



Materials industry modelling in net-zero emissions scenarios: the case of steel

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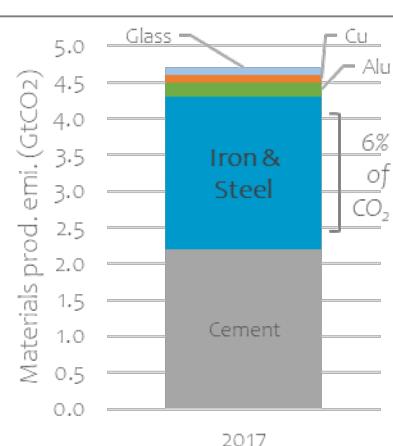
WORK IN PROGRESS
findings not final

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MOTIVATION – OBJECTIVE

- Steel: important role in global emissions
- What transformations towards economy-wide GHG neutrality?



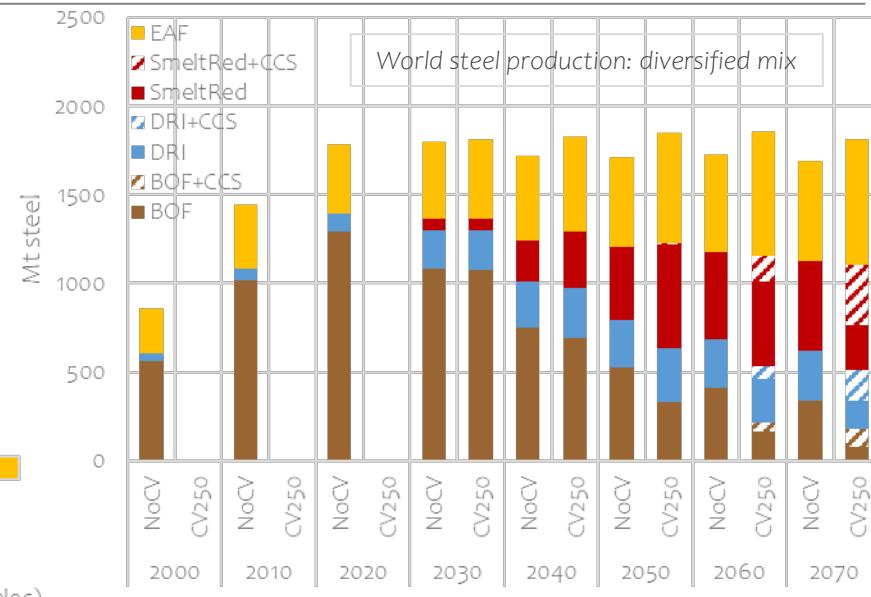
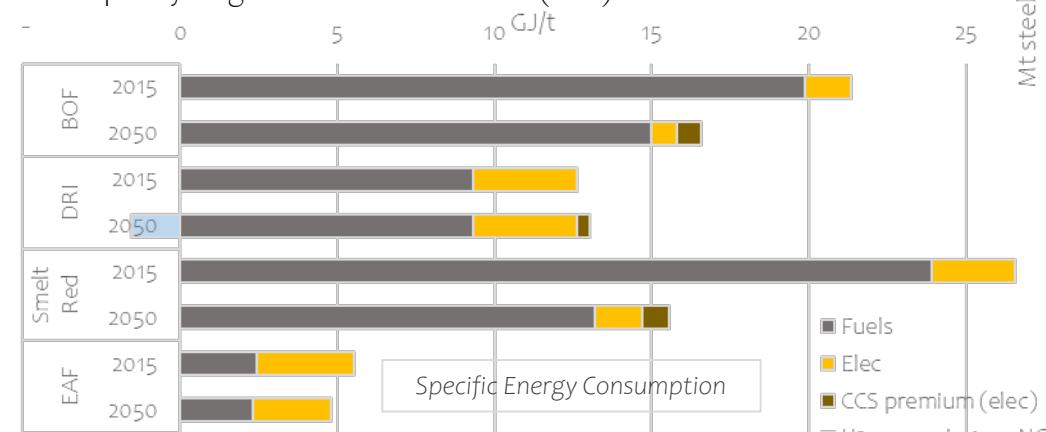
PROJECTING DEMAND

- Steel demand expected to increase, few signs of saturation
- Methods: Intensity of Use, Intensity of Stock, bottom-up individual uses

