

# THE FUTURE OF URBAN MOBILITY.

Buehler Networking Days 2019.

Andreas Welter | 26. August 2019



# THE FUTURE OF URBAN MOBILITY. DEMAND VS. NEED FOR ACTION.



# THE FUTURE OF URBAN MOBILITY. SOLUTION SPACE.

Management

Systems

Infrastructure

Vehicles

## Traffic Management

Shift & reduce	mobility demands.
Improve	traffic control.
Make smart use of	access-regulations & -pricing.
Combine the demands for	pooling services.
Avoid	obstacles.

## Transport systems

Extend & combine	public transportation & ODM.
Maintain	private transport.
Create an overview of all	mobility options.
Link the several	delivery services.
Intensify the use of	data from vehicle & infrastructure.

## Infrastructure

Provide suitable	charging options.
Optimize the use of	parking space.
Modify the design of	roads & streets.
Rethink the use	rails.
Close the gaps of the	digital networks.

## Vehicles

Accelerate the rollout of	electrification.
Introduce	autonomous driving.
Strengthen & develop further	connected Services.
Refine	MicroMobility vehicle.
Check the supplement of	flying and swimming vehicles.

# THE FUTURE OF URBAN MOBILITY. REDUCTION OF MOBILITY DEMAND.

Management

Systems

Infrastructure

Vehicles

Life

Work

Shopping

Relax



# THE FUTURE OF URBAN MOBILITY. TRAFFIC MANAGEMENT.

Management

Systems

Infrastructure

Vehicles

Poor management makes any type of traffic inefficient.



VS.

Digitization & (artificial) intelligence offers potentials.



# THE FUTURE OF URBAN MOBILITY. TRAFFIC SYSTEMS.

Management

Systems

Infrastructure

Vehicles

Perfect for ...



Less suitable for...

... medium range & multistep rides.

... rides with groups or with luggage.



Private transport



...inner-city rides with low occupancy in the rush hour.

... huge passenger numbers.

... well-used bus stops.



Public transport



... supply of areas with low population.

... supply of the area & last miles.

... changing request.



ODM  
On Demand Mobility



... mass transport in competition with public transport.

# THE FUTURE OF URBAN MOBILITY. BEVS / PURE BATTERY ELECTRIC VEHICLES.

Management	Systems
Infrastructure	Vehicles



The BEV is ideal for urban traffic.



... however, the transition from an established & proven to a new technology has to be supported at the beginning!

1914



2012

now



# THE FUTURE OF URBAN MOBILITY. PHEVS / HYBRID VEHICLES.

Management	Systems
Infrastructure	Vehicles



Emission-free in urban areas



The Future PHEV is an important contribution to the rollout of e-mobility.



Sometimes more ecological than a long-distance BEV



Suitable for long distance, even without a complete charging infrastructure



Reduction of raw material and supplier dependencies

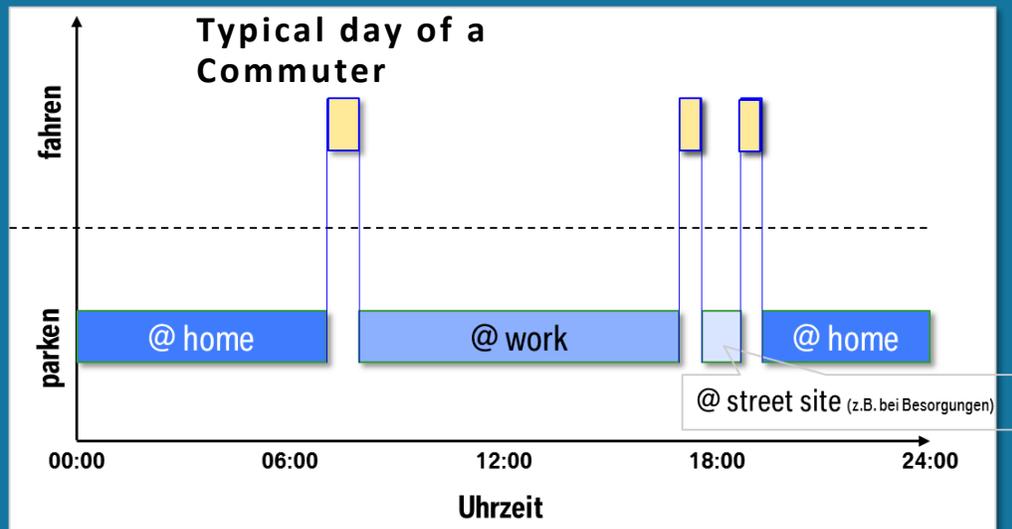
# THE FUTURE OF URBAN MOBILITY. CHARGING / CUSTOMER VALUE.

Management

Systems

Infrastructure

Vehicles



## Advantageous charging possibilities

- The most convenient way of charging takes place where a car is parked for a long time anyway.
- Charging @home and @work require ...
  - ... no detours.
  - ... no waiting.
  - ... no high performance charging.
  - ... no high energy costs.

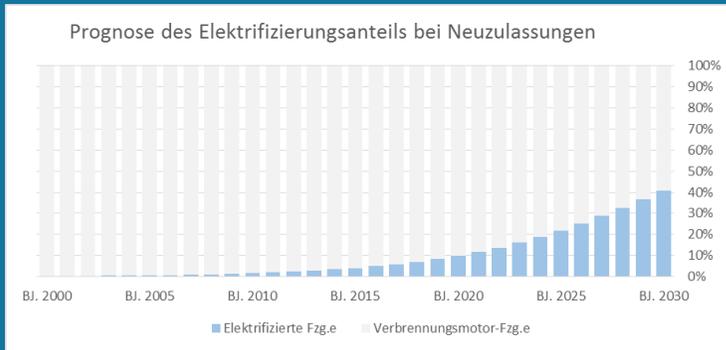
# THE FUTURE OF URBAN MOBILITY. CHARGING / RUN-UP OF E-MOBILITY.

Management

Systems

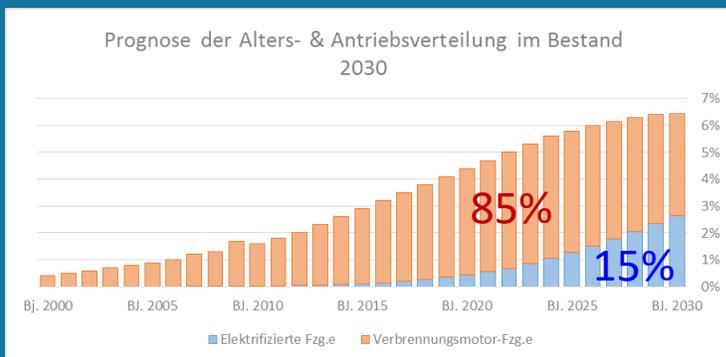
Infrastructure

Vehicles



CO<sub>2</sub> regulation in Europe  
+ local aspects

approx. **40%** xEV share of new registrations in  
a metropolitan area in 2030



Age distribution in the vehicle inventory  
+ increasing of xEV ratio over the years of construction

approx. **15%** of xEV ratio of the stock in  
a metropolitan area in 2030

xEVs = BEV + PHEVs = Electrified Vehicles

# THE FUTURE OF URBAN MOBILITY. CHARGING / VEHICLE FLEET 2030.

Management	Systems
Infrastructure	Vehicles

## Commuting IN

approx. 220.000 vehicles commute daily to the city, of which about **45.000\*** xEVs with charging demand during the day.



## Commuting OUT

Commuting vehicles can be charged in the city at night.



Central European metropolis with approx. 2,0 million inhabitants

## INVENTORY

about 700.000 vehicles registered in the city, of which about **105.000\*\*** xEVs with charging demand at least at night.

2030 approx. **150.000 xEVs** will have daily charging demand in this city.

\* Assumption: 20% e-cars in the fleet of commuters

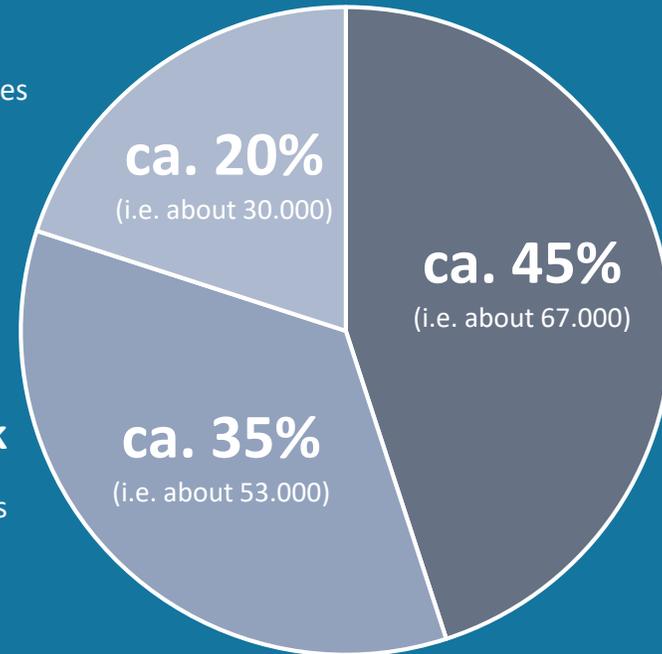
\*\* Assumption: 15% e-cars in the average fleet

# THE FUTURE OF URBAN MOBILITY. CHARGING / DISTRIBUTION OF CHARGING OPTIONS.

Management	Systems
Infrastructure	Vehicles

## Charge @ street site

- about 10% of street parking plus fast charging stations for emergencies or commercial vehicles



## Charge @ work

- about 20% of employee parking spaces

## Charge @ home

- about 15% of registered vehicles minus about 1/3 (due to difficult retrofitting of charging infrastructure)

$$\sum \text{xEVs} \sim \sum \text{Charging spots}$$

# THE FUTURE OF URBAN MOBILITY. SUMMARY.

Management	Systems
Infrastructure	Vehicles

- There is no single solution for the urban traffic of the future.
- New ODM services will not replace private & public transport, but will help to combine and optimize them.
- E-Mobility is an important part of the solution. Its run up requires among other things...
  - ... the promotion of BEVs und PHEVs.
  - ... massive efforts for adequate charging infrastructure @home and @work.