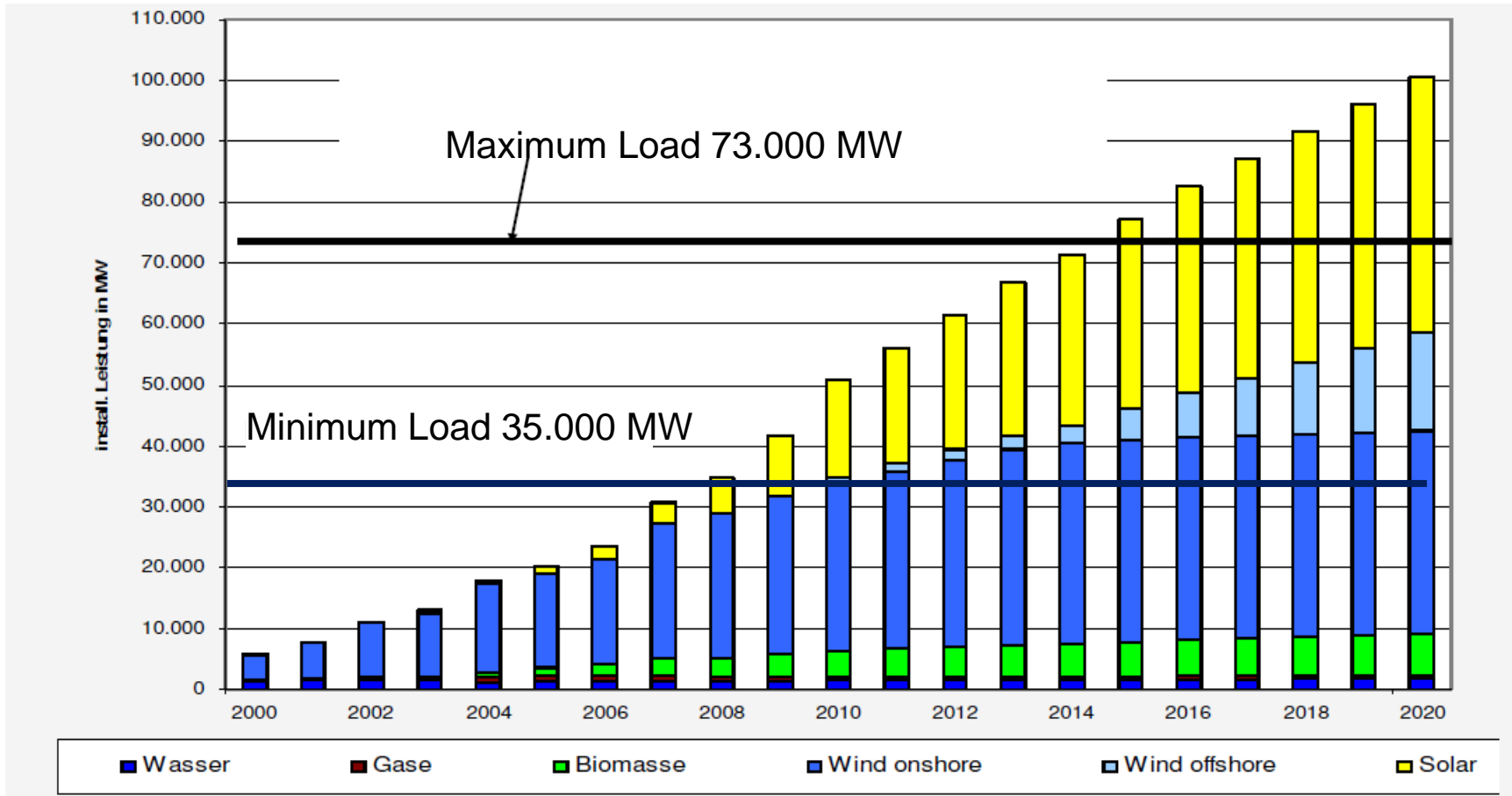




## Options for integrated Systems

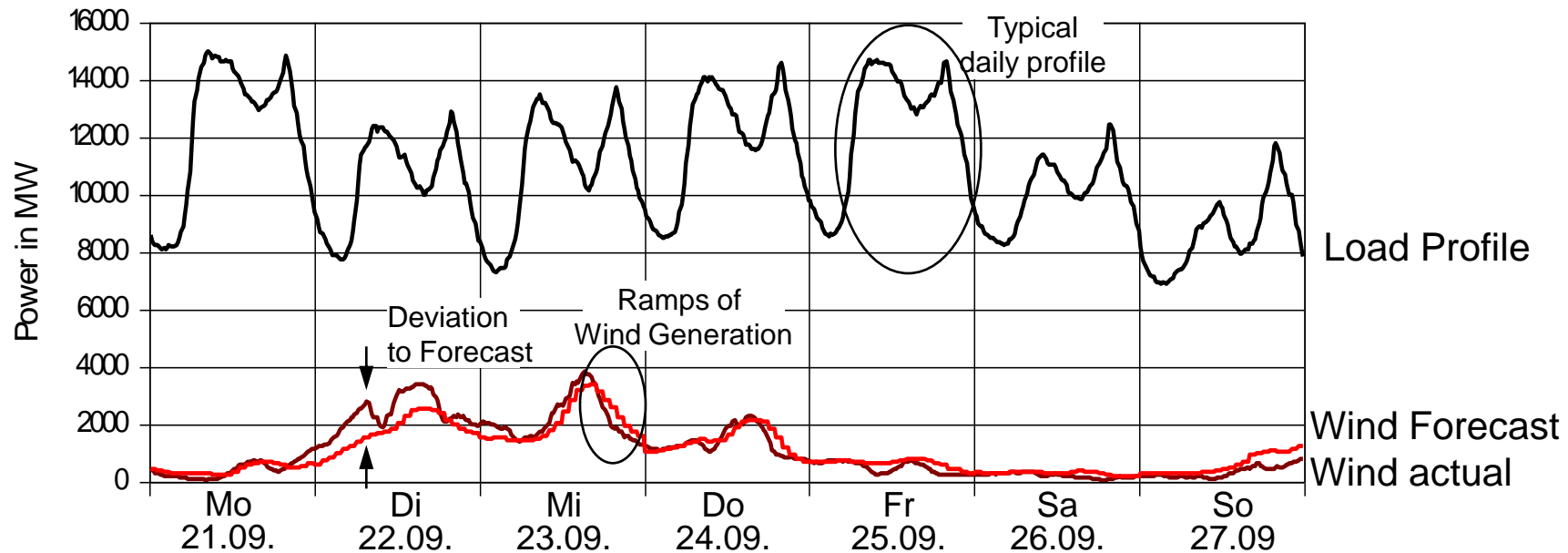
Dr. Wolfgang Woyke  
E.ON Energie AG, Asset Management  
iea, Paris February, 15th 2011

# Challenge Renewable Energy Systems: Actual Forecast



# Feed in of Wind Energy (2009)

High Voltage Grid of Transpower GmbH (21.-27. September 2009)

