

# DECARBONIZATION THROUGH ELECTRIFICATION

COP20 – Energy Day 5. December 2014

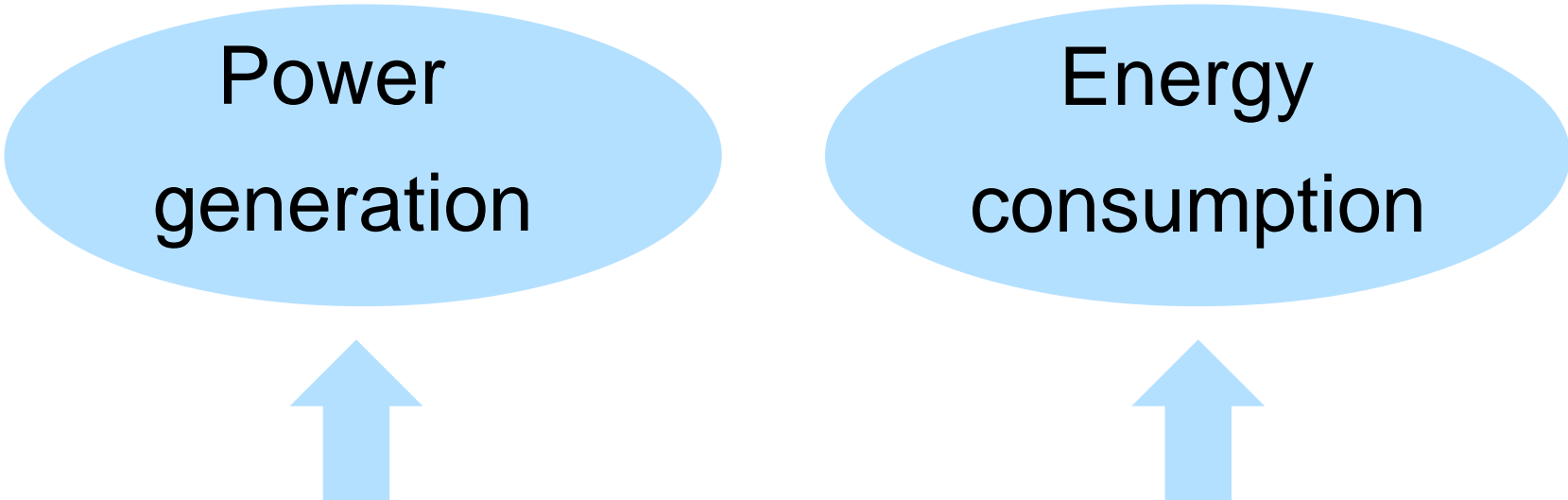
Anne C. Bolle

Head of Climate Policies

Statkraft



# Reducing emissions



Power  
generation

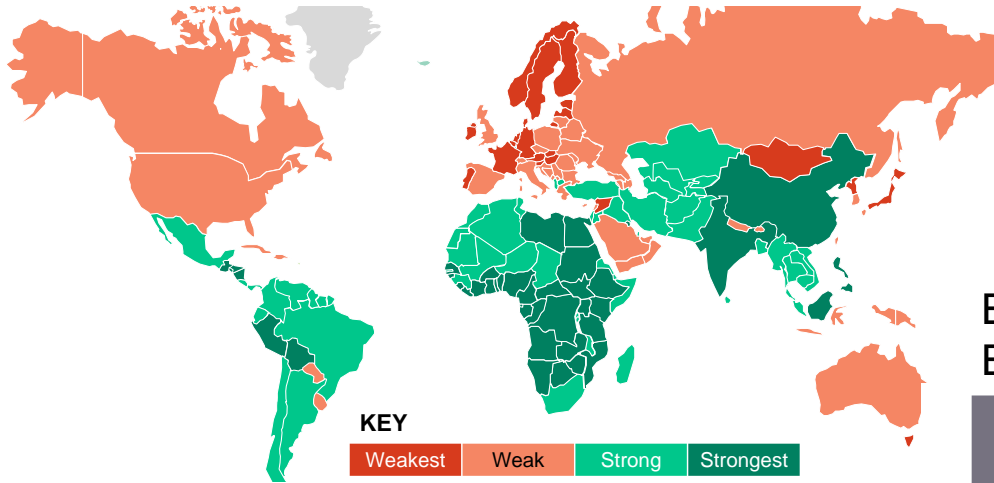
Increase the share of renewables

Energy  
consumption

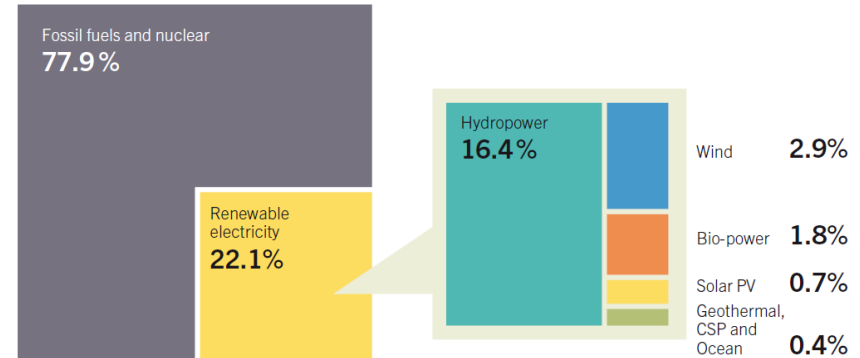
Avoid a myriad of small emission sources

# Scaling up renewables - now

Power demand towards 2030:



## Estimated Renewable Energy Share of Global Electricity Production, End-2013



**New solar 2030: + 1900 TWh**

**100** bill  
€

