



green2store – The Energy Storage Cloud

Dr. Magnus Pielke

EWE AG

Brussels, 23th November 2016



Agenda



TOP 1 our approach

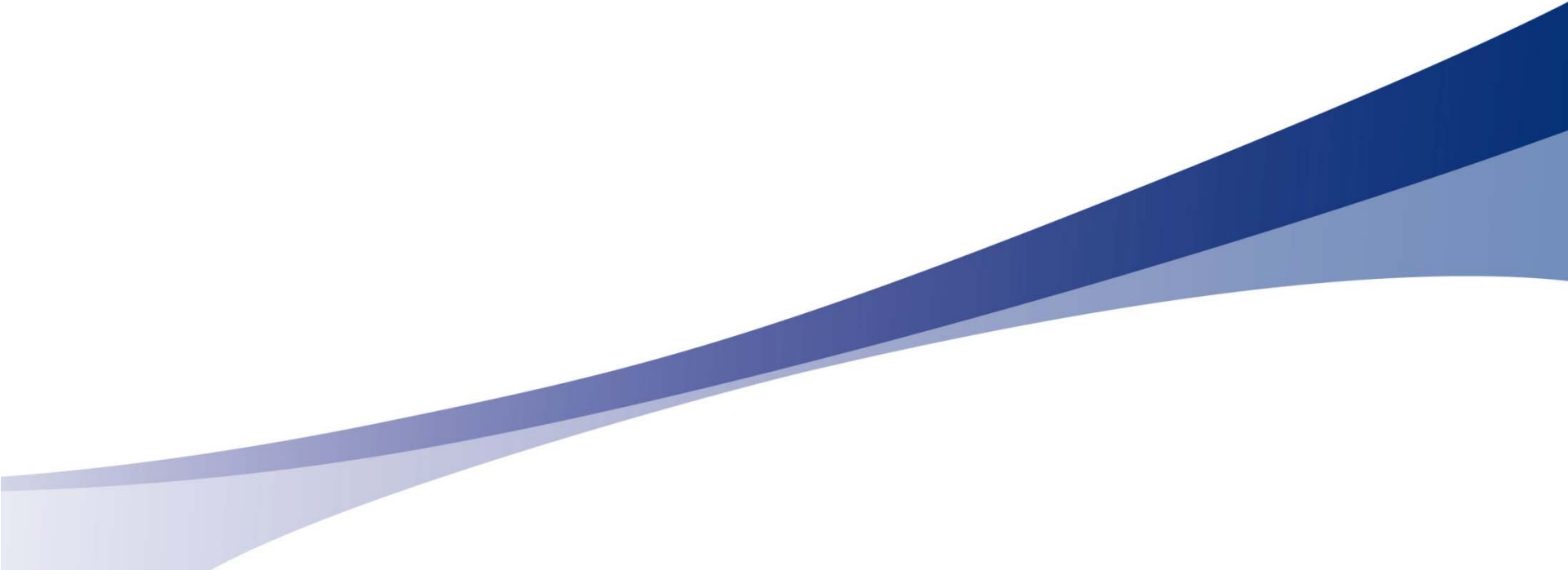
TOP 2 Development of other sectors as impulse

TOP 3 The Energy Storage Cloud

TOP 4 Our awareness of the field test

TOP 5 Summary and Outlook

Our approach



Our approach

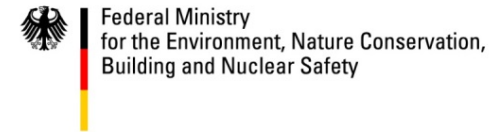


- Ziel** Enhancing the grid capacity for renewables
Improvement of the cost effectiveness of storage applications
- Idee** Interconnecting distributed energy storages by an IT-Cloud
- Benefit** Marketing of the Energy Storage Cloud for third parties
Taking the primary application of storages into account

Who is green2store?



Supported by:



based on a decision of the German Bundestag



- Funding authority:** Federal Ministry for Economic Affairs and Energy
- Funding initiative:** Förderinitiative Energiespeicher
Part of the lighthouse project
“Batteries in distribution networks“
- duration:** 4 years (Jan. 2013 – Dec. 2016)
- volume:** 9 Mio. Euro



Main idea:

Combination of digitalization and energy storage systems



**Implementation of new business models on existing Hardware
by linked systems and new software applications**

ENERGIEWENDE



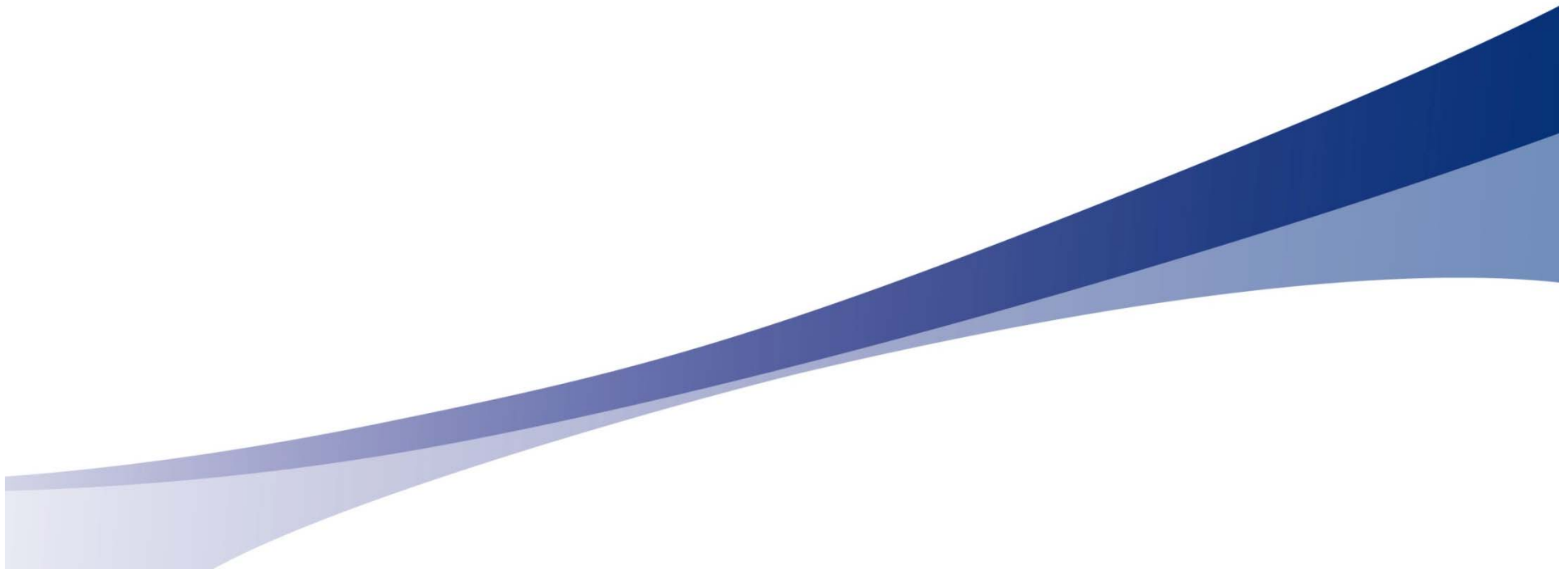
ENERGIEWENDE
Initiator for digitalization

DIGITALIZATION



DIGITALIZATION
Incubator of the Energiewende

Development of other sectors as impulse



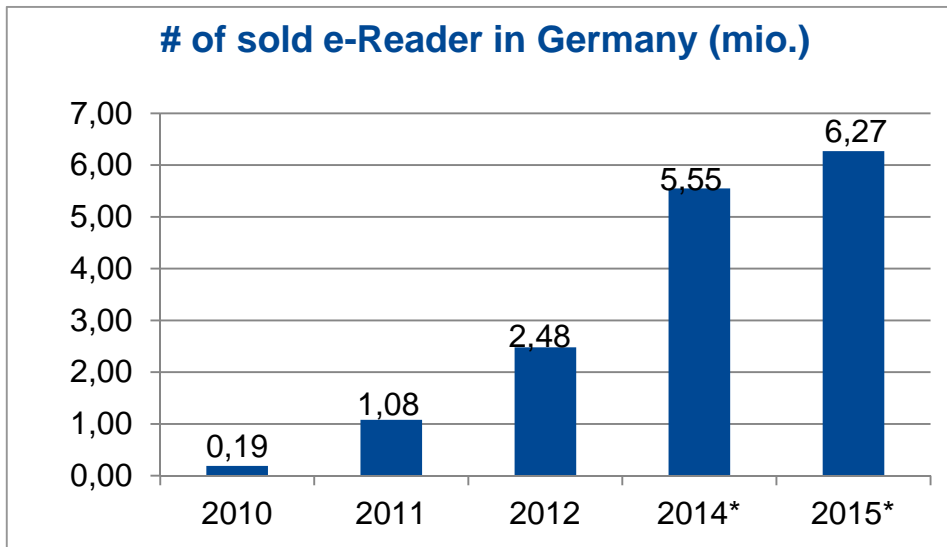
Business model innovation driven by digitalization



