RWE E-MOBILITY

RWE

The energy to lead

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Market Expectation, Strategy/Business Model, Implementation Status

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Frankfurt, 15 September 2009

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Agenda

A **Market expectation –** commercialisation from 2012

B Strategy/business model – focus on combining electricity for cars and infrastructure services

C Implementation status

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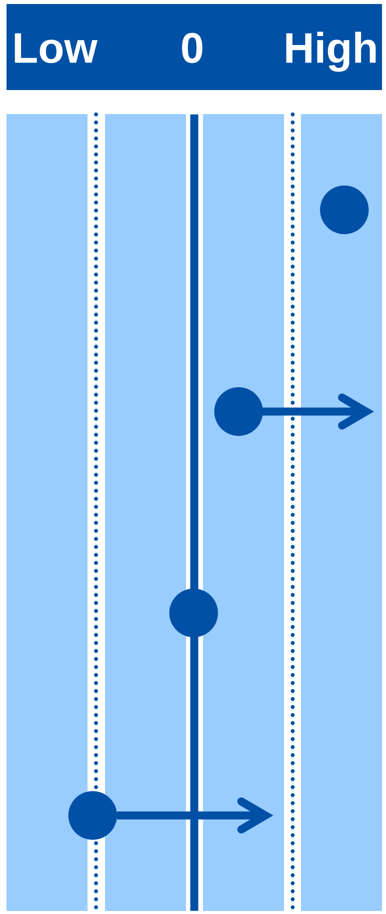
Conditions satisfied for lasting success in the market

KEY DRIVER ELECTROMOBILITY

Social relevance/ environmental/ climate protection	> Environmental/climate protection has reached the core of society all over the world (Kyoto, Copenhagen) > Reduction of emissions identified as precondition for future private transport – esp. in metropolitan regions
Commercially mature (battery) technology	> Li-Ion batteries with a range > 150 km available in the near future > Significant investments in technology and manufacturing planned worldwide – appreciable cost reductions expected
Readiness to invest of OEMs / Utilities	> All established OEMs with concrete plans for series production of electric vehicles > Serious initiatives of energy utilities and the private sector for commercial infrastructure rollout in Europe, Asia and the US
Political support	> Worldwide political support for electromobility – varying national characteristics/support > Examples of pioneers: France: one-off bonus, US: significant tax rebate, China: 10,000 electric car programme

Germany well positioned – need to catch up in terms of political support

SITUATION ELECTROMOBILITY GERMANY



	Assessment
Social relevance/ environmental/ climate protection	> Question of future energy supply (generation mix) is of crucial importance to society > Public at large is deeply aware of the need for environmental and climate protection
Access to commercially mature (battery) technology	> Partnership of OEMs with battery manufacturers, e.g. BMW + Bosch/Samsung; GM/Opel + LG Chem > Foundation LiTEC as JV of Daimler/Evonik
Readiness to invest of OEMs / utilities	> Daimler in an international pioneering role, BMW with Mini initiative effective in terms of marketing > RWE European pioneer for infrastructure > Broad-based commitment of electricity utilities/municipal utilities
Political support	> All parties with positive statements on e-mobility > EU fleet targets; economic package II, national development plan (target 2020: 1 mln e-cars in Ger) > But: no concrete end customer incentives

Commercialisation depends on vehicle availability – starting in 2012

GLOBALLY ANNOUNCED ELECTRIC SERIES VEHICLES – 2009 to 2012

Period	2009	2010	2011	2012
A and B segment	**Mitsubishi** iMiEV; **Tata** Indica; **Subaru** R1e	**Pininfarina** Bluecar		**Smart** smart ed; **Mercedes** A /B class; **VW** UP; **Renault** City EV; **Nissan** City Car; **Toyota** IQ, EV
C and D segment	**Miles** Coda; **BYD** F3DM, 6DM	**Nissan** Leaf; **Toyota** Prius Plug-in; **GM** Volt/ **Opel** Ampera; **BYD** F3e	**Renault** Megane EV; **Renault** Kangoo EV	**Ford** Focus PHEV; **Ford** Connect EV; **Tesla** Model S; **BYD** e6
G and SUV segment	**Tesla** Roadster	**Fisker** Karma		