**ANNUAL GLOBAL  
INVESTMENT**





**New windpower 2030: + 2700 TWh**

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**80** **bill**  
**€**

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INVESTMENT**





**BIOPOWER 2030: + 600 TWh**

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**25** **bill**  
**€**

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**NEW HYDROPOWER 2030: + 1500 TWh**

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**56**

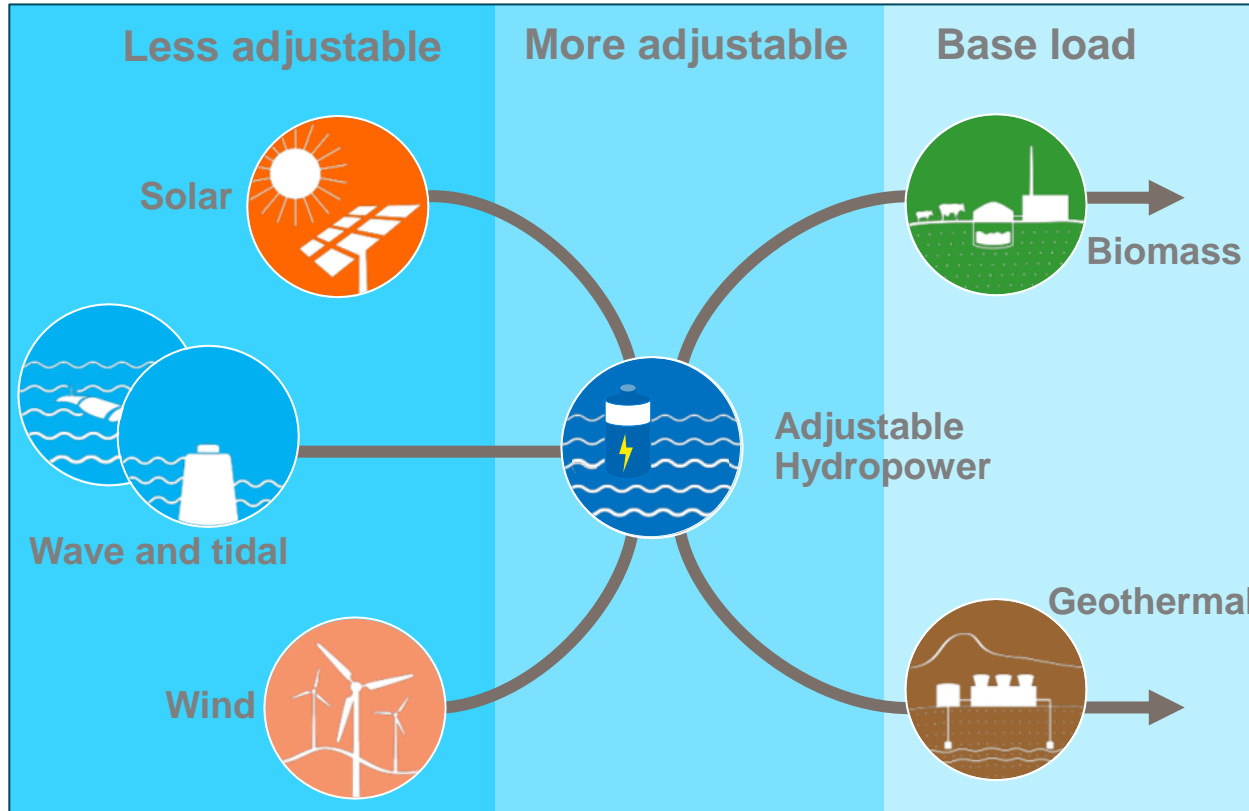
**bill**  
**€**

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**ANNUAL GLOBAL  
INVESTMENT**



