



**It's innovation, stupid!**

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Generalversammlung Swissgas  
22<sup>nd</sup> / 23<sup>rd</sup> June 2015, Hotel Bellevue Palace in Bern

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# Agenda

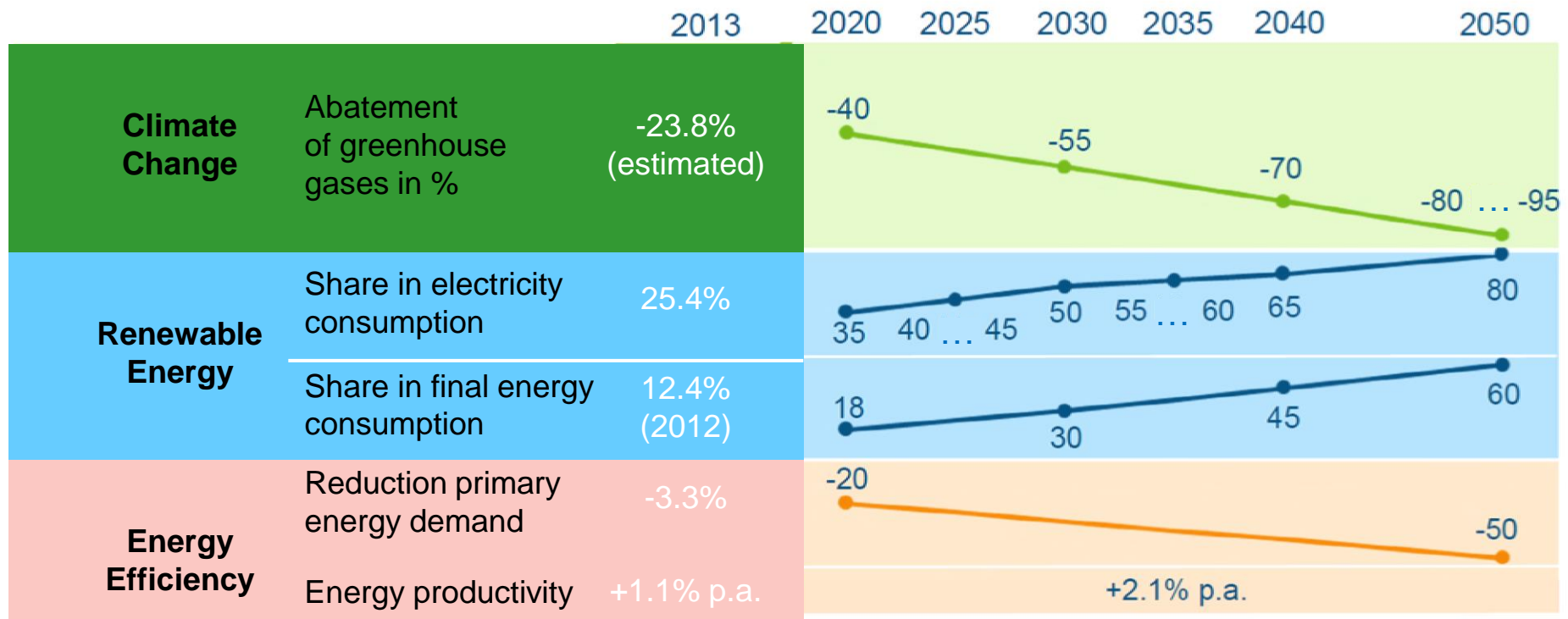
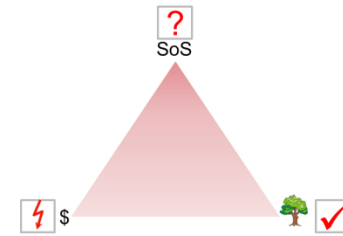
**The German „Energiewende“ is just an example for other energy transitions taking place globally**

There is no way back: “Energiewende” is a now global trend driven by innovation not by politics – and digital is a key element

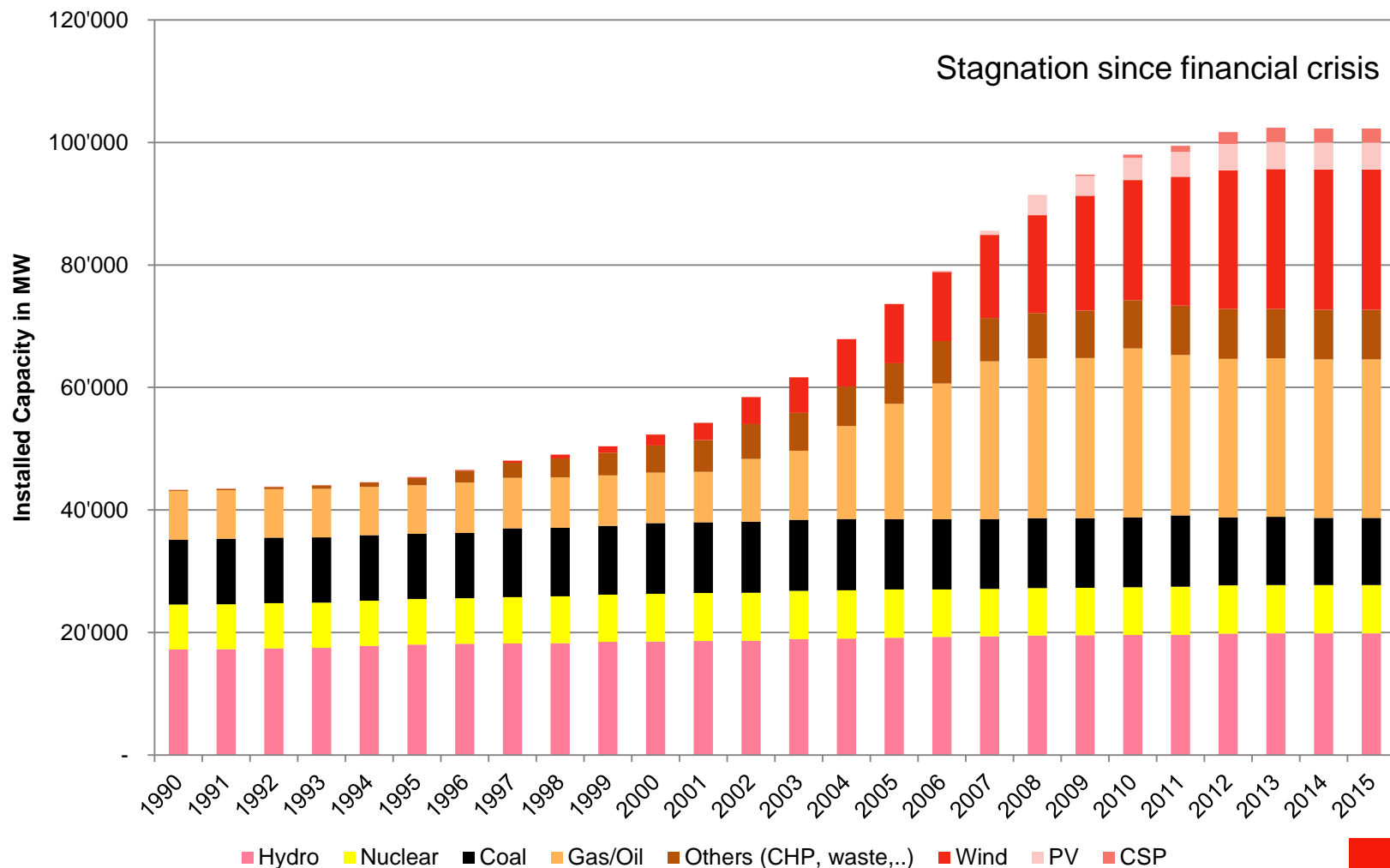
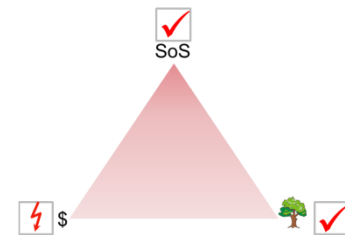
The energy landscape becomes increasingly complex – also for gas

Investor owned utilities and the gas industry need to adopt their business models aggressively to this environment.