Digitalization of the book market



Quelle: utopia



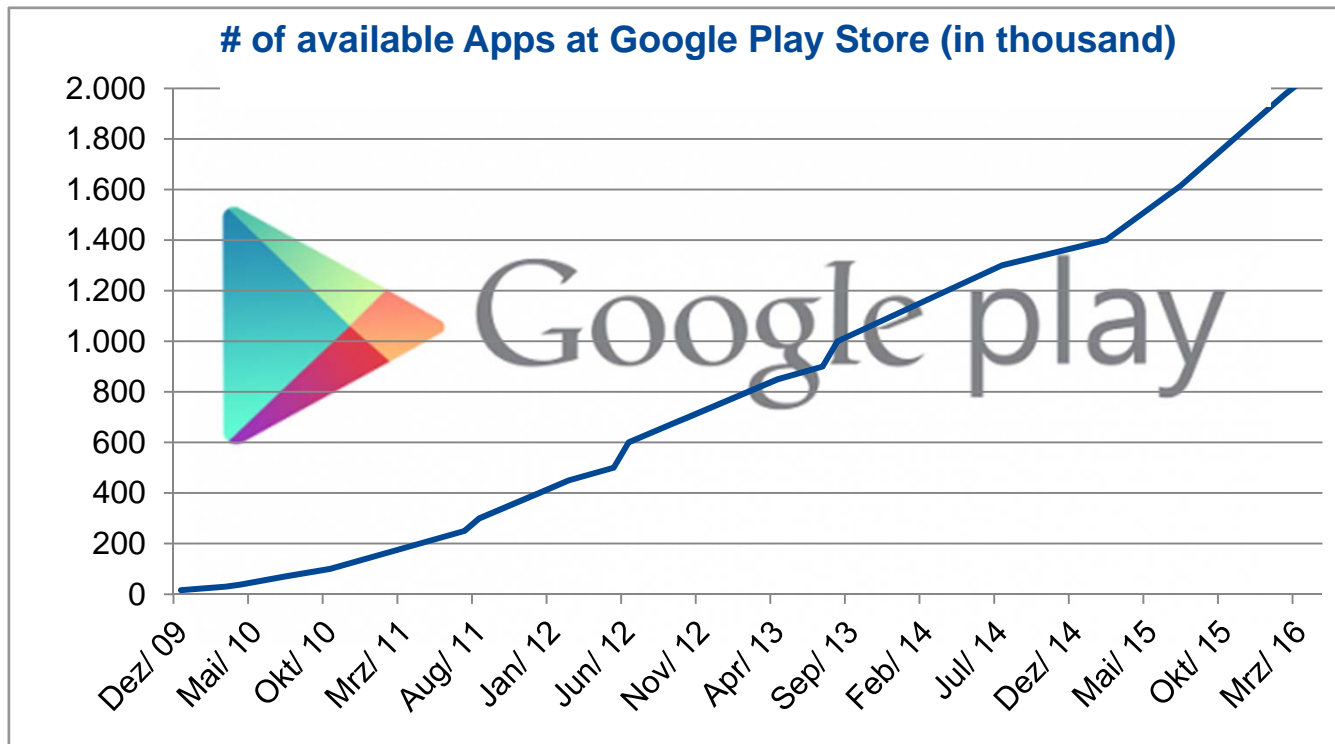
The market share of e-Books increases slowly but consequently. E-Books are replacing conventional magazines and newspapers

Quelle: in the style of www.statista.com

Business model innovation driven by digitalization

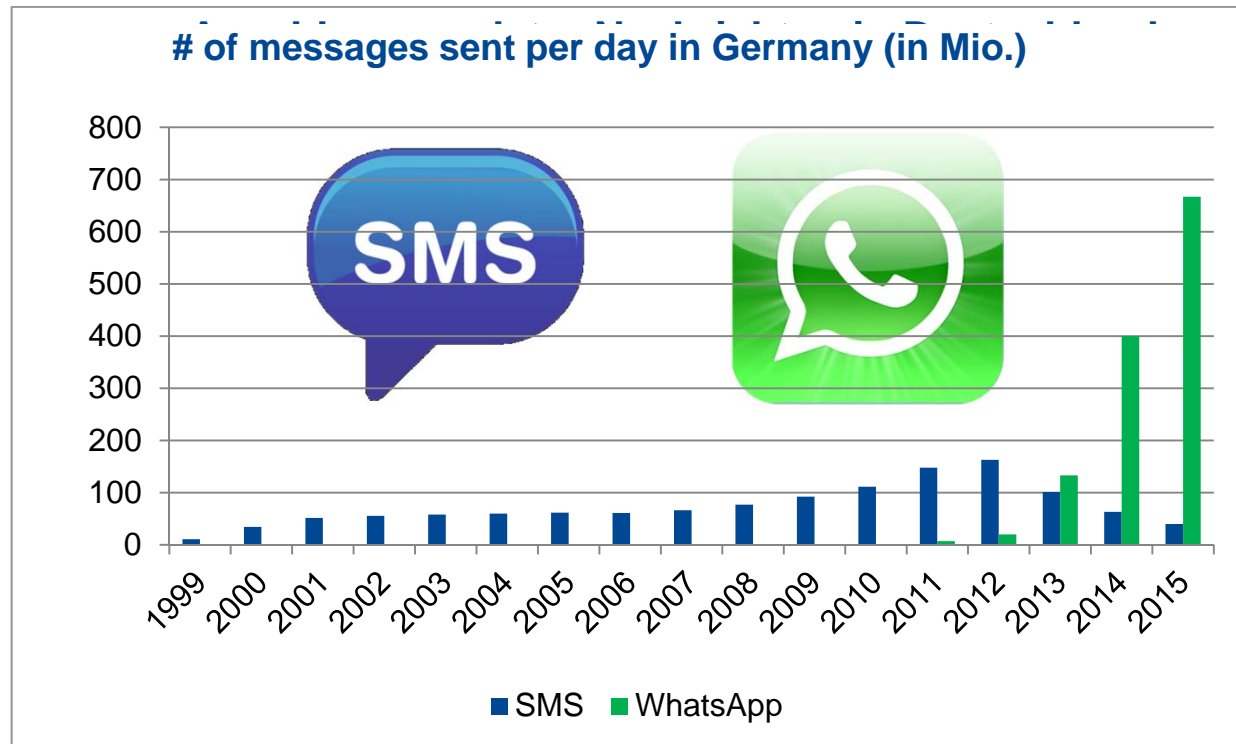


Market for applications on Smartphones and Tablets



→ actually, there are more than 40.000 Apps coming up at Google Play Store monthly

The displacement of the conventional SMS

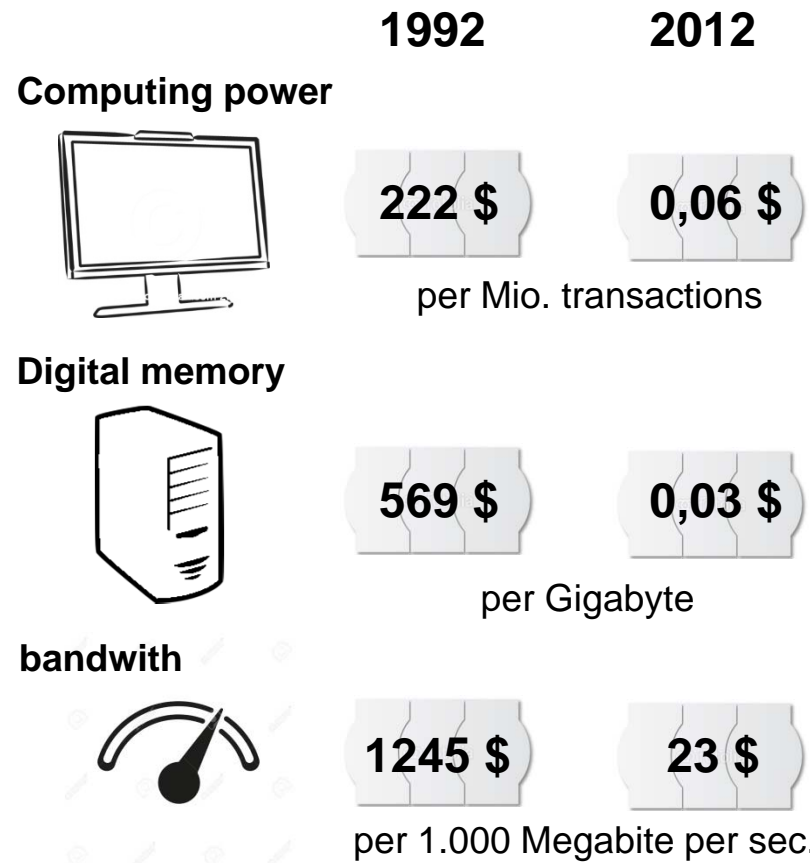


→ The market for SMS is overtaken by WhatsApp totally and in the same time the market volume rises to a volume which is five time bigger than before.