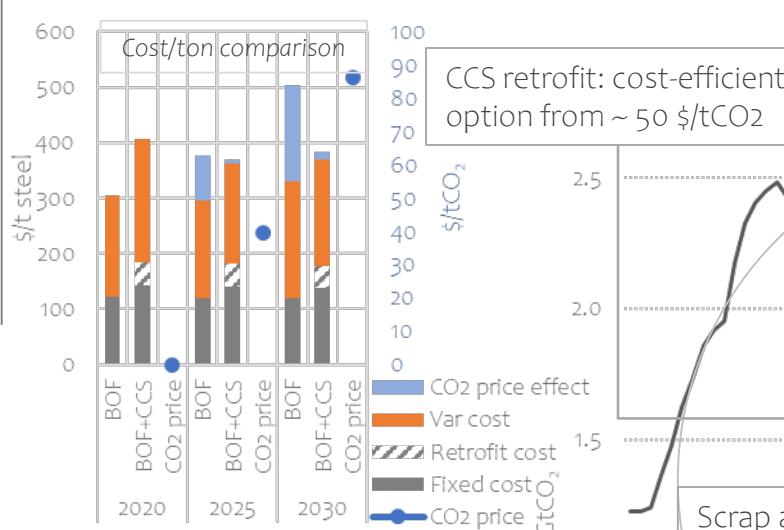


TECHNOLOGIES Low-emissions options:

- CCS retrofit, use of biomass in Blast Oxygen Furnace (BOF) or in Smelting reduction
- Direct-Reduced Iron (DRI) with hydrogen +EAF
- Scrap recycling in electric arc furnace (EAF)



MITIGATION OPTIONS & TRADE-OFFS

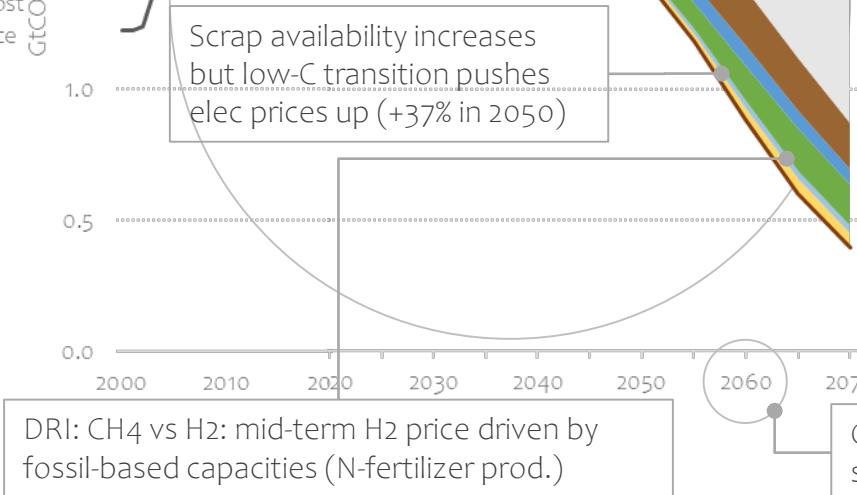
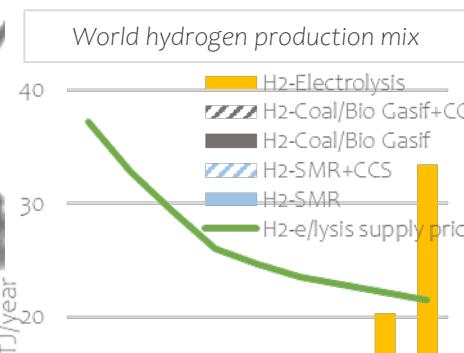
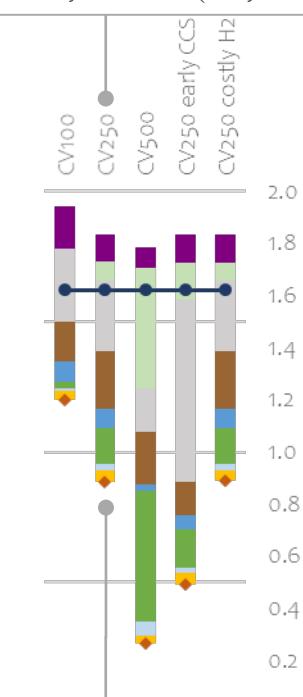


2050 rebound: Steel in Power:
t/MW 19% lower but 29% more MW installed

2060 mitigation options of
sensitivities on carbon price;
CCS deployment (15-yr delay);
H2-electrolyzer cost (20-yr delay)

World steel mitigation options (1)

Scrap availability increases
but low-C transition pushes
elec prices up (+37% in 2050)



> POLICY PRIORITIES

- Foster circular economy & material efficiency
- Assess (BE)CCS feasibility/desirability
- Invest in H2 electrolysis learning

> FURTHER RESEARCH

- Demand sensitivities coupled w/ construction & cement module
- Trade: import low-C steel vs low-C electrofuels