# German energy transition: Achieving the impossible?



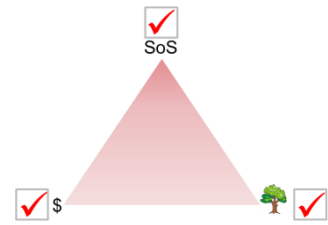
# Energy turnaround in Spain driven by gas and renewables



Source: Red Eléctrica de España (Spanish TSO)

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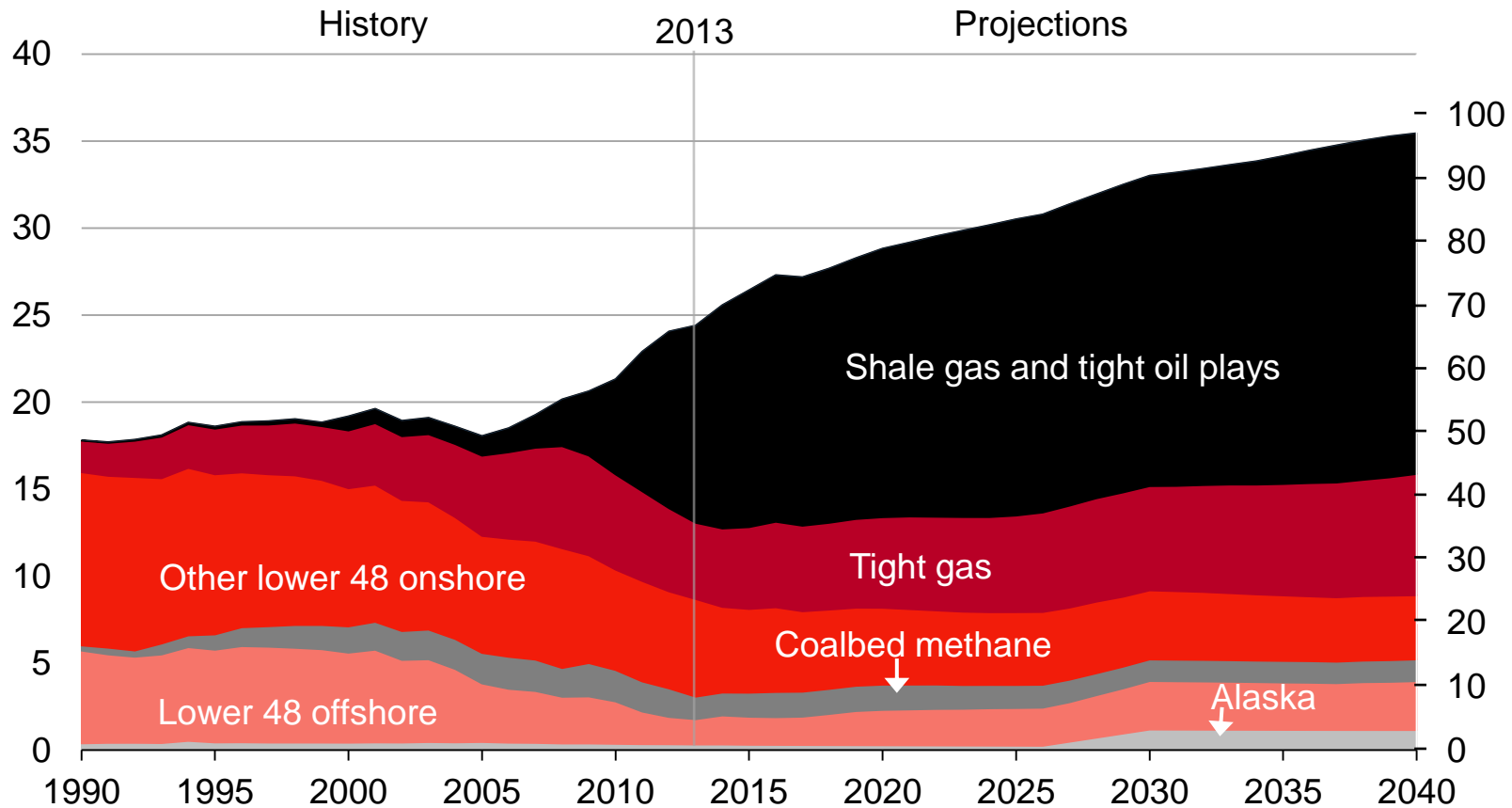
# Energy turnaround in the US driven by success of unconventional gas



U.S. dry natural gas production

billion cubic feet per day

trillion cubic feet

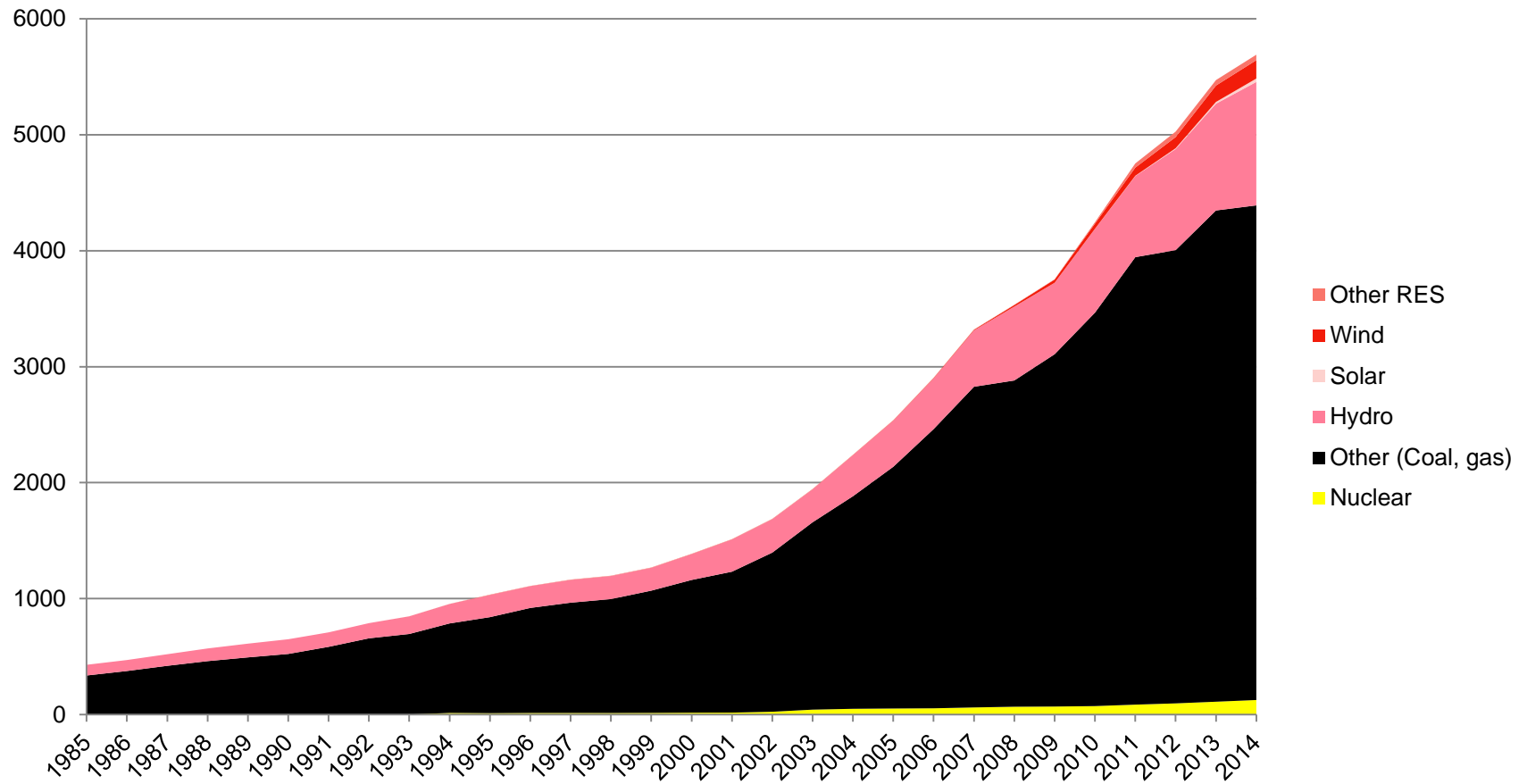


Source: EIA, Annual Energy Outlook 2015 Reference case

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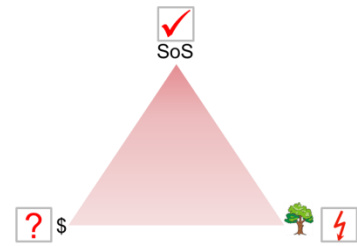
# Energy turnaround in China driven by dramatic economic growth

