

A new Role of Utilities within Energy Transition

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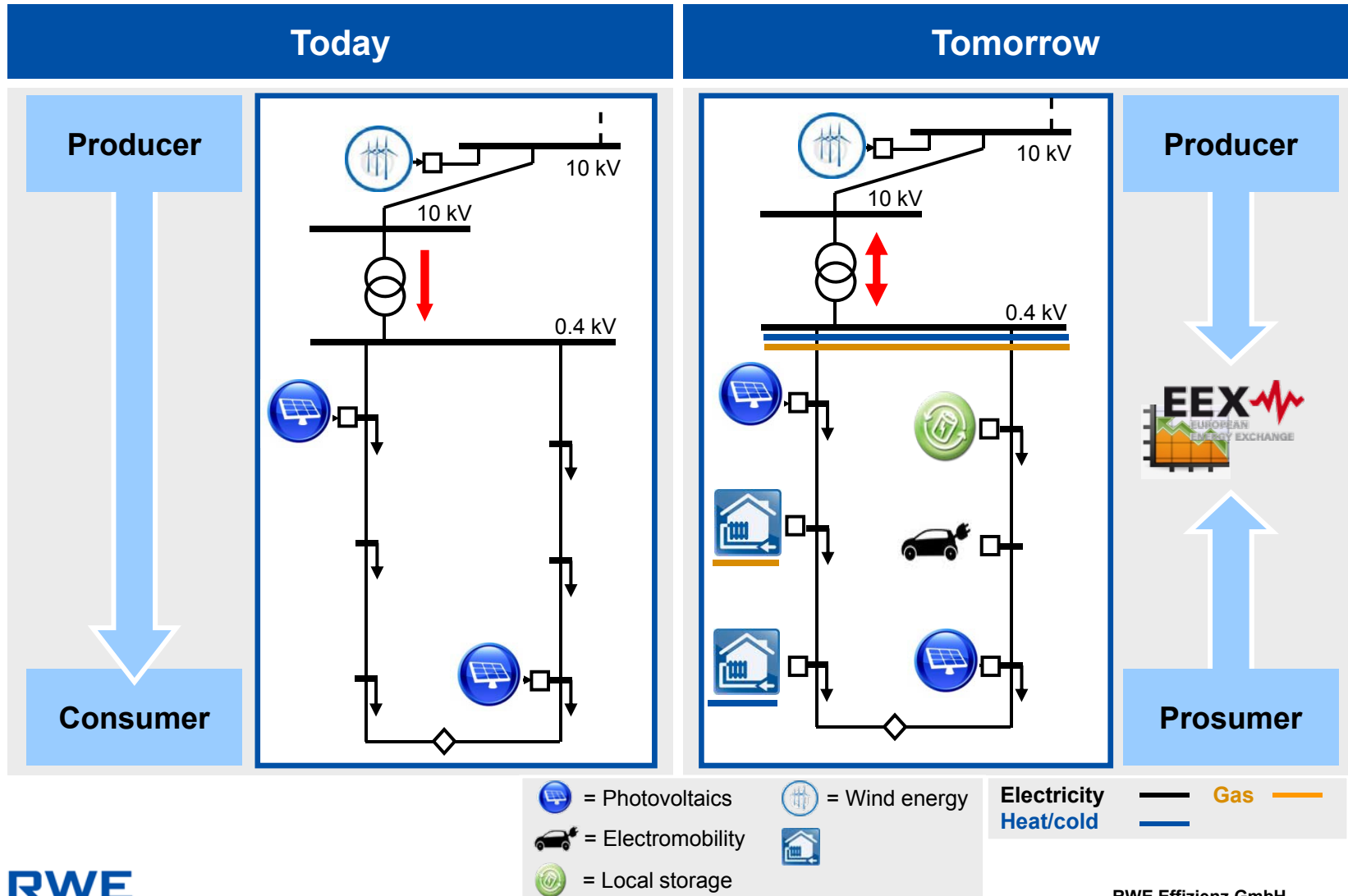
RWE Effizienz GmbH