Pathfinder and effect of digitalization



Price decline of IT-system services



source: in the style of bdew, Die digitale Energiewirtschaft

awareness of digitalisation processes of other sectors

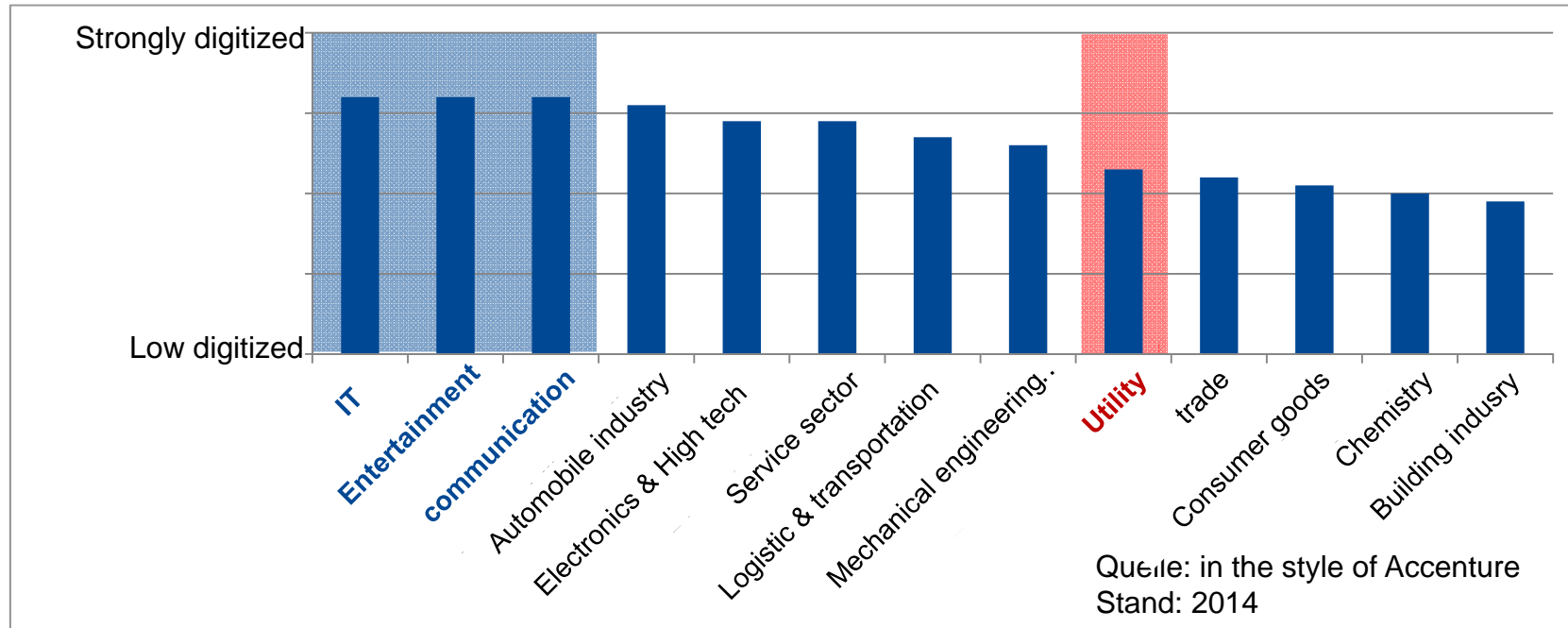


1. Business model innovations are mostly disruptive and threatening or destroying existing business models.
2. The introduction phases of these business model innovations are quiet short.
3. In some cases the digitalization of a sector influences other sectors tremendously. The effect may open new options for business models and processes.

What's the current status of the digitalization process in the Utility sector?



Comparison of the digitalization grade of different sectors

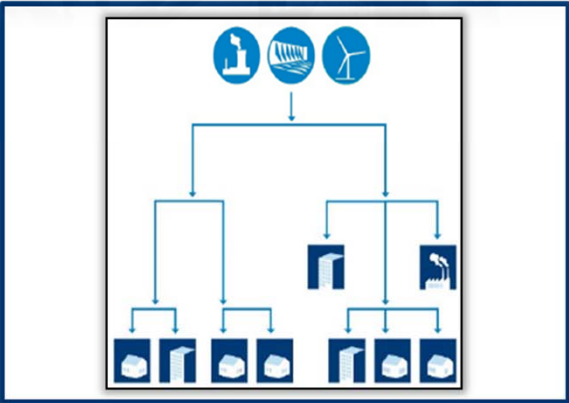


→ The Utility sector is still at the beginning of digitalization.

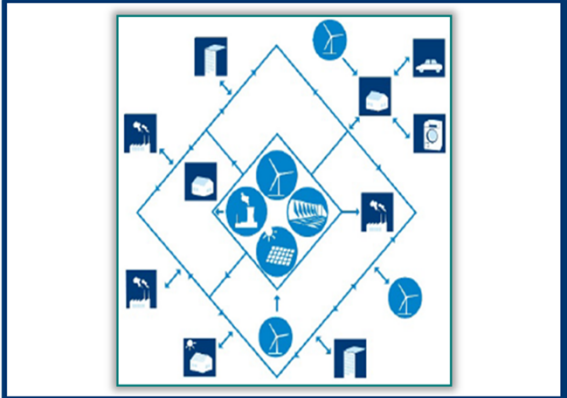
The change process of the energy utility