China's net electricity generation by fuel type, 1985– 2014 in TWh

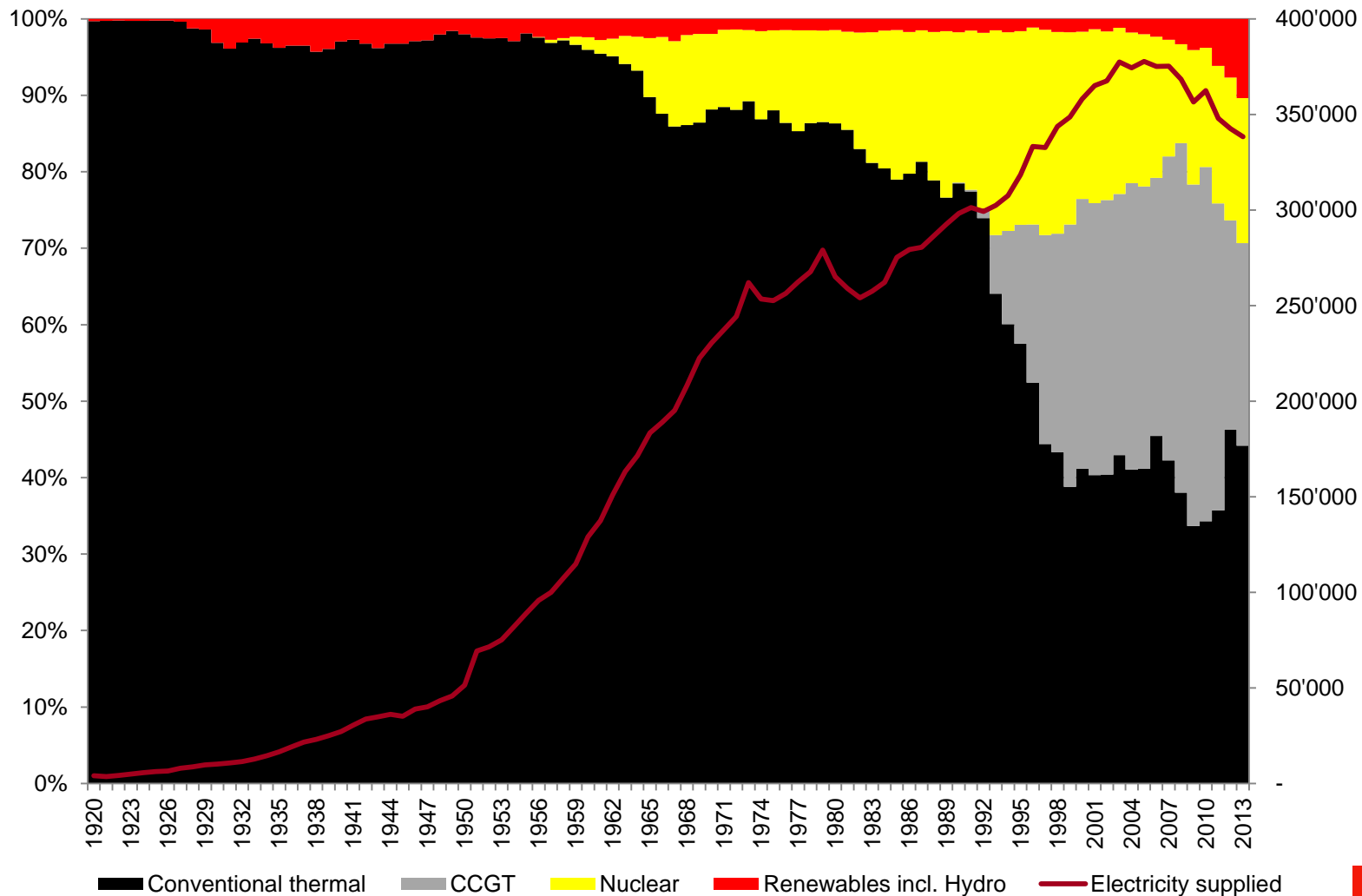


Source: BP Statistical Review of World Energy 2015

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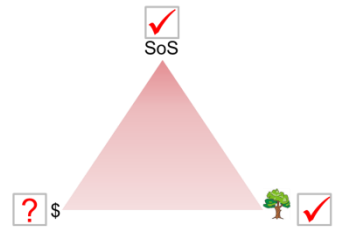


# Energy turnaround in the UK: History repeating



Source: DECC – Department of Energy and Climate Change („Generated electricity“)

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# Agenda

The German „Energiewende“ is just an example for other energy transitions taking place globally

**There is no way back: “Energiewende” is a now global trend driven by innovation not by politics – and digital is a key element**

The energy landscape becomes increasingly complex – also for gas

Investor owned utilities and the gas industry need to adopt their business models aggressively to this environment.



*There are **known knowns**; there are things we know we know. We also know there are **known unknowns**; that is to say we know there are some things we do not know. But there are also **unknown unknowns** – the ones we don't know we don't know.*

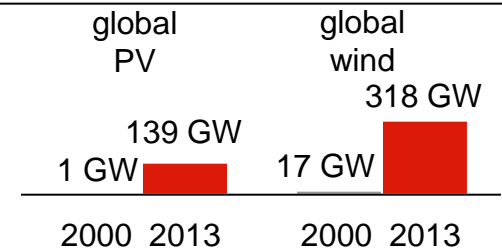
*-Donald Rumsfeld -*

# Dynamic innovation and technology are driving changes on energy markets

## Examples

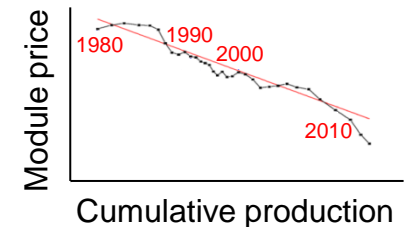
### Renewable energy: substantial size

▶ Europe 2014: 72% of new installations (22% in 2000)



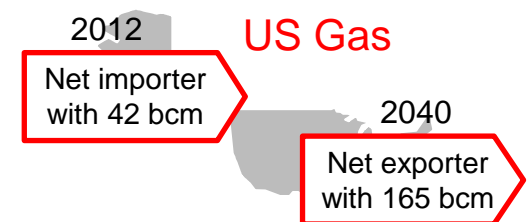
### PV: cost decrease beyond expectations

▶ Price decreased by 20%  
each time the installed capacity doubled



### Shale gas: technology „Hydraulic fracturing“

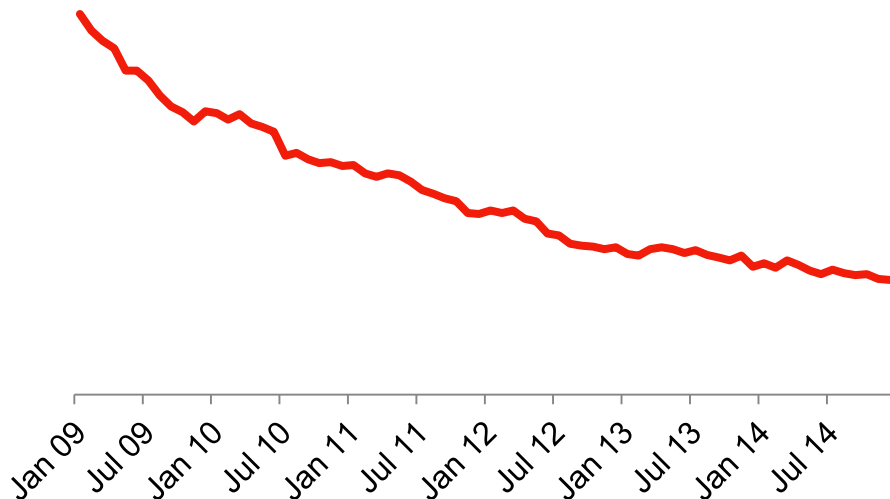
▶ Increasing gas resources  
change global macro economics



# Photovoltaic: Continuous cost reduction

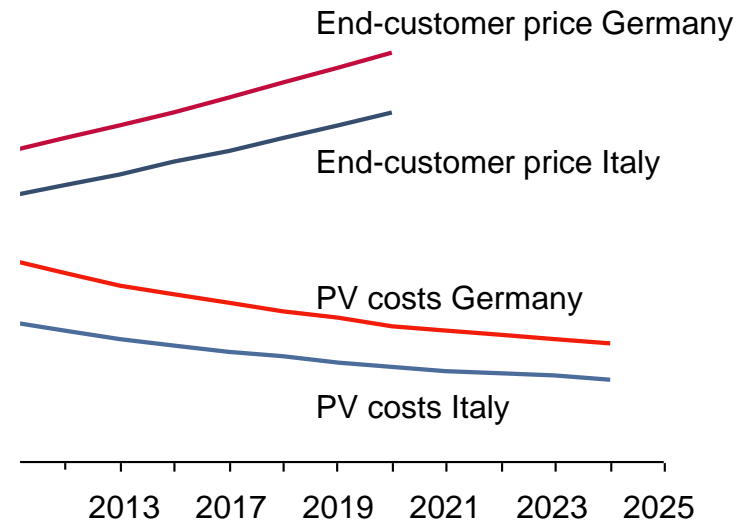
## PV system price, Germany

[<100kWp System]



## PV electricity costs vs. end-customer costs

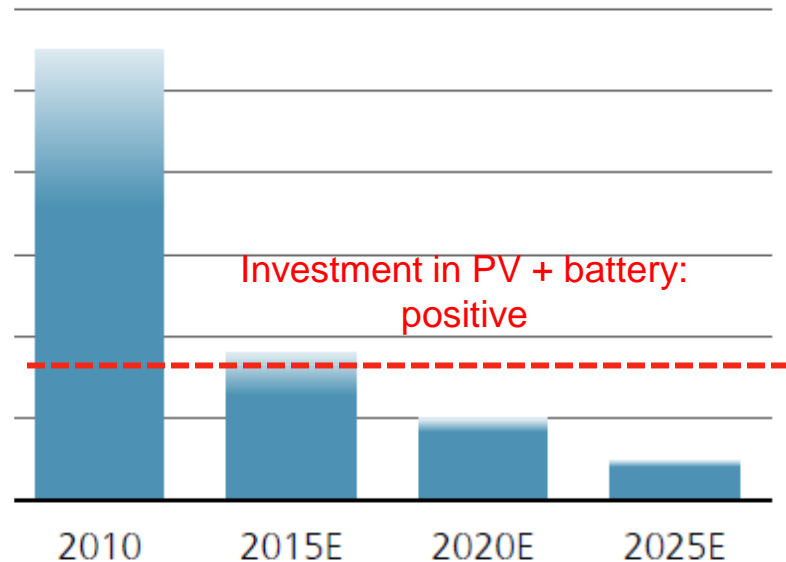
[€/kWh]