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100 year old, neatly arranged value chains are in for a reshuffle



Changes in the Value Chain

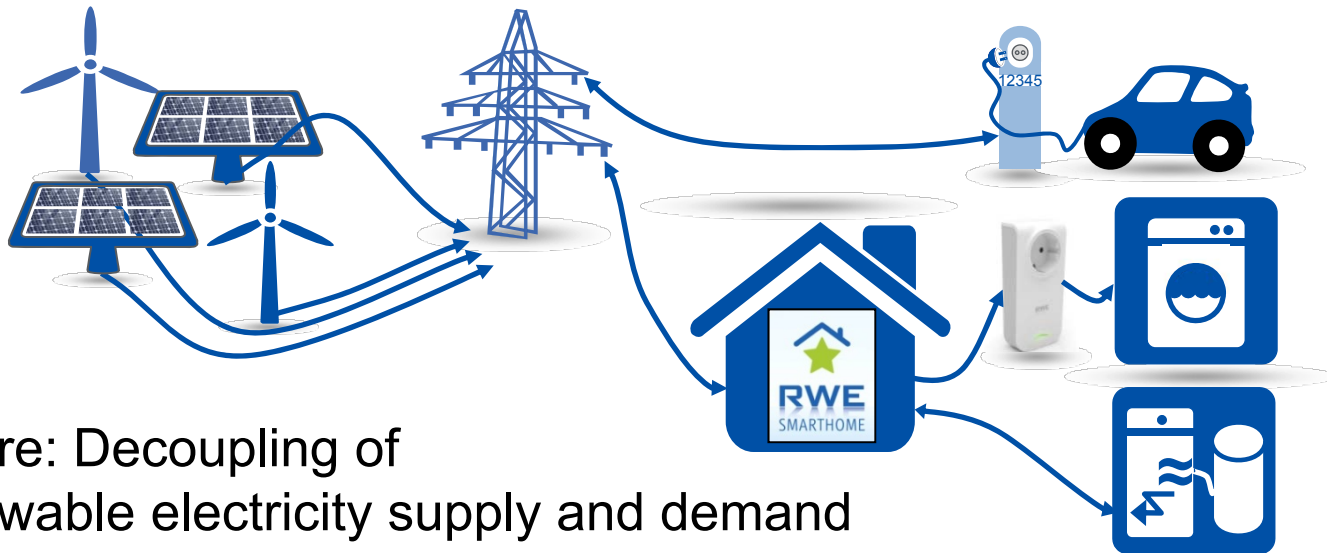
Decentralization induces structural change

Past: Demand determined the electricity generation



Competences: „traditional Utility“

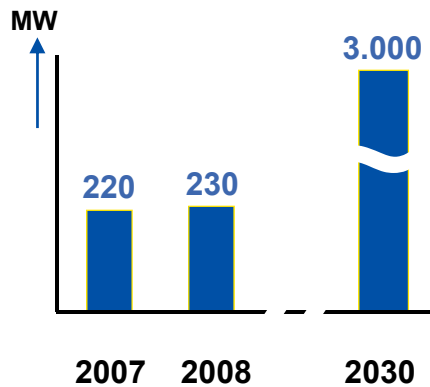
„smart“: decentral and sophisticated



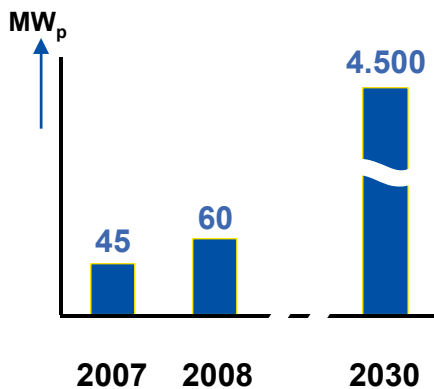
Future: Decoupling of renewable electricity supply and demand

