Linearantriebe – Energieeffizienz durch innovative Technik

Effizienz-Gipfel 2018

Andreas Schierenbeck, CEO thyssenkrupp Elevator
Stuttgart, May 14, 2018
Cities consume 2/3 of global energy

Size of Manhattan being built every day

Metropolitan Century
Urban Mobility

Energy-efficient solutions needed
Elevator became a bottleneck

40% usable space are used by elevator shafts
How to increase passenger transportation speed and transport capacity.
First idea

PATERNOSTER
Our know-how

LINEAR MOTOR TECHNOLOGY
Linear motor technology

Active principle of linear motor with permanent magnets

MULT® Permanent Synchronous Linear Motor Ironless
Distributed along shaft
MULTI first ROPE-LESS elevator INNOVATION
Innovative Benefits

- Increasing capacity by 50% and reducing the elevator footprint within a building by half
- Scalable transportation
- Freedom for architects
- No limit in heights
Smarter energy usage

- **up to 75%** reduction in peak power
- Multiple smaller cabins & fewer shafts lead to distributed power demand
Smart Building grid – Energy Buffer

- **add. 50%** reduction in peak power with Buffer
- No power feedback to grid
- Reduce infrastructure cost

![Graph comparing conventional and multi energy buffer on power demand over time](image)
First MULTI project

East Side
Tower Berlin

140m
Energy consumption
[MJ/ passenger-km]

<table>
<thead>
<tr>
<th></th>
<th>Manhattan</th>
<th>Metro</th>
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</thead>
<tbody>
<tr>
<td>Car</td>
<td>2.45</td>
<td>0.46</td>
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Average vehicle speed 13.7 km/h
- 7,300 passengers/h
- 3.3 m/s (12 km/h)
- 100 – 1,500 m

30% additional passengers for metros
<table>
<thead>
<tr>
<th>Mode</th>
<th>Energy Consumption [MJ/passenger-km]</th>
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</thead>
<tbody>
<tr>
<td>Cars</td>
<td>2.45</td>
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<tr>
<td>Bus</td>
<td>1.05</td>
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<tr>
<td>PRT</td>
<td>0.55</td>
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<tr>
<td>ACCEL</td>
<td>0.23</td>
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ACCEL: Leading energy-efficient transportation

Buildings consume 1/3 of buildings pre-1970s by 2030. Modernization is key.
Buildings

Efficient Urban Mobility

Transportation