**Investment for customers with high own consumption positive without subsidies**  
**Dependency on subsidies reducing by further cost reductions and additional appliances increasing the own consumption.**

# Batteries: Costs have reached the turning point

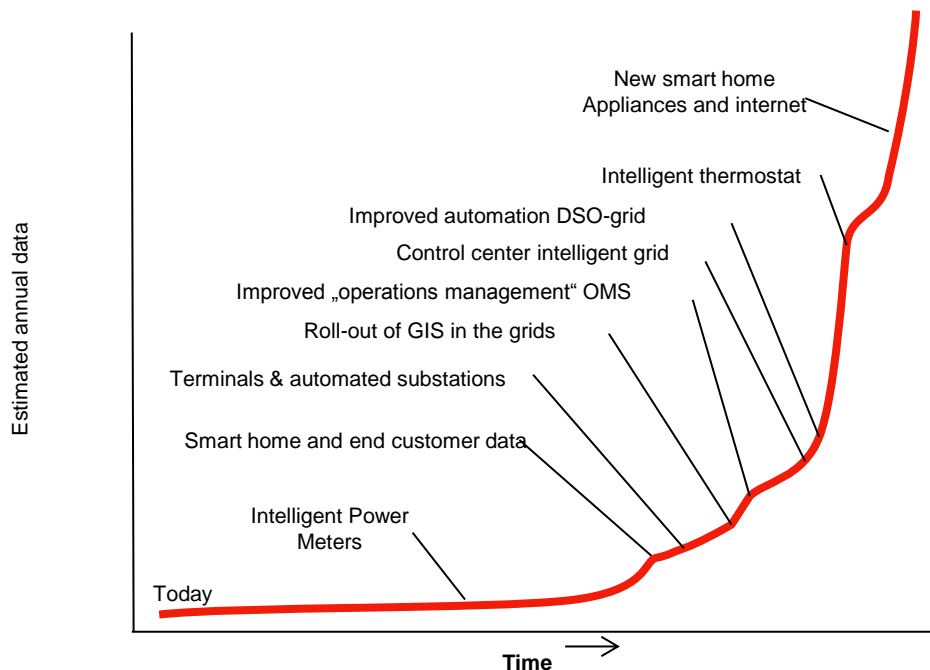
Costs for batteries [€/kWh]



- Electric vehicles reduce costs for Li-ion batteries by > 50% by 2020.
- Market leader Tesla “Giga-factory” will produce more than the current global production volume

# Digitalization, Big Data & „Internet of things“: Integral part of our life in the future

## Exploding data volumes



3<sup>rd</sup> generation of the internet – the „internet of things“ connects

- 1 bn people via PCs
- 6 bn. People via mobile phones
- **28 bn. „things“ in 2020**

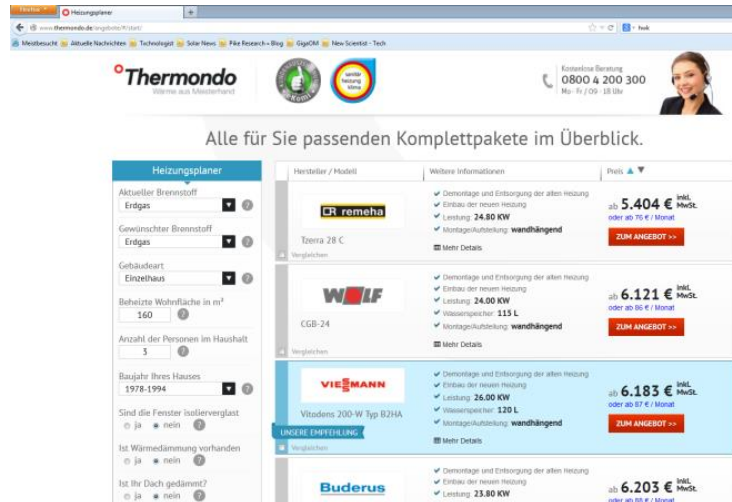
# Example for digital handling in the energy sector

KNOWN  
UNKNOWN



...rolls up the German installation market

Start 2013 – today Germany's largest installer

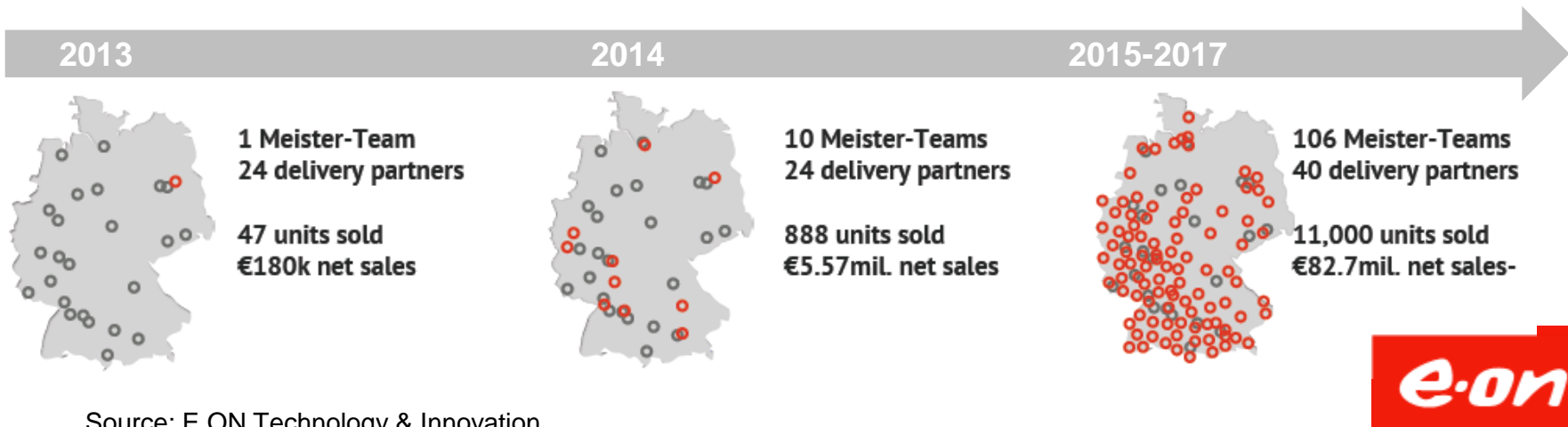


## The first online based heating installer

- Little assets, no working capital
- State-of-the-art digitalization in a traditional market
- Proprietary process fully integrated in an IT-architecture with unique planning tool

## Three lasting cost advantages:

- No on-site visit needed to create best offer
- Installation within 1 instead of 2 days
- Largest volume discounts in the sector



Source: E.ON Technology & Innovation

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# Example of digital sales in the energy sector

KNOWN  
UNKNOWN



... sells PV-systems online with an individual guarantee on performance

In 2014 conversion rate of 15% in NL and an NPS of 73

Attractive,  
personalized  
offers

Several options  
to choose for  
customers



Guaranteed monthly  
costs and savings  
are communicated  
in a transparent  
manner

Simple, easy to use  
access for the  
customer

Outstanding after-sales  
communication to create  
excellent customer  
relationship



# Innovations will dynamically reinforce each other

## “e-Home Energieprojekt 2020”

Interdisciplinary field of research with technical & customer oriented questions: main research on VRDT\* / batteries / customer satisfaction / e-Vehicles



1. Photovoltaic
2. Air conditioning
3. E-mobility
4. Smart metering
5. Transparent energy consumption
6. Intelligent local distribution system
7. Battery storage

Ad \*: VRDT = Voltage regulated distribution transformer



„Simply because you do not have evidence that something exists does not mean that you have evidence that it doesn't exist.“