Main Changes and Challenges

Decentralization by distributed generation



Wind power



Photovoltaics



Challenges

- > Local phenomenon because of different types of primary energy resources
 - > Primary energy resources like wind are far away from the major demand areas
 - > Volatile feed-in causes local bottlenecks in the grid
 - > Supply and demand are not correlated
- **Technical challenges like voltage level, reactive power or capacity shortages have to be solved**

Origin: Pfalzwerke and juwi 2007

Energy Efficiency is of high Relevance

New political and societal framework

Political factors

Politicians are addressing energy efficiency more strongly in communication and legislation and are increasing the pressure in the market



Economic factors

Ever scarcer resources and rising energy prices are boosting the demand for energy efficiency



Market

Energy-efficient products are becoming ever more attractive on the supply and on the demand side

Public / Media

Media are driving the public debate surrounding energy efficiency



Technical factors

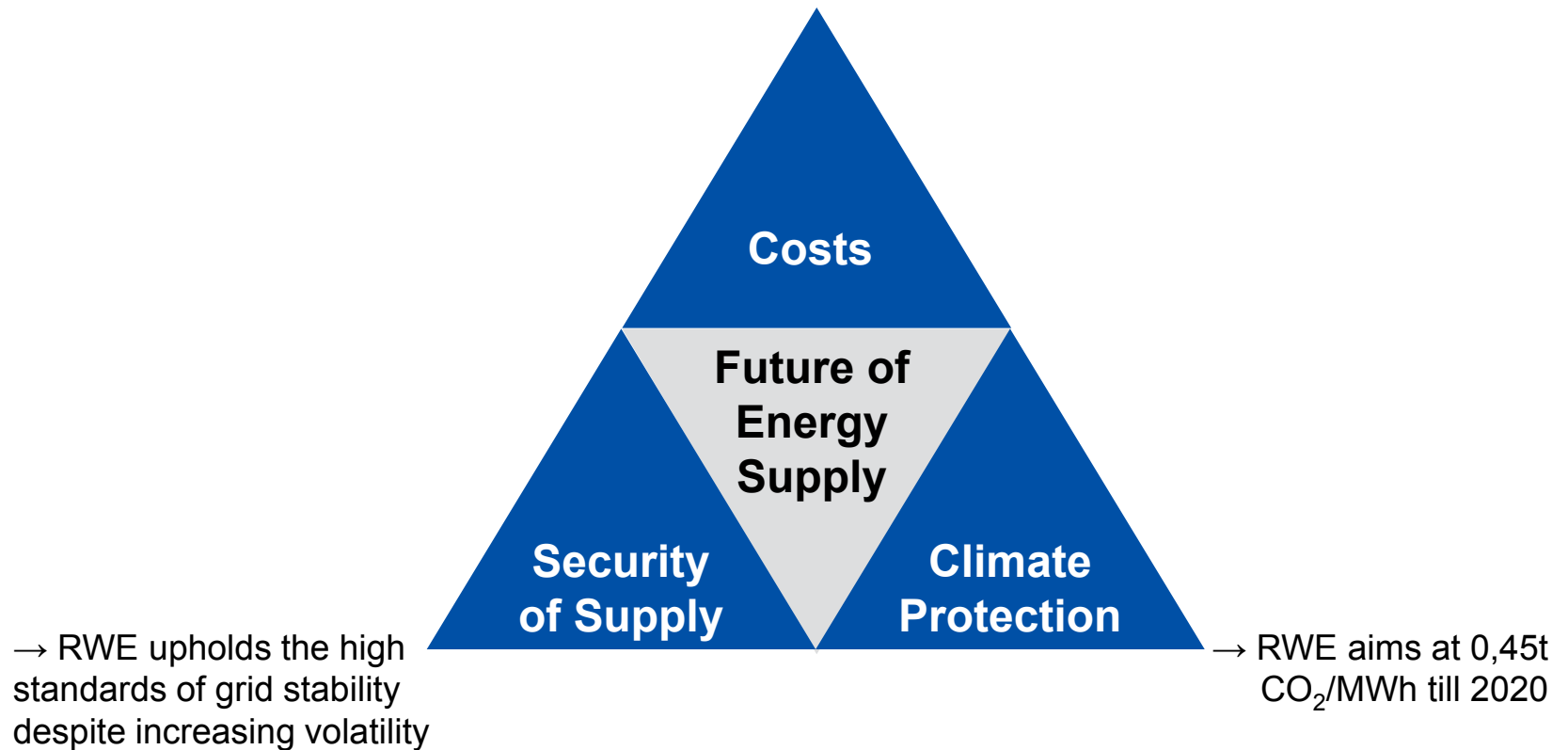
Greater use of renewable energies, as well as technological progress, are forcing efficient handling of energy



