

Promoting **clean** public transport

# Trolley

## TROLLEY – What was achieved in Salzburg

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# About Salzburg

- Salzburg is one of the most important cities in Austria
- Cultural and tourist destination
- About 148 000 inhabitants
- Primary mode of public transport (City centre)
- About 40 millions of passengers per year
- One out of two trolley cities in Austria
- 12 Trolleybus lines
- Trolley-network of more than 100 km
- 100 Trolleybuses
- Long Trolleybus history



# Pilot Actions in Salzburg

- **Network extensions to the agglomeration** Feasibility studies on network extensions
- **Development of an optimized solution for the power supply** of trolley bus lines across open land track section
- **Reshaping Image of Trolleybuses** Improvement of **patronage** and the overall **awareness** of Trolleybuses.



# Network extensions to the agglomeration

- Business analysis (extension line 4)
- General comparison between diesel bus and trolleybus system
- Impact on the environment, passenger volumes and economic viability
- Passenger and citizen survey (Hallwang Esch)





# Feasibility studies for network extension in Salzburg



## Trolleybuses for agglomerations - the Hallwang-Esch example

### Trolleybuses in Salzburg

In approximately 60 cities of the European Union, trolleybuses form an integral part of public transport. In Salzburg, the trolleybus network (that consists of 10 lines) and 3 tram lines provide the backbone of public transport. Salzburg's transportation service is complemented by several gas and diesel bus lines. Currently, the trolleybus network of the Salzburg AG has a length of approx. 100 kilometres (61.24 miles).

### Network extension into surrounding area

The Salzburg AG/Salzburg Local Railways is a lead partner of the EU project „Trolley“. This project is concerned with questions of energy consumption optimization, efficiency enhancement in public transport and improvement of the trolley bus image.

To meet the focus on „efficiency enhancement“, the Salzburg AG and the Hallwang municipality authorized the investigation of a trolleybus network extension into the surrounding area. As since trolleybus line 4 was successfully extended to Hallwang Mayrwies in 2007, the question was raised whether further extensions of the network into the agglomeration would make sense.

Starting point of the investigation was a general comparison between the diesel bus and trolleybus systems. Based on these findings, concrete use cases were applied to shed light on the effects of network extensions, including extension of the trolleybus network within the municipality Hallwang from Mayrwies to Esch. Then the impact on the environment, passenger volumes and economic viability could be investigated. The results of a passenger and citizen survey conducted in Hallwang could be used to gain information on acceptance of the trolleybus service and its network extension.



## Extension of the trolleybus system to Freilassing

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# Tasks of the energy supply

- Supplying the energy on the right time in demanded amount
- Challenge -> Efficiency and profitability:
  - very high power-fluctuations
  - complex feeding situations in existing network
  - complex networks
  - very dynamic environment
  - interaction with rolling stock
  - handling of new technologies and traffic systems



