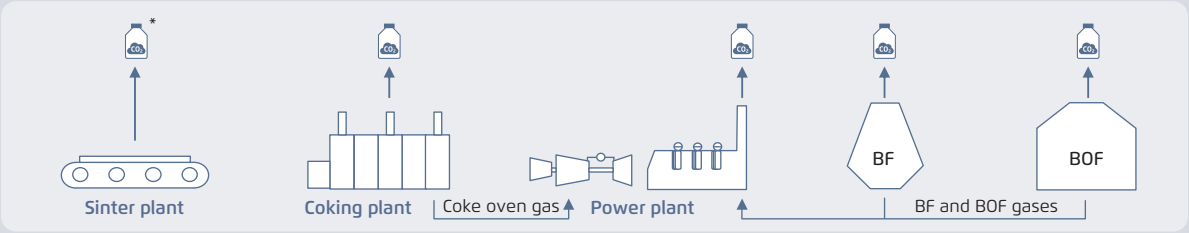

BF-BOF-CCS...

...leaves high residual emissions

- BF-BOF-CCS will likely only reduce direct CO_2 emissions by 73% compared to the BF-BOF route
- While higher emission reductions are technically possible, it is questionable whether they are economically viable

...will be prone to disruptive technology cost developments

- Direct electrification technologies such as molten oxide electrolysis could be cheaper once they become commercially available in the 2030s
- There is a risk that the combination of cost factors (CO_2 transport, storage and residual emissions compensation) will make BF-BOF-CCS uncompetitive

...cannot address upstream emissions

- Upstream emissions from coal mine methane leakage currently add ~12% in addition to the current direct CO_2 emissions of the steel industry**
- BF-BOF-CCS cannot address upstream emissions directly and if they are included in the future regulation of the steel industry, they may worsen the business case for BF-BOF-CCS

...faces an offtake risk in green lead markets

- Progressive companies that strive to decarbonise their supply chains (i.e. automotive, household appliances) and want to advertise this fact to their customers may not want to be associated with coal-based technologies

Agora Industry and Wuppertal Institute (2024). Note: BF-BOF-CCS has several uncertain cost facts, depending on which CO_2 point sources are included in capture, whether the CO_2 is stored onshore or offshore and the distance to storage sites. Offshore CO_2 storage tends to be more expensive than onshore CO_2 storage. *The figure illustrates the capture of CO_2 from the sintering plant which is technically feasible, but may not be economically viable. **Upstream methane emissions from coking coal are estimated to be 320 $MtCO_2eq$ based on a GWP 100 measurement and 825 $MtCO_2eq$ based on GWP 20 (author's calculations based on IEA 2023a).