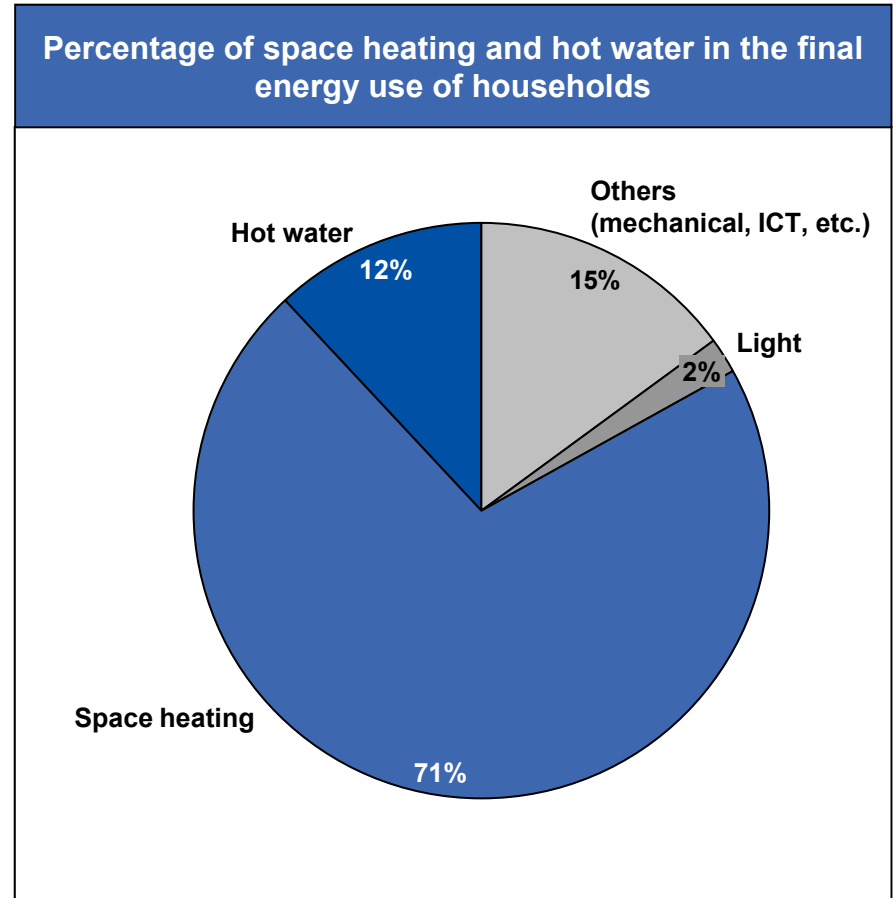
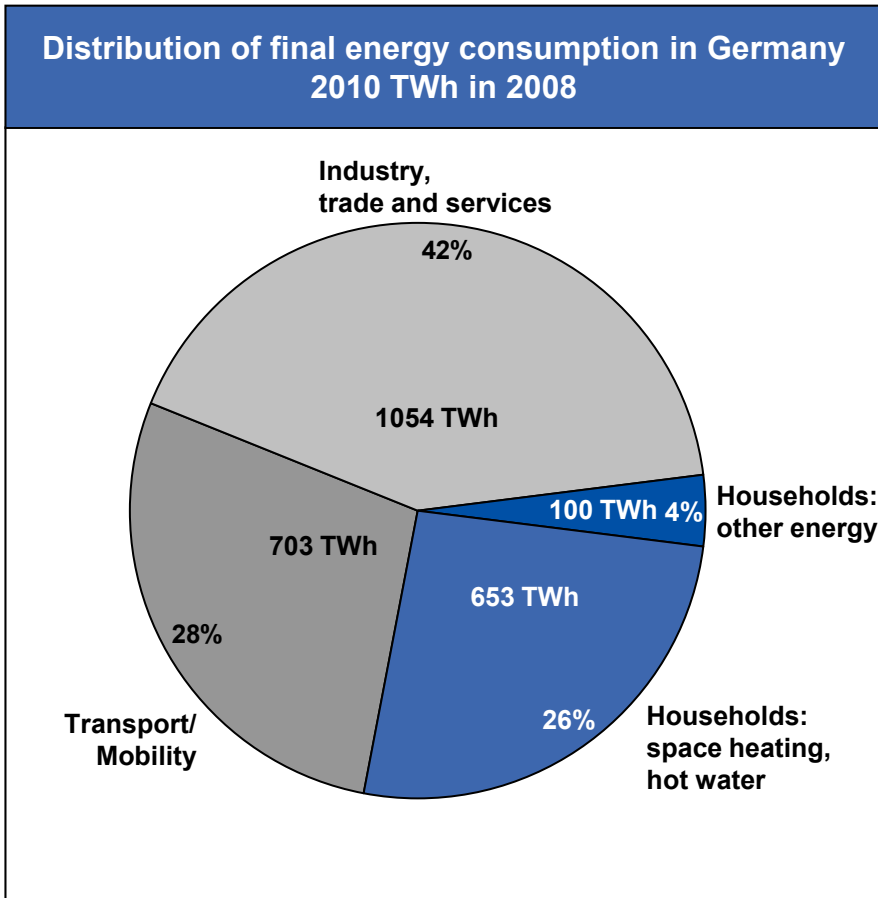
Transition of RWE