*-Donald Rumsfeld -*

# Agenda

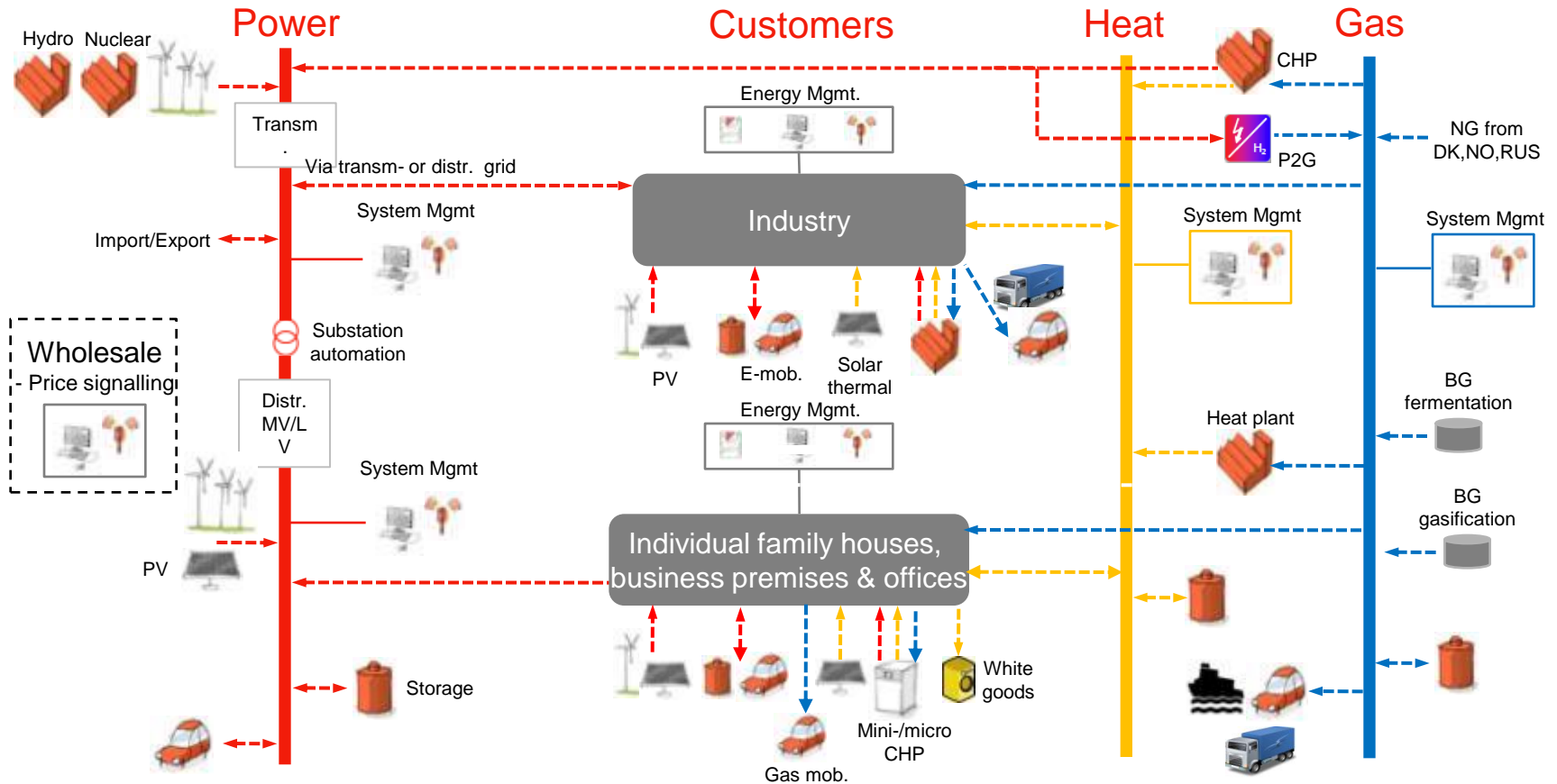
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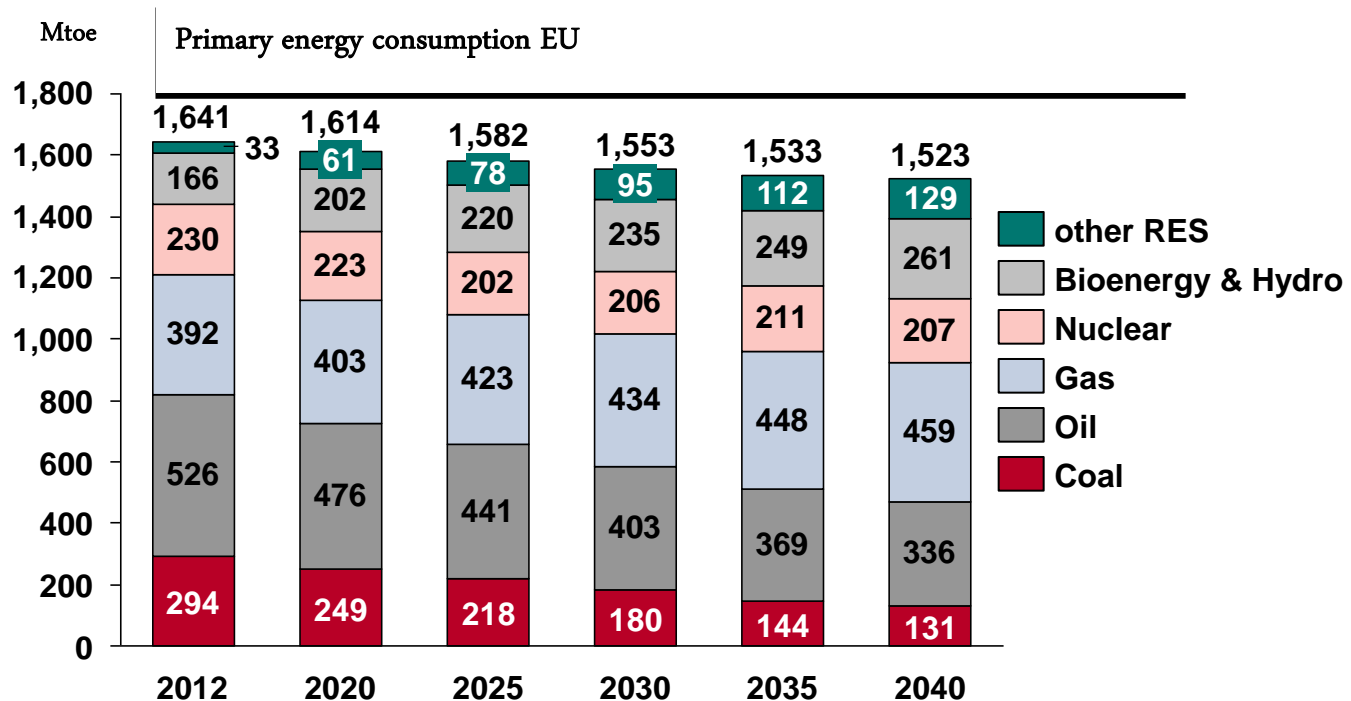
**The energy landscape becomes increasingly complex – also for gas**

Investor owned utilities and the gas industry need to adopt their business models aggressively to this environment.

# The future energy system is highly complex and will have implications on all our businesses

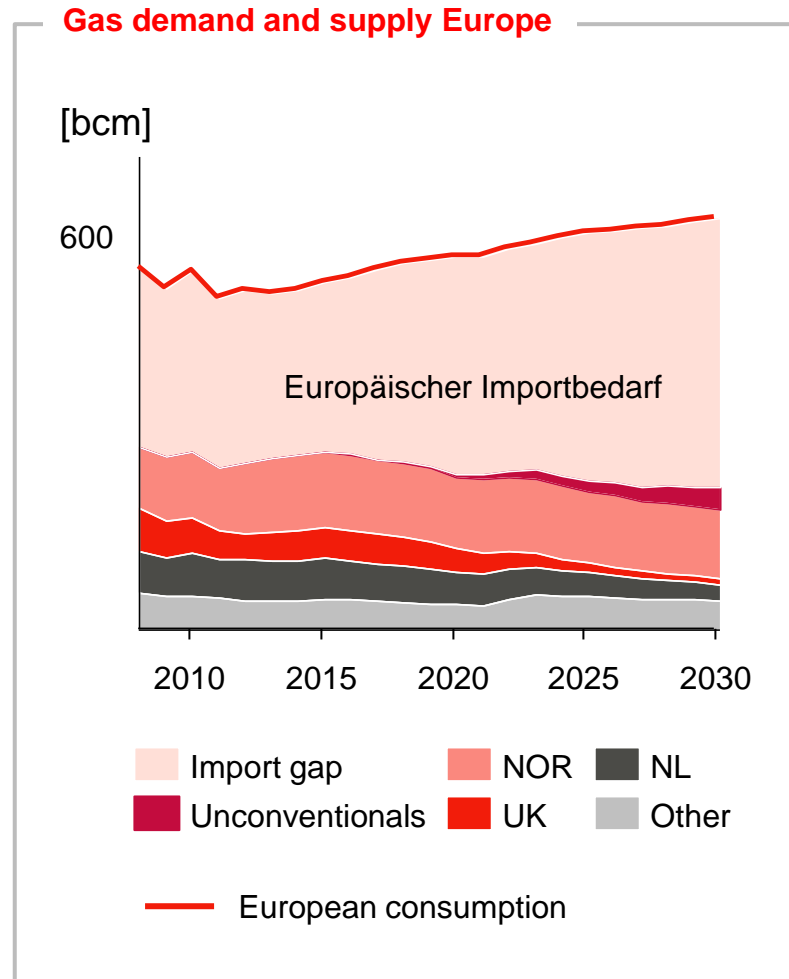


# Nevertheless, Europe will depend on energy imports for the foreseeable future



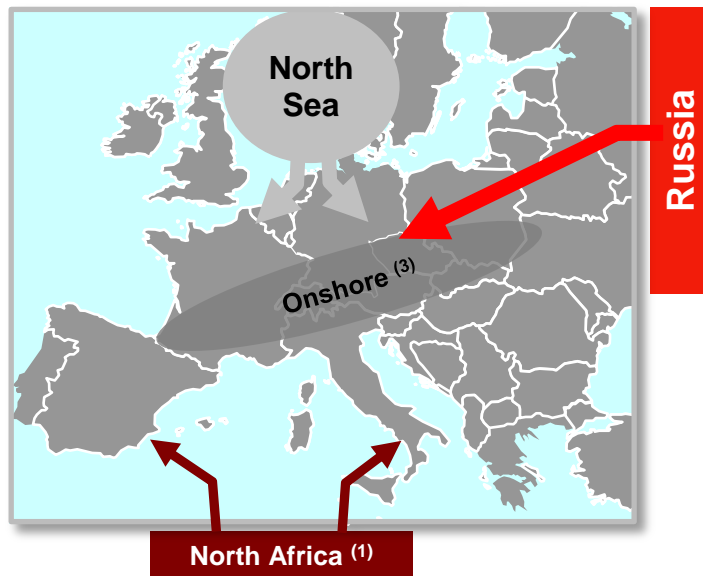
Source: IEA World Energy Outlook 2014, New Policies Scenario