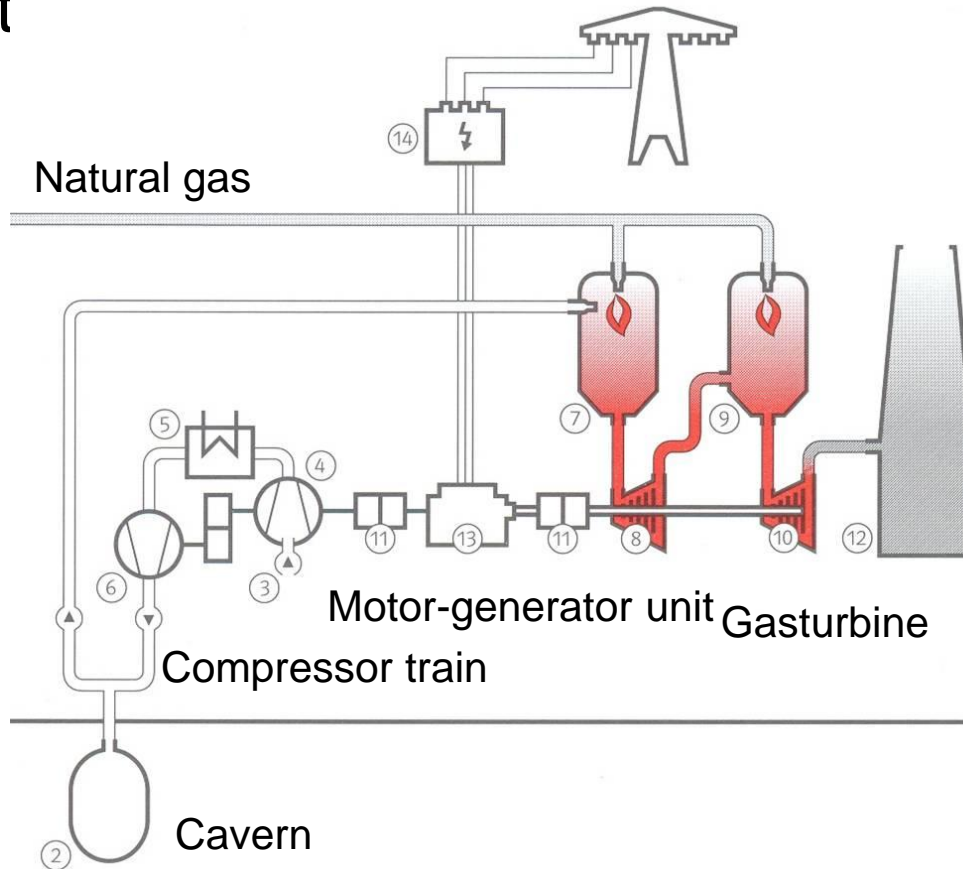


## Backbone of Storage Portfolio: Pumped Hydro



- Mature Technology
- About 6700 MW in Germany (912 MW owned by E.ON Energie)
- Options on upgrading sites

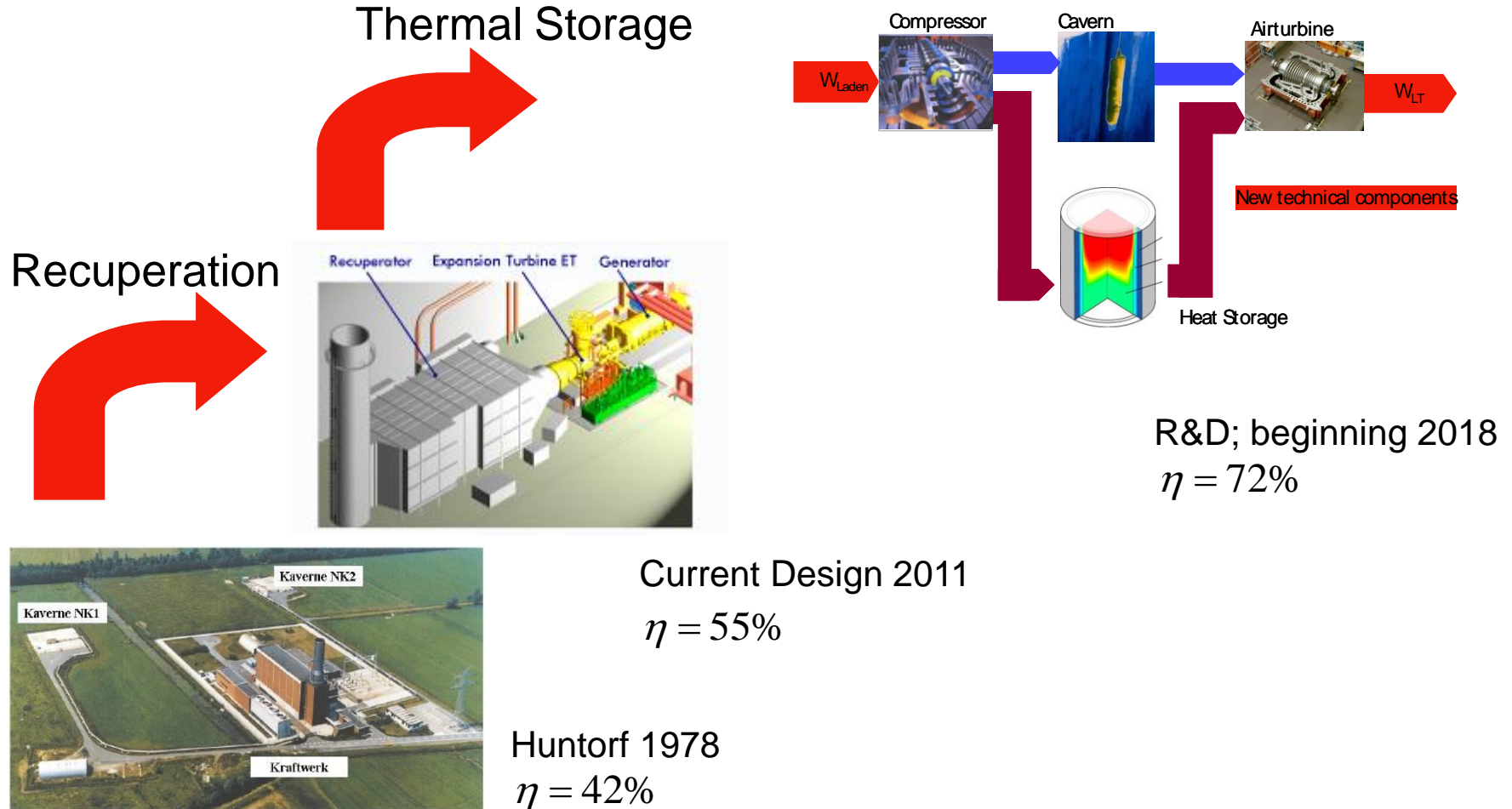
# Option Central Facilities: Compressed Air Energy Storage