Goals for RWE as Utility

→ RWE is a still prospering company offering highly attractive products to the customer along the value chain



30% of final energy consumption (D) derived from Households are a huge potential for Energy Efficiency



Source: BMWI, updated 05/2010

RWE Effizienz provides standardised Mass Market Solutions

Energy efficiency sector

Standardised energy efficiency solutions

- Simple, uncomplicated solutions with comprehensible promised benefits
- Requirements on energy saving analyses, remediation and financing suggestions
 - Competition with manufacturers and tradesmen
 - Per capita savings potential slight
- Expected consumer: Households interested in energy saving measures

➔ **Standardised, smart solutions / products ("product business")**

Individual energy services

- Customized plans
- Requirements on "contracting" and services
- Competition with energy suppliers, energy service suppliers and infrastructure companies
- Primarily long-term business ("contracting")
 - Per capita savings potential high
- Expected consumer: Commercial customers with a high energy demand for production, industrial or administrative buildings, municipalities

➔ **Individual, specific, complex solutions ("plant business")**

RWE Efficiency

Energy efficiency for mass markets

RWE has the **energy to lead** in the field of energy efficiency through **innovations**

A change of image through energy-efficient **innovations** with **growth** potential

On the way to success with three main product lines and further new plans

Electromobility



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Smart home



Product development

Market research

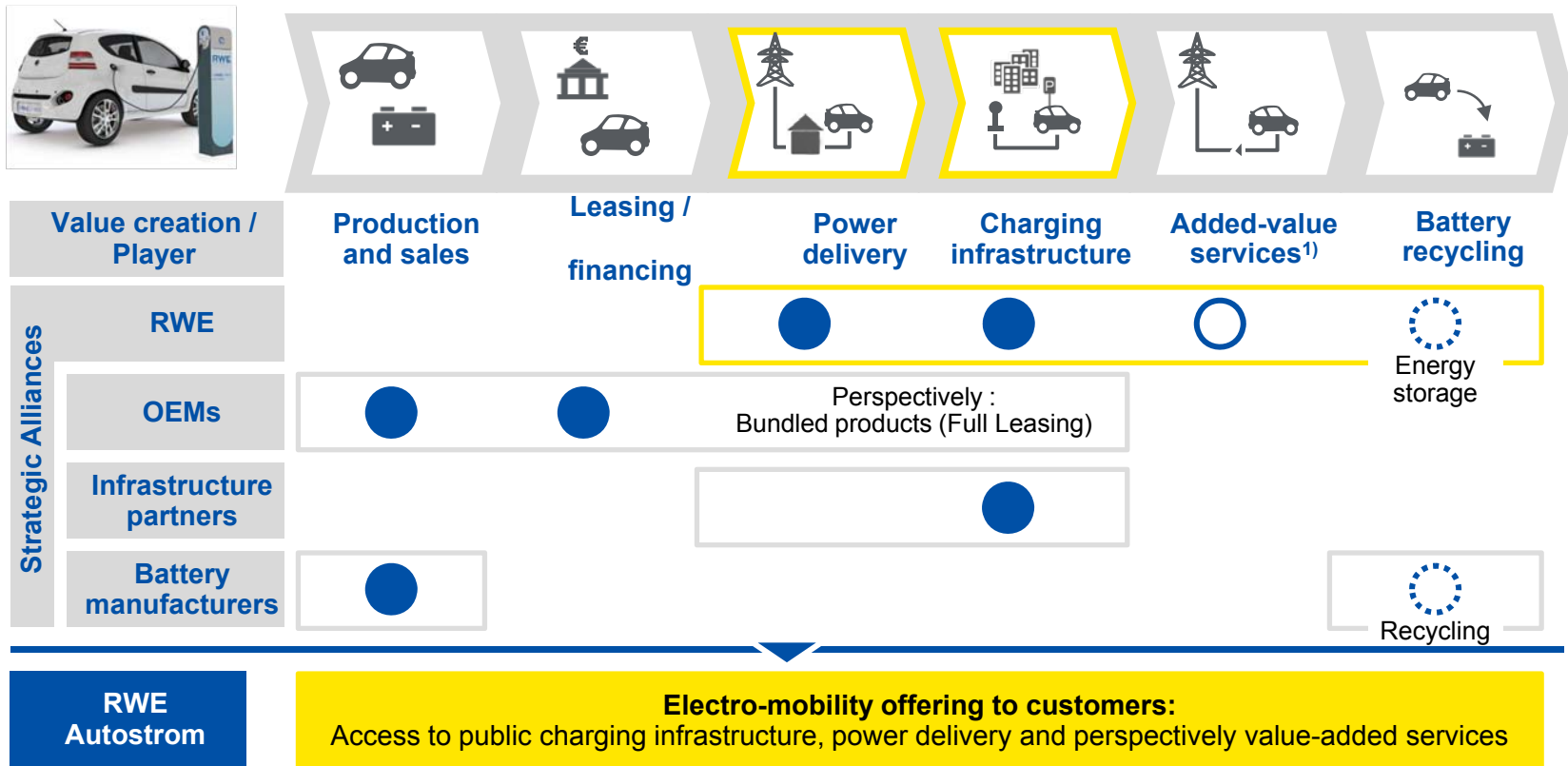
Surrounds management

Our Role as RWE Effizienz

- > **Service provider for energy efficiency infrastructure** → to develop and to market standard products
- > **Integrator** → to consolidate efficiency plans in the RWE Group, to link smart technologies
- > **Innovator** → to develop new products for RWE affiliated companies and own sales and marketing (“Think tank”)

Example for Energy Efficiency of RWE Efficiency

e-Mobility extends the traditional value-chain

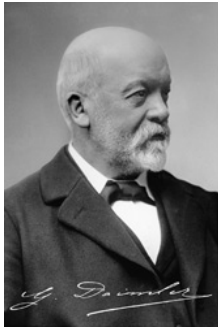


● Core business activities ○ Potential to extend value creation

¹⁾ E.g. automatic billing, info services, partner network

Smart Mobility: the automotive industry and energy business are seated at the same table for the first time

... or is it all just a hype?