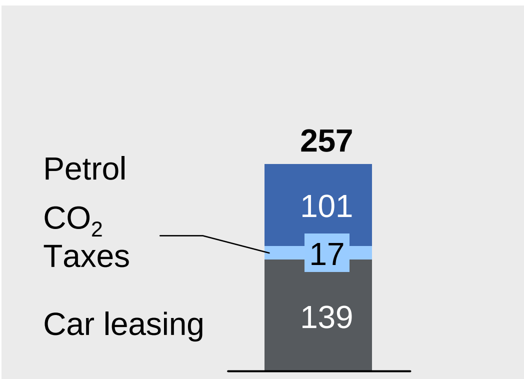
EVs planned (not yet specified): Audi, BMW, Fiat, Karmann, Volvo

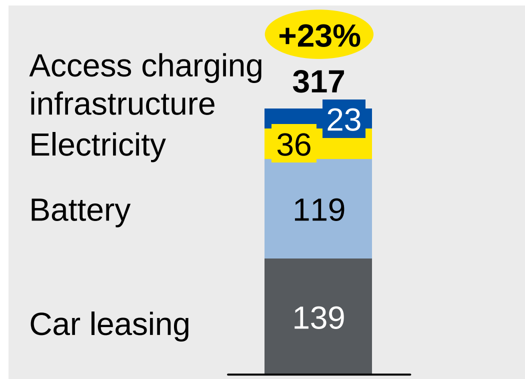
Source: OEMs; Roland Berger

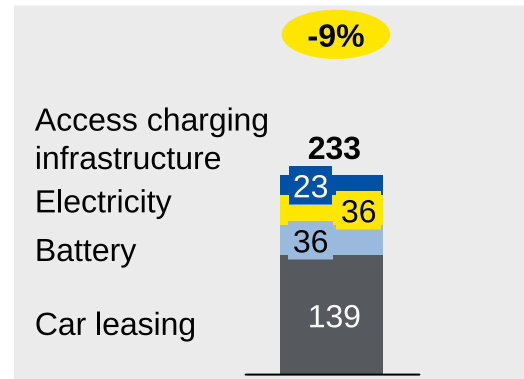
Volume market depends on relative lifecycle costs – starting in 2015

LIFECYCLE COSTS E-CARS VS. PETROL CARS, GROSS, 2015 [EURO/MONTHS]

Combustion engine	Electric vehicle – today's subsidisation	Electric vehicle with one-off bonus







Key assumptions

- Battery size: 20 kWh, battery price (net): 300 EUR/kWh (today: approx. 600 EUR/kWh)
- Leasing rate: 1.1%, purchase price electric vehicle without battery 12,500 EUR
- Mileage: 15,000 miles/a
- Fuel consumption per 100 km: Combustion engine 5.8 l, electric vehicle 13 kWh
- Consumption costs: 1.39 EUR/l or 0.22 ct/kWh
- Depreciation of battery over 5 years (0 EUR residual value)
- 5,000 EUR one-off bonus when buying an electric car
- CO_2 taxes: 7 EUR per g CO_2/km above limit of 100 g CO_2/km

Agenda

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B **Strategy/business model** – focus on combining electricity for cars and infrastructure services