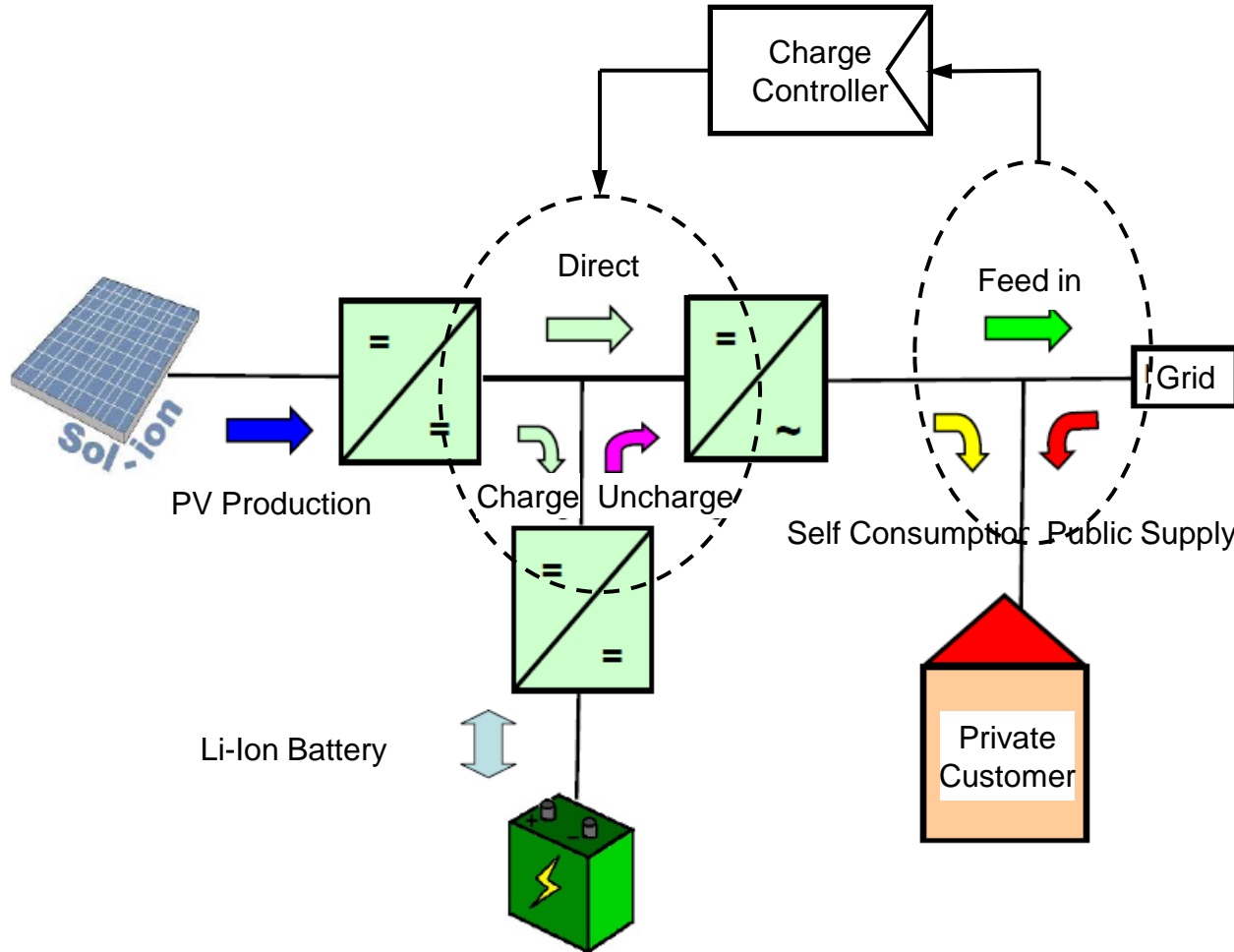
## E.ON Power Plant Huntorf:

Capacity: 321 MW  
 Construction: 1978  
 Fuel: Natural Gas;  
 Compressed Air  
 Efficiency: 42%

# Roadmap of Compressed Air Energy Storage



# Private Household Battery Application – Project Sol-Ion



## Running activities:

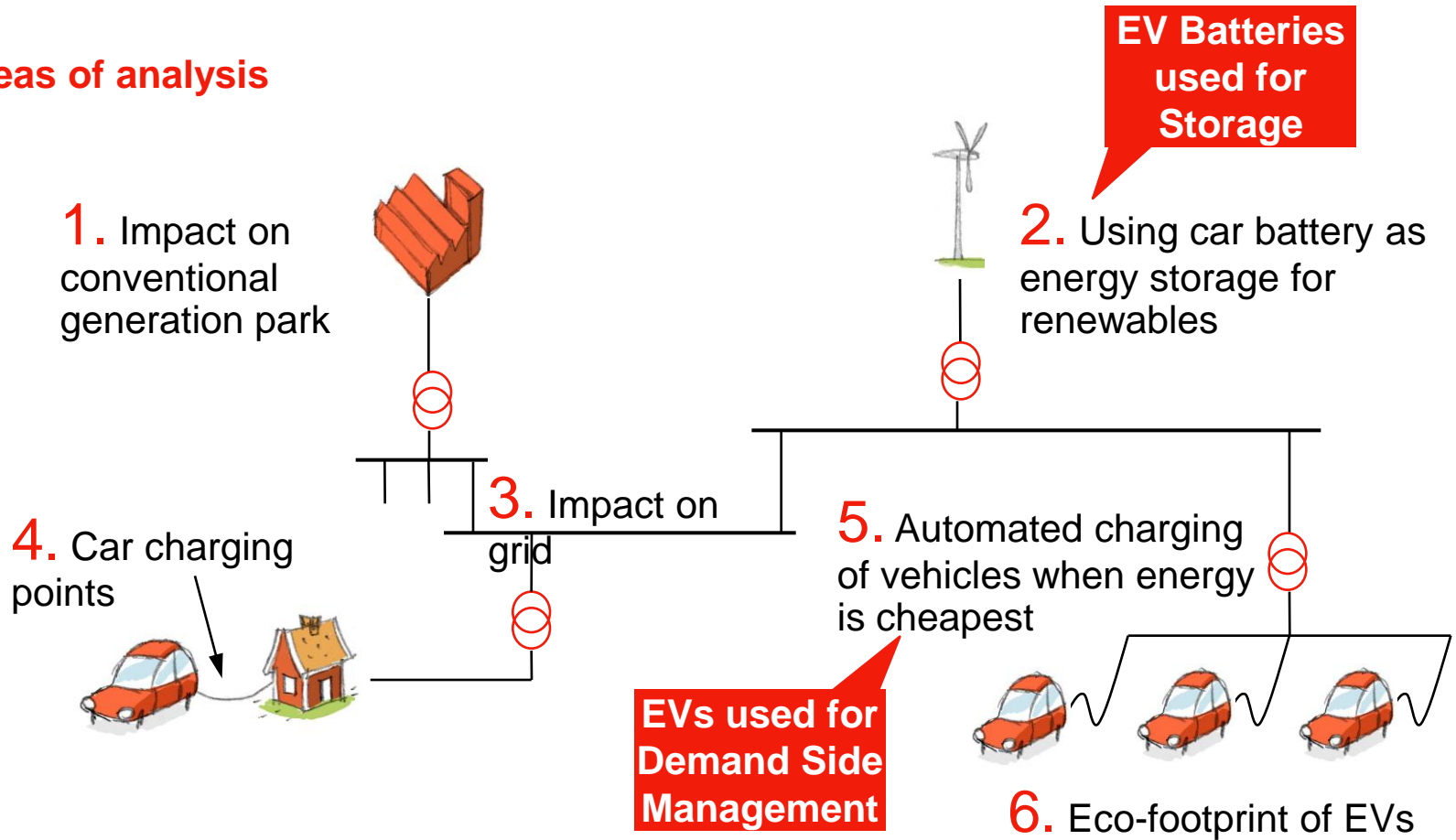
PV self consumption gets a premium which is higher than the difference of feed in tariff and public supply costs;  
=> Maximizing self consumption via battery gives certain benefits for private customers;

