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INSTITUTE FOR
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The background of the slide is a composite image. The top half shows several modern skyscrapers with glass facades against a cloudy sky. The bottom half shows a close-up of solar panels, suggesting a focus on sustainable energy and technology.

How industrial innovation and circular economy can improve sustainability and reduce emissions

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Scene setting



Current global context:

- Interconnected crisis
- Global race to the top
- Lack of incentives for companies to invest in low-carbon innovation in the EU
- Poor cost-competitiveness of low-carbon manufacturing technologies (capital and operating costs)
- Challenges in facilitating circular solutions and improving energy efficiency in recycling
- Challenges to scaling up new innovation



What are the key levers to improve sustainability and reduce emissions?

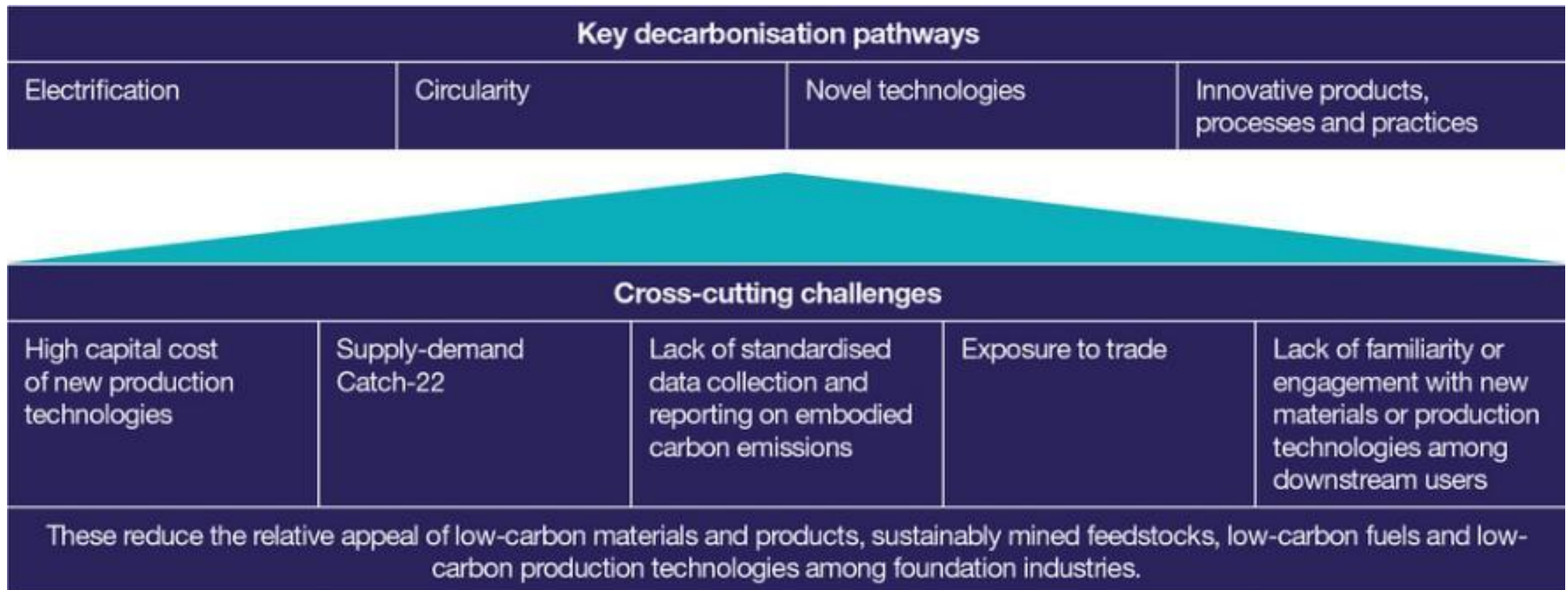
- Innovation and circular economy are key solutions.
- The presentation builds on the report ['Market driven decarbonisation: The role of demand-led innovation in supporting emission reductions in foundation industries'](#) and the policy briefing ['Circular Savings - Business perspectives on energy savings through circular practices'](#)