source: wikipedia.de



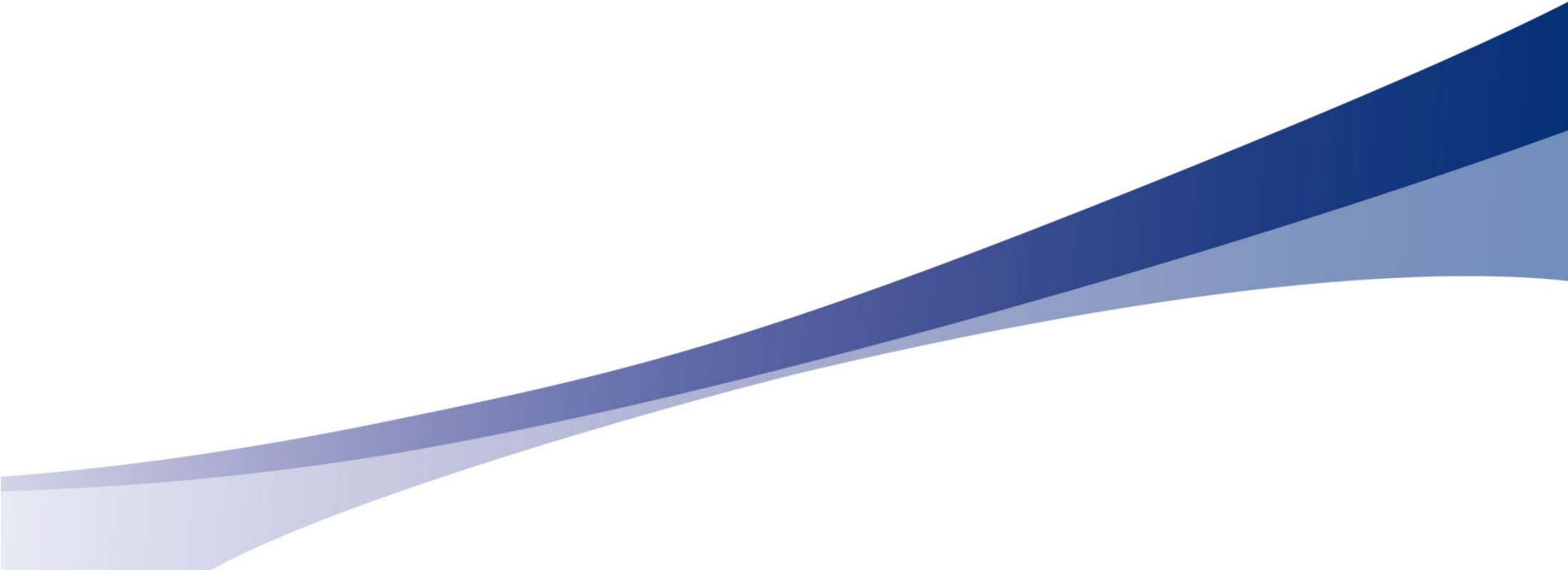
Conducting a chamber orchestra



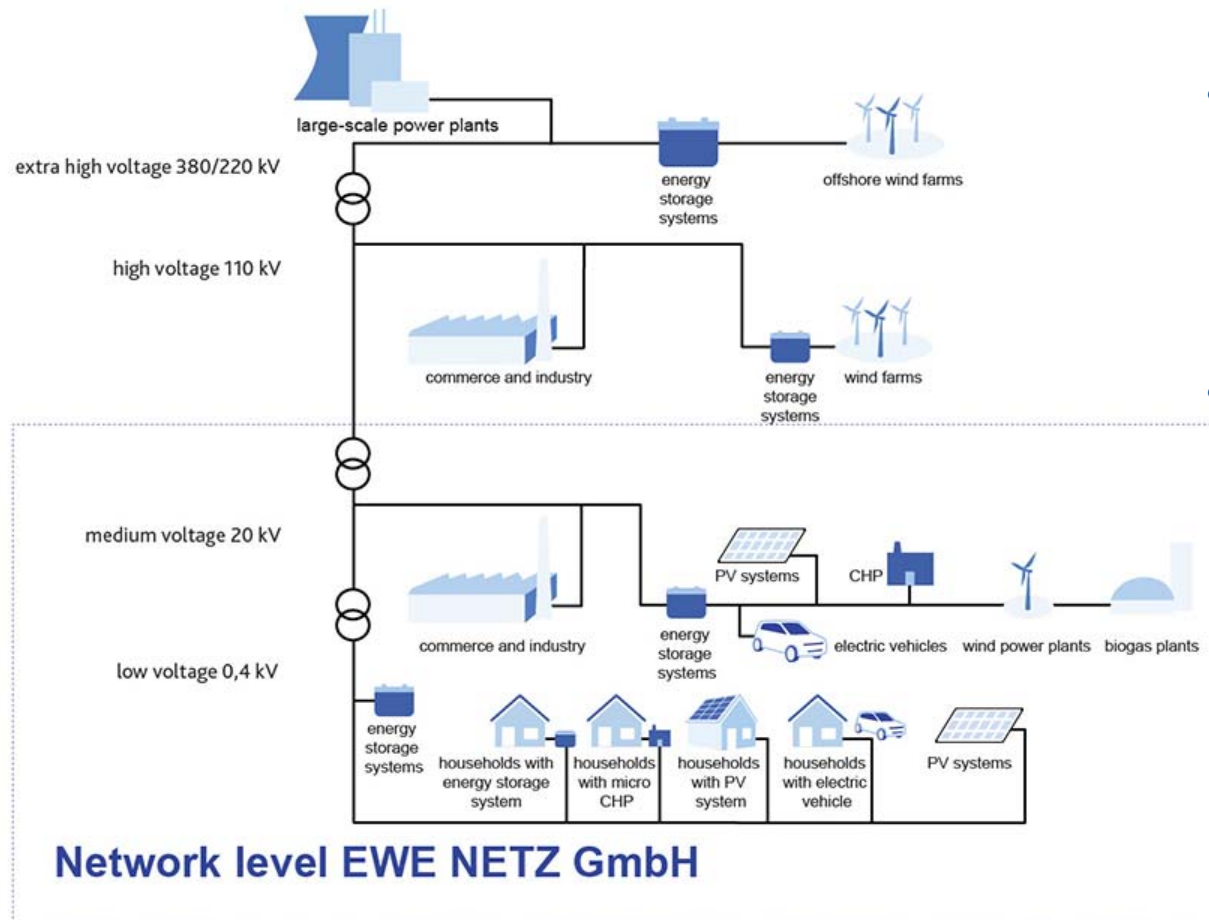
source: berlin.de

Organizing the fan fest

Our approach: The Energy Storage Cloud



In medium term, the energy system will be penetrated by different kinds of energy storage systems.



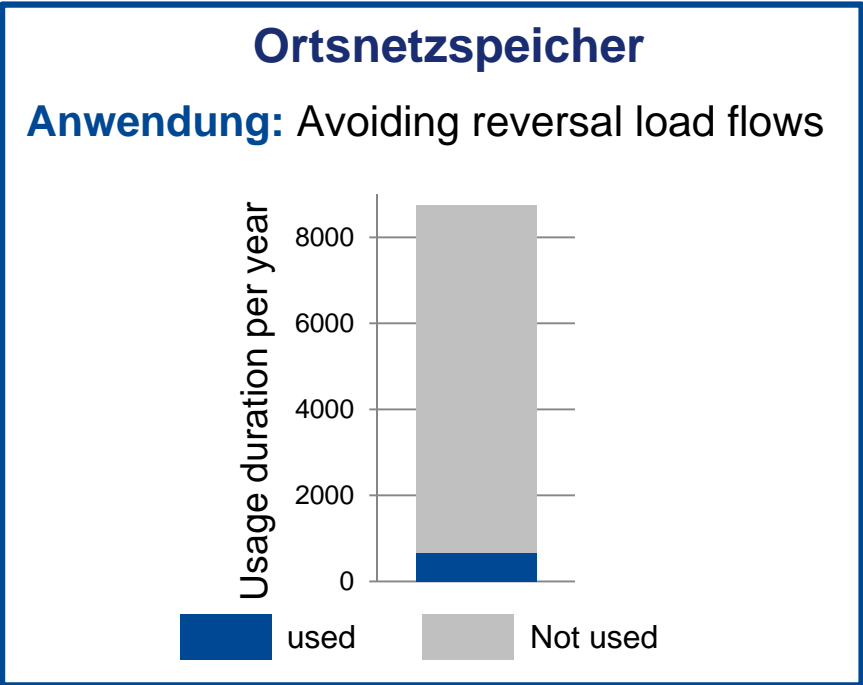
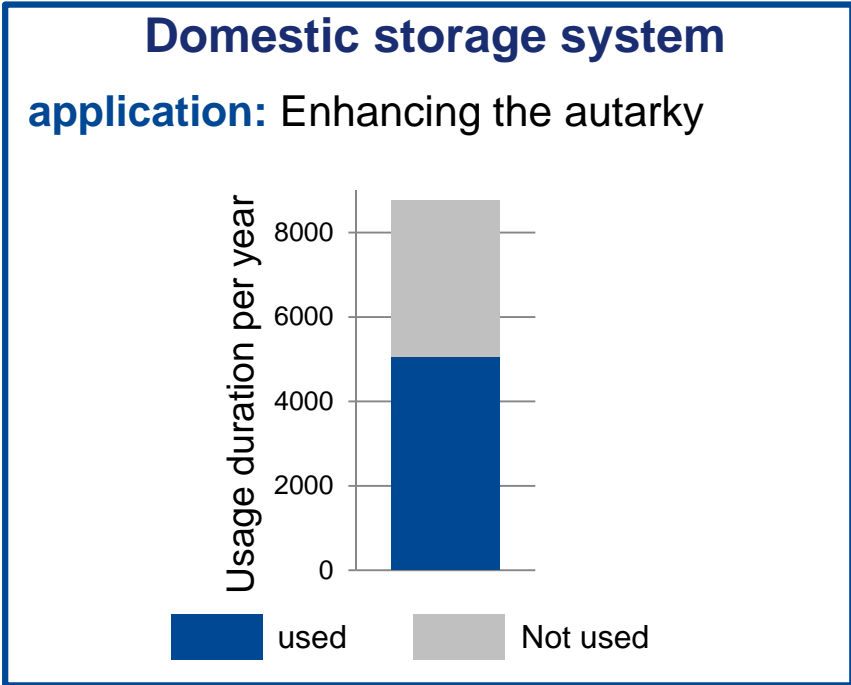
- The application cases vary strongly and lead to totally different system settings and installation sites.
- Typical system settings run from domestic appliances to multi MW systems at the transportation level.

→ Till 2032, EWE is expecting a potential of domestic storage system of about 250,000 systems with a capacity of around 1.5 GWh in its own network.

