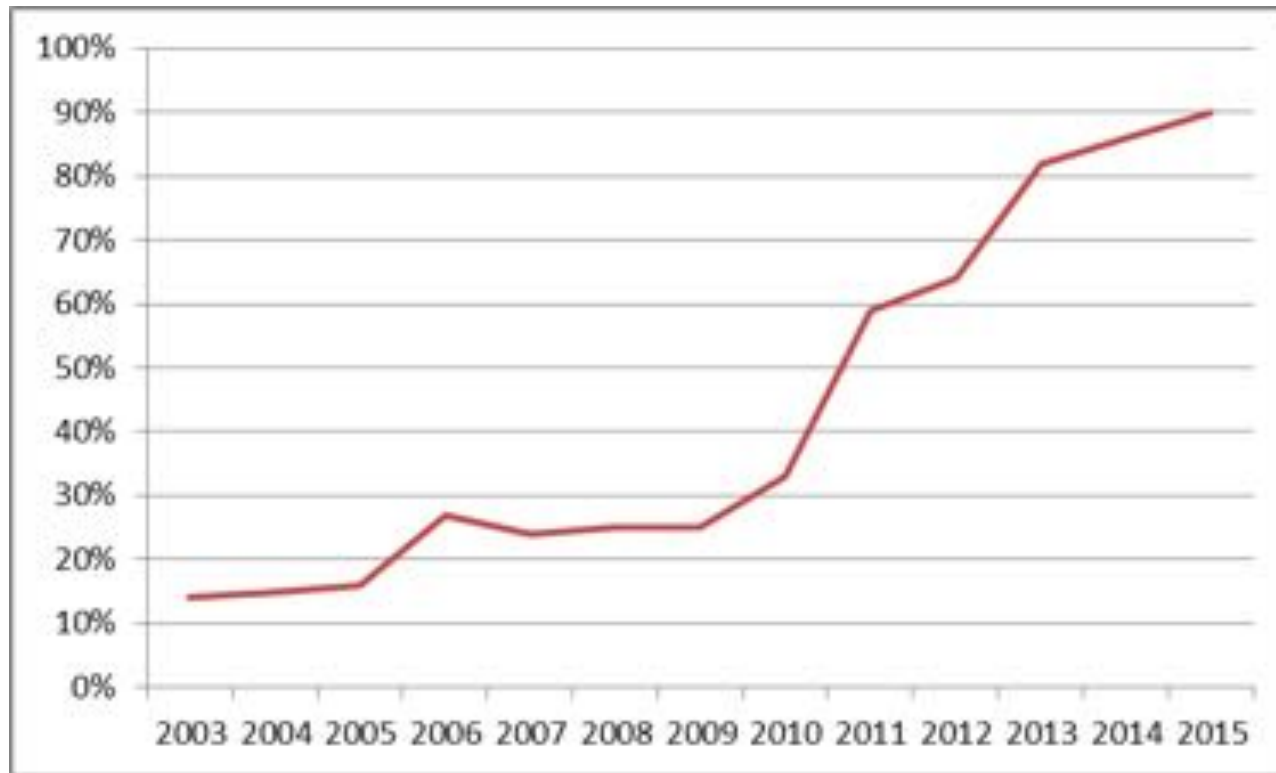
**In 2015
53 hybrids
8 plug-in
hybrids**

Goals driving toward electric bus operation

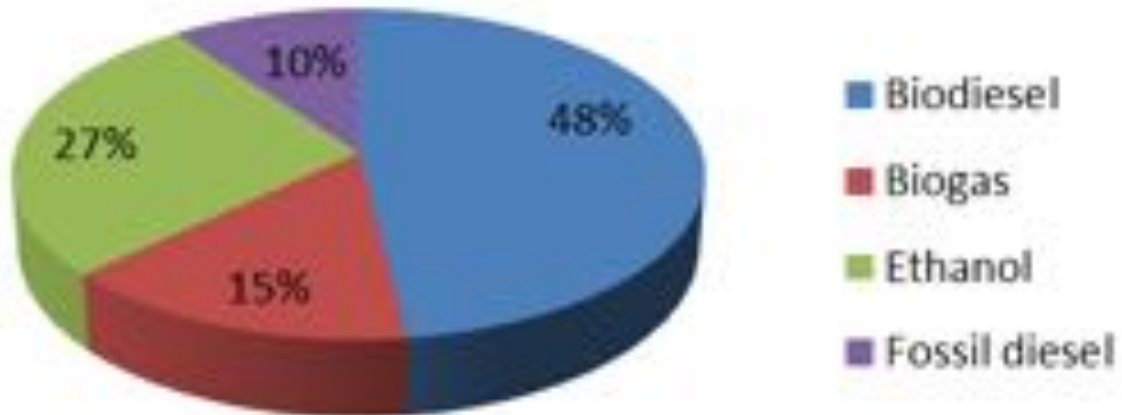
Photo: H. Liljewall

- Environmental goals for 2030
 - 100 % renewable fuel (may be revised to year 2020)
 - 75 % reduction of particles and NOx (base year 2009)
 - Decrease public transport energy usage per passenger-km with 35 % (base year 2007)
- Goals regarding
 - Attractive public transport
 - Customer satisfaction
 - Cost efficiency