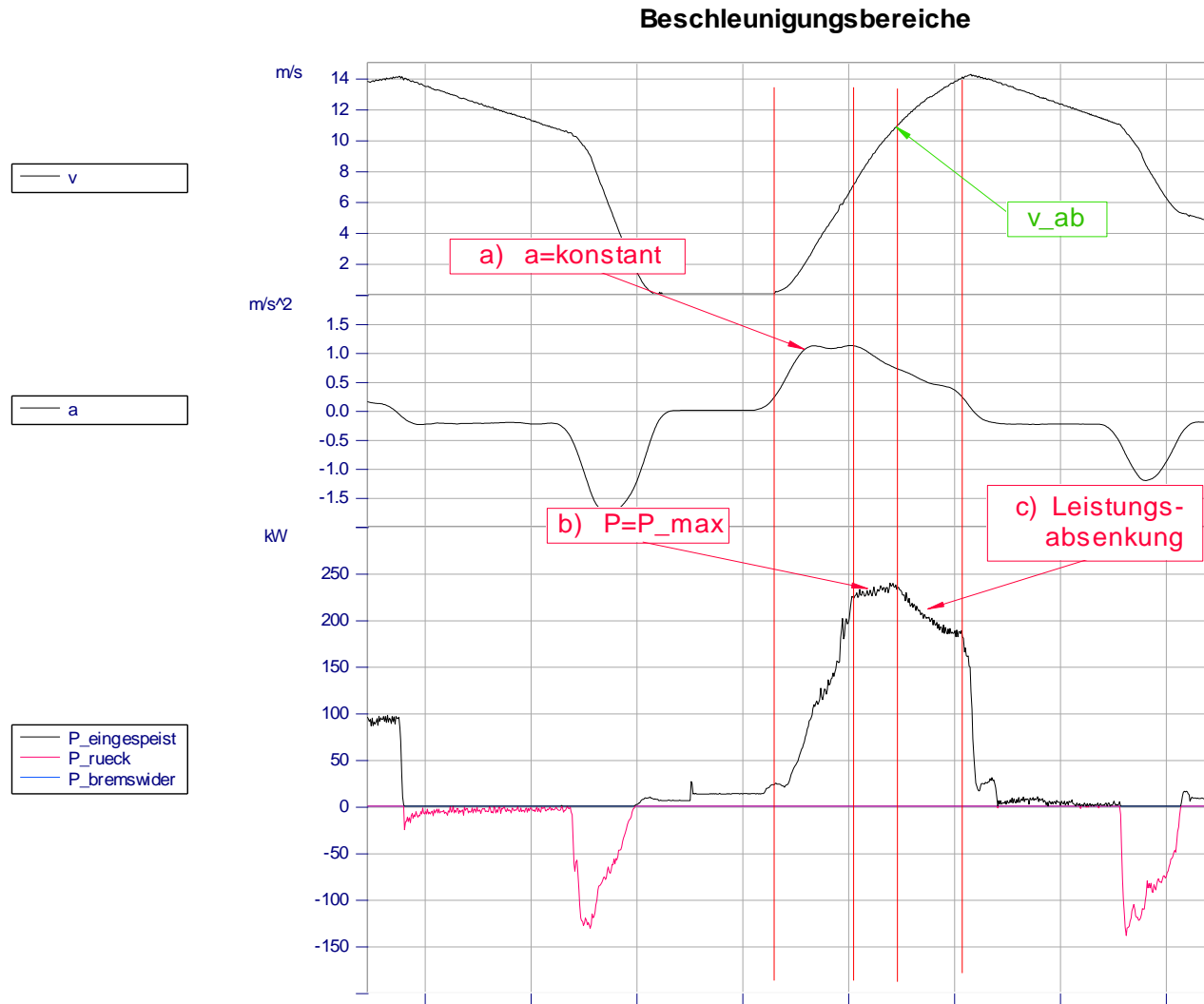
# Power demand

- Knowledge of the operation circumstances
- Knowledge of the parameters from the rolling stock
- Network status (type of overhead line, cross sections, use)
- Long-term planning
- Expansion possibilities
- Route parameters (gradient, radii, signals, crossings, jams?, length, ...)
- Feeding concepts