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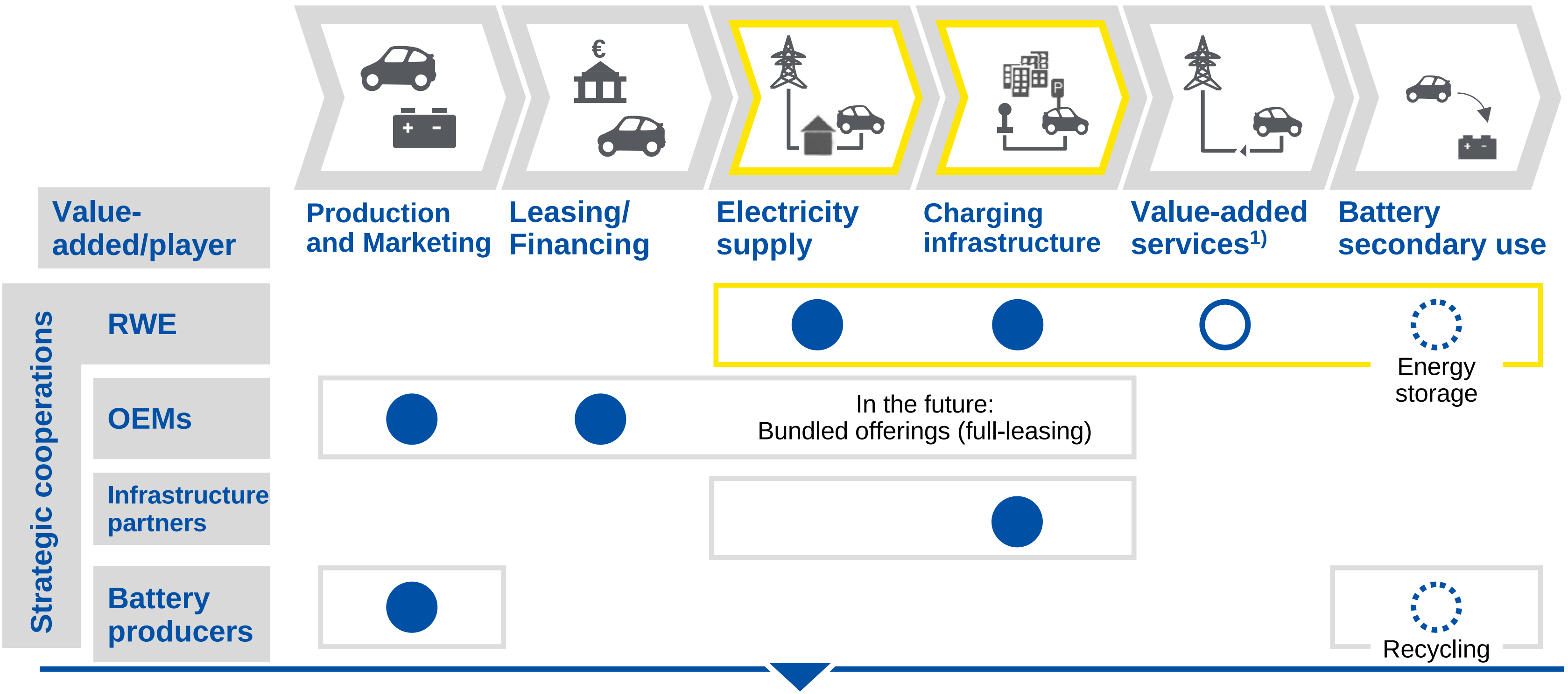
RWE with clear focus on core value-added: Electricity supply and infrastructure

RWE POSITION ALONG E-MOBILITY VALUE CHAIN



RWE Autostrom

Electric mobility offer for customers:
Access to public charging infrastructure, electricity supply and, in the future, value-added services

● Core business activities ○ Potential for value-added growth

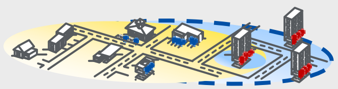
[1)] e.g. automatic billing, information services, partner network

Business model with focus on private and fleet customer business

SCHEMATIC BUSINESS MODEL

Mobility for private/fleet customers

Access to area-wide infrastructure, automatic billing



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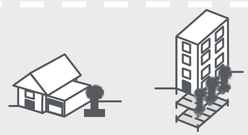
Individual RWE Autostrom charging box at home[1)]



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Supply of RWE car power

Test of tariff-rate schemes in Berlin and NRW

Partner offers for infrastructure providers (e.g. municipal utilities)

Provision & maintenance of charging posts

\+

Operation of charging posts (power supply, data management, etc.)