# Especially in gas new import sources required



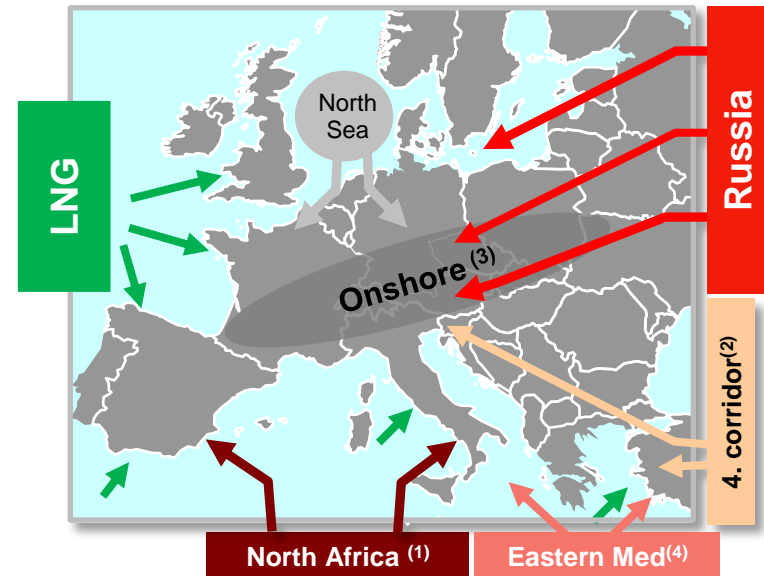
# Gas supply diversification needed for security of supply

## Traditional sources



- LTCs Russia/ North Africa
- North Sea production

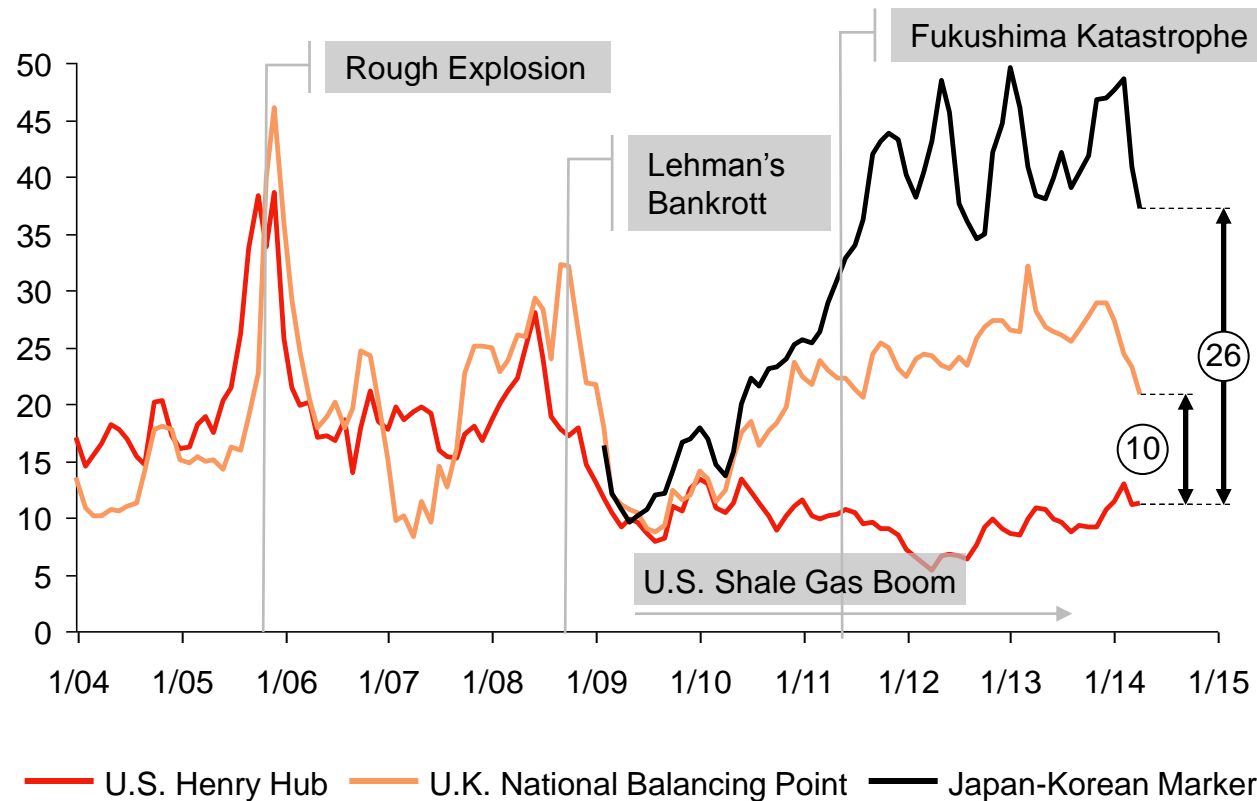
## Future sources



- LTCs Russia/ North Africa
- LNG import
- 4<sup>th</sup> corridor
- Eastern Med

# Complication: European market currently unable to attract LNG

Gas-Spot prices [€/MWh, nominal]

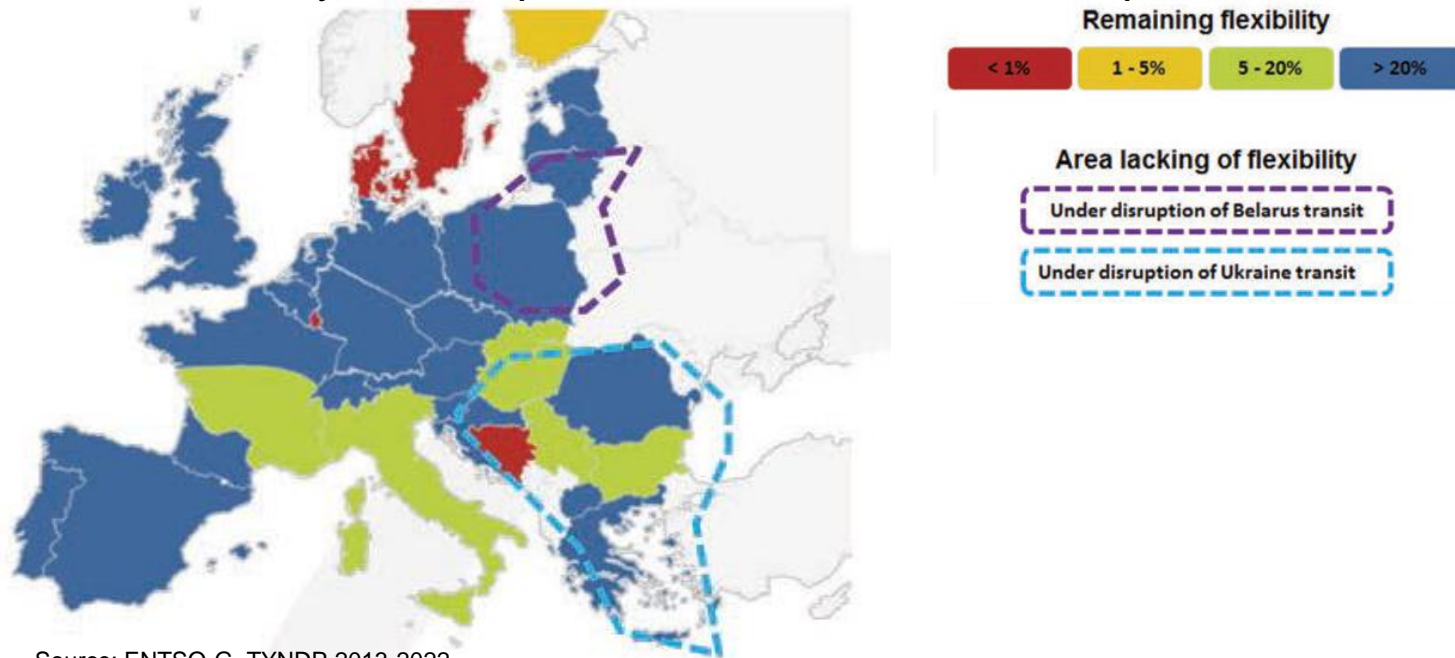


Source: Platts Average until April 2014



# Complication: Political tensions need to be taken into account in diversifying sources and transit routes

## ENTSO-G Analysis of impacts of Ukrainian transit stops



Source: ENTSO-G, TYNDP 2013-2022

- ENTSO-G Modell:
  - based on IP-capacities, storage capacity, import flex, market demand
  - Modelling of gas flows, Assessment of supply disruption scenarios
- Sufficient flexibility (i.e. diversification and security of supply) in Western and Southern Europe
- Disruption of supply via Belarus affects Poland, disruption via Ukraine affects SEE