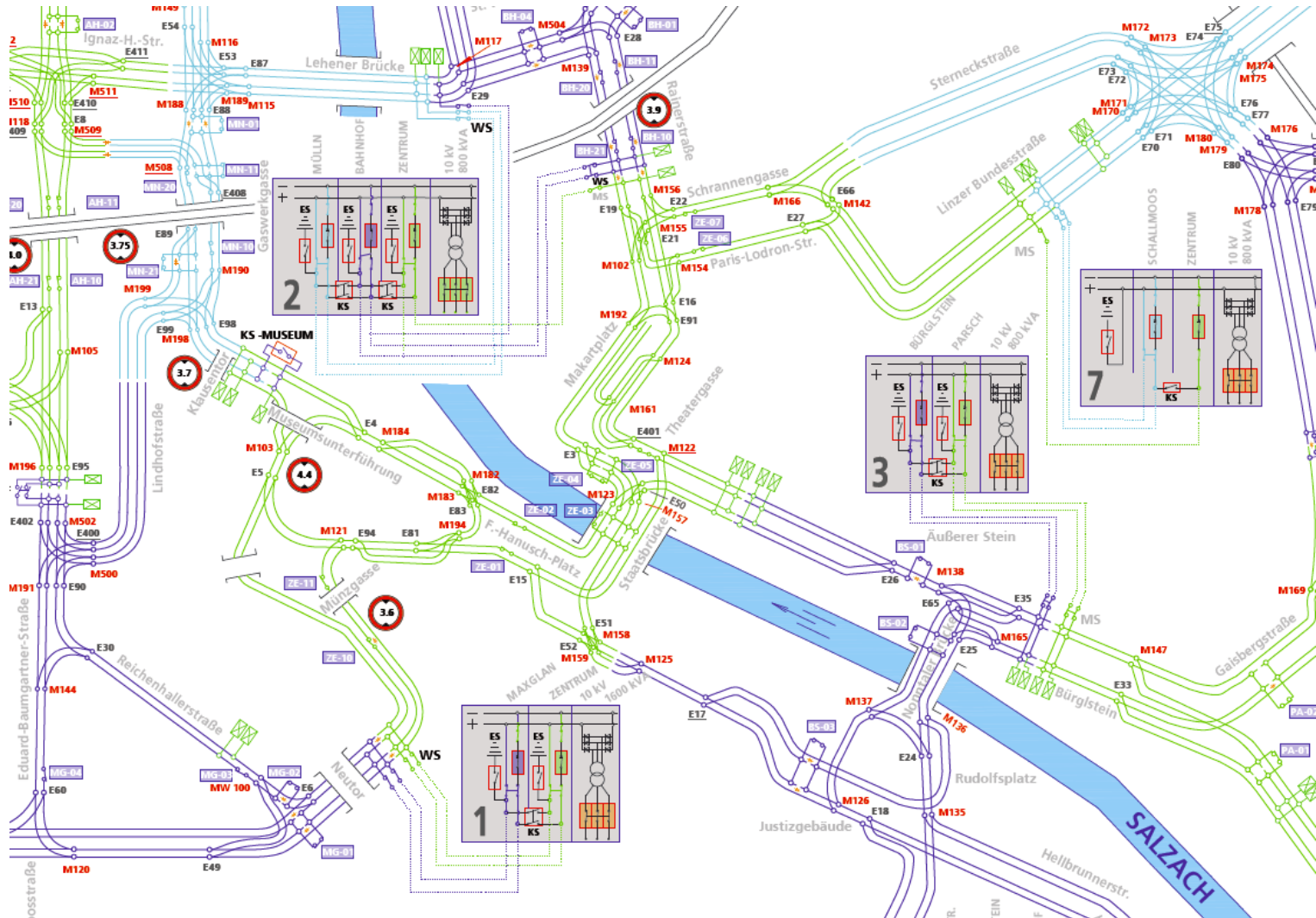


# Power demand – interaction rolling stock





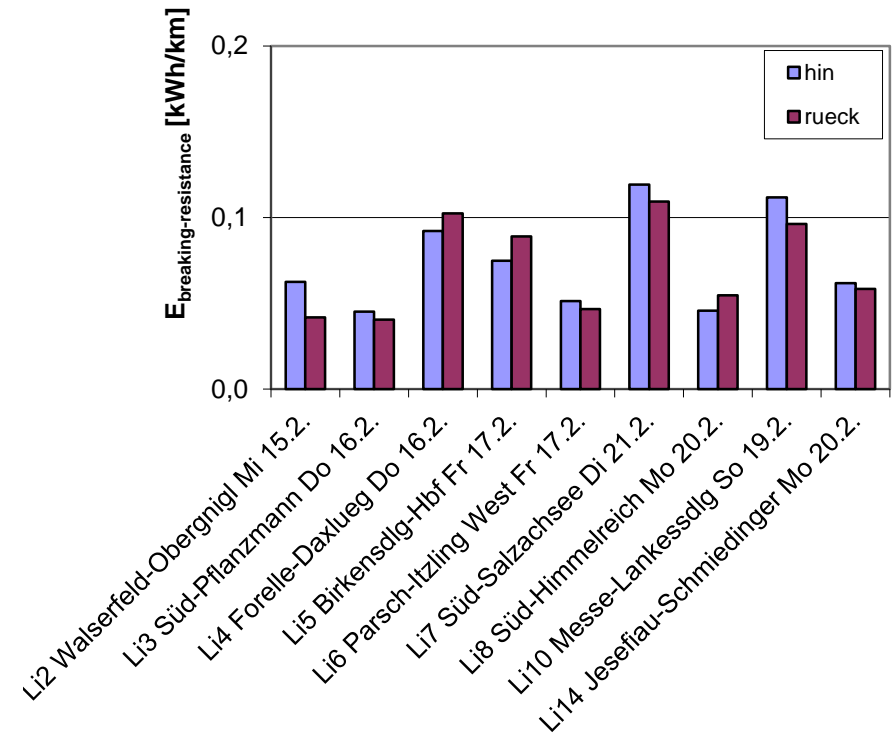
# Power demand - Network



# Potential for energy savings

- Appr. 0,07 kWh/km unused breaking energy
- Appr. 5 Mio. km / year makes
- 350.000kWh / year
- Total consumption of 12,2 GWh in 2011
- 2,86% are unused
- AND NOW?????

