



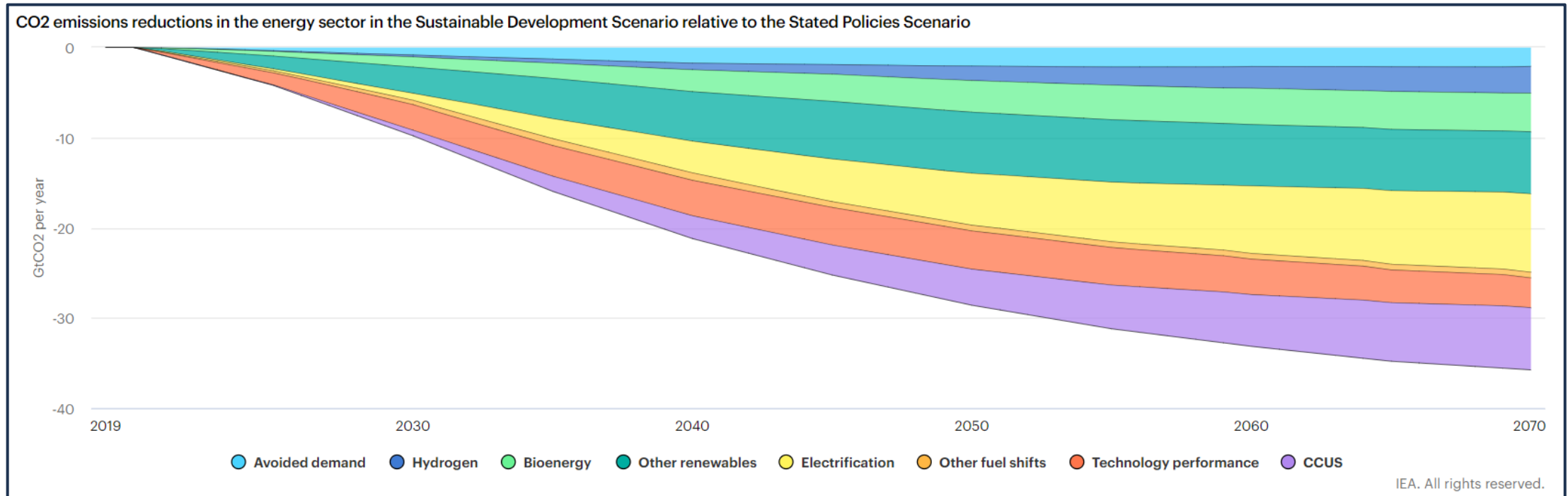
Giammarco
Vetrocoke

Tackling Climate Change with CCUS: the HPC Approach by Giammarco-Vetrocoke

Copenhagen, May 18, 2022



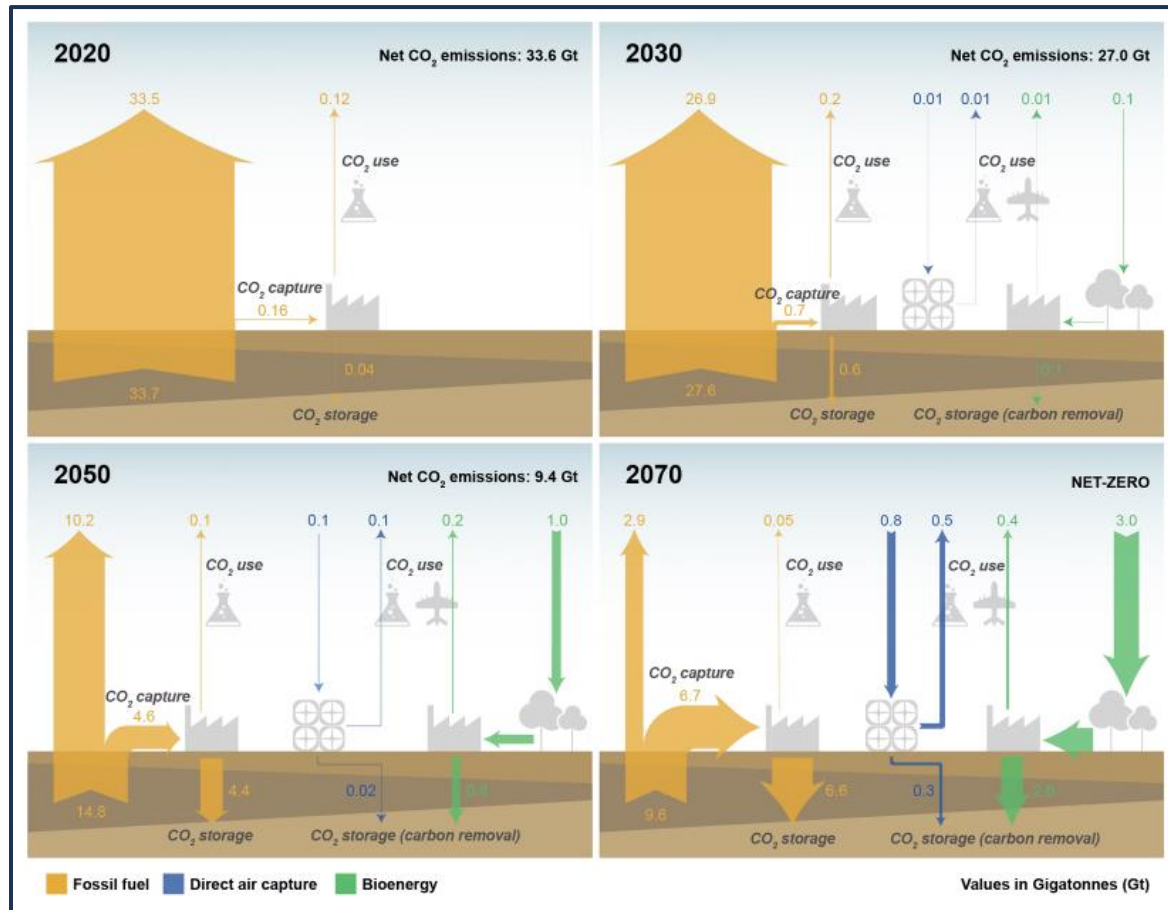
CCUS is needed!