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Products and billing Autostrom customers

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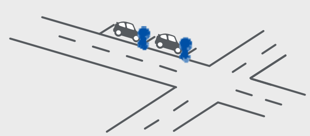
Co-branding and access to RWE's charging network

RWESW

Offers keep being updated

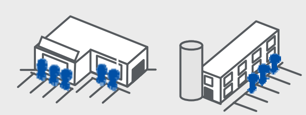
Installation of public access infrastructure

On public roads



Provision by RWE

Customer/employee parking areas at B2B partners (e.g. APCOA)



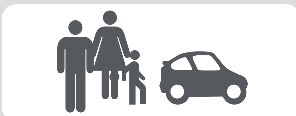
Cost sharing with strategic infrastructure partners

1) rsp. location fleet

Strategy relies on cooperative ventures and technology leadership

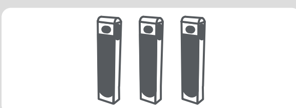
STRATEGIC GUIDELINES

A **OEM cooperation**



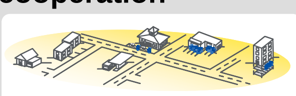
- Marketing partnerships with OEMs
  - Secure initially scarce electric vehicles
  - Market RWE car power directly when vehicles are purchased
- Marketing of e-mobility to private and fleet customers

B **Leadership technology**



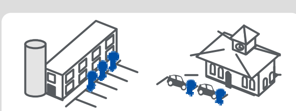
- Separate smart charging infrastructure
- Standardisation driven by electric car/charging station interface
- Competitive edge through comfortable charging infrastructure system

C **Infrastructure development/ cooperation**



- Winning over TOP partners for charging stations at the most attractive locations
- Participation of the partners in infrastructure costs
- Joint marketing / co-branding

D **Customer acceptance/ marketing**

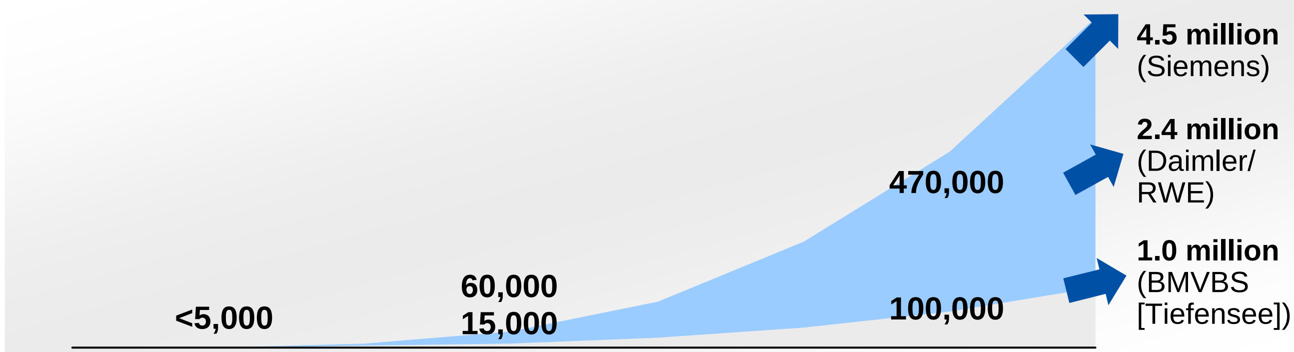


- Comprehensive information on e-mobility
- Concrete product offerings for end customers
- Targeted media and advertising work
- Marketing jointly with OEM and other partners

Market preparation with focus on metropolitan areas and fleet customers by 2012

MARKET PHASES AND RWE COMMITMENT

Market expectation electric vehicles Germany
[# vehicles in the market]



Year	2009 2010	2011 2012	2013 2014 2015	2016 2020
Phases	**1** **Marketing/ Positioning**	**2** **Expanded offer/ OEM partnerships**	**3** **Active marketing/ Market development**	**4** **Mass-market rollout**
Targets of RWE electro mobility	> Positioning as first mover > Test of technology and infrastructure	> Presence in relevant **metro-politan areas** > Attraction of **fleet customers** with OEMs	> Expanded **area-wide coverage** > Attraction of more **private customers** with OEMs > Secure market shares	> Expand separate business > Rollout charging infrastructure and offers