“The world-wide demand for motor vehicles will not rise above one million - one reason being the lack of available chauffeurs.”

Gottlieb Daimler (1834 - 1900)



"I believe in the horse. The automobile is only a temporary phenomenon."

Emperor Wilhelm II (1859 -1941)

We already set standards for fast charging – but will these become the market standards?

Fast



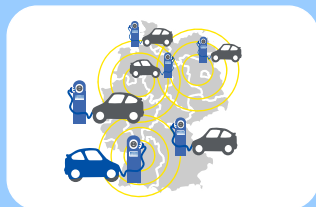
- > Full charge with RWE charging technology in under 1 hour¹⁾
- > Public charge column for ca. 44 kW¹⁾ charging capacity with two charge points
- > Quick-charge box for wall installation at home ca. 22 kW¹⁾
- > High safety standards

Child's play



- > Plug & Charge
- > Automatic authentication²⁾ without PIN
- > Transparent settlement with itemised billing per post to your home or online
- > Charging can be interrupted at all times to continue a journey
- > Public charging: work place, car parks, shopping mall

Networked



- > Intelligent RWE charging infrastructure is roaming-compatible
- > Charge any car at any column throughout Europe
- > New information services via intelligent charge column
- > Integration of electromobility in Smart Grids
- > Vehicle-to-Grid: electric cars as local buffers for green electricity

1) Actual charging capacity depends on vehicle and battery technology as well as local distribution grid.

2) For RWE Autostrom customers and subscribers to the RWE roaming programme.

There is a great demand for energy efficiency advice – to date more than 3 million visitors to "energiewelt.de"!



Free information platform to plan and realise energy efficiency measures for end customers and to market energy efficiency offers for tradespeople and manufacturers







Everyone's talking about "Smart" – but who brings the various components together ?

