

# E-MOBILITY

Where we come from

Where we are

Where we will be

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October 2017

ALTRAN

# AGENDA

**01** Where we come from

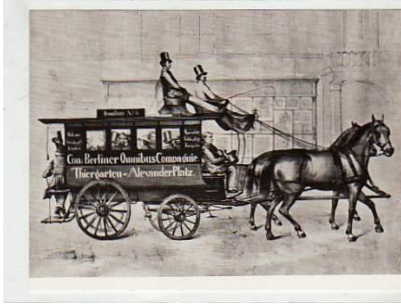
**02** Where we are

**03** Where we will be

# 01

## WHERE WE COME FROM

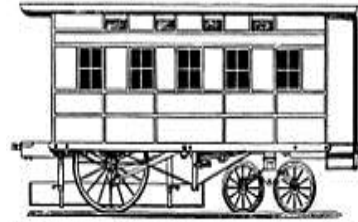
# WHERE WE COME FROM



The human being was mobile with the horse cart.

In much of the underdeveloped world, the horse-drawn car is still the first means of choice if you do not want to walk. More than 5500 years ago, oxen barrow were used.

Source: Wikipedia

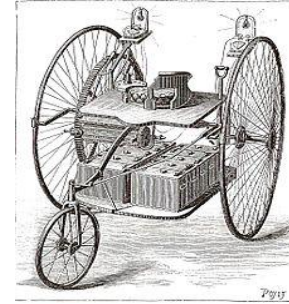


THE FIRST LOCOMOTIVE THAT EVER MADE A SUCCESSFUL TRIP WITH GALVANIC POWER.

The battery powered locomotive by Charles Page (1851)



1881 Trouvé Tricycle, Paris - first electric vehicle for road traffic



1882 Ayrton & Perry Electric Tricycle

# WHERE WE COME FROM



Elektromote by Werner Siemens, Berlin 1882, the first trolleybus in the world.



1887 Volk Electric Dog-Cart



Flocken Elektrowagen von 1888, The picture shows the reconstruction of Franz Haag (flakes)



In 1899 an electric car was built, which Porsche presented as "Semper Vivus" ("Always alive") at the Paris World Exposition in 1900. (Hightspeed 50km/h, reach 50 km)

# WHERE WE COME FROM



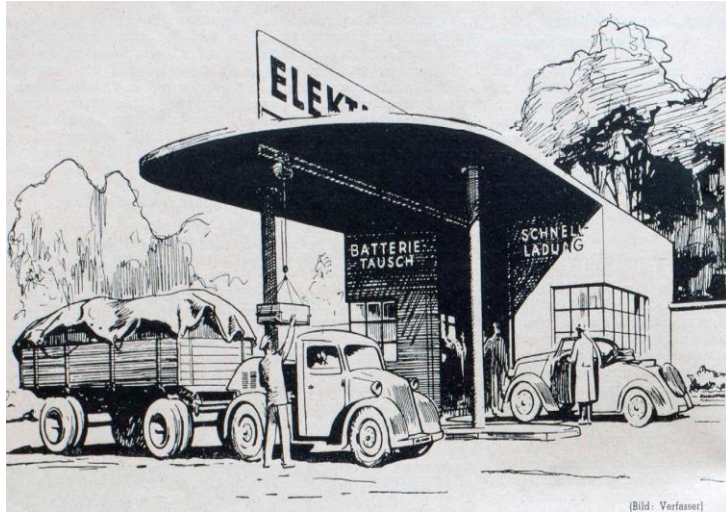
1. Camille Jenatton in the record electric car La Jamais Contente.  
2. After the 100 km/h record journey at 29. April 1899 (Speed 66,66 km/h)

Lohner-Porsche with all-wheel drive (1900)  
The four-wheeled race car from Lohner-Porsche, built in the same year as the star of the world exhibition in Paris 1900.

EMW 340 from Eisenacher Motorenwerke.  
It was built between 1949 and 1955.

DKW Truck  
Built from 1949-1962 in Ingolstadt.  
Power: 23.5 kW (32hp)  
Top speed: 70-80 km / h

# WHERE WE COME FROM



## Tankstellen für Elektrowagen

Ein Zukunftsproblem, das große Möglichkeiten in sich birgt

### Fuel station for electrical vehicle

A Future problem, which has great possibilities

If you are talking about electric vehicles, this was an Idea of a commercial vehicle for urban transport with a top speed of 25 to 30 km / h over a distance of 60 to 80 km. (with Battery swap station)

# WHERE WE COME FROM



- The Ford Nucleon was a concept car that was introduced in 1958 by Ford Motor Company.
- The car should be operated with nuclear fuel.
- A small nuclear reactor, suspended between the rear wheels, was provided for this purpose.
- A fill should **cover 5,000 miles (approximately 8,000 km)** before it should be replaced at a **petrol station**.
- Ford built only one model on a scale of 1: 2.66 from the vehicle, it was never produced. It stands for a whole series of similar concepts from the 1950s at the beginning of the atomic age.