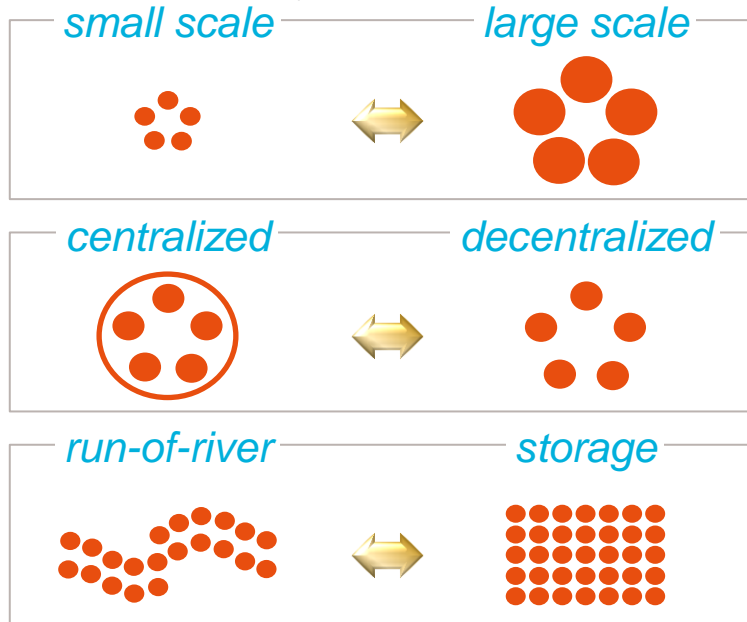
# The renewable family – playing together





# Hydropower has an unique role in mitigation and adaptation

Spectrum of hydropower



- Hydropower's low carbon foot print is crucial in mitigating climate change.
- Storage hydropower provides quick and cost efficient flexibility.
- Hydropower contributes with flexibility and increases security of supply at any time.
- Hydropower plants have a crucial role in avoiding inundations during floods, providing water in dry seasons and irrigation and supply of drinking water.
- Creating reservoirs is often the only way to adjust the uneven distribution of water in space and time.

**Integrated water management will become an important tool in adapting to climate change**

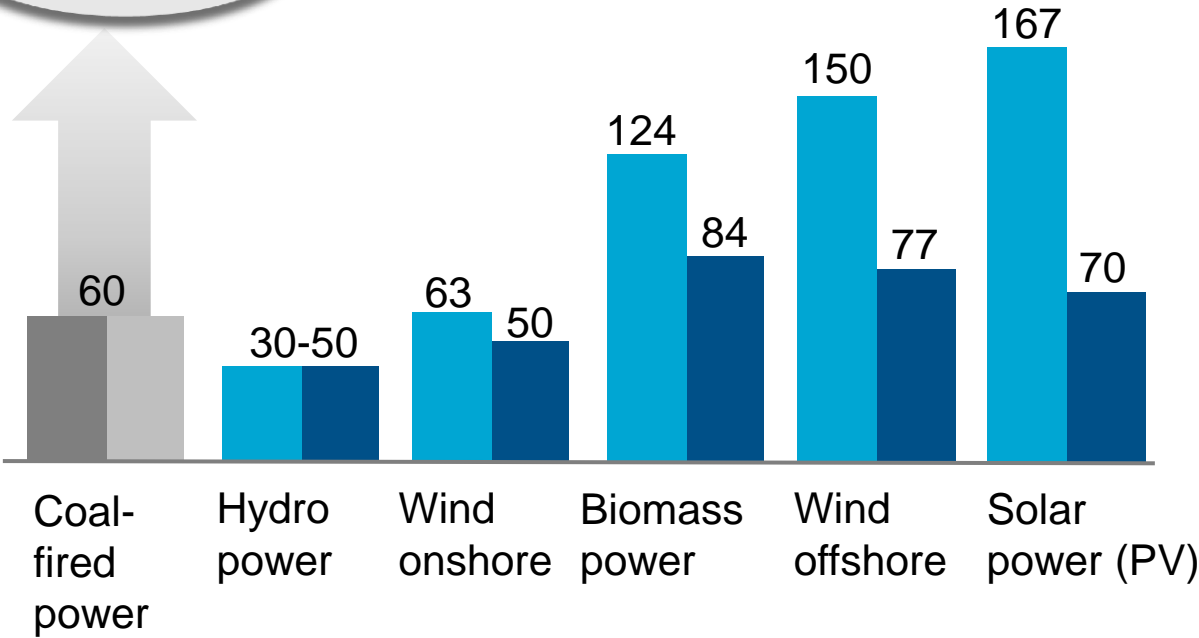
# Electricity production costs 2012/2025