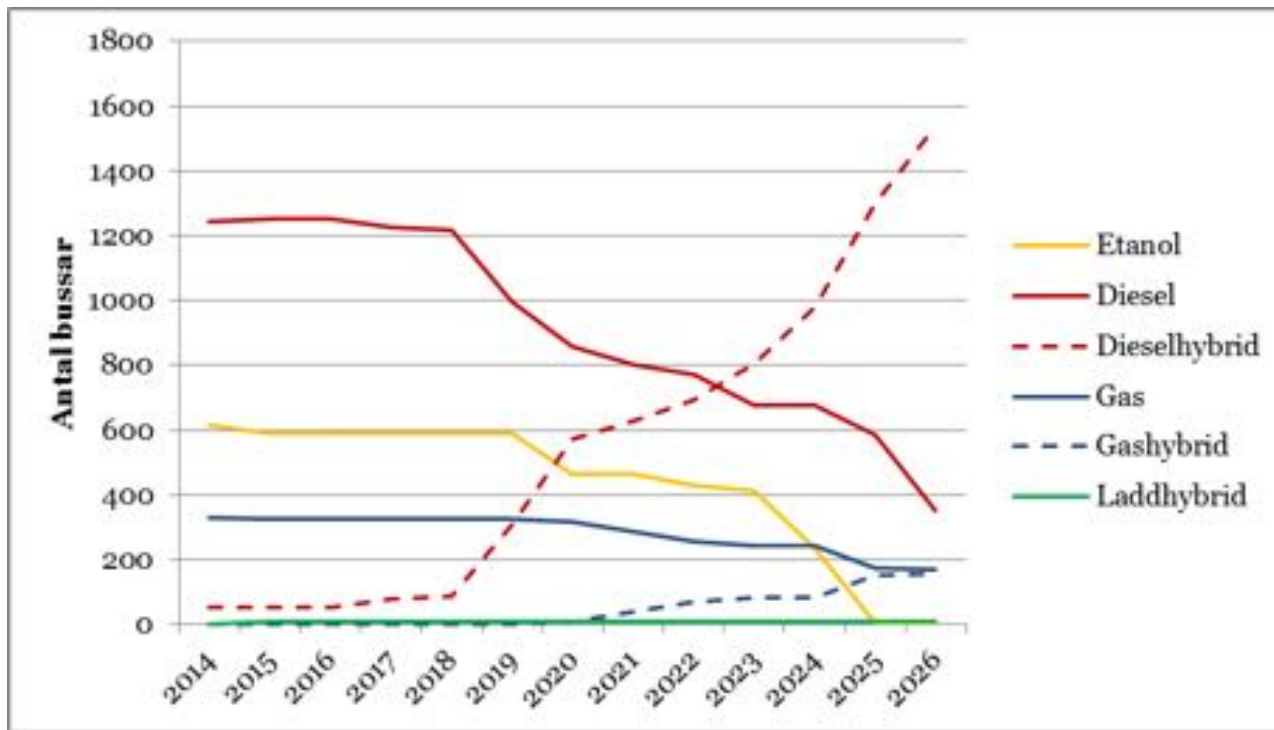
Renewable fuel



Distribution of fuels



Energy Efficiency: Base scenario for bus fleet development



Fleet development if no action from the county
to increase amount of electric bus systems



-25 %

To reduce energy usage -35 % action is needed

Course of action – recommendations from our analysis

1. To reduce costs – Aim at goals set for 2030

- a) High cost to change existing contracts
- b) Also high cost to remove buses before planned age
- c) Higher risk with immature charging technology, try it out in projects instead of big bang
- d) Standard interfaces for charging will be agreed on in time

