



Promoting **clean** public transport



TROLLEY – What was achieved and what is the way forward after TROLLEY?

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TROLLEY Final Conference



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Starting point

Leipzig is located in the east of Germany, in the north- western part of Saxony. It is the most populous city in Saxony with around 500,000 inhabitants. The city covers an area of 297.6 km².

The city of Leipzig is a fair city with a long tradition. It is famous for:

- The hometown of Johann Sebastian Bach
- Goethe and Auerbachs Keller
- The Gewandhaus Orchestra & the Leipzig Gewandhaus
- Leipzig Main Station

On behalf of city of Leipzig, the Leipziger Verkehrsbetriebe (LVB) GmbH is responsible for the long term with the provision of regular services in public transport until at least 2028.



Starting point

1703

First use of litter carriers

1872

Opening of the horse-drawn tram

1896

Implementation of Electric trams through GLSt. and LEST

1919

Municipalization of GLSt and LEST after fusion in 1916

1925

Re-launch of omnibus operation

1938

Implementation of trolleybus operation and renaming the company as LVB

1951

First newly-made tram vehicles since 1931

1969

First application of Tatra-Trams

1975

Cessation of trolleybus operation

1992

First use of low-floor busses

1993

Foundation of Leipziger Verkehrsbetriebe as limited company

1995

First implementation of low-floor trams

1996

Opening of tram line to „Neue Messe“

1998

Begin of restructuring the LVB

2001

Implementation of the new network

2004

First operation of „LEOLINER“ - prototypes

2006

Completion of modernisation infrastructure before the Football World Cup

2007

111 years Electric tram operation in Leipzig

2012

30 „Classic XXL“ ; 50 „LEOLINER“ and 19 hybrid buses in operation

Starting point

The Trolleybus in Leipzig: 1938- 1975



Starting point

Current LVB network- tram and bus

Number of passengers (2011):