EUR/MWh<sup>1</sup>



+ CO<sub>2</sub> costs

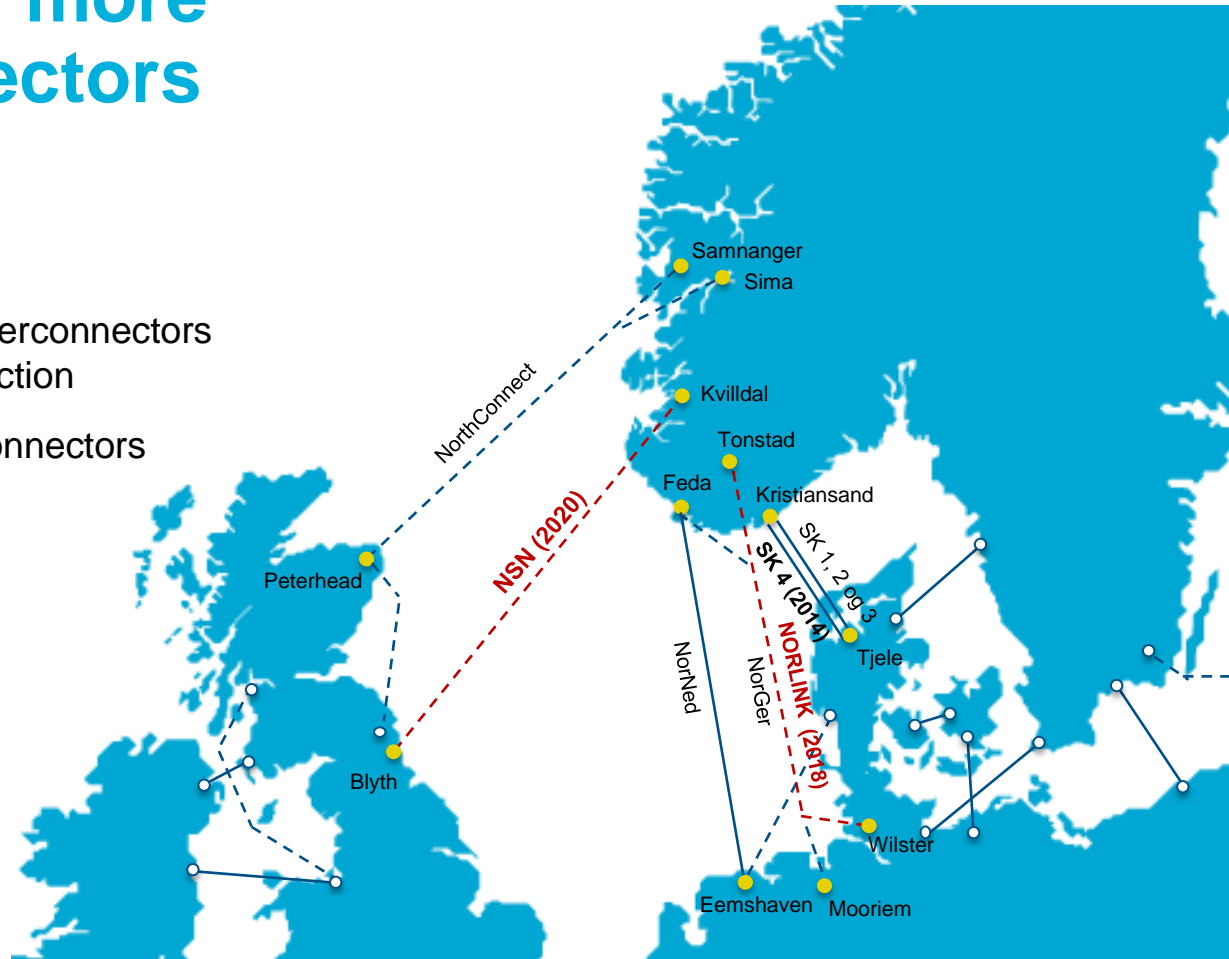
2012  
2025



<sup>1</sup> LCOE, 10% WACC

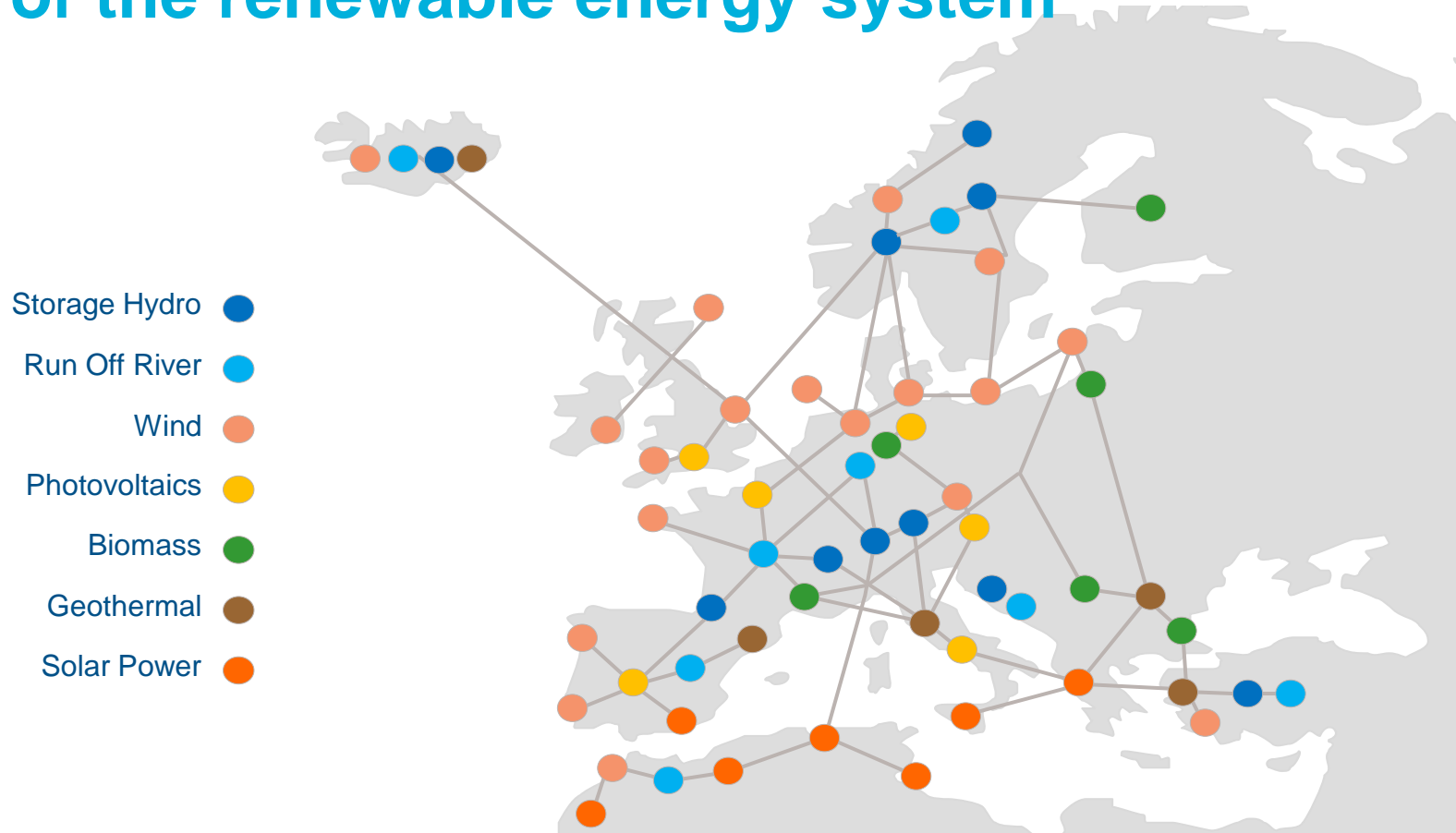
# A need for more interconnectors

- Existing and interconnectors under construction
- - - Planned interconnectors

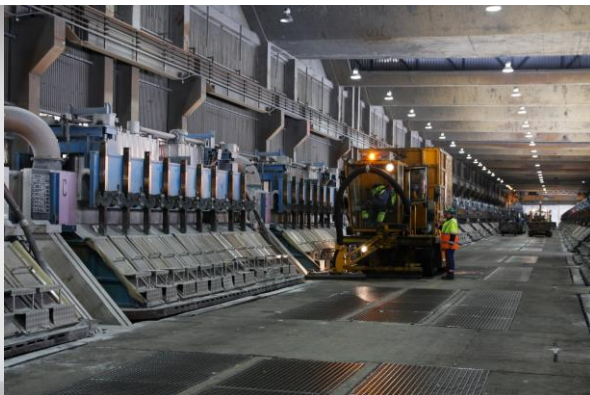




# Vision of the renewable energy system



# The future is electric!



# Could consumers really defect from the grid?