The CCUS is essential to achieve **carbon neutrality** by **2050** and beyond (source IEA).



CCUS is needed!



In the next 50 years the Fossil Carbon will represent the **largest source** for Reuse/Storage:

- Existing infrastructure
- Hard-to-abate Sectors
- Cost-effective way for H2 production



Carbon Capture

Carbon capture is the core of the **CCUS value chain**.



Carbon Capture

Emitters Point of View:

- Gas condition (CO₂%, contaminants, T, capture rate....)

- Energy costs



- Utilities availability



- Low-grade heat availability, DH



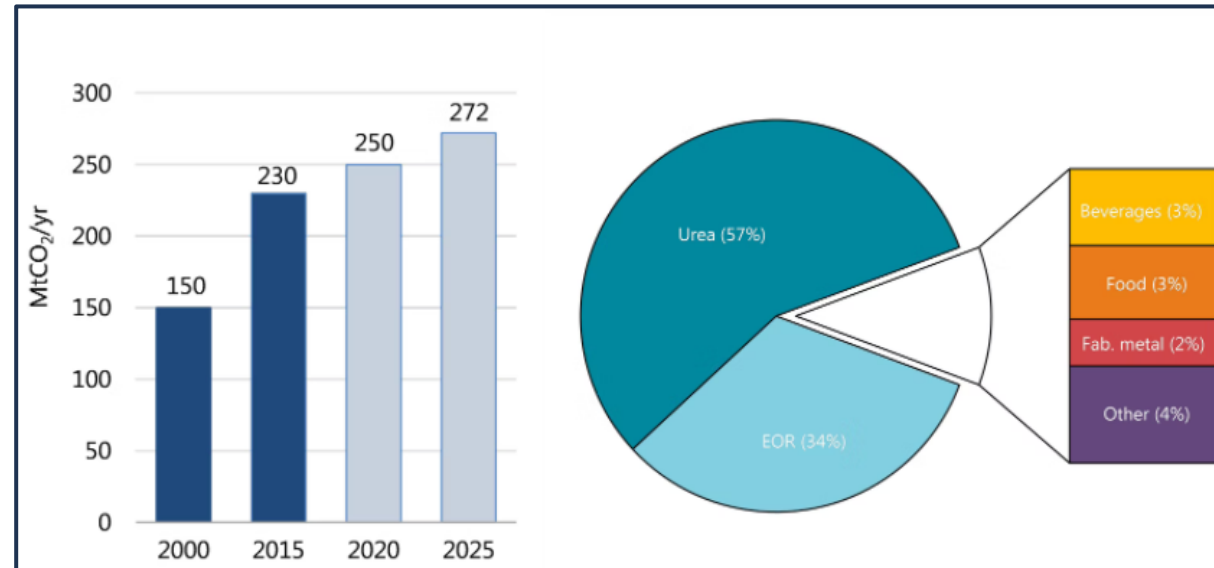
- Footprint



Carbon Capture

CO₂ Users Point of View:

- Purity, Quantity
- Steady/Intermittent
- P, T, other condition



Carbon Capture

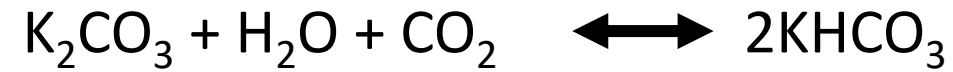
Local Authorities Point of View:

- Law / Regulations
- Soil Consumption / Surrounding Areas
- Social Acceptance



Hot Potassium Carbonate

Equilibrium Reaction:



- Fully reversible
- Favored by high pressure (L to R)
- Favored by mid-low temperature (L to R)



Hot Potassium Carbonate

Advantages

- Inorganic /non toxic solvent
- No volatility
- Robust and resistant to oxygen
- No reclaiming, low plant maintenance



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Disadvantages