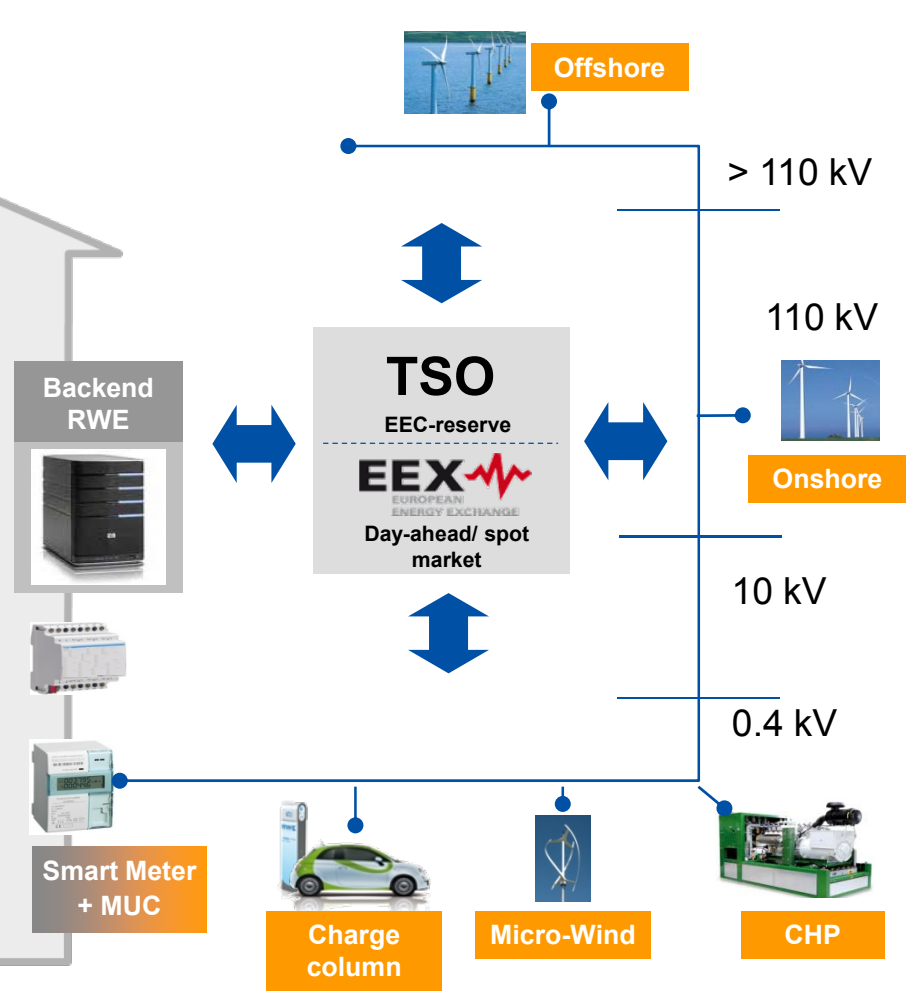
Smart home

Intelligent network

Controller = multifunctional control unit

- 1 **Smart Home** 
- 2 **E-Mobility** 
- 3 **Electrical devices** 
- 4 **Heat, storage, local generation** 
- 5 **Aggregator**

Intelligent rates • Pooling • EEC-reserve energy • value added services



Example for Energy Efficiency of RWE Efficiency

Smart home – a clear benefit for the customer

Our unique selling point :

- Plug & Play Standard
- Intuitive installation and operation
- Radio-based, i.e. suitable for all (tenant and owner, new and existing buildings)
- Affordable for all - mass marketable



Smart home can be supplemented by value added services and services from RWE market partners

- conditions oriented heating maintenance
 - virtual power plant
 - etc.

“Less energy consumption, more electricity” Energy efficiency supplements the utilities strategy!

4 examples of functioning substitution ...

Heat Pump

Substitution of natural gas and heating oil for electricity as primary energy source for heating.

Result: CO₂-reduction through more efficient heat generation and use of renewable energies

E-Mobility

Substitution of crude oil (petrol, diesel) as a liquid fuel, for electricity.

Result: CO₂-reduction through the use of renewable energies and higher efficiency (example: 1 kWh equivalent in diesel is enough for ca. 1.5-2.5 km, whereas with an e-car ca. 6.5 km)

Building renovation

Improved thermal insulation reduces the demand for heating energy in the building.

Result: but better insulation also calls for more air conditioning / automated ventilation in summer for the removal / exchange of air.

Micro-CHP

Cogeneration of heat and electricity in private households.

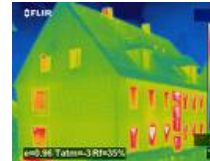
Result: CO₂-reduction through local usage of heat as by-product and grid smoothing by decentralised & flexible power generation

Outlook on enhanced System Solutions

Overall assessment performed with the following criteria:
potential, relevance, economic savings potential, bundling and image

Fields of action include:

- > Smart meter
- > Boiler, circulation pump, heat pump
- > Building renovation
- > Lighting
- > Innovative "contracting" for photovoltaic and micro CHP
- > Fridges/freezers for industry, trade and services as well as municipalities



Summary

- > **New technologies, new political requirements and new competitors result in greater complexity**
- > **We at RWE place emphasis on the application of Smart Technologies at optimal costs**
 - to anticipate the future
 - to plan grids & homes intelligent
 - to select the right “smart technology”
- > **Innovation demands a close partnerships in Research & Development**
 - ➔ Our partner of choice is the „**Fraunhofer inHaus-Zentrum**“ as strong industrial partners cooperate in mutual interest for common success in innovative product solutions
- > **Urban planners, utilities, architects and owners are requested to cooperate at an early stage!**
- > **A continuous process for innovation will deliver enhanced System Solutions**

THANK YOU VERY MUCH
FOR YOUR ATTENTION AND
LET'S COLLECTIVELY BE:

