

Neue Geschäftsfelder – Nutzen der neuen Möglichkeiten

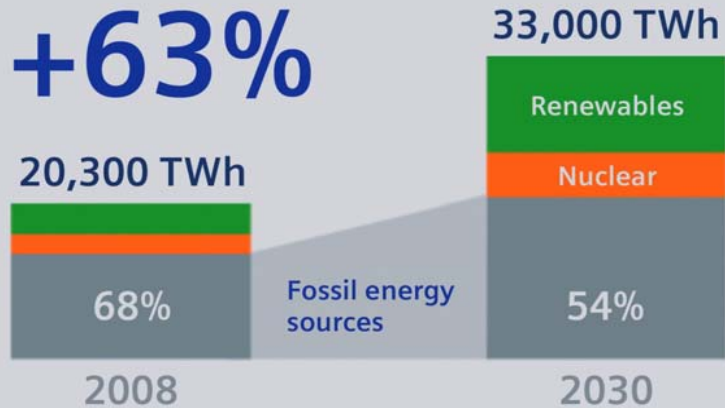
A 3D architectural model of a smart city is shown on a dark grey base. The model includes various elements: a wind turbine on the left, a solar panel labeled 'Solar Panel' with 'SIEMENS' branding, a central building with a blue grid facade and 'SIEMENS' branding, a glass water tower, a modern office building, a green park area with trees, and another wind turbine on the right. Dotted lines connect the various components, suggesting a networked system. The base of the model has 'SIEMENS' branding on the right side.

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Electronics, Energy & Environment

Münchner Kreis
Mitgliederkonferenz, 17.11.2011

Urge for more electricity and increasing fluctuation of power flow in the electrical grid

Growing demand



High share of renewables

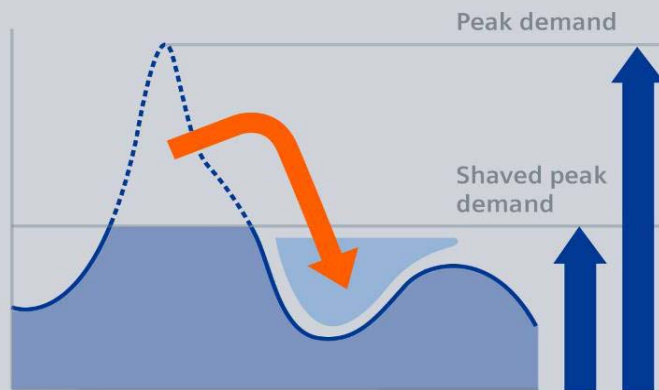
EU Agenda:

18% electricity from renewables

38% installed capacity of renewables

2020

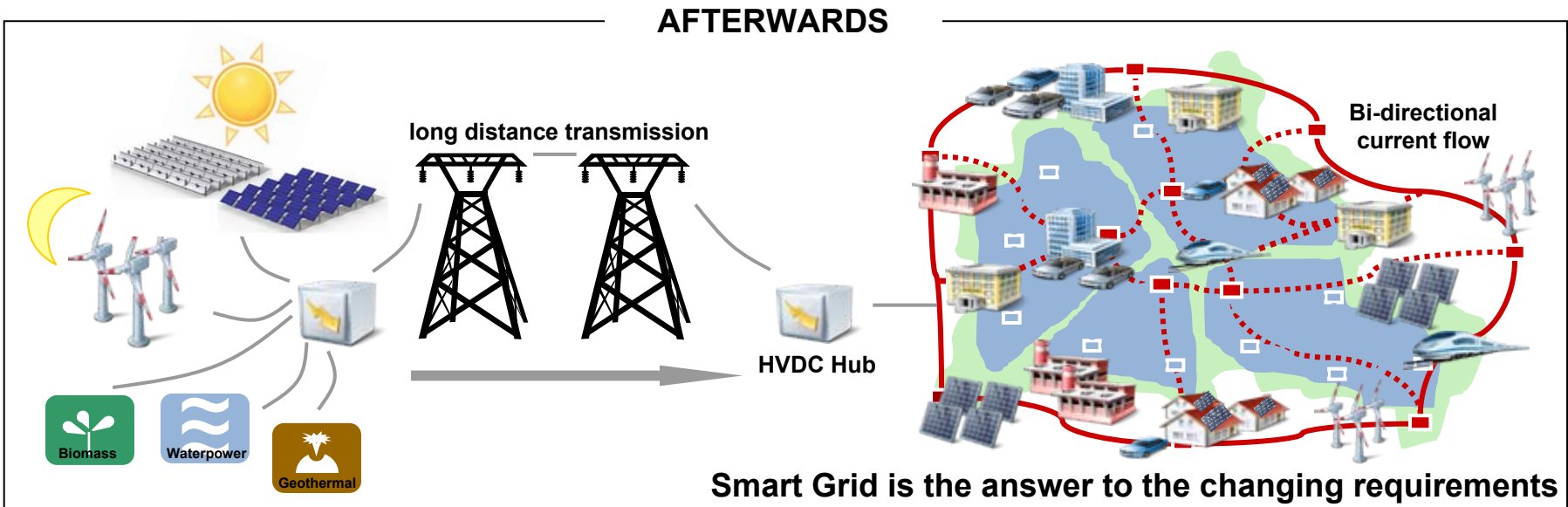
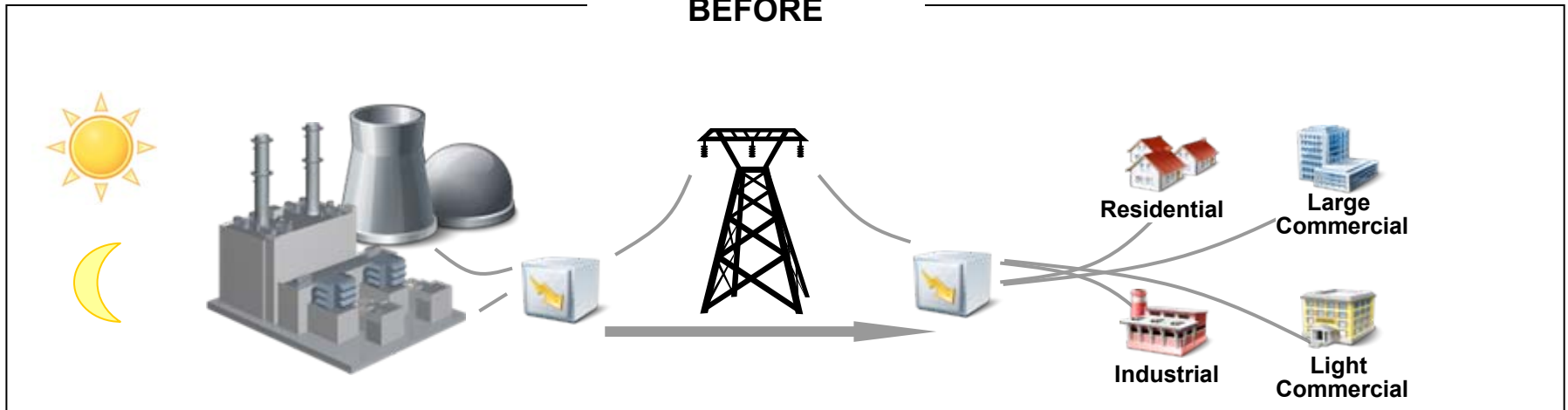
Stochastic power flow



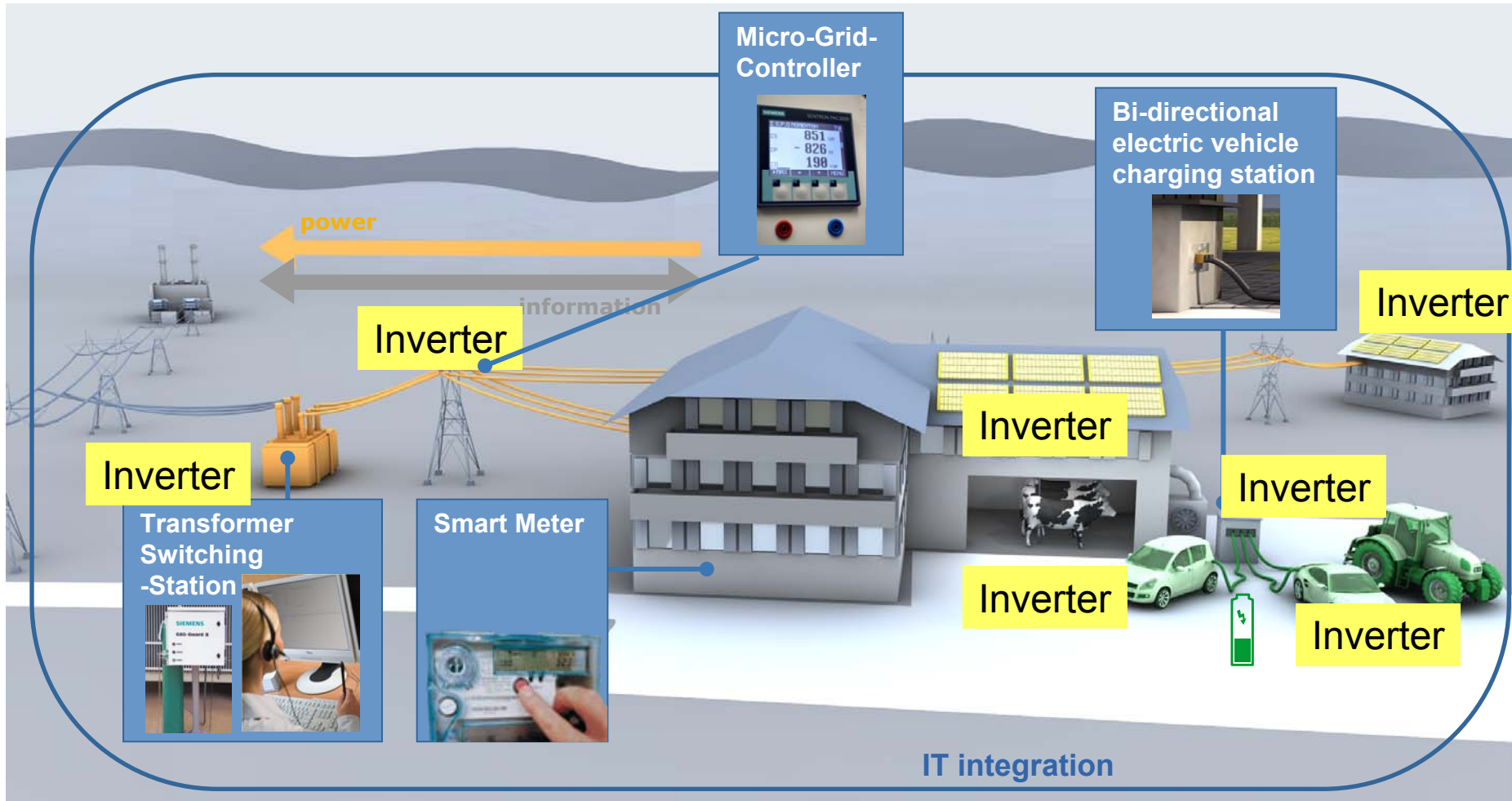
Increasingly distributed generation



Our customer's world is in transformation – From “*generation follows load*” to “*load follows generation*”



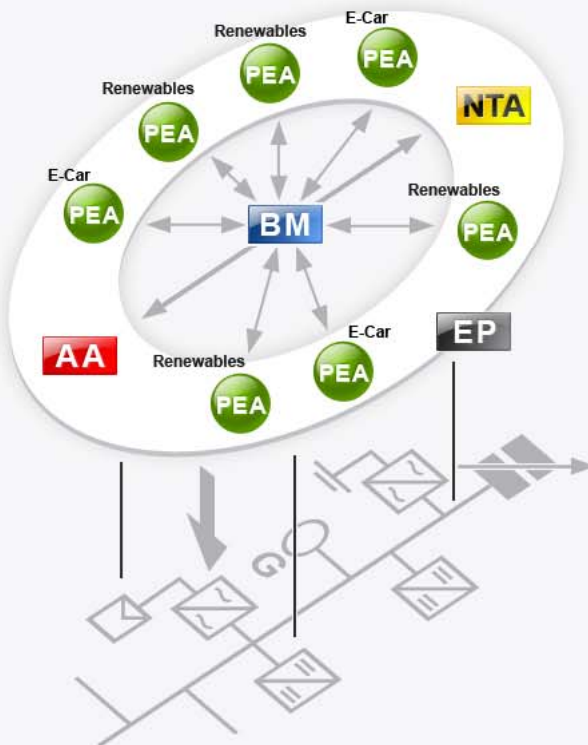
Intelligent components enable the transition from conventional grids to Smart Grids



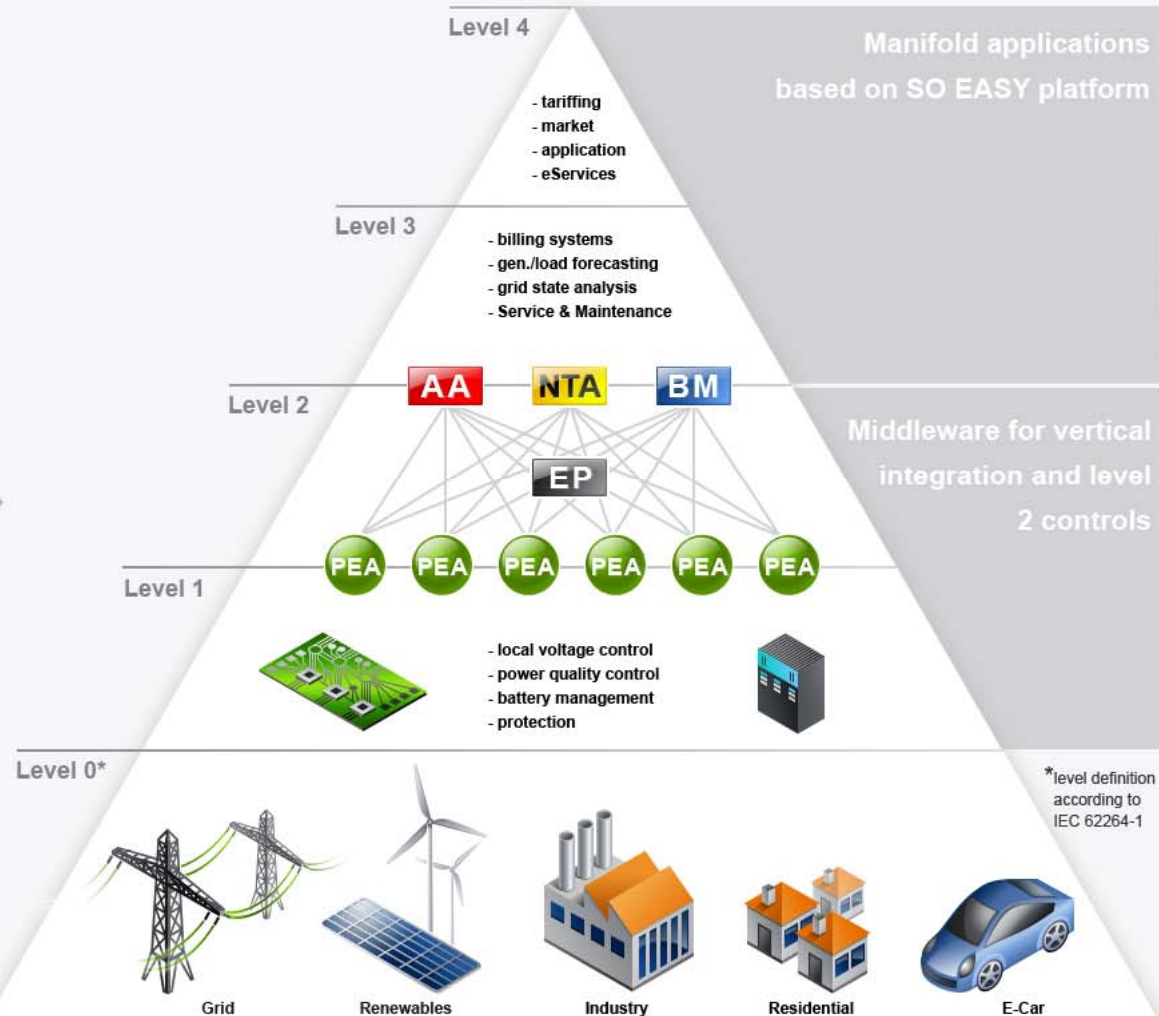
On the Way to an Integrated Energy System

SO EASY Solution

SO EASY, the Self Organizing Energy Automation System of Siemens provides one platform for solving different automation tasks like state estimation, balancing and voltage control.



Automation & ICT as a Key Enabler



The electric car is an opportunity in developing innovative solutions for components and drive train

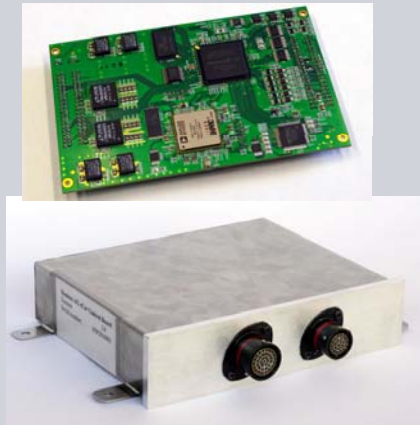
axle drive



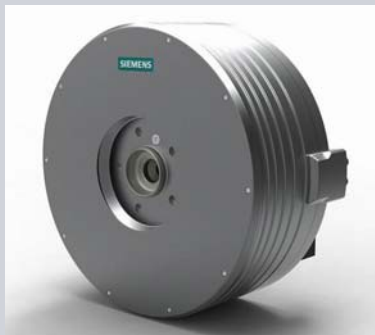
integrated inverter & charger



controller

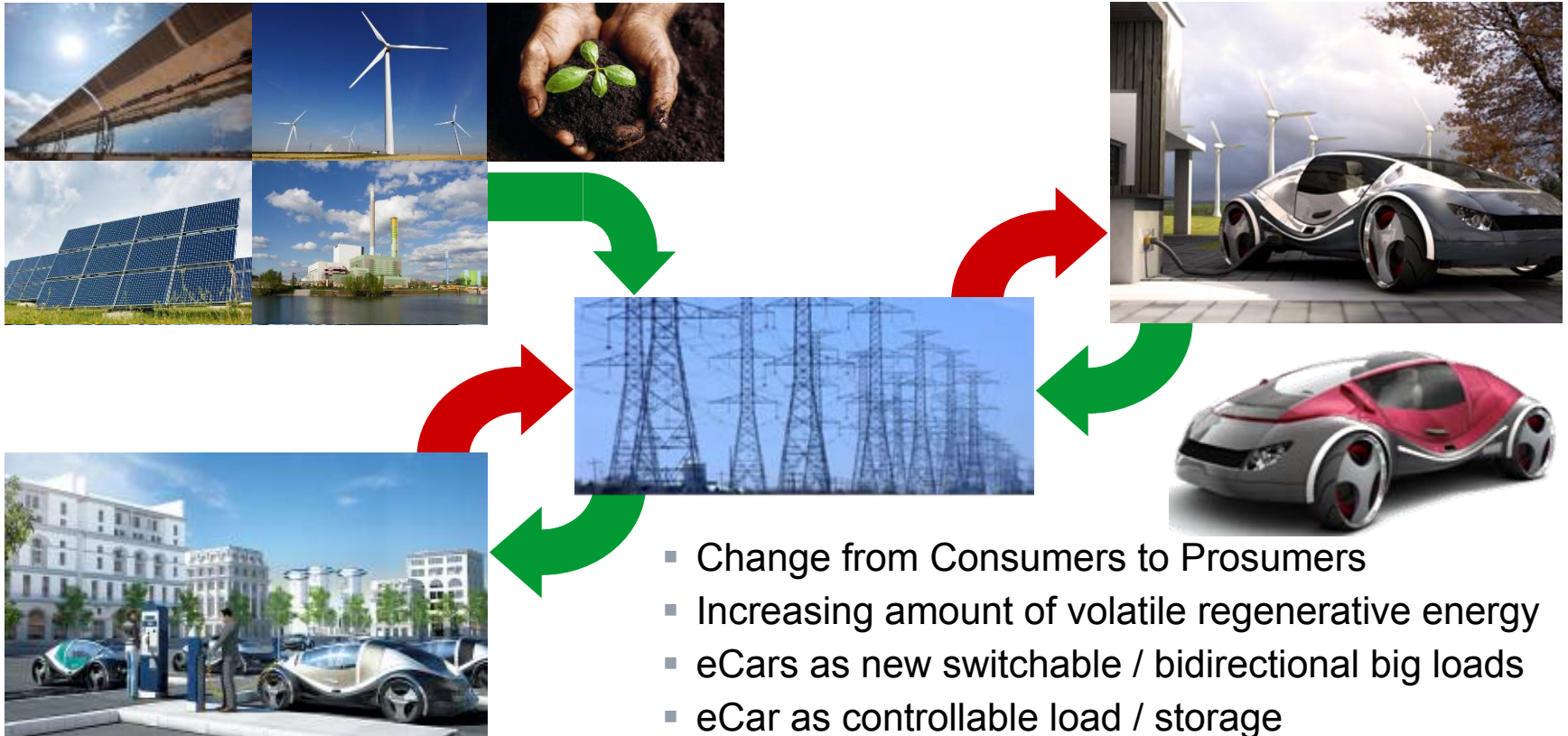


**direct drive
(in-wheel)**



Increasing functionality and intelligence in automotive systems

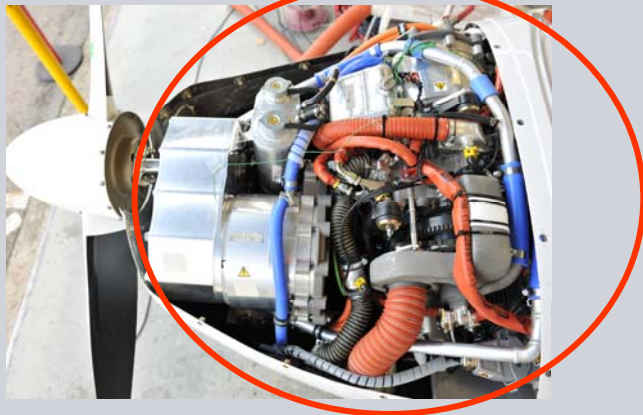
The electric car is changing the relation between automotive industry and utility



Increasing intelligence in future energy grids

Integrated electric drive train for aircrafts - one step towards efficient and low-emission air transport

SIEMENS



Benefits of serial hybrid electric airplane:

- reduced fuel consumption
- low noise / low emission
- more efficient plane topologies
- increase in safety due to redundancy

Requirements:

- ultra-light components
- high reliability
- better performance

Partners:

- Diamond Aircraft Ind.
- Austro Engine
- EADS
- Siemens

Milestones:

- Project started on 05/2010
- Flight demonstration of serial hybrid electric airplane DA36 E-Star at Le Bourget Airshow 2011