Average breaking-resistance-energy on a line



# Lessons learned

- New tackle to Projects
- Economy studies
- Usage of standardized models
- Collection of data for data models
- Statistics, evaluations
- At the moment no serious comparability between the companies caused by missing evaluation models and indexes, e. g. costs for energy are very different

# What has changed in Salzburg through TROLLEY



- Better comprehension between operation-service and infrastructure
- New ideas for future Projects
- E.g. how could the bus stop of the future has to look like
- Technical equipping of stops in the future
- Creating the missing links between different transportation systems



# The ebus-campaign

**Trolley**  
Promoting *electric* public transport



# ETD European Trolleybus Day

- Initiated in 2010 through the TROLLEY consortium
- Celebrated on the first Saturday of the **European Mobility Week**



# ETD

## European Trolleybus Day



- Its purpose:
  - Raising **attention** for the advantages of public e-mobility in urban areas
  - Building **awareness** for the popularity of local trolley services
  - Staging Trolleybus transport as a substantial part of **sustainable mobility**
  - Helping the partners to find **support** for their work and spread the **idea** of the “ebus” transport solution

# Local implementation

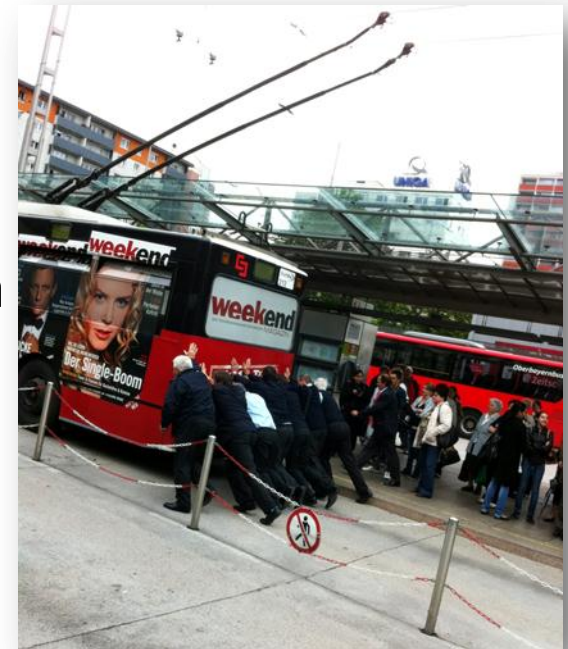
- Local Implementation of international image campaign “ebus – the smart way”
- European Trolleybus Day
- Movie about the Trolleybus system in Salzburg
- Design Contest “Young Style Obus”
- Stakeholder events e.g. Round Table in Vienna





# What is the way forward after TROLLEY in Salzburg

- Optimising the processes in planning of infrastructure
- Intensified discussion about agglomeration / network extension, two projects are on hold
- Yearly European Trolleybus Day (starter kit, Trolleybus Museum in Sandtoft)
- Eco-Driving Trainings for Trolleybuses in Salzburg:  
Energy Savings up to 25% possible
- Optimized passenger information



# How do we benefit?

- Exchange with partners in other countries and cities in a bundled way
- Networking
- High quality of partners
- Cross-section through the levels of the companies
- Other points of view and other priorities and emphasis
- Awareness: we have common targets

# How do we benefit?

- New ways in starting projects for trolley buses
- Technical planning on optimised level
- Relaxed conditions / no commercial pressure
- Space for creating new ideas
- No influences
- Everything seems to be possible
- Space for Innovation

# How can others benefit?

- Exchange with other projects
- Overview of other projects
- Organising those projects
- Provisioning the knowledge
- Information platform and contacts on a neutral basis
- Reliable and actual data based on the experience under real operation conditions



# Thank you for your attention!

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