Applications of battery storage system in distribution networks










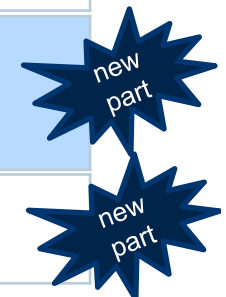
Many applications are characterized by low usage rates



source: own calculations

There are many player who are interested in storages

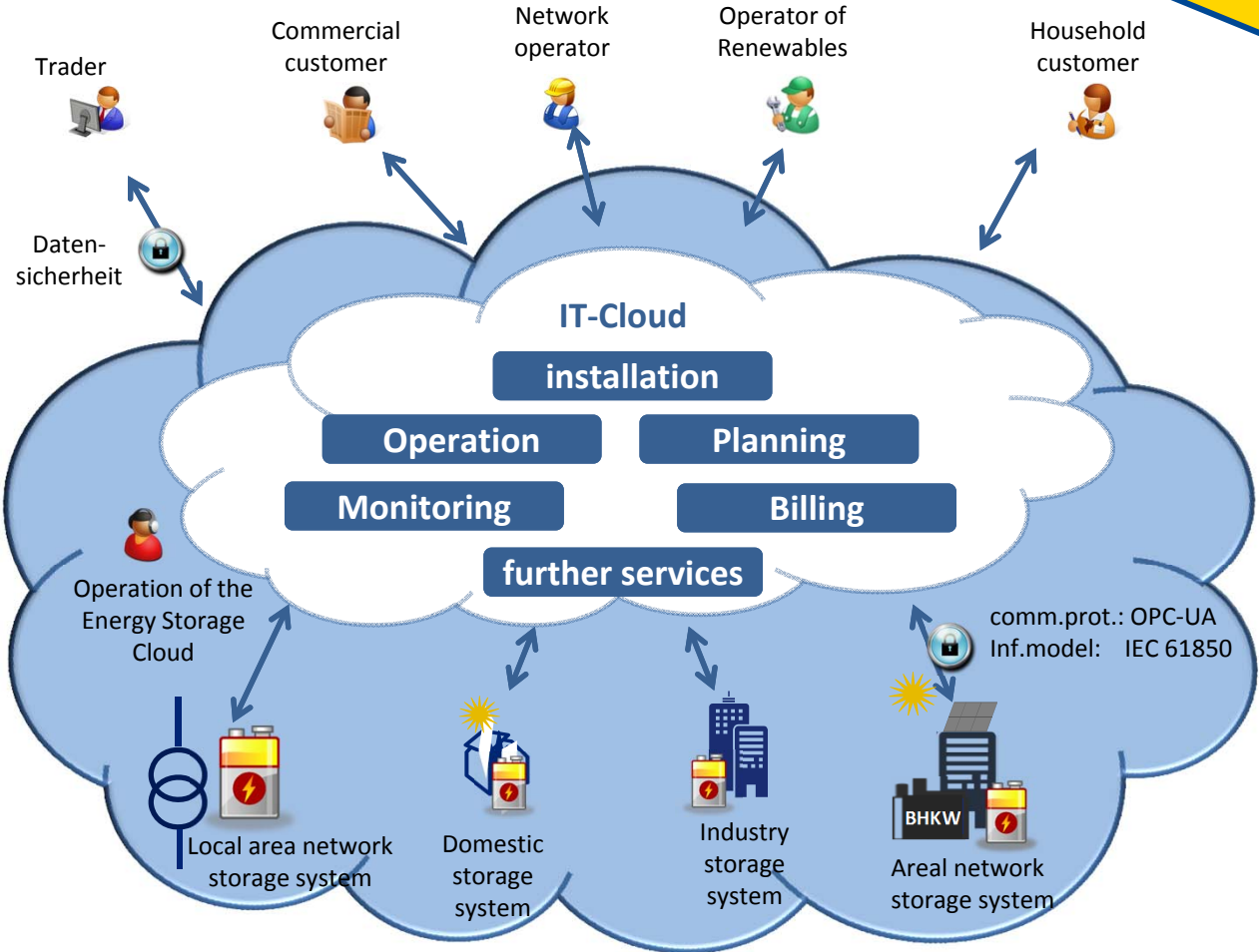
Stakeholder	Incentive
 Grid operator	<ul style="list-style-type: none"> • Local grid optimisation • Avoid feed-in management and grid reinforcement
 Household customer	<ul style="list-style-type: none"> • Local supply optimisation • Increase self-sufficiency
 Operator of renewable energy plant	<ul style="list-style-type: none"> • Improved and secured direct marketing of renewable energy • Provision of system services
 Commercial customer	<ul style="list-style-type: none"> • Adjustment of energy demand and supply • Economical optimisation of electricity supply
 Energy trader	<ul style="list-style-type: none"> • Selling of additional flexibility • Timetable optimisation
 Storage investor	<ul style="list-style-type: none"> • Investments in storage • Commercialization of storage usage for different stakeholders
 Operator of the <i>Energy Storage Cloud</i>	<ul style="list-style-type: none"> • Provision and commercialization of basic IT services for storage management