Energy storage technologies available in Germany



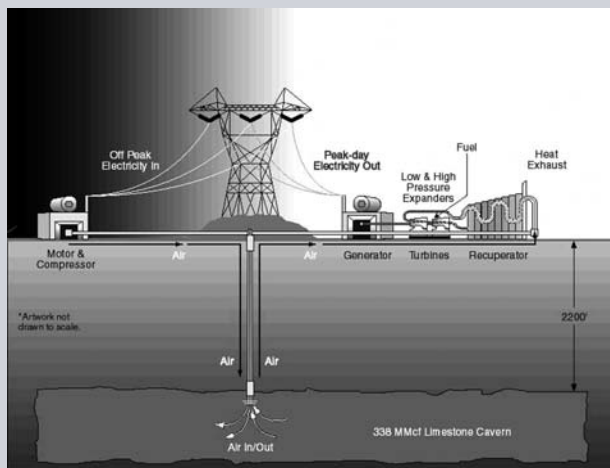
Pumped hydro



Natural gas cavern



Gas vessel



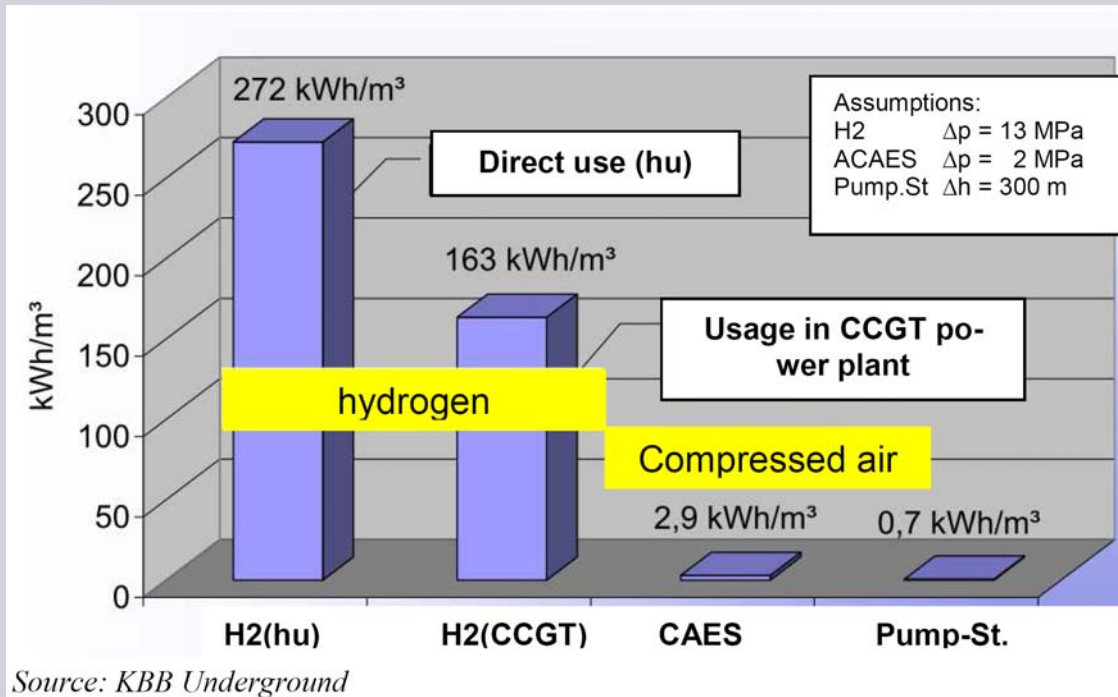
CAES storage facility



Gas grid
Foto: RWE

Energy storage technologies

Energy density of storage medium

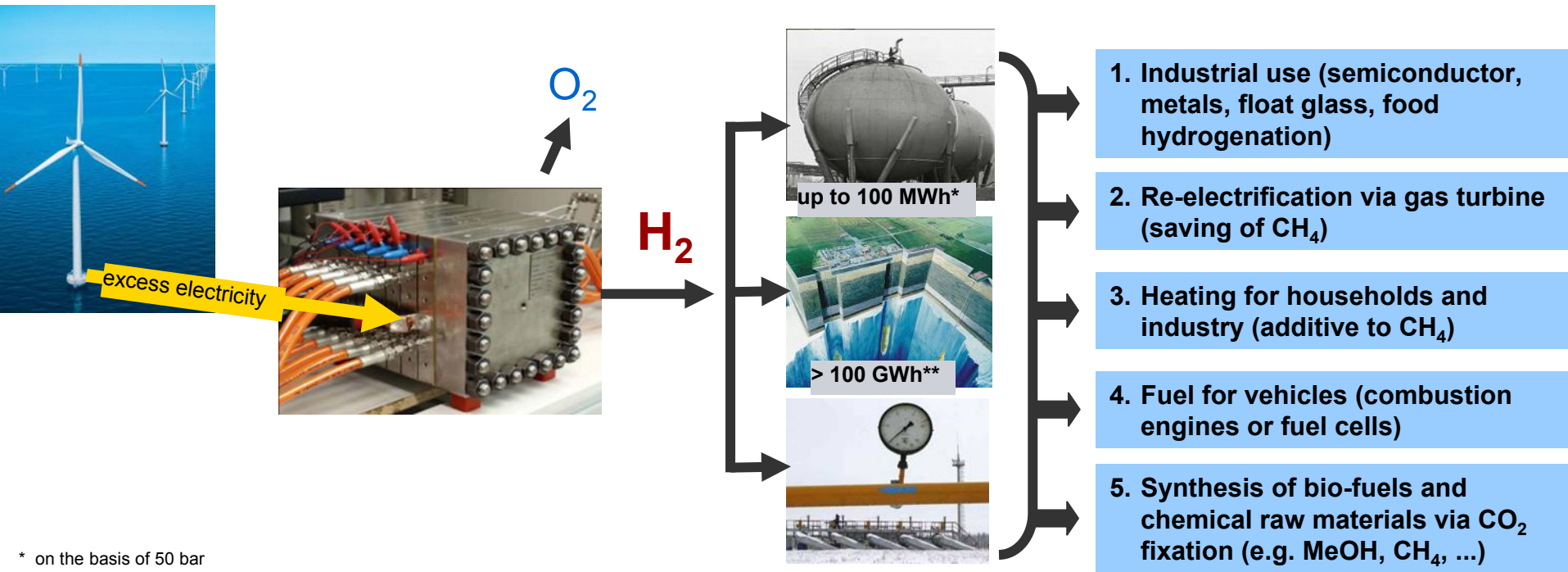
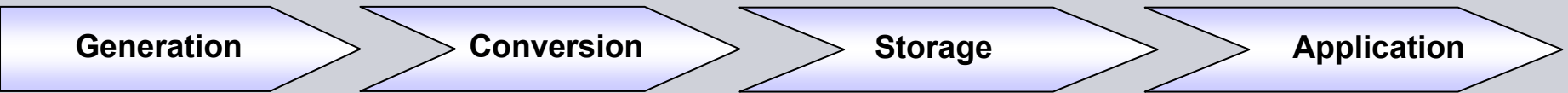


- The established pump storage technology has a very low energy density
- The energy density of CAES is 4 times higher
- Hydrogen appears technically as the most promising storage medium
- Cost and economic aspects of H₂ production have a strong impact on the development of industrial-scale storage facilities

Key components for an economic hydrogen storage are electrolysers with

- ▶ low-cost,
- ▶ high-efficiency and
- ▶ long-lifetime

Hydrogen as storable energy carrier – Green production from excess renewable energy



* on the basis of 50 bar
 ** on the basis of 50 bar; more than 300 bar demonstrated

Hydrogen is a multi-functional and easily storable energy carrier

Vielen Dank für Ihre Aufmerksamkeit!

Fragen?

Earth at Night
More information available at:
<http://antwrp.gsfc.nasa.gov/apod/ap001127.html>

Astronomy Picture of the Day
2000 November 27
<http://antwrp.gsfc.nasa.gov/apod/astropix.html>