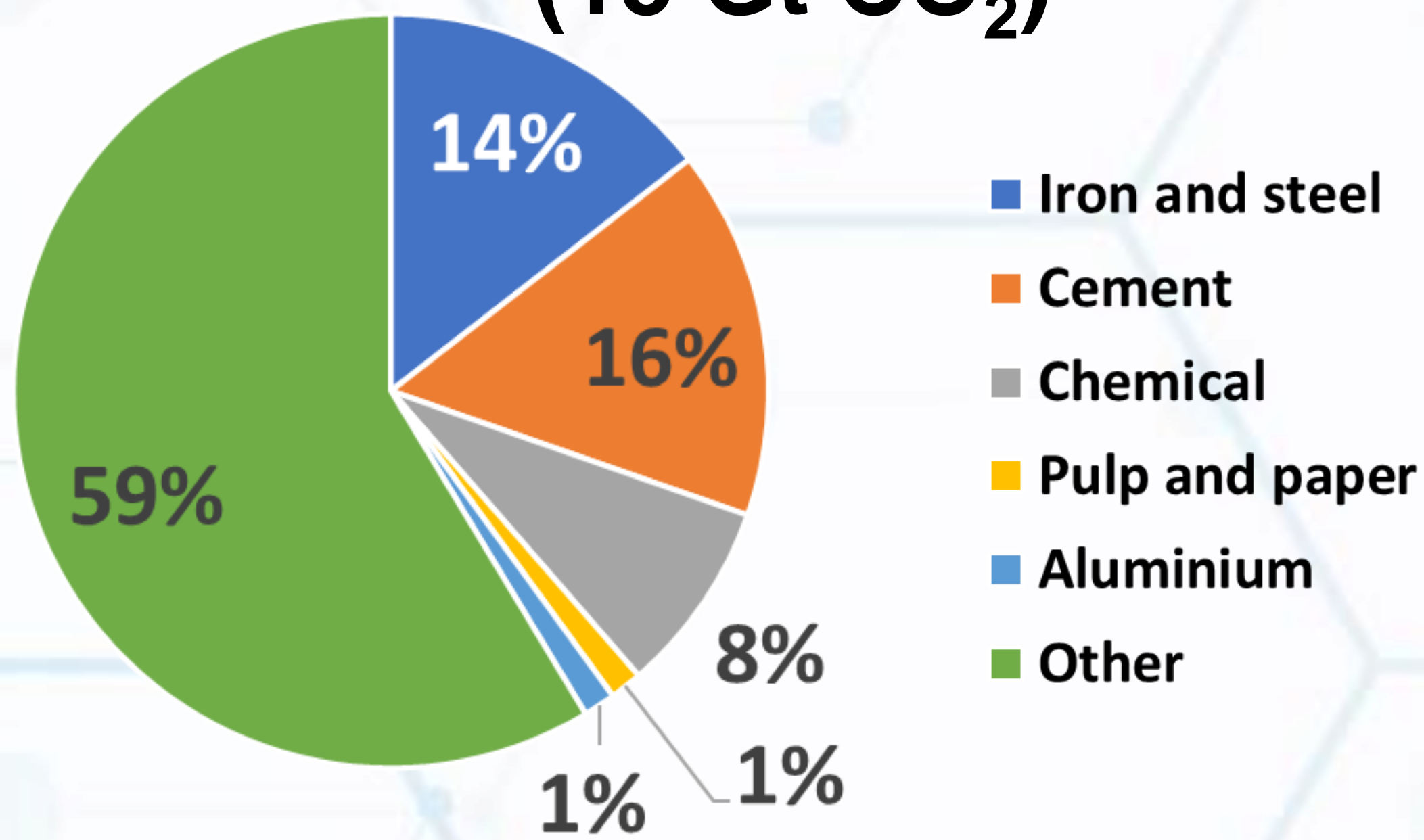


Industrial sector

Industrial sector emissions 2018 (15 Gt CO₂)



The Iron and Steel industry (ISI)

- Responsible for 2 Gt of CO₂ per year
- Steel is an essential material for human society
- Its production is expected to increase in the upcoming years
- Its decarbonization is challenging

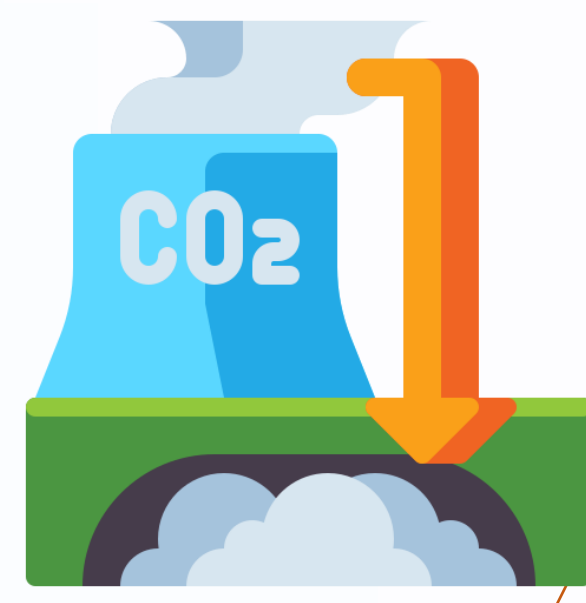
Main questions to answer with this study

1. How NETs
 - could contribute to climate targets?
 - can interact with other low carbon options?
2. Which regions of the world are the most likely to rely on NETs? Would biomass be traded among regions?
3. What are the implications for NETs deployment in the ISI when considering the rotation period of biomass?