Main idea of the Energy storage cloud



analog to Cloud-Computing



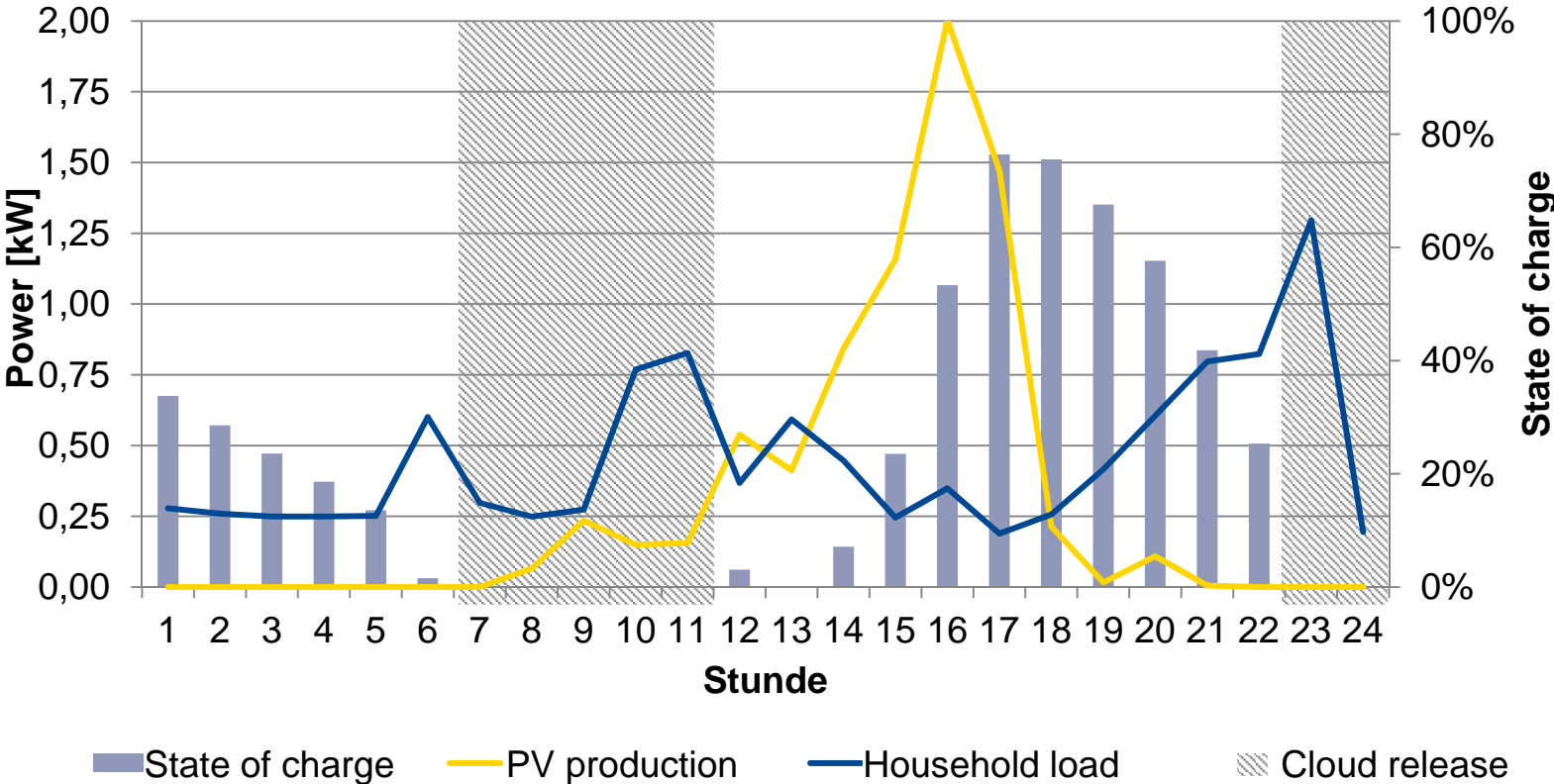
Quelle: EWE

Preconditions of interconnecting storage systems to the cloud



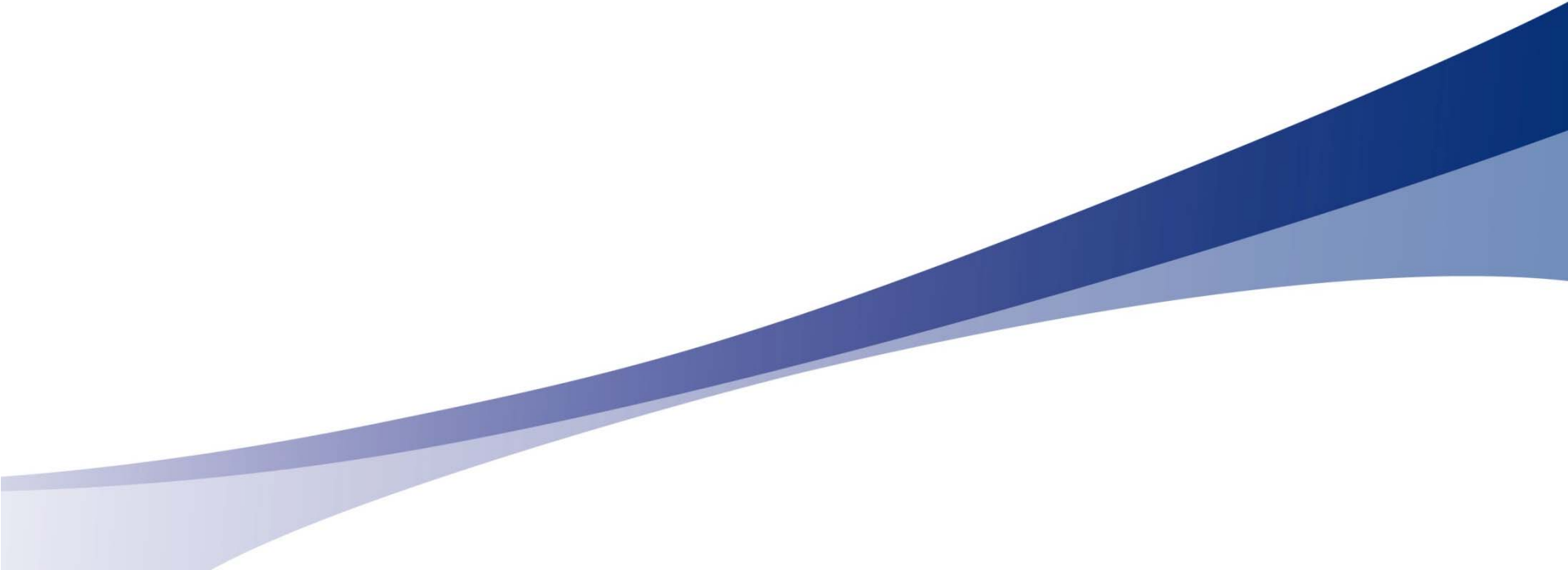
Analog to Car-Sharing

- No distortion of primary applications
- No parallel usage of systems for primary and secondary use cases



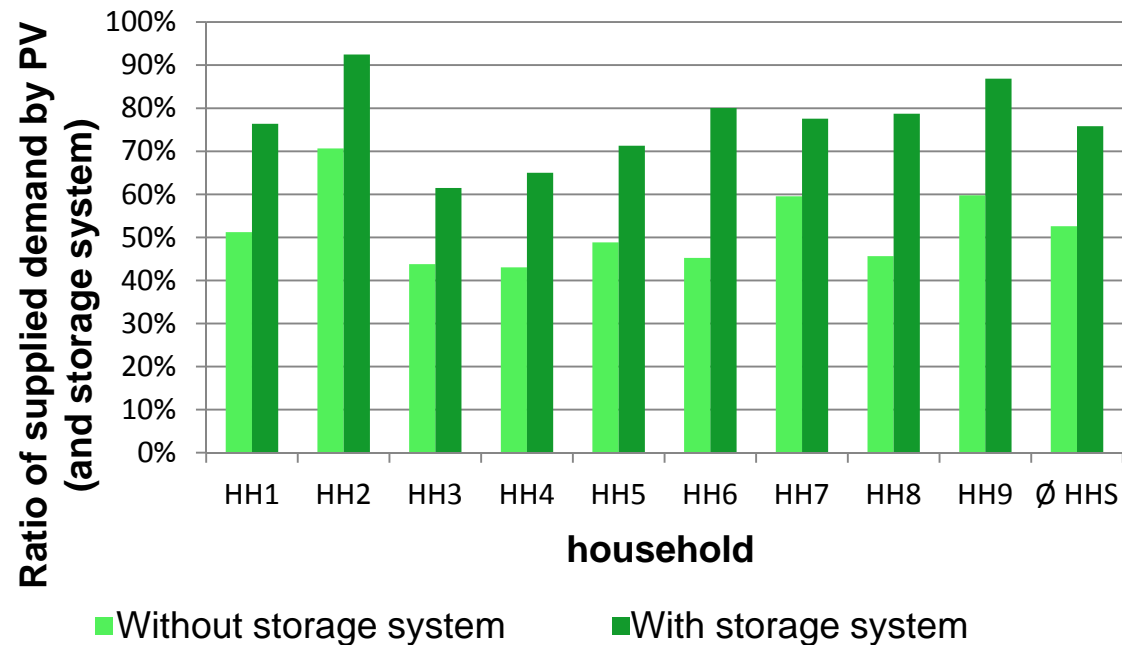
source: own calculations

Our awareness of the field test



Changes of the ration of supplying the local load by PV and a storage system

The demand can be supplied by 60 to 90 % through PV and storage system.

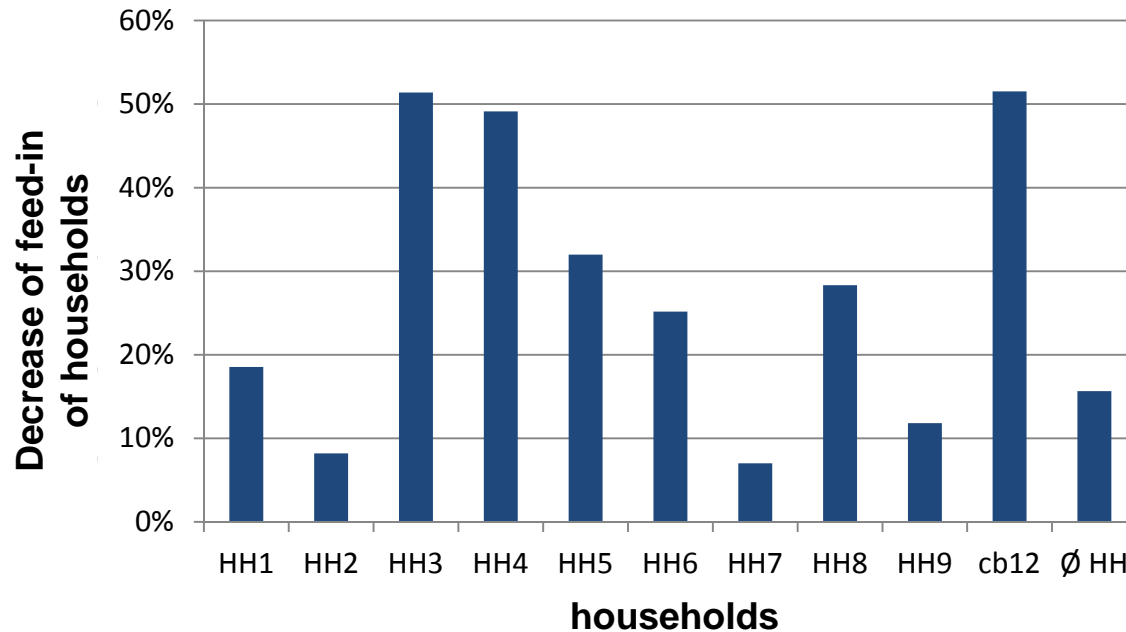


- The ratio can be extended up to 20 percent by using a storage system.

The integration of domestic storage systems affect the feed-in behaviour of households tremendously.



The feed-in by households decrease by around 15 percent.