# WHERE WE COME FROM



Tama Model E4S-47, in a model configuration, as it was built starting from 1947 in series. (Japan)

The power output was stated to be 4.5 HP (3.3 kW). The top speed was 35 km / h and the range 65 km. For speed control, the driver was provided with a manual twist gearbox.



Source: Wikipedia



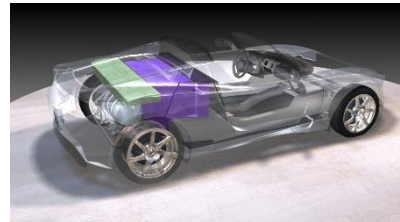
Enfield 8000 from Enfield-Neorion, 1973.

120 cars were built in total.



Powered by an 8 bhp (6 kW) electric motor and lead-acid batteries. The car has a top speed of around 48 mph (77 km/h) and a range of around 40 miles (64 km)

# WHERE WE COME FROM



Tesla Roadster 2006  
248 bhp (251 PS/185 kW) at  
8000 rpm and 286 Nm (211  
lb-ft/29.2 kgm)  
High speed 209 km/h or 130  
mph, and carbon dioxide  
emissions are 46.0 g/km.



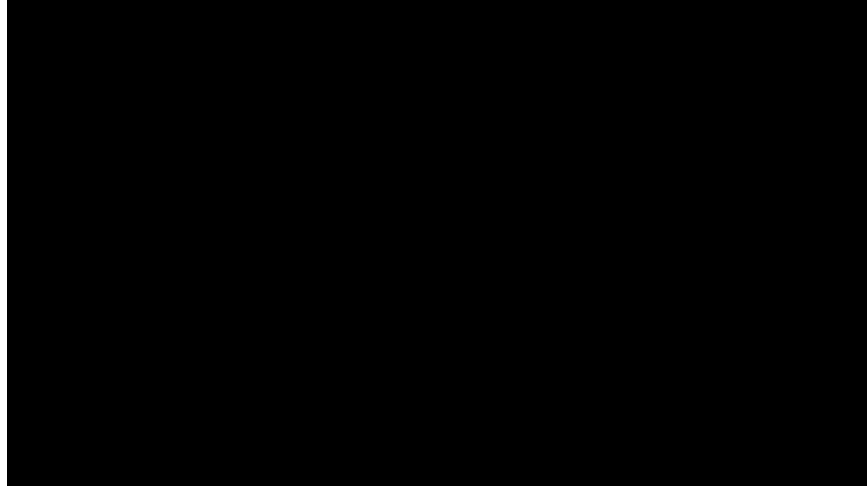
Framo Truck  
First series electric truck  
Range 250 km,  
capacities from 57 to 318  
kWh, drive from 80 to  
420 kW (480 kW peak  
power).



# WHERE WE COME FROM



# WHERE WE COME FROM



People Mover (Personal Rapid Transit)  
for 4 Persons with opportunity charging

Top speed 50km/h  
Range per charge: 30km w/o charging  
Operation time 18/7/365  
Operation: City of Masdar ( Abu Dabi)

Source: 2getthere

ALTRAN

# WHERE WE COME FROM



SUPERBUS (BEV)

Top speed: **250km/h**  
Power: 588kW

Length: 15m  
Height: 1.65m  
Range per charge: 200km

24 Persons

PROTOTYP

# WHERE WE COME FROM



MAN Metropolis (BEV + RANGE EXTENDER)

Top speed: 89km/h  
Weight: 26t  
Battery: 105kWh  
Power: 286kW  
Torque: 1650 Nm  
2 Speed Gearbox

REX: 3.0l TDI with 95kW Generator  
Range per charge: Dayshift (8h + 2x 22m<sup>3</sup>)  
Garbage collection (app.150km)

Operation time 18/7/365  
Operation: was close to Antwerp (B), now Munich

# 02

## WHERE WE ARE

# WHERE WE ARE

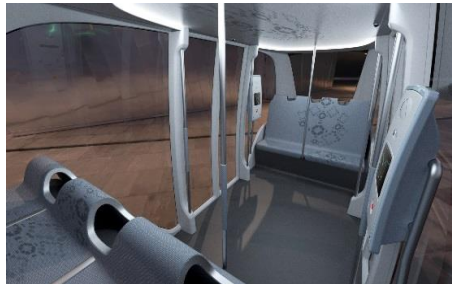


People Mover (Grand Rapid Transit)  
for 24 Persons with opportunity charging

Autonomous driving LEVEL 3,  
LEVEL 4 in Development  
LEVEL 5 app. in 2025

Top speed 50km/h  
Range per charge: 50km w/o charging

Operation time 19/7/365  
Operation: ASIA / MIDDEL EAST / NL (2018)