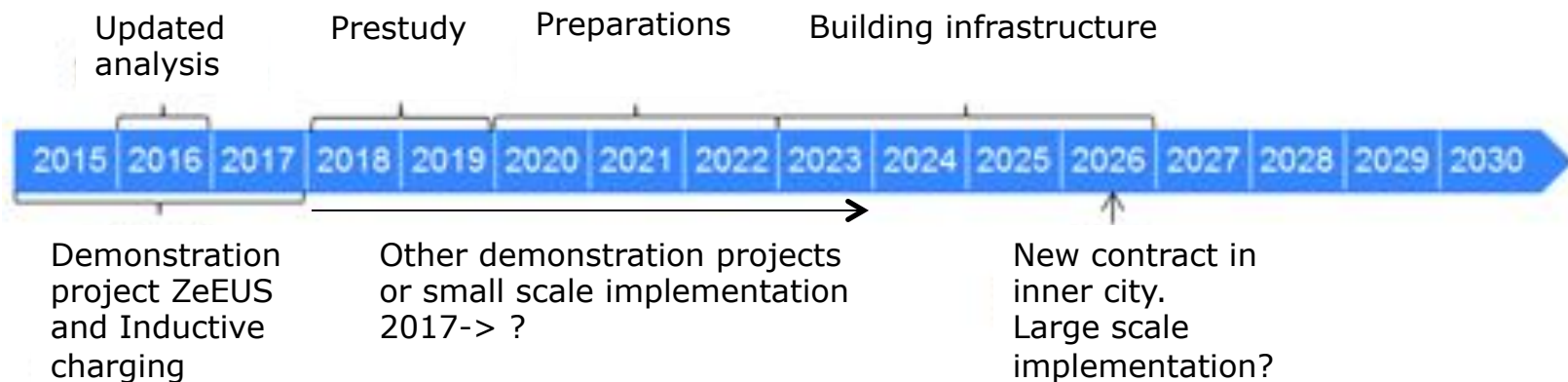
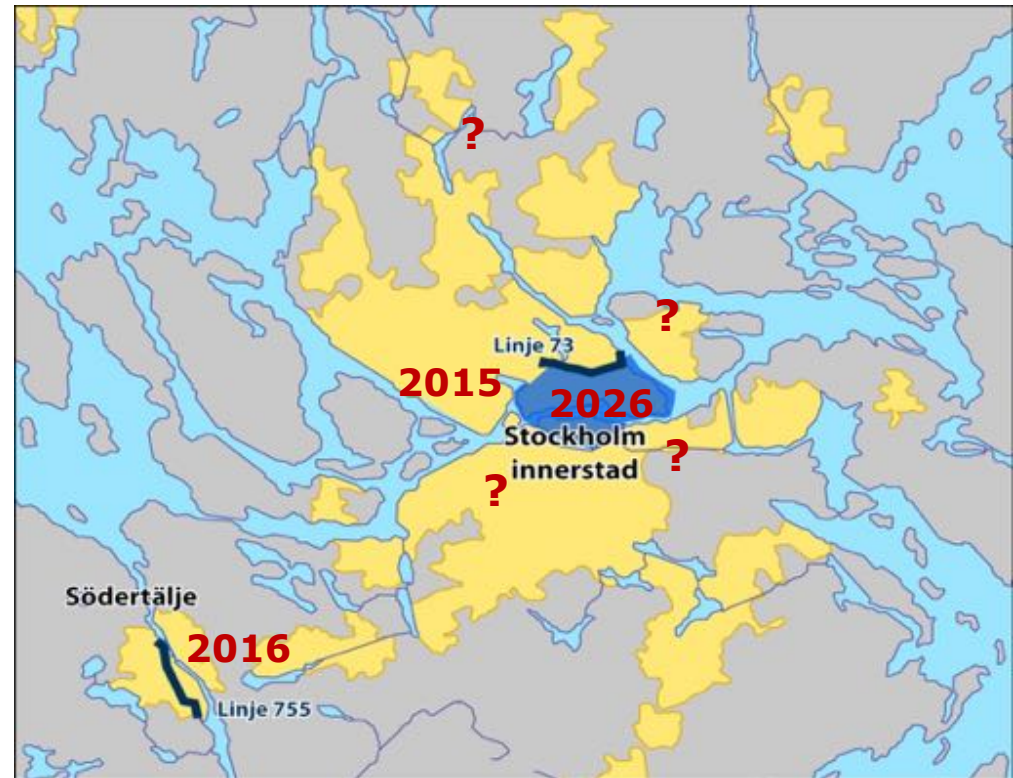
2. Major implementation at the start of the new inner city contract in 2026

Course of action – recommendations from our analysis, cont.

3. Requirements on decreased energy usage in new contracts
4. Use already made investments in infrastructure
 - Existing biogas fueling systems
5. Test and demonstrate electric bus systems
6. Learn from others and share experiences
7. Perform further studies

Scenario based on the recommendations

- Demonstration projects "ZeEUS" and "Inductive charging" during 2015-2017
- Other demonstration projects or small scale implementation 2017-> ?
- IF decision on electrifying inner city, preparation and building infrastructure before start of contract 2026






In demo projects

- ## The difficult questions ahead

- Business model harder than hardware
- Choosing charging infrastructure depends on many different aspects

- 
- **Need for cooperation**
 - Reuse knowledge and lessons learned
 - Needs to be time efficient
 - Formalised network could be a success factor (as NordicBus project)
 - Tool to support decision on which technology to use (trolley, battery, opportunity charging)
 - Calculations on costs
 - Financing and business model

The cities may be different, but the challenges are the same.