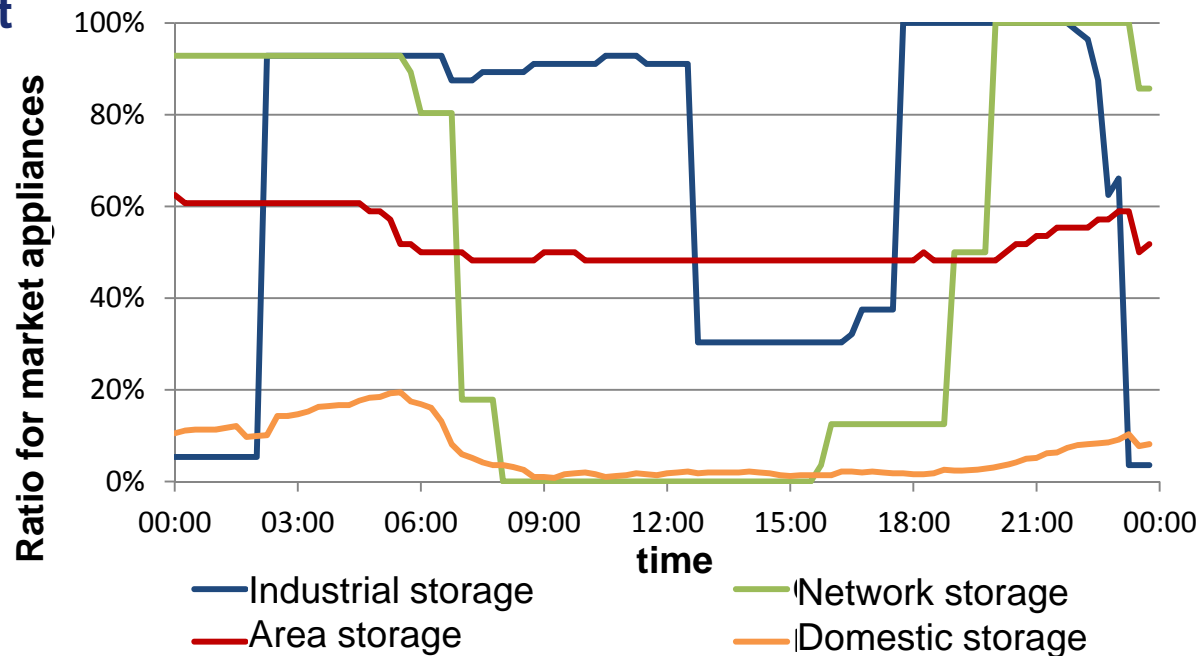


- The feed-in depends strongly on the PV system size and the demand.
- But in all cases, the main PV peak can not be avoided automatically by storages due to the limited storage capacity. (most storages are fully charged at 11 AM)

The investigated storage systems are available for market applications in very different dimensions.



Domestic storage systems are almost available in the non-productive time. Network storage systems are almost always available for the market

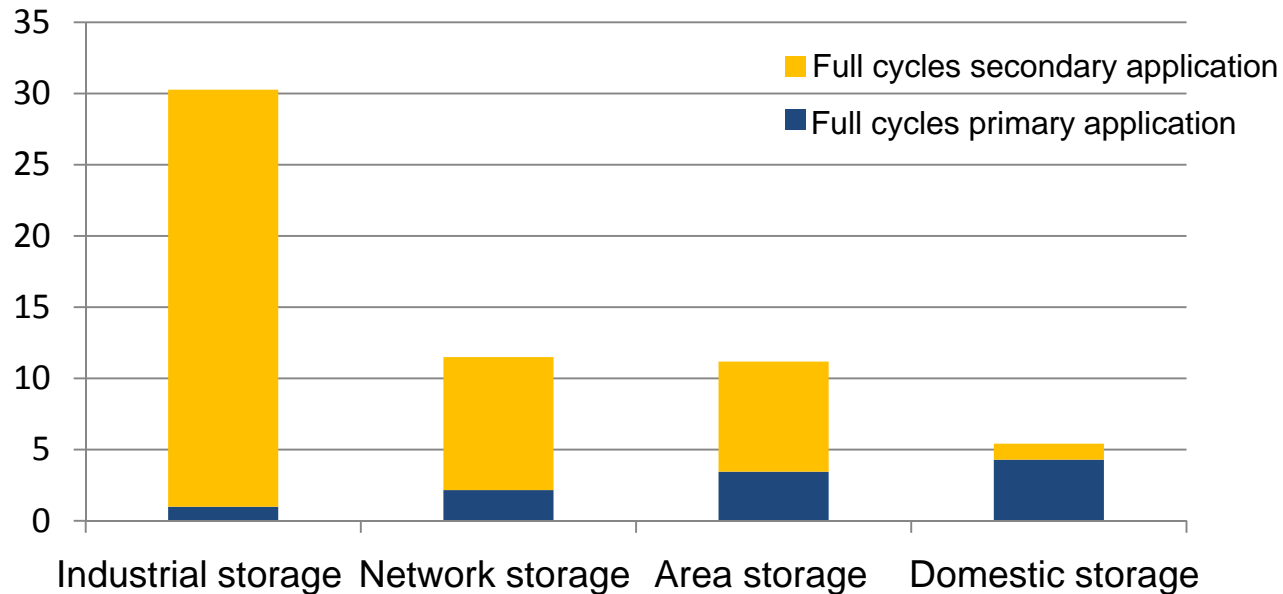


- Domestic storage systems have the lowest availability, network storage systems are not available during the PV peak production.

Usage of the different storage systems for primary and secondary applications



The number of full cycles per week depends on the primary application

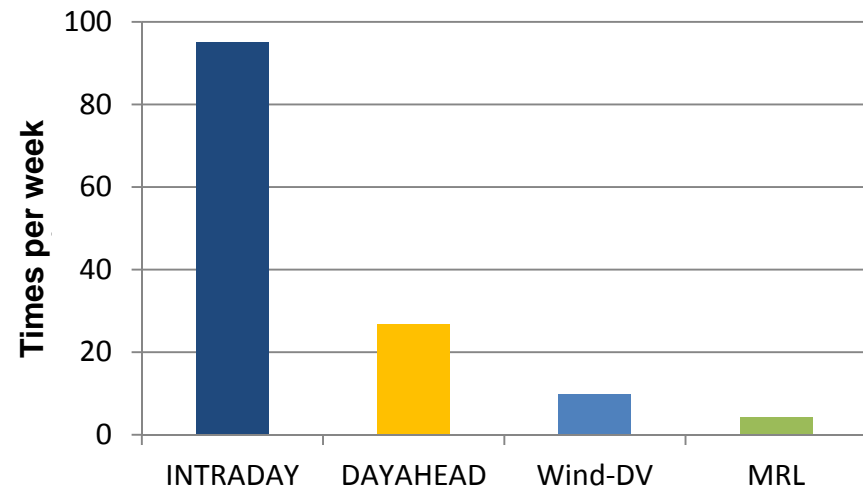
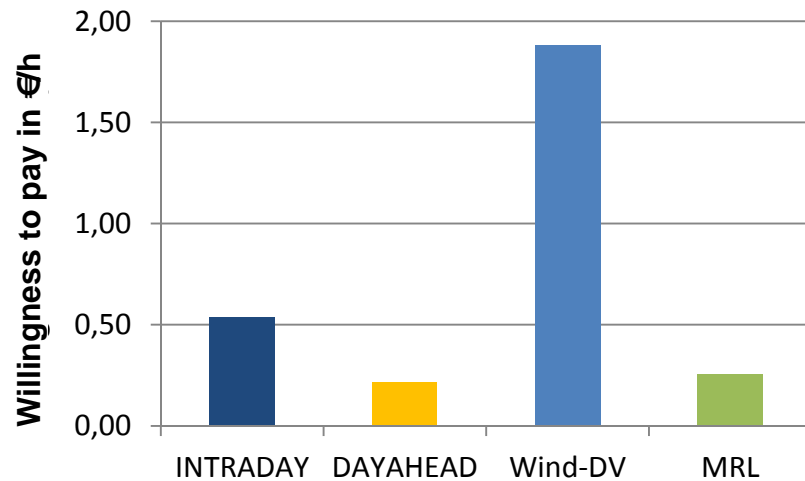


- The large scale storages are strongly used by secondary applications
- Domestic storage systems offer only a low potential for further use cases beside the domestic application.

The spread of the willingness to pay for storage usage is strongly divergent.



Wind direct marketers offers the highest willingness to pay to avoid costs for balancing power.