Biomass



CCS-CCU



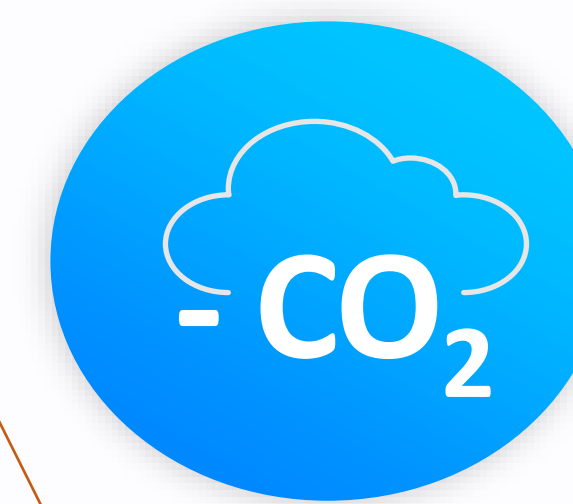
New techs



Green steel



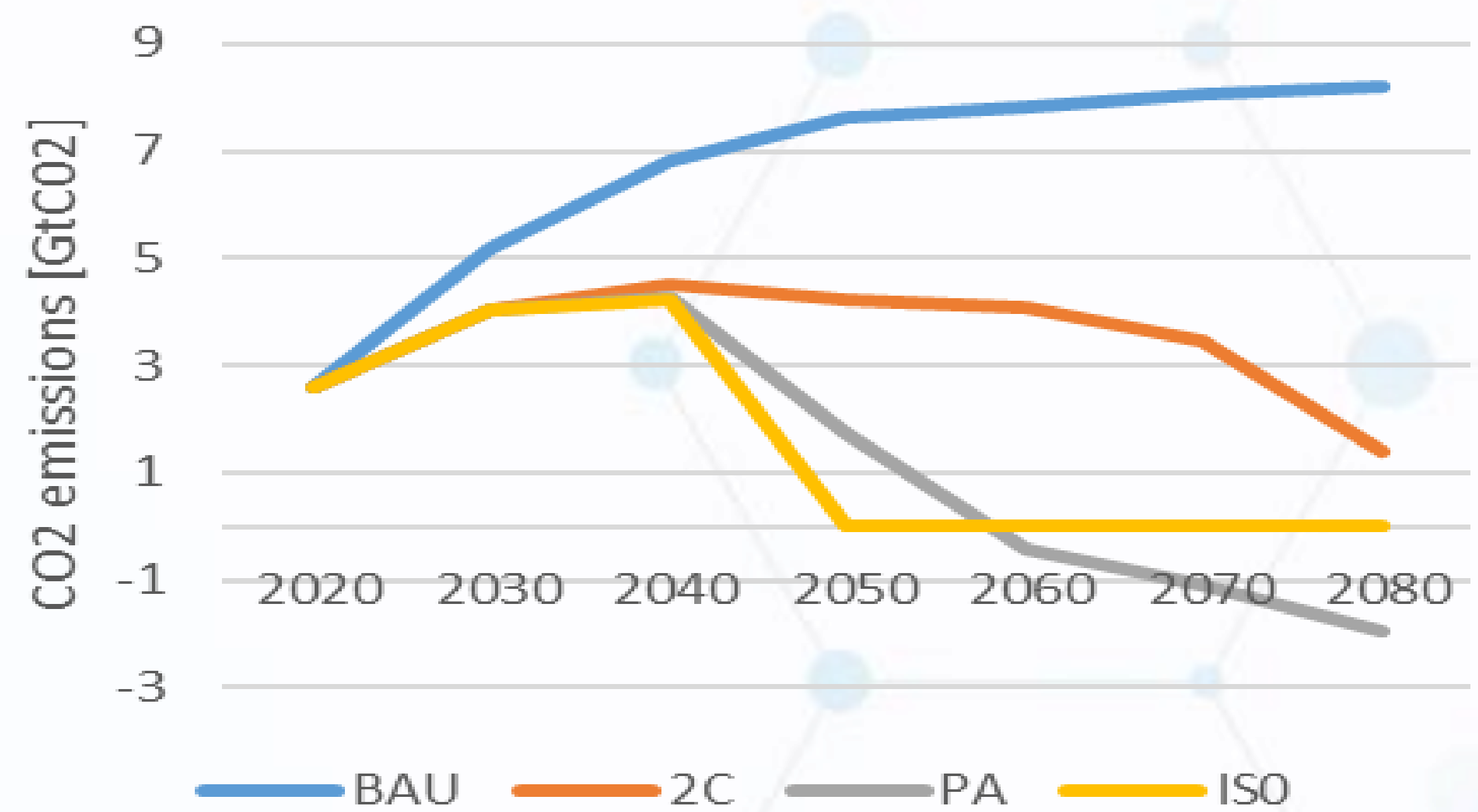
BECCS BECCU



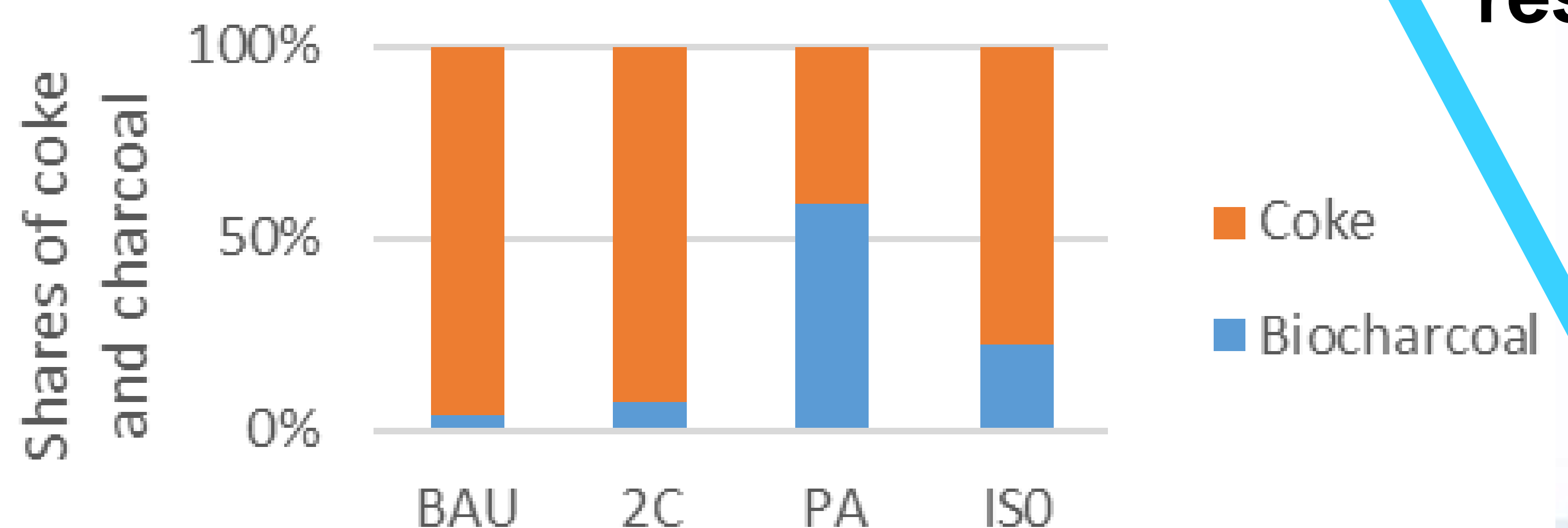
Decarbonization options for the ISI

Study developed with TIAM-FR

Process	Fossil fuel use	Bioproduct substitution	Maximum substitution potential
Coke oven	Coal	Charcoal	0%-5%
Pelletization	Coal	Charcoal	0%-100%
Sintering	Coke	Charcoal	0%-40%
Blast Furnace / with CCS (including the Top Gas recycling option)	Coke	Charcoal	0%-6%
	Coal	Charcoal	0%-100%
Direct Reduction of Iron (MIDREX) / with CCS	Natural gas	Biomethane	0%-100%
	Coal	Charcoal	0%-100%
COREX / with CCS	Coal	Charcoal	0%-45%
	Coke	Charcoal	0%-45%
HISARNA / with CCS	Coal	Charcoal	0%-45%
ULCORED / with CCS	Coal	Charcoal	0%-100%
	Natural gas	Biomethane	0%-100%
ULCOWIN	Natural gas	Biomethane	0%-100%
	Coal	Charcoal	0%-100%
Cupola	Natural gas	Biomethane	0%-100%
	Coal	Charcoal	0%-100%
EAF	Natural gas	Biomethane	0%-100%
	Coal	Charcoal	0%-100%
DRI-H2 integrated steel plant	Coal	Charcoal	0%-100%
	Natural gas	Biomethane	0%-100%
Final production of steel	Natural gas	Biomethane	0%-100%



CO₂ emissions from ISI according to scenarios



Average shares of charcoal and coke used in the ISI

Biomass uses within the ISI

Some results