The role of innovation in supporting industrial decarbonisation

- **Innovation is essential** to deliver manufacturing without the same environmental footprint (decarbonisation) and will be **needed at all stages of the value chain**
- **Innovation needs to include:**
 - ✓ Products (to reduce material intensity and improve recyclability)
 - ✓ Processes (to reduce emissions from industrial processes)
 - ✓ Business models (to facilitate greater circularity and reduce material use)
 - ✓ Policy (to create demand and enabling conditions for innovation and its upscaling)
- **Circular solutions can avoid emissions and energy heavy primary processing and reduce emissions from material manufacturing**, but waste management services and technologies also require energy and chemicals
- **Need to pursue both innovating virgin material manufacturing and developing circular solutions**

Innovation needs to support foundation industry decarbonisation

Our [research](#) identifies where innovation is needed to support industrial decarbonisation and to address the cross-cutting challenges to it.



A focus on circularity as a key measure in driving energy savings and reducing emissions



- The energy transition will likely cause a spike in the consumption of raw materials and heighten Europe's import risks and dependencies on non-domestic resources
- The industry and residential buildings sectors accounted for over 25% each of the EU's final energy consumption in 2020
- Adopting circular economy measures can reduce energy consumption while retaining the value of materials and products:
 - ✓ e.g. **recycling automotive lithium-ion batteries** after their 2nd life requires up to 6% less energy
 - ✓ e.g. **the chemical industry** could enable a reduction of 37% of energy consumption in downstream sectors by 2030
 - ✓ e.g. **building insulation** can reduce energy demand by 45% but material production energy can also be reduced by using recycled insulation materials

Case studies

ROCKWOOL

- Closed-loop recycling system, **RockCycle**, recycles stone wool insulation waste as raw material for new products
- This reduces the company's reliance on virgin materials and contributes to improved energy efficiency in manufacturing processes
- Recycling stone wool leads to a reduction in carbon emissions of close to 10%
- The insulation products sold in 2022 will, over the lifetime of their use, reduce the need for heating energy by 931 TWh

Signify

- **ALight initiative with Air Liquide** reduces building carbon emissions by 33% by 2035.
- This is Product-as-a-Service model replaces traditional lighting with highly efficient LED lighting
- LED fixtures installed across 31 sites in Europe, Asia, and the Middle East have led to an estimated reduction of 2,840 MWh in energy consumption and 770 tons of CO₂ emissions per year

Case studies

Saint Gobain

- **Glass Forever roadmap** aims to increase cullet use in its glass production to 50% by 2025
- Use of cullet reduces carbon and sulfur oxide emissions during the production process
- Integration of one tone of cullet into a flat glass furnace reduces CO₂ emissions by 300 kg and saves 1.2 tons of primary raw material per ton of cullet used
- Use of cullet in the melting process uses 30% less energy than melting primary raw materials

Ball Corporation

- Increasing recycled content is Ball Corporation's biggest decarbonisation lever
- Carbon footprint of virgin aluminium varies depending on electricity source, from 5 to more than 20 tons CO₂e/t Al
- Recycled aluminium uses just 5% of the energy required for primary production
- Recycled aluminium creates significantly fewer GHG emissions, around 0.5 tons CO₂e/t of recycled aluminium

Business challenges



- **Incoherent and misaligned policy environment**
 - EED does not elaborate on the complementarity of the CEAP
 - Transposition of EU legislation at the national level imposing barriers for businesses operating across borders (e.g. EPR schemes)
 - Predominant focus on end-of-life solution and less on resource productivity and supply of raw materials
- **Lack of adequate end-of-life provisions**
 - High inefficiencies, such as contamination with other polymers or waste streams, even when the waste was separately collected

Business challenges



- **Lack of adequate technologies**
 - Lack of data, insufficient standardisation of information, limited interoperability between platforms and data sources, legal and intellectual property barriers impose significant challenges for businesses to adopt technological solutions at scale
 - Recycling and production technologies require high capital investments and provide no guarantee that secondary materials will become the go to market choice

Policy recommendations:



Develop a clear vision for a new European green industrial strategy



Create supporting links between energy efficiency and circular economy policies



Support the development and widespread adoption of recycling technological solutions



Enable the recirculation of materials through fiscal policies applied across all stages of the product's life cycle in alignment with existing EPR fees



Use demand-side policies to increase the demand for circular products and services



Improve policy coherence across Member States to facilitate the transition towards a sustainable circular economy

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