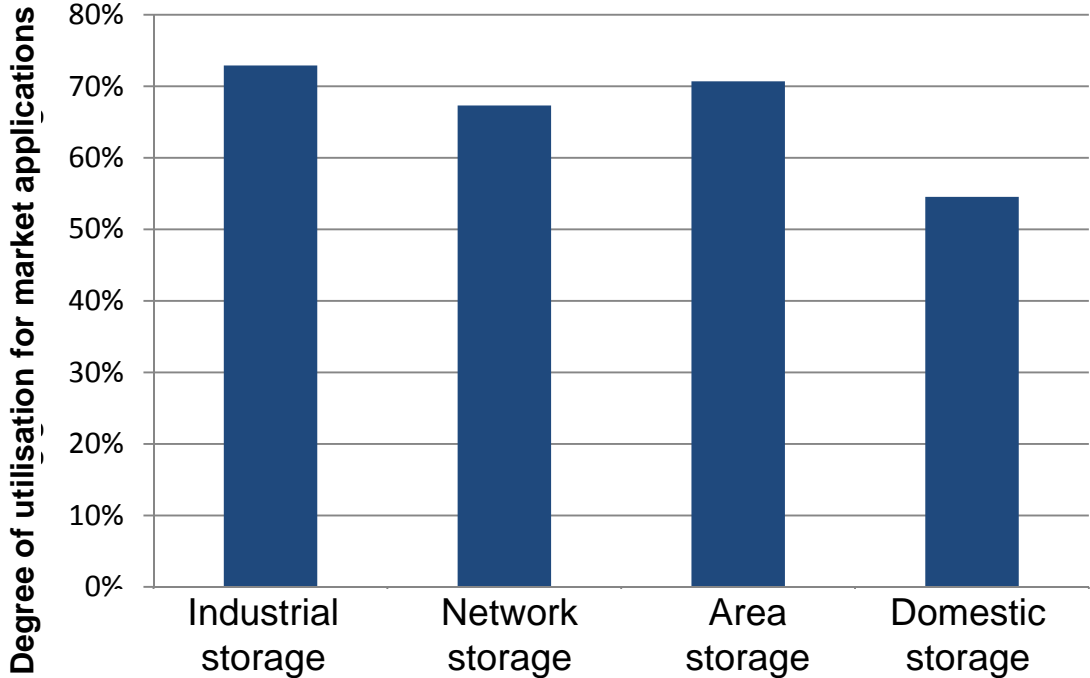


- The most inquiries are put by energy trader for Intraday and dayahead market.
- Wind direct marketers and provider of minute reserve do have just a few inquiries per week.

The provided availability of the storage systems for market applications is in a high demand.

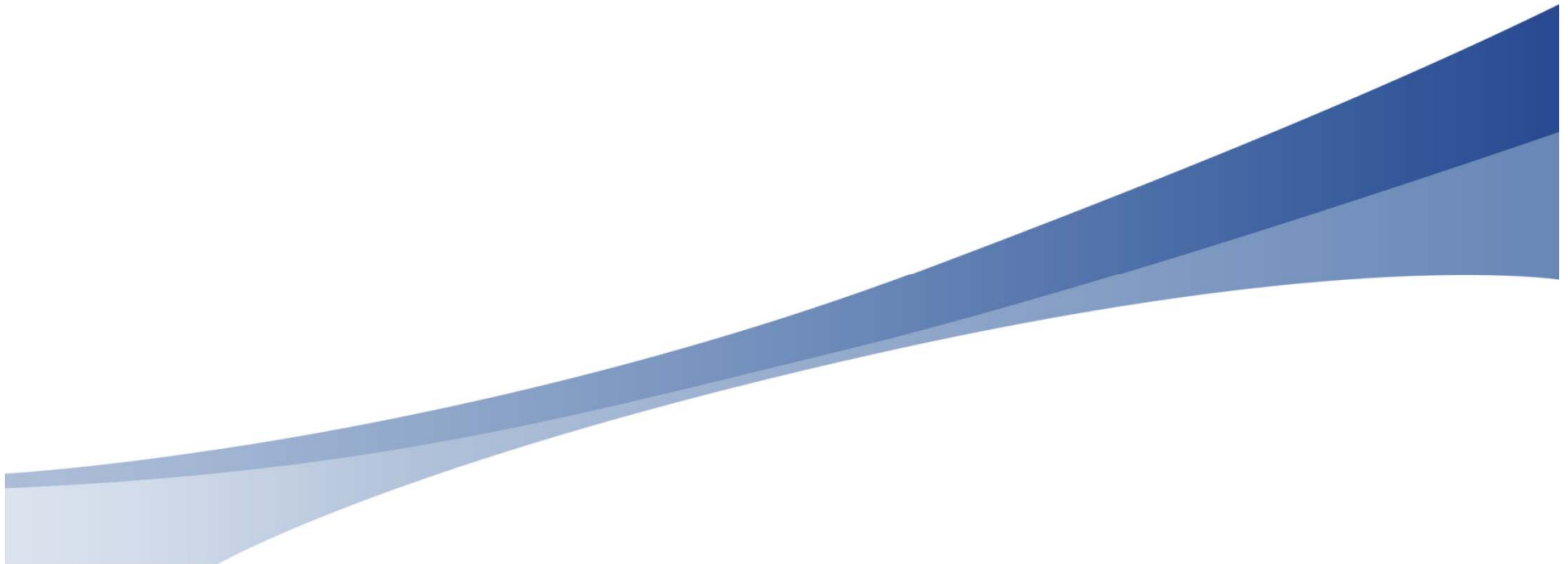


Especially the availability of large scale storage systems has a tremendous resonance on the market.



- The offered capacity for market applications are called in a dimension of 50 to 70 %.

Summary and outlook

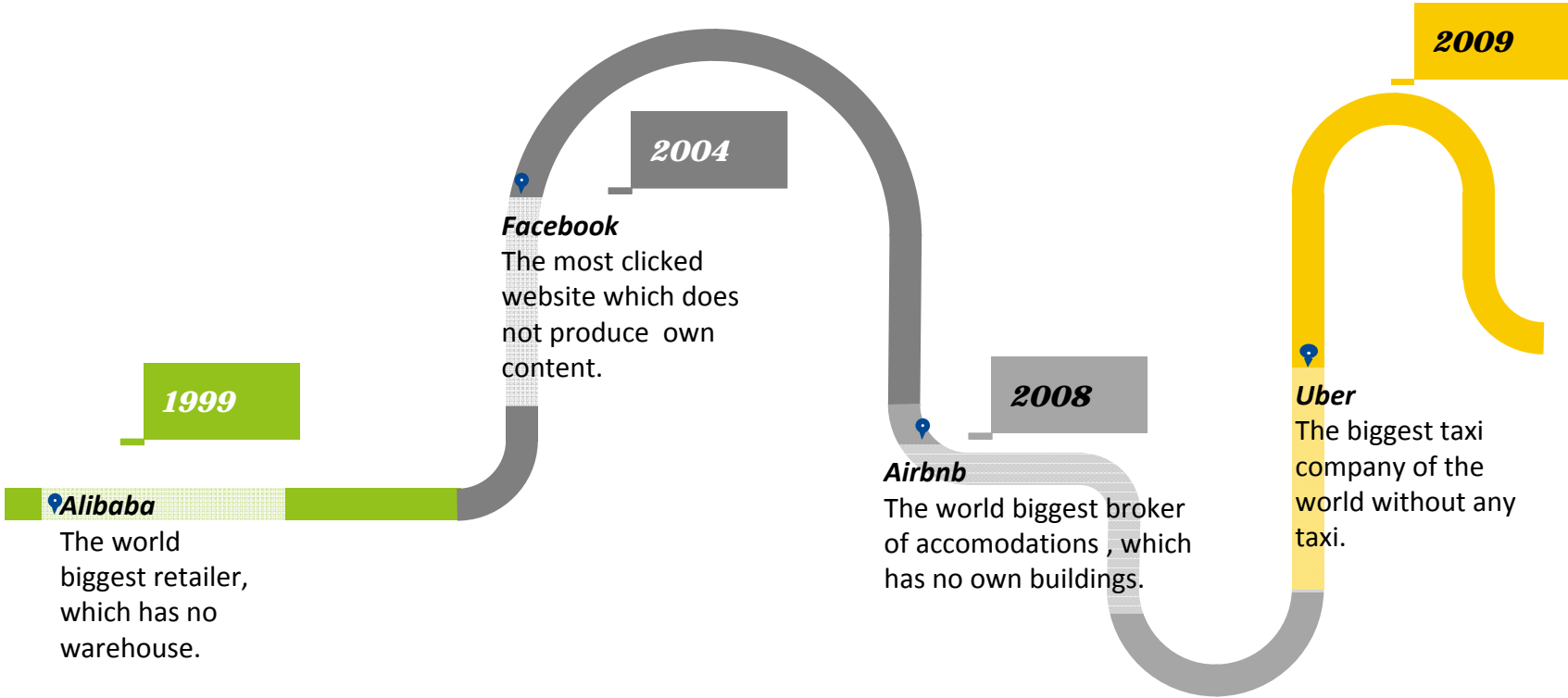


Awareness about the Energy Storage Cloud



- The digitalization of storage capacity by an Energy Storage Cloud butts on market interest
- Storages with low degrees of capacity utilisation for primary applications are able to offer greater additional value for market applications – these storages will be called more often.
- Domestic storage systems are only limited suitable for an Energy storage cloud due to their small capacity and low availability for market applications.

Digital business models of other sectors showed already their tremendous market potential!



What's next: A storage operator without any own storages?



Thank you for your interest.

Quelle: EWE AG

Dr. Magnus Pielke
EWE Aktiengesellschaft, Oldenburg
0441 / 4805 – 1447
magnus.pielke@ewe.de