- ▶ Rising retail electricity prices (driven in part by rising utility costs)
- ▶ Less need for demand (due to energy efficiency)
- ▶ Rapidly falling costs for distributed energy technologies (e.g. solar plus battery systems)

Source: RMI



# Potential game changers



# So what do we know?

- ▶ Energy markets are changing rapidly because of increased RES production
- ▶ Grid parity for PV & wind will increase RES deployment further
- ▶ Future external shocks and technological breakthroughs will also strengthen the case for RES
- ▶ Zero emission technologies will eventually take over – the question is WHEN?

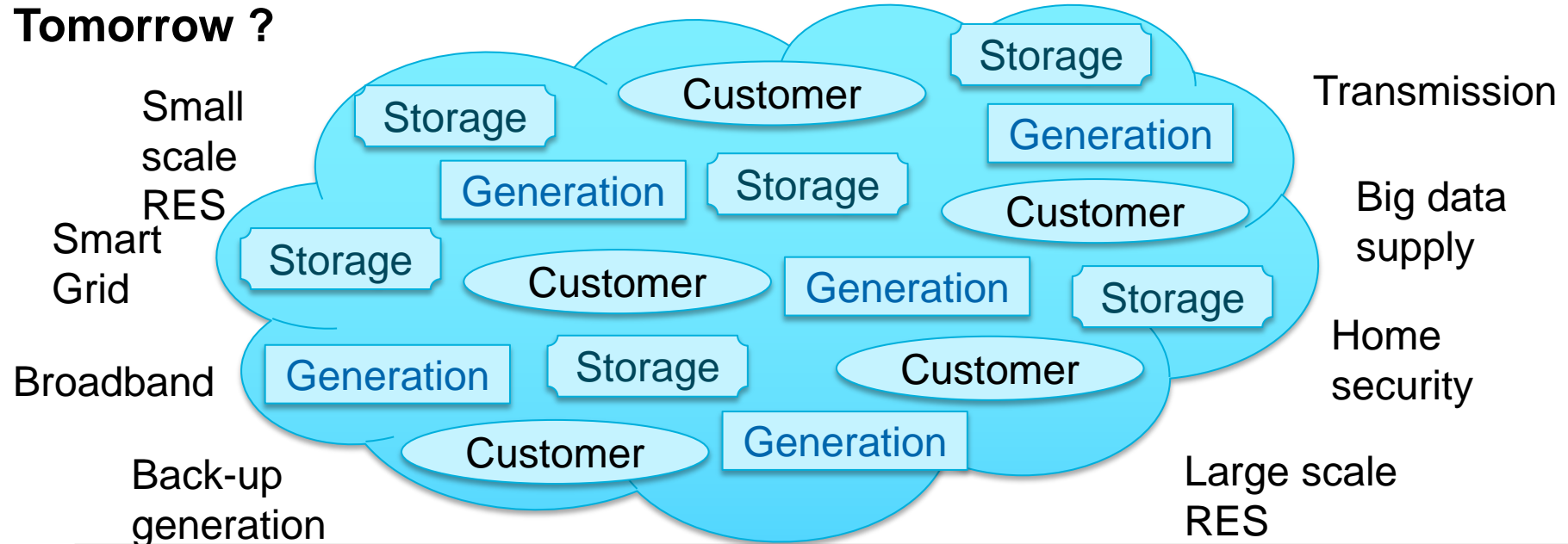


# A necessary utility evolution process?

Today



Tomorrow ?





# Statkrafts contribution to the «green change»

**Hydro**



**Wind**



**District  
Heating**



**Market  
operations**





# THANK YOU