

New trends in LRV-Business



**Stadler – Light Rail Vehicle – Families
*Tango & Variotram***

Customized flexibility with approved components and latest technology–
Stadler Light Rail Vehicles

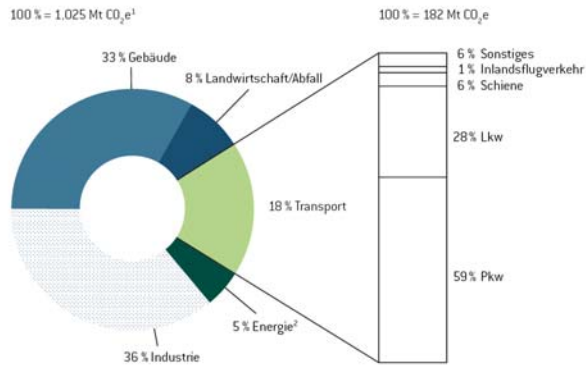
The 3 most important trends for the railway market worldwide

Increase of environmental pollution

Increase of noise in growing metropolitan areas

Higher demand on mobility compared
with growing passenger requirements

Portion of the transport sector regarding the emission of greenhouse gas in Germany 2004



Quelle: McKinsey 2007, VDB 2007

¹ CO₂e = CO₂-Äquivalente

² Die indirekten Emissionen werden den jeweiligen sektoriellen Energieverbrauchern zugeordnet.



Rail traffic has only a portion of 1% on the total emission of greenhouse gas per year in Germany with a 7,6% portion on the modal split



Due to a shift to rail traffic, a significant lowering of the emission of greenhouse gas can be achieved

Noise exposure of different sound sources in Germany

Source of noise	People disturbed by noise
Road traffic	62%
Neighbors	47%
Air traffic	38%
Industry / business	26%
Rail traffic	22%

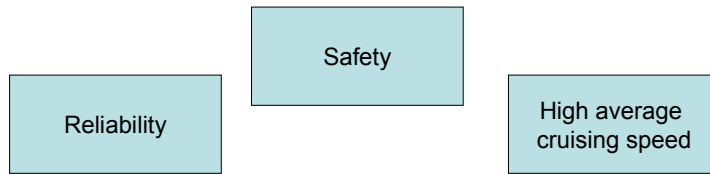
Source: Umweltbundesamt 2006



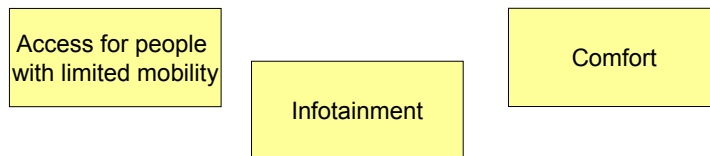
According to a survey of the European Commission the Stadler tram (e.g. Variobahn) is one of the quietest light rail vehicles

Source: European Commission DG Research; Silence – State of the art validation platforms trams and metros, 2006

General requirements for means of transportation



...but new requirements become more and more important



Stadler: The partner of the customer to find solutions for...

Avoiding the emission of greenhouse gas

Avoiding noise

Satisfaction of higher
passenger requirements

Stadler Rail Group

Stadler Rail Group

Consolidated turnover: CHF 1'050 Mio.
Employees: ~ 2'200

DIVISION Switzerland



Stadler Bussnang AG
Bussnang
1000 employees



Stadler Altenrhein AG
Altenrhein
350 employees



Stadler Winterthur AG
Winterthur
170 employees

DIVISION Germany



Stadler Pankow GmbH
Berlin
500 employees



Stadler Pankow GmbH
Velten
50 employees

DIVISION INTERNATIONAL



Stadler Pusztaszabolcs
Hungary
30 employees



Stadler Szolnok
Hungary
in construction



Stadler Siedlce
Poland
70 employees



Stadler Algier
Algeria
20 employees

Stadler's solutions to handle the new requirements detailed on LRVs

Main Line

Modular vehicle concepts



RS1

GTW

FLIRT

DOSTO

LRV



Variobahn

Tango

Competence Center in Berlin

Tailor Made



Vehicles for infrastructure

Passenger carriage

Rack railway

Narrow-gauge railway

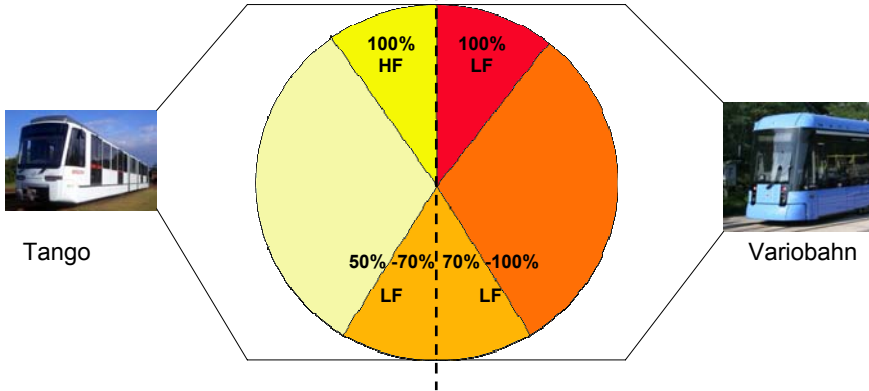


Trogenerbahn

Forchbahn

Stadler LRV product details

Different floor concepts on the LRV market



➔ Solutions with different bogie-concepts are available

Variability for operators for adaption to customer specific requirements



➔ Realized by construction kit

Variability but also Reliability

Technical Data:

- **Body shell made from stainless steel**
 - Available in different sizes
- **Outer wall assembly realized by bonding technology with GRP**
 - flat and easy cleaning surface
 - Easy to maintain
 - Lower weight



A flexible interior, which meets all passenger desires



Variotram Munich



Variotram Helsinki

- Possibility of flexible arrangements inside the vehicle (front & end-module)
- Easy accessibility due to wide doors and articulations
- Comfortable atmosphere due to bright and friendly surfaces
- Relaxed travelling because of low noise level
- Tidy ensemble

Examples interior



Example Bochum (2,3 m width)



Example Nuremberg (2,3 m width)



Example Tango Bochum (2,65 m width)

Comfortable seating for joyful riding



Different kind of seats allow an individual design of the interior



Stadler designed a LRV seat by himself

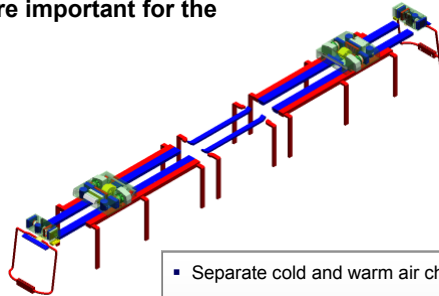
- higher upholstery
- Different solutions against vandalism



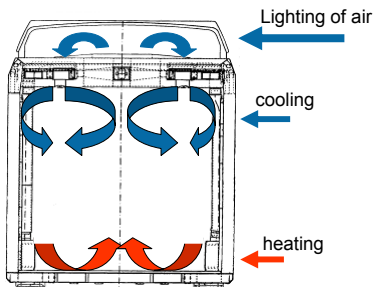
Adaption to the various needs of the different operators

Air conditioning is more and more important for the passengers

- Modular system
- Different systems for cold air and hot air
- Quick response time
- Upgradable

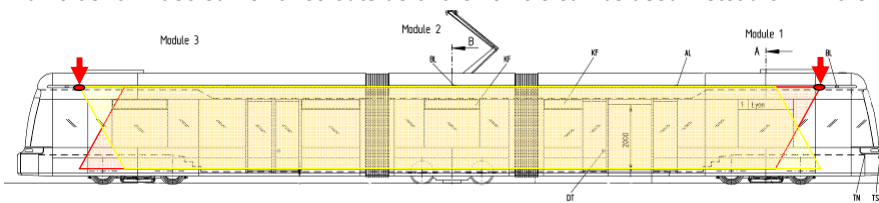


- Separate cold and warm air channels
- Air conditioning without infiltration
- Separate driver air conditioning units
- Design in respect of DIN EN 14750 and 14183



Safer boarding due to video surveillance outside of the vehicle

Cameras for video surveillance outside of the vehicle can be used instead of mirrors



Rear View Monitor links

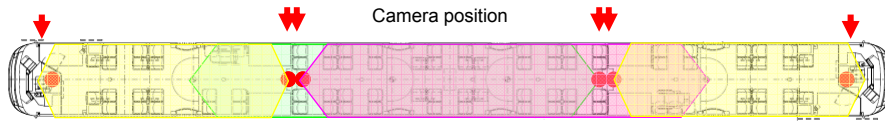


Rear View Monitor rechts

➡ Better overview of the whole platform for the driver

➡ Safer boarding of the passengers

Video surveillance onboard makes the passengers feel safer



- ➔ The passengers feel more comfortable
- ➔ Less vandalism



Infotainment gets higher importance



- ➔ Infotainment for the passengers results in a more relaxed atmosphere
- ➔ Additional advertising revenue for operators



The passengers needs require sufficient vehicle power

→ Optimized auxiliary converter (70 kVA), appropriate to the needs of the future

→ Supply of vehicle power with 3 x 400 VAC, 50 Hz and 24 VDC

→ Size and weight optimized



→ Result: Zero emission with low noise at highest comfort

Stadler solutions



To increase the transport share of railway traffic we offer modern vehicles while reducing the pollution of greenhouse gas and noise!

→ Stadler solutions are ready for future markets!

Modern vehicles for public transportation have to fulfill various requirements

Latest technology

Reliable components

Low costs

Light construction

Customized solutions

Very robust

Maintainability

Stadler's success

Reliable components

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Customized solutions

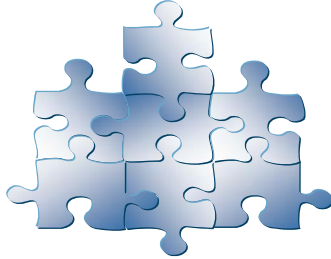
Tango

Variotram




Stadler's vehicles are designed for the future



Managing the future – handling the requirements



Stadler railway vehicles can handle the future and give answers for the next generation

-  They give answers to the environmental pollution
-  They offer a high transportation performance for growing metropolitan areas
-  A modern and comfortable interior increases the satisfaction and the number of passengers