134,4 Mio

Number of lines

Tram lines: 13

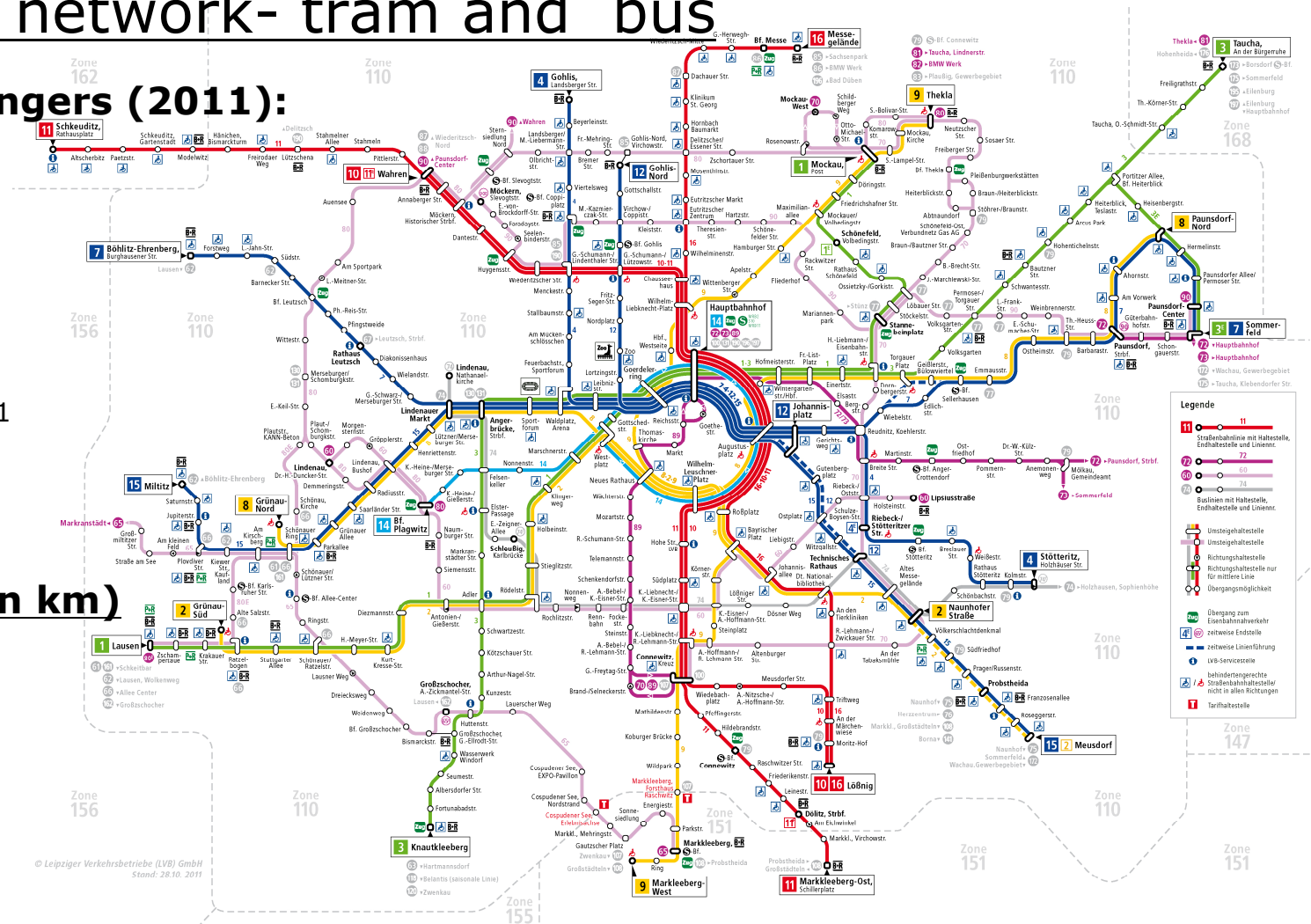
Omnibus lines: 61 ¹

Length of lines (in km)

Tram 319,0

Omnibus 1050,5 ¹

1 with the lines of Leobus



Starting point

► Fleet of vehicles

Tram

Type	2012
T4DM/B4D-NF	139/4
NB4	38
NGT8	56
LeoLiner	50
Classic XXL	33
Total	320

Buses

Type	2012
Articulated bus (18m)	43
Standard bus (12m)	62
Midibus + Sprinter	8
Hybrid bus (18m)	14
Hybrid bus (12m)	5
Total	132

Feasibility study on establishing a electric city bus system in Leipzig

Why was it done?

- ▶ LVB was faced with the task, to renew the bus fleet (18m articulated buses) over the next years
- ▶ Global requirements: urgent need to reduce the greenhouse gas emissions of the public transport

We had to face the question:

- ▶ What is the best environmentally friendly and appropriate technology?
- ▶ **Focus on electromobility**

The study on bus line 60 was done in 2009.

Feasibility study on establishing a electric city bus system in Leipzig

Summary:

- ▶ the trolleybus was at the time of the study the onliest immediately available technology of a zero-emission vehicle
 - ▶ very good operating and infrastructure conditions
 - ▶ high synergy effects with the tram network
- } **positiv**
- ▶ the operation of a trolleybus system requires a completely existing infrastructure - investments needed (ca. 900.000 €/km)
 - ▶ question of affordability - trolleybuses are more expensive than dieselbuses
- } **negativ**

Sustainable mobility in Leipzig

The serial hybrid buses- our first step to a modern electric bus service

- ▶ Funding for hybrid buses were available
- ▶ 2011: Commissioning of 13 articulated hybrid buses (EvoBus, HESS / VK) by LVB GmbH under the projects "SaxHybrid" and "RegioHybrid"
- ▶ 2011: Commissioning of 5 standard hybrid buses (MAN) by LeoBus GmbH as part of the project "RegioHybrid"