## Follow up activities:

Remote control of the battery system;  
=> Implementation of smart grid features;  
Support the grid to integrate additional PV systems

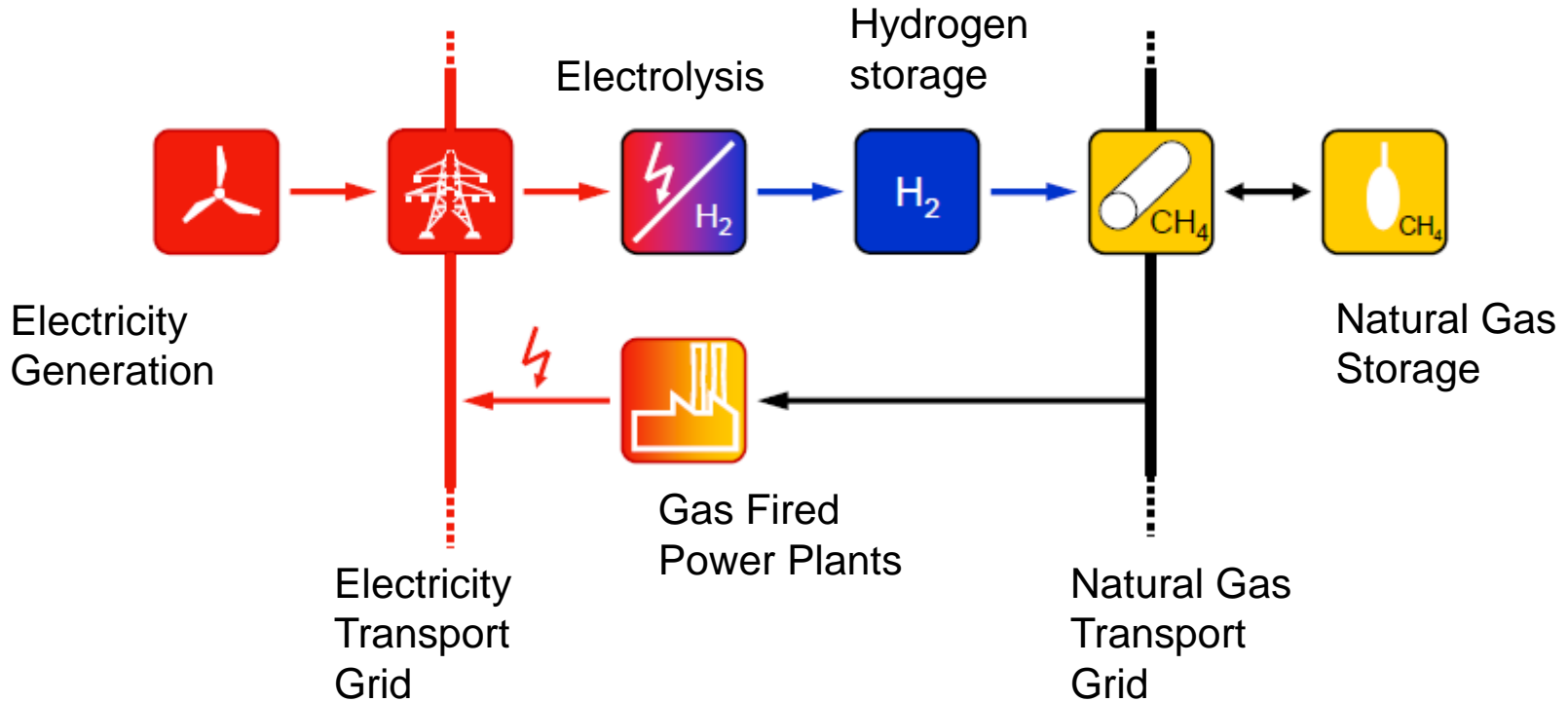
# Synergies of Electric Transport and E-Mobility

