

# Solar Mobility



**Environment 2005**

**Abu Dhabi 30.1. – 2.2.2005**

**Roland Reichel  
Solar Mobility Federation (Germany)**

# Solar Mobility



**E-motion**

# Solar Mobility



**E-motion >> electric motion**

# Solar Mobility



**E-motion >> electric motion**

**S-class**

## Solar Mobility



**E-motion** >> electric motion

**S-class** >> solar class

## Solar Mobility



- 1 The development of „Solar Mobility“
- 2 Energy for „Solar Mobility“
- 3 Vehicles and components
- 4 The future

## Solar racing vehicles



## Solar vehicles prototypes



Energy for solar mobility



•Solar electric vehicles

- main vehicle components:  
body, drive system, batteries, control system
- solar mobility
- on land (cars, scooters, bikes)
- water (solar boats)
- in the air (solar planes, first planes available)

Energy for solar mobility



Energy for solar vehicles

- energy from „clean“ sources: solar, wind, hydro-power etc.
- „clean“ energy sources make the electric vehicle  
a real „zero emission vehicle“
- energy consumption low - typically from 5 to 20 kWh per 100 km
- solar generator (photovoltaic) either on top of the vehicle or external
- solar supply to the car through the so-called „solar grid system“
- Park & Charge system of public charging stations for electric vehicles

Solar vehicles with built-in solar modules



3,3 kW solar generator in Erlangen, Germany



The electric vehicle plus the solar grid system = solar vehicle

The electric vehicle in combination with a grid connected solar power system uses solar power only for driving. Thus an electric vehicle can be 100 % solar powered even without solar generator on the car. For small vehicles, a 1 kW solar generator generates sufficient energy for 10 000 km p.a.

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Park & Charge station for electric vehicles

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Park & Charge station

**Park & Charge**  
Solar-Stromtankstelle

Sponsoren:  
Horst Garthoff  
Haberkorn  
0521 - 68136

Ansprechpartner:  
Solargruppe Bielefeld  
Henning Braun  
0521 - 205783  
Bundesverband  
Solarmobil e.V.  
040 - 7929329

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Park & Charge station in Bielefeld, Germany

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Citroën SAXO électrique



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06:00 - 12:00 Uhr  
page 19 of 21

Citroën Berlingo électrique



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2.2.2010 - 06:00  
06:00 - 12:00 Uhr  
page 20 of 21

City-EI - single seater made in Germany



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page 19 of 21

City-EI - version "TARGA-FUN"



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page 20 of 21

**TWIKE, two-seater hybrid, made in Germany**



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page 29 of 21

**The new REVA - made in Bangalore, India**



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**Helektra TownLife (made in Italy)**



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page 29 of 21

**KEWET (before: Denmark, now: Norway)**



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page 29 of 21

MEGA - mini lorry - made in France by Aixam



MEGA - Nutzfahrzeuge



Chassis cabine



Plateau ridelles

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2.2.2005 - 065  
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page 37 of 211

Electric Porter, made by Piaggio / Daihatsu



Electric-powered Porter



Electric-powered Porter in the city of Reggio Emilia.



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2.2.2005 - 065  
0653 75000000  
page 38 of 211

ATW - Trans (made in France)



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0653 75000000  
page 37 of 211

Arrow 45



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page 38 of 211

Peugeot electric scooter „Scootelec“



*Scoot elec*



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2.2.2005-06  
000-1000000-04  
page 30/21

EVT Roller 4000 und 168



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page 30/21

E-TON scooter, made in China



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000-1000000-04  
page 31/21

e-max scooter, made in China



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page 32/21

Vectrix scooter (USA)



Vectrix scooter -

- electric drive system
- hydrogen/fuel cell energy supply



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helio



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swizzbee powerbike



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MZ - Charly - Germany



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Two examples of electric vehicles for public transport



Electric bus in China - powered by Li-batteries (ThunderSky)



Velotaxi - a new concept



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2.2.2010, 09:00  
09:00-10:00  
page 09 of 21

Three different Lithium battery technologies



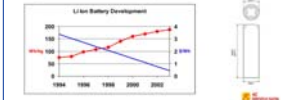
Wichtige Eigenschaften

- Spannung 4 V
- Kapazität 65 Ah (typisch) 80 Ah
- Geometrie HxBxT 155 x 115 x 34 mm<sup>3</sup>
- Gewicht 1300 g
- Spez. Energie 200 Wh/kg (CTSI)
- Energiedichte 420 Wh/L (CTSI)
- Entnommeladestrom 65 A (10°C)
- Innenwiderstand < 5 mΩ/cm



Lilon Battery Progress

- Li Ion cells now in mass production
- 18650 cells used for laptops
- Many producers, millions per month
- High durability, reliability, uniformity
- 170 Wh/kg now and increasing
- \$500/kWh now and decreasing



The size of lead acid batteries compared to ThunderSky Lithium batteries

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09:00-10:00  
page 10 of 21

Concept cars with lithium batteries, USA



T-Zero  
Volvo  
Venturi

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Jan. 2005 - LA Auto show <http://www.fitchshow.com>

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09:00-10:00  
page 11 of 21

Solar ship „Heidelberg“ -Kopf Solar-Design, Germany



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2.2.2010, 09:00  
09:00-10:00  
page 12 of 21

Solar-pavillon in Berlin-Köpenick, Germany



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11.000-100  
2002-2003  
page 02 of 21

Mini- solar rail (Internet: [www.solarbahn.de](http://www.solarbahn.de))



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page 02 of 21

„My“ solar cars



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page 02 of 21