Pilot Action I

Our hybrid buses



Hess 10 vehicles



Mercedes 3 vehicles



Solaris 1 vehicle



MAN 5 vehicles

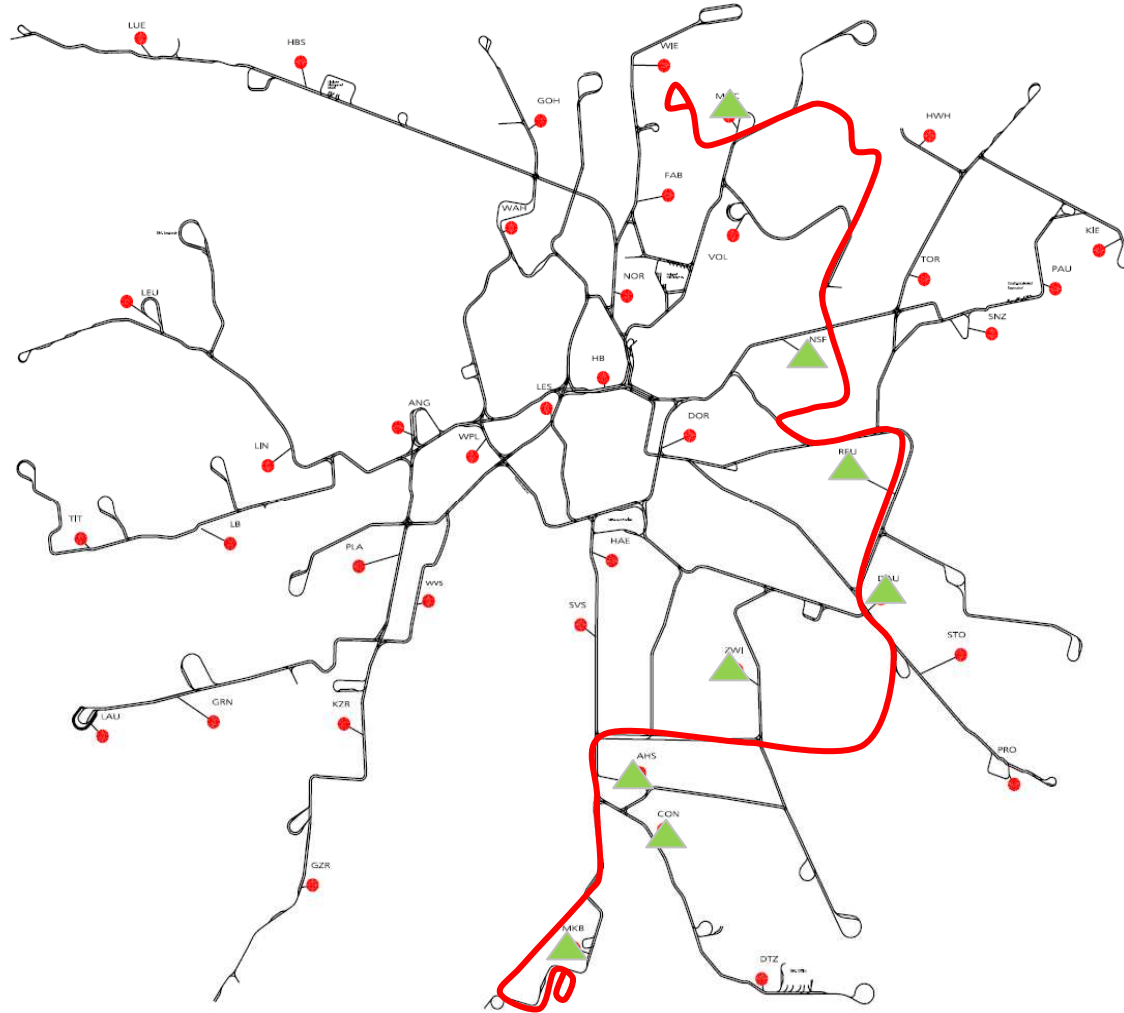
EU-Project Trolley: excerpt of the main activities

- ▶ **WP 3:** Draw up of a compendium for the setup of new electrical bus systems or for conversion into electrical bus systems within an existing urban or tram network
- ▶ **WP 4:** Feasibility study for the conversion into electrical operation on the example of the city bus line 70

➡ An existing **infrastructure** and **know-how** from the **operation and maintenance** of electric railways provide important **synergies** for the conversion of bus lines into electrical operation

Pilot Action II

- ▶ Investigation of the chances to convert the diesel bus line N° 70 to an electric bus service
- ▶ Analysis of synergy effects due to the possibility to use the tram power supply network
- ▶ 8 rectifier substations along the course available



What has changed in Leipzig through TROLLEY



increased awareness by the international conference week of electromobility in Leipzig October 2012

- ▶ to showcase the trolleybus as a smart, innovative and sustainable transport mode, as in particular in Germany the trolleybus is often not considered as a future- looking transport mode
- ▶ trolley buses → high purchase costs → it is much more difficult to exchange diesel into ebus buses, since the system start-up costs are too high
- ▶ construction of a new eBus system (with Trolley buses) = less financial effort required than for the construction of a new tram system
- ▶ Our analysis shows that here in Leipzig it is only possible to electrify an inner- city bus line

How can others benefit?

Leipzigs investigations provide information for other interested stakeholders, as part of the

- ▶ Reference Guide on Combination of Trolleybus and Tram Systems
- ▶ Transnational Take-up Guide on Diesel Bus Replacements
- ▶ impulses are set for the implementation of trolleybus systems with partial catenary lines by analyzing the local situation
- ▶ Hybrid buses as a requirement for this process

What is the way forward after TROLLEY in Leipzig

- ▶ Search for financing options
- ▶ Germany- electromobility program by the government

Project „eBus Butterfly“

- ▶ Conversion and extension of the existing bus system in Markkleeberg in a fully electric operating system
- ▶ System implementation and field testing of 2 electric buses with recharging at selective points

Projectline „eBus 70“

- ▶ Implementation of the results & stepwise conversion of bus line 70 in an electric operated bus line
- ▶ Extension of bus line 70 towards Markkleeberg

Thank you for your attention!

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