HOLD POINTS
> Reappraisal of market development
> Update of strategy if required

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EBIT depends essentially on price acceptance for infrastructure and number of customers

SENSITIVITIES E-MOBILITY EBIT 2015, NORMALISED

	Drivers	EBIT sensitivity (normalised to 1)
1	Price infrastructure contribution end customers	1.00
2	RWE customer portfolio	0.70
3	Charging station investments	0.20
4	Electricity price component end customers[1)]	0.07
5	Charging station revenue with partners[2)]	0.03

> Increase price acceptance and number of customers
  - Jointly with OEM/B2B partners
  - Media/advertising work
  - Convincing products/ value-added

> Optimise investments in charging stations
  - Reduce costs
  - Control number

> Note: Total electricity consumption p.a. for 2.5 million electric vehicles approx. 4 TWh

1) Gross earnings per kWh 2) Conservative assumptions for achievable revenues

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RWE first mover for e-mobility among energy utilities

SELECTED IMPLEMENTATION RESULTS (AS OF SEPTEMBER 2009)

A OEM cooperation

DAIMLER
RENAULT

- Daimler: Pilot Berlin – largest integrated pilot project worldwide
- Renault: Pilot end of 2010
- Ongoing talks with other OEMs

B Technology leadership

- De-facto standard interface electric vehicles/charging stations with 20 leading OEMs/ electricity utilities
- Already approx. 100 charging points installed (56 in Berlin, more locations)
- Applications made for 13 patents

C Infrastructure partners/customers

APCOA ADAC
SIXT SIEMENS
...

- Apcoa: Nationwide infrastructure development
- Sixt: Nationwide infrastructure development
- ADAC: Marketing, 50 charging stations across Germany
- Siemens: Nationwide infrastructure development, more talks ongoing
- Talks ongoing with other partners

D Politics

- Support by the Federal Government (Chancellor Merkel)
- Sponsored by Federal Economics Ministry
- More applications for subsidies have been filed (Federal Ministry for Transport, Construction and Urban Development)

Daimler and Renault on board as OEM partners

AUTOMOTIVE PARTNERS RWE

DAIMLER

e-mobility Berlin

- World's largest integrated project with implementation of vehicles, charging infrastructure, electricity supply
  - Test of technology and customer behaviour
  - 500 charging points 2009/2010
  - 100 near-series electric vehicles by mid-2010
  - More vehicle manufacturers in 2010
- Cooperation for standardisation and technology

RENAULT

- As from the end of 2010, joint pilot trial
  - Approx. 100 Renault cars
  - RWE charging infrastructure
- Joint product in mid-2011
  - Electric vehicle
  - RWE car power, RWE charging box, access to public charging posts
- Cooperation for standardisation, technology and new services

RWE with own smart charging stations and driver of standardisation

TECHNOLOGY LEADERSHIP

Key facts on RWE's charging infrastructure

> **Efficient charging posts** for the public: Designed for approx. 40 kW of charging output - vehicle/battery-specific 20 kWh battery charged in less than 1 hour

> **RWE car power charging box** for at home with approx. 20 kW charging output

> **Plug & Charge:** Payment by means of authentication through charging cable and dedicated control centre

> **RWE customer centre** to manage contract data and provide customer support on the phone

> **Standardisation** interface charging station/electric vehicle:
- Process initiated with over 20 leading OEMs and leading energy utilities
- Hardware and software standards (e.g. plug connector, protection, communication protocol)

As of today approx. 100 charging points installed across Germany - important infrastructure cooperation established

DEVELOPMENT CHARGING INFRASTRUCTURE

Public access charging points

Berlin	**56**
Essen	**28**
Dortmund/ Frankfurt/ Hamburg/ others	**24**

> By end of 2010 demonstration charging infrastructures planned for all metropolitan areas in Germany

Charging points at B2B partners

Current B2B partners:

APCOA "The World Of Parking"

ADAC

SIXT rent a car

Berliner Wasserbetriebe

SIEMENS

> Cooperation talks with other partners (e.g. retailers, fast food restaurants) ongoing

Join us in demonstrating the energy to lead!

… in the cockpit of a Tesla Roadster!