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# Challenge #1: building smarter energy systems

**Smarter  
Renewables**



**Cleaner & better  
conventionals**



**Integration of  
transport (power & gas)**



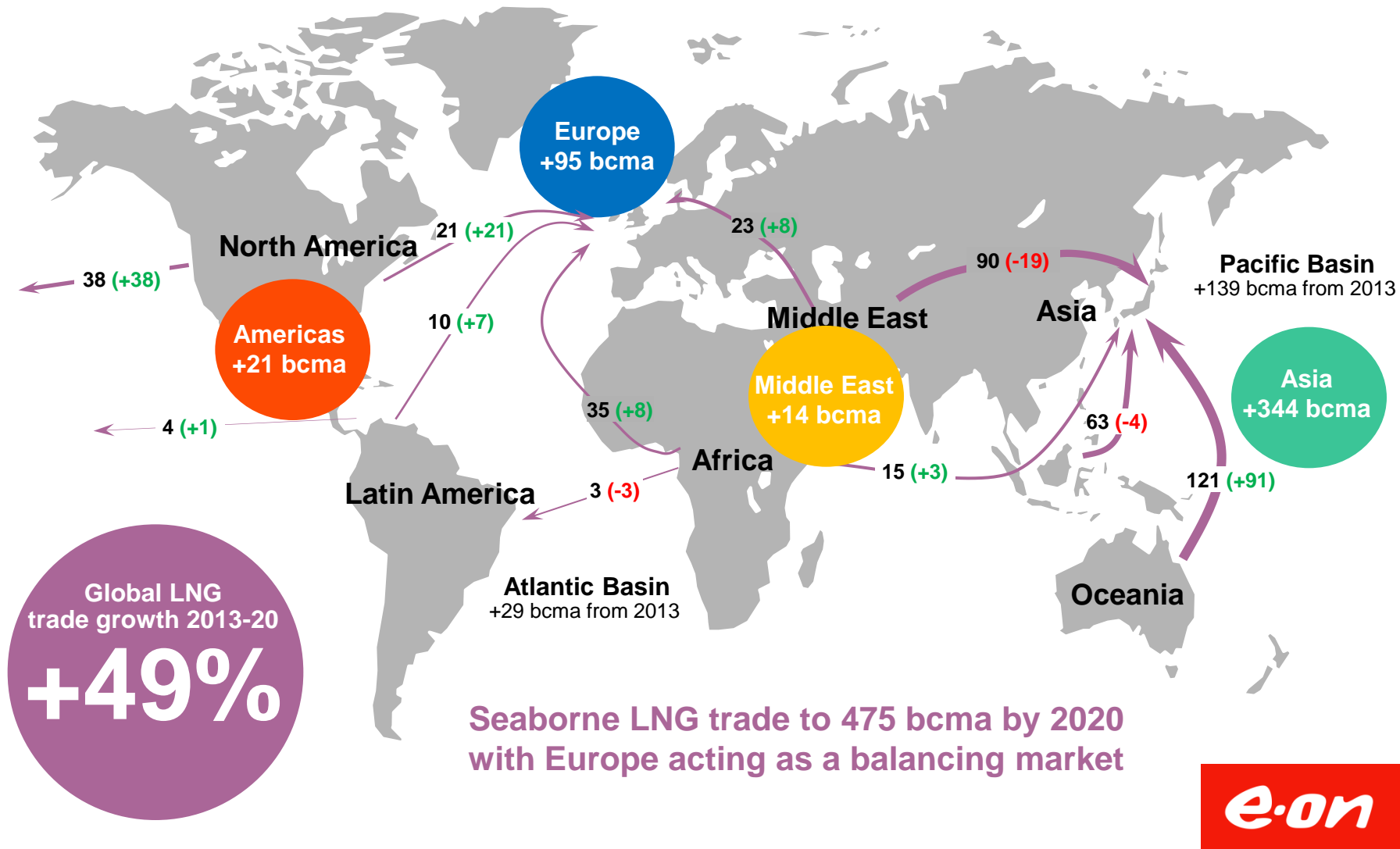
**Smart grids /  
micro-grids**



**Integration of  
heat**



## Challenge #2: building smarter energy supply chains



# Ready for a radical re-thinking in this context?



The world largest taxi company owns no cars.

The company owning the most media content globally does not produce content.

The Facebook logo, featuring the word 'facebook' in white, lowercase, sans-serif font on a blue rectangular background.

facebook



The globally most valuable trader has no inventory or stocks

The largest provider for accommodations owns no real-estate.

The E.ON logo, featuring the word 'e-on' in white, lowercase, sans-serif font on a red rectangular background.

e-on

# E.ON is ready for radical re-thinking!

One of the globally leading energy company owns no power plants?



The world largest taxi company owns no cars.

The company owning the most media content globally does not produce content.

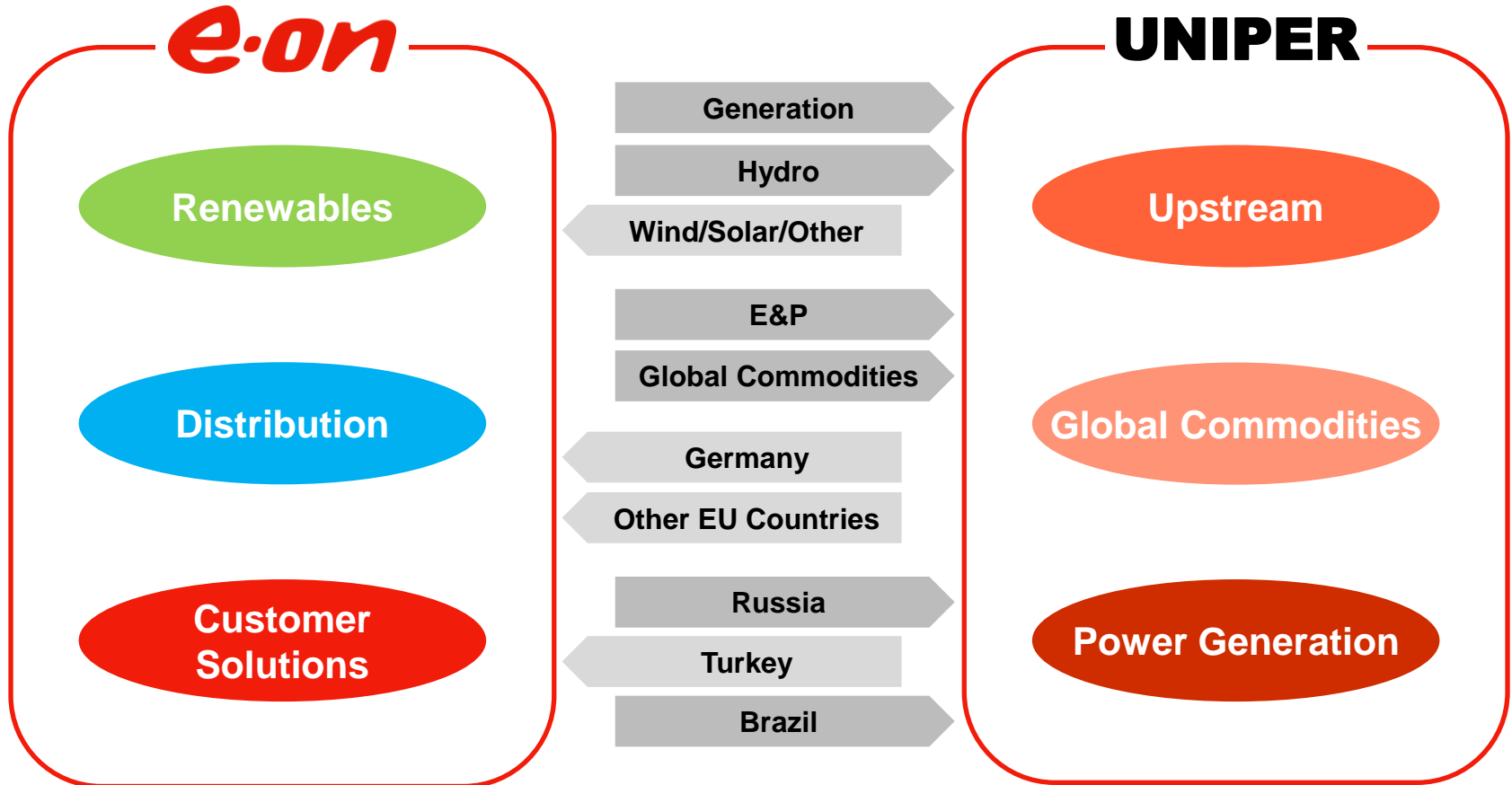


The globally most valuable trader has no inventory or stocks

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## Two leading companies for two energy worlds



Distinct opportunities, mindsets and capabilities

# Challenge #3: Application of new technologies to drive future gas demand



Storage

- Analyzing the potential of large storage in the energy system: linking power, gas and heat



High efficient CCGTs

- CCGT > 60%



Distributed Generation

- Improve technology, economics and environmental impact of fuel cells and Stirling engines



Gas Heat Pumps

- Market entry of gas heat pumps



Bio Methane

- Commercial production and feed-in of bio methane

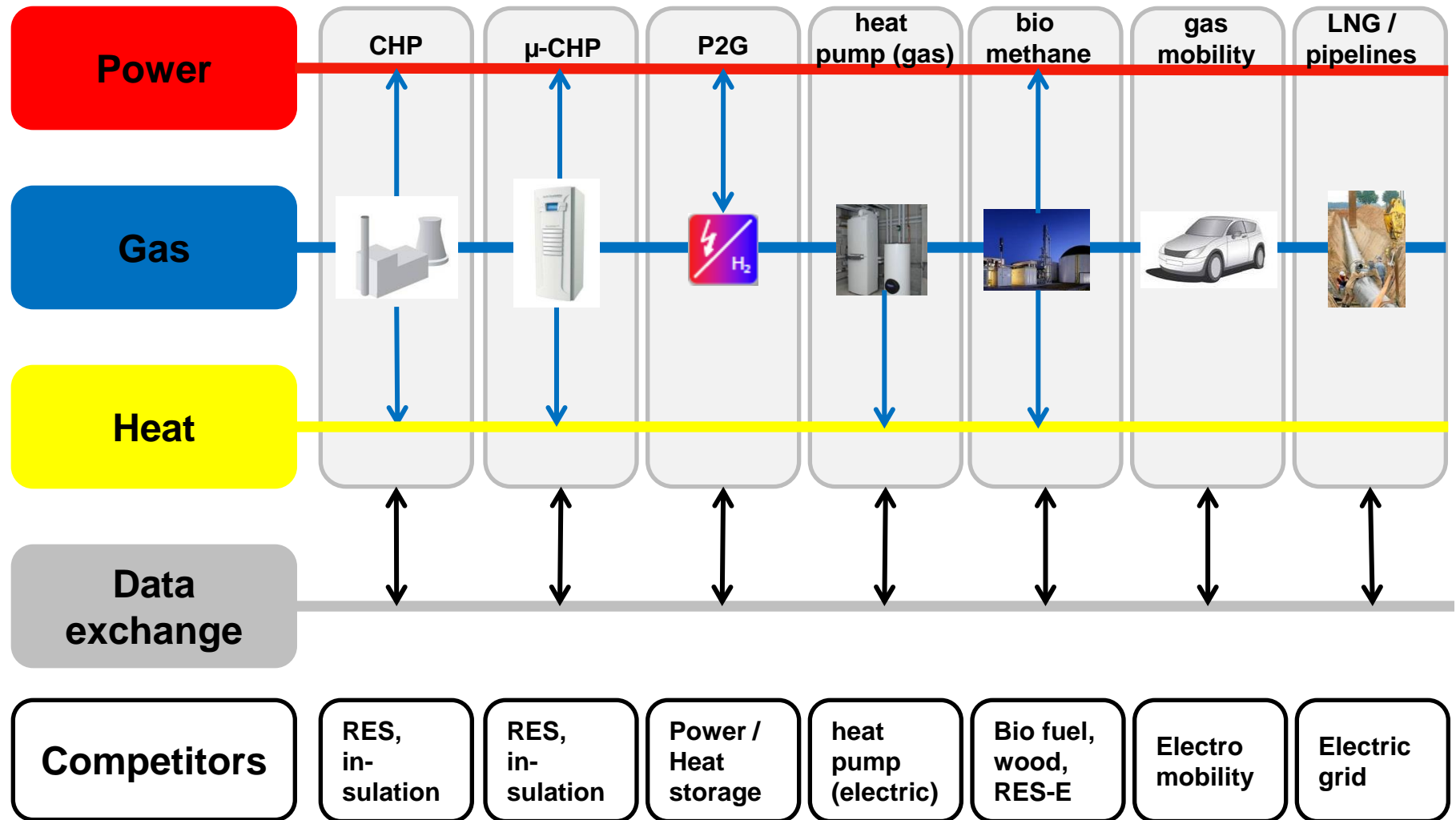


Gas mobility

- Lift the potential of gas mobility



# Power the main competitor?!



# One example for a smart energy partnership: the joint project „WindGas Falkenhagen“





# Construction of one of Germany largest gas block heat and power plant by HanseWerk Natur



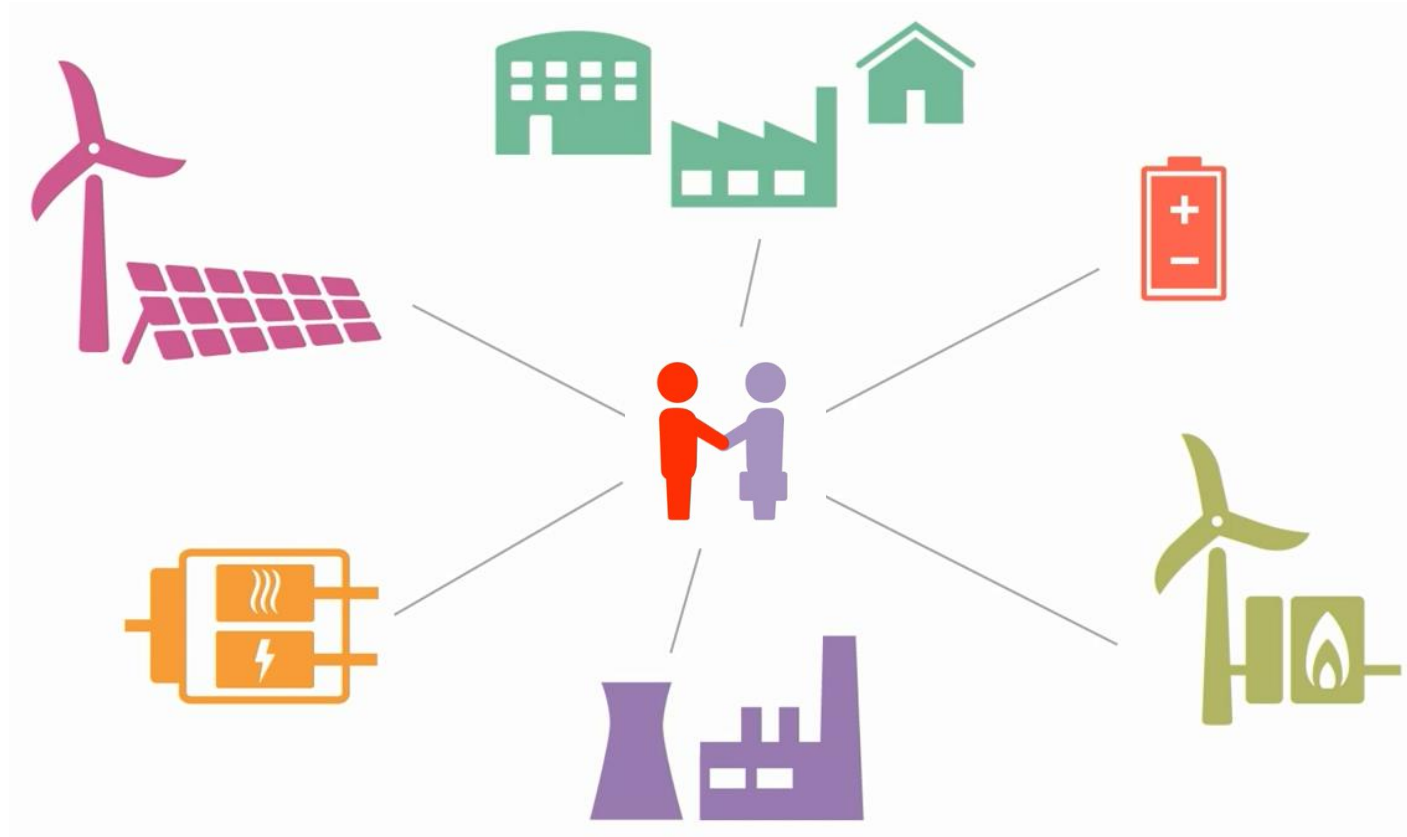
## Customer situation

- The district heating station in Stapelfeld, to the east of Hamburg, is part of the district heating system Verbund Ost.
- In Verbund Ost part of the heat is generated with inefficient boilers.

## E.ON solution

- HanseWerk Natur builds a gas-fired CHP with 10 MW<sub>el</sub> to generate power for 21,500 households
- The flexible and highly efficient plant has a total efficiency of up to 95%.

## Challenge #4: building smarter energy partnerships



# Conclusion

## Embrace innovation

...if only to protect your existing business

## Be part of the transformation

Build smarter energy systems

Build smarter global supply chains

Support gas as part of the solution

## Rely on proven partnerships

E.ON/Uniper appreciate their successful partnership with Swissgas



It's the innovation,  
stupid!



Thank you for your attention

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