Source: 2getthere / ALTRAN



# WHERE WE ARE

MAN e Truck (BEV)

Top speed: 89km/h

Weight: 32t

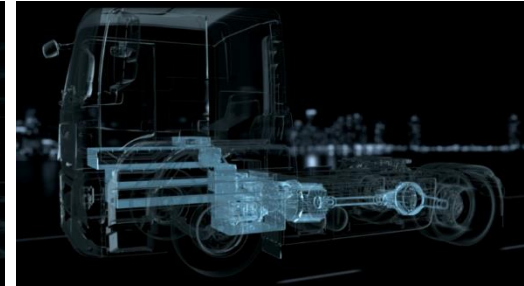
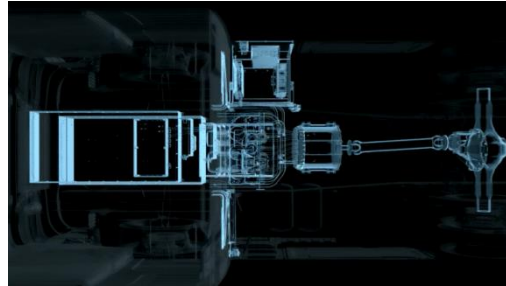
Battery: 154kWh

Power: 350kW

Torque: 3450 Nm

Direct Drive

Range: Dayshift with opportunity charging (150kW)  
(app.200km)



# WHERE WE ARE



PSA OPEL eAMPERA  
Power: 150 kW (204 hp),  
Top speed: 150 km/h,  
max. Torque: 350 Nm,  
battery: 60 kWh lithium-ion  
Range: 520km (NEDC)

Nissan Leaf 2018  
Power: 110/160 kW (150/218 hp),  
Top speed: 144 km/h,  
max. Torque: 320 Nm,  
battery: 40 / 60 kWh lithium-ion  
Range: 378 / 500km (NEDC)

e-Golf  
Power: 100 kW (136 hp),  
Top speed: 150 km/h,  
max. Torque: 290 Nm,  
battery: 35.8 kWh lithium-ion  
Range: 300km (NEDC)

# WHERE WE ARE



TOYOTA MIRAI  
Power: 114 kW (155 hp),  
Top speed: 178 km/h,  
max. Torque: 335 Nm,  
**Fuel cell: 5kg Hydrogen (700bar)**  
Range: 500km (NEDC)



Tesla MODEL S  
Power: 315 / 515 kW (428 / 700 hp),  
Top speed: 225 / 250 km/h,  
max. Torque: 660 / app.1000 Nm,  
battery: 75 / 100 kWh lithium-ion  
Range: 466 / 632km (NEDC)



Tesla MODEL X  
Power: 245 / 386 / 568 kW (428 / 525 / 730 hp),  
Top speed: 210 / 250 km/h,  
max. Torque: 660 / app.1000 Nm,  
battery: 75 / 100 kWh lithium-ion  
Range: 417 / 565km (NEDC)

# WHERE WE ARE



## Tesla MODEL 3

Power: 192 kW (261 hp),  
Top speed: 209 / 225 km/h,  
max. Torque: 660 / app.1000 Nm,  
Battery: 50 / 75 kWh lithium-ion  
Range: 354 / 499 km (NEDC)



## Tesla Model Roadster (Darkstar)

Power: 251 hp/185 kW) at 8000  
rpm and 286 Nm (211 lb-ft/29.2  
kgm)  
Top speed 209 km/h or 130 mph,  
and carbon dioxide emissions are  
46.0 g/km. Range: 350 km.

# WHERE WE ARE



Streetscooter  
Asynchronous motor output 30 kilowatts, maximum torque of 130 Nm 20.6 Kw / h. Reach 80 km and high speed 80 km / h.

Renault Kangoo Z.E.  
33 kWh. 80 to 115 km / h top speed. Up to 270 km to NEDC.

Kia Soul EV  
81 kW / 110 hp Performance at 2730 rpm Top speed 145km / h

# 03

## WHERE WE WANT TO GO

# WHERE WE WANT TO GO



**Audi Aicon**  
The study has four electromotor with a total of 260 kW and 550 Nm of maximum torque. Reach 800 Kilometer and recharge is no longer a problem.

**Mercedes EQ**  
Model-specific total capacity of more than 60 kWh.  
Range of about 400 kilometers.

**Borgward Model BXi7**  
With an output of 272 hp and 400 newtonmeter of torque, Borgward promises a range of up to 500 kilometers.







# WHERE WE WANT TO GO



Source: Airbus

altran

**THANK YOU FOR YOUR ATTENTION**

## CONTACT DATA

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