

Energy-intensive Industries

Challenges and opportunities in energy transition

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For energy-intensive industries, the transformation towards a climate-neutral form of production is a particular challenge, not only because of their large carbon footprints, but also because they are embedded in value chains that are still predominantly fossil-based. However, they too are part of the effort to reach climate neutrality by 2050 and at the same time accelerate the transition by providing competitive clean technology solutions. This study explores how European energy-intensive industries can transition to a climate-neutral economy while maintaining, and ideally improving, its global competitiveness. It investigates different technology options, policy designs and financial instruments.

There has long been a concern that climate policies would hurt the global competitiveness of energy-intensive industries (EII) in Europe, resulting in carbon leakage. Yet, as more and more countries turn to carbon pricing or otherwise commit to enact climate policies, this picture changes: in a decarbonizing global economy, competitiveness will be increasingly determined by the capacity to deliver solutions at competitive prices, but with a drastically reduced carbon footprint.

The European Green Deal acknowledges that. In it, the Commission sketches its strategy to transform the EU into a resource-efficient, competitive and climate-neutral economy by 2050. For that to succeed, the transformation of Europe's EII is key and frontrunners are needed to develop commercial applications of breakthrough technologies in important industrial sectors by 2030.

The political response to the corona crisis presents a unique opportunity to accelerate investments for the transition of EII towards carbon neutrality, as governments across Europe launch multi-billion stimulus packages to restart economic development. Using this window of opportunity is key since much of the investment for transitioning to a climate-neutral economy will need to happen in the 2020s. By contrast, any investment incentives that cement the current structures in EII must be avoided, as these would only produce more stranded assets over the long run.

Already today, there is a range of technologies available that can contribute to the decarbonisation of Europe's EIIs. They can be divided into three categories:

- First, energy efficiency measures and CCS can reduce emissions of industrial production processes, without fundamentally altering these processes.
- Second, fossil fuels currently used in the production process can be replaced with renewable energy sources, or fuels derived from renewable energies – this concerns electrification, biomass, green hydrogen or other synthetic (power-to-x) fuels.
- Third, for some production processes there is the option to develop alternative routes with significantly lower CO₂ footprint such as CCU or process intensification.

The latter also includes steps to drastically reduce material throughput or close material consumption (circular economy). Many of these technologies are technologically mature, but high upfront capital costs and higher operational costs create an effective barrier to their uptake. Yet developing a carbon-neutral industry is not only a matter of removing economic barriers to low-carbon investment – it also requires adaptations of the existing energy infrastructure, and making sure that renewable energy (and derived products) can be supplied at the necessary scale.

Therefore, a successful uptake of these technologies requires government intervention with smart policy designs and adequate financial support. The following steps are key to assist the transition of European EII's towards carbon-neutrality:

- Massive investments in renewable electricity and in infrastructure such as hydrogen networks
- Public funding to kick-start technology development
- Creating demand for carbon neutral products through public procurement and product regulation
- Substantially higher carbon prices and carbon contracts for difference
- An effective carbon border adjustment tax

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Authorship

[Benjamin GÄrlach](#)

Jan-Erik Thie

Sander de Bruyn (CE Delft)

Chris Jongsma (CE Delft)

Bettina Kampman CE Delft)

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