## Areas of analysis





# Storage and Combined Usage of Hydrogen



# Realizing the Smart Grid Vision

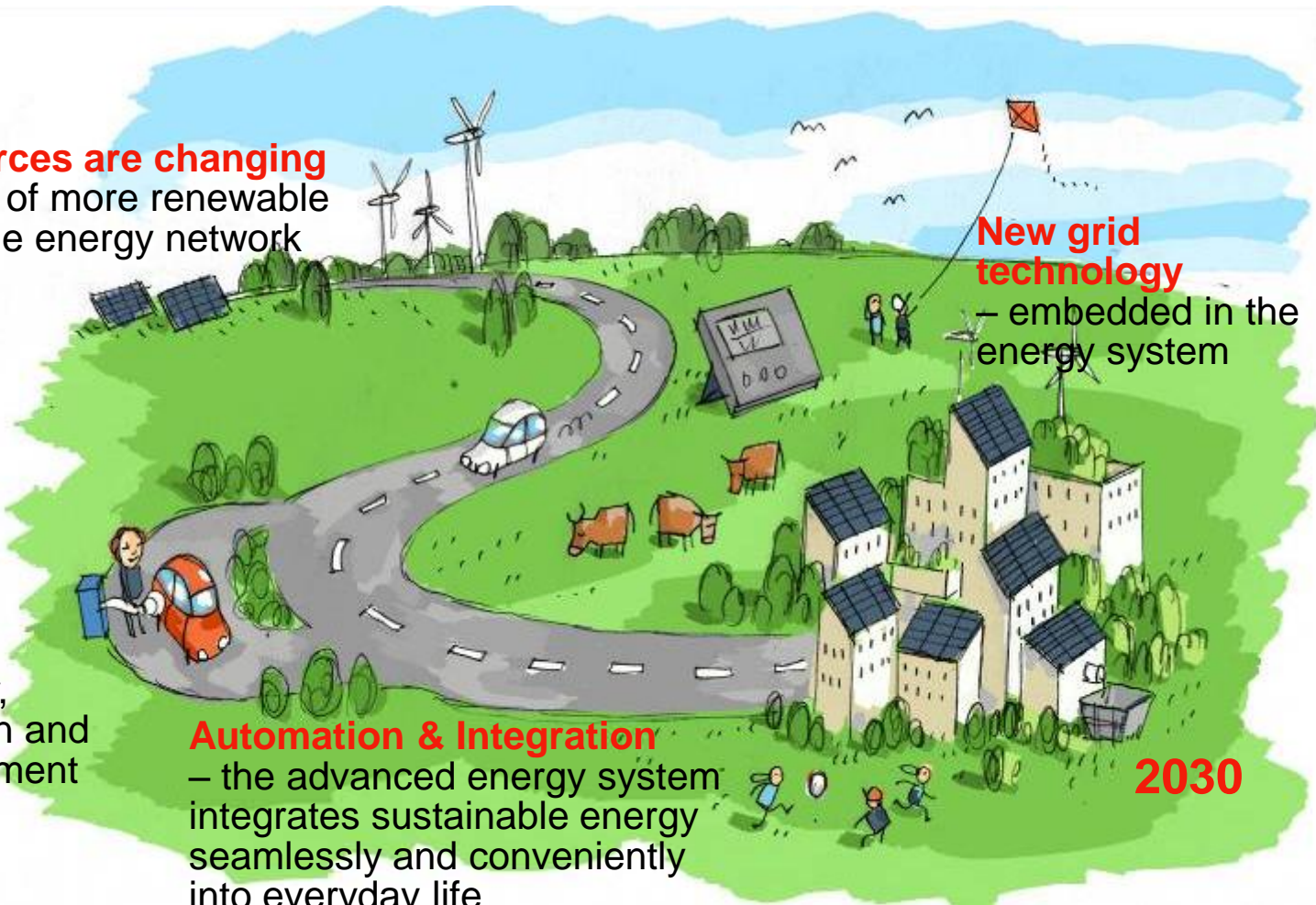
**Energy sources are changing**  
– integration of more renewable sources in the energy network

**New grid technology**  
– embedded in the energy system

**Customers are changing how they use energy**  
– e.g. E-mobility, home generation and energy management

**Automation & Integration**  
– the advanced energy system integrates sustainable energy seamlessly and conveniently into everyday life

**2030**



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