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Our world in 2050: Three factors determining how our future will look like

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What can we learn from experience 90 years ago?

- If climate change triggers economic and social instability, then democratic structures are at risk and global tensions and wars are likely.
- Need to cooperate locally, nationally and internationally to
  - tackle climate change,
  - care for local jobs and local actors as foundation of democracies.
- History shows – transformation can be faster than you think.
Important determinants for our future:
I. Resource and energy efficiency
Why are we interested in materials?

Percentage contribution of various basic materials to global CO2 emissions

Sources of Emissions in Material Production

- Fuel Combustion
- Process
- Power Generation

Source: Based on IEA ETP 2017
Difficult to envisage that RE supply suffices for clean material production, unless portfolio of demand side measures for use of materials successful.

### Filling gaps in the policy package to decarbonize Europe’s materials sector

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<th>Gaps in policy package</th>
<th>New / Extended policy instrument to close gap</th>
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<td>- Extended producer responsibility</td>
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<td>Efficient product</td>
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<td>Material substitution</td>
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<td>Conventional processes</td>
<td>3. How to make BAU not a viable perspective?</td>
<td>- ETS including a carbon charge</td>
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<td>- Emission intensity standard for materials</td>
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Summary: Resource and energy efficiency

**Challenge:** Implementation of policy package

**One decisive factor:** National Climate Change Law, EU 2030 governance, to provide framework for policies in **all** sectors.

- Lack of demand side policies  
  -> Tension on energy/resource markets

- Inconsistent picture for supply side  
  -> Public R&D focused policy  
  -> Investment limbo

- Successfull demand side policies  
  -> Opportunities for local business

- Clarity on vision for supply side  
  -> Public & private driven innovation  
  -> Investment
Important determinants for our future:
II. System integration
Size of areas proportional to primary input by energy carrier and sector

Based on AG Energiebilanzen (2016)
Unlocking demand side flexibility

- To replace conventional generation and meet extra needs
- Large potentials from e-mobility, electric heating, industry

Unlocking potentials requires
- Tailored proposal & credibility to engage consumers
- Clear interface to distribution/transmission system

Two scenarios:
- Flexibility portfolio managed in centralised systems
- Customers offer flexibility responding to local prices
**Summary: System integration**

**Challenge:** Create incentives for households and regional business to unlock flexibility potential

**One decisive factor:** Local prices

- **No**
  - Cloud-based flexibility control
    - concentration of actors and data
    - accelerated if used for re-dispatch
    - lack of regional anchoring/jobs
    - difficult to align with cyber security
  - Tendency towards autarky
    - Households seek privacy
    - Physical linking of RE and Flex
  - Failure to reach scale and efficiency

- **Yes**
  - Price based flexibility control
    - standardised protocols address cyber security and privacy risks
    - value for system fully remunerated
    - easy market entry for local actors
    - tailored solutions unlock potentials
Important determinants for our future:

III. Financing
Financing costs important for viability of wind and solar

Illustration excludes system costs

Annuitized Investment for wind and solar to replace fossil fuels at
- 10 % capital costs
- 5 % capital costs

Annual expenditure
CO2 at 30 Euro/t
Domestic fossil fuel
Imported fossil fuel

DIW Berlin Calculations based on BP Statistical Review of World Energy; Energy Statistics for the EU-28; Bundesverband Solarwirtschaft e. V.; IEA; European Wind Energy Association; Bundesamt für Wirtschaft und Ausfuhrkontrolle, first published in Energy Journal (2016)
If nothing changes all will change

Floating Premium: As technology costs decline, optionality kicks in, floating premium offers less hedging, financing costs increase, total cost increase.

Without long-term hedging 30% cost increase from
• Project revenue risk (1)
• Liability in LT Contracts (2)

Matches overall assessment (3)

**Challenge:** Allow simple hedging to facilitate low-cost finance

**One decisive factor:** Shift to contracts for difference

- Concentration of actors
  - lack of local engagement and support
  - insufficient capacity to realize projects

- Increase of cost to consumer
  - (example Germany 2030 projection)*
    - Floating market premium: 0,8 billion
    - Fixed market premium: 2,7 billion
    - CO2 price only: 3,4 billion.
  - Industry/HH less supportive for RE
  - Speed of transition declines

- Multiple actors compete
  - improves projects/technologies
  - realisation of deployment targets

- Consumers fully benefit from cost
  - RE reductions
  - accelerate electrification
  - accelerate speed of transition

* Source: DIW Berlin, Weekly Report 28/2018
What do we need for our world in 2050?
• Rapid reduction of emissions
• Functioning communities

What is important to make this happen?
• Governance for efficiency policies
• Local prices for system integration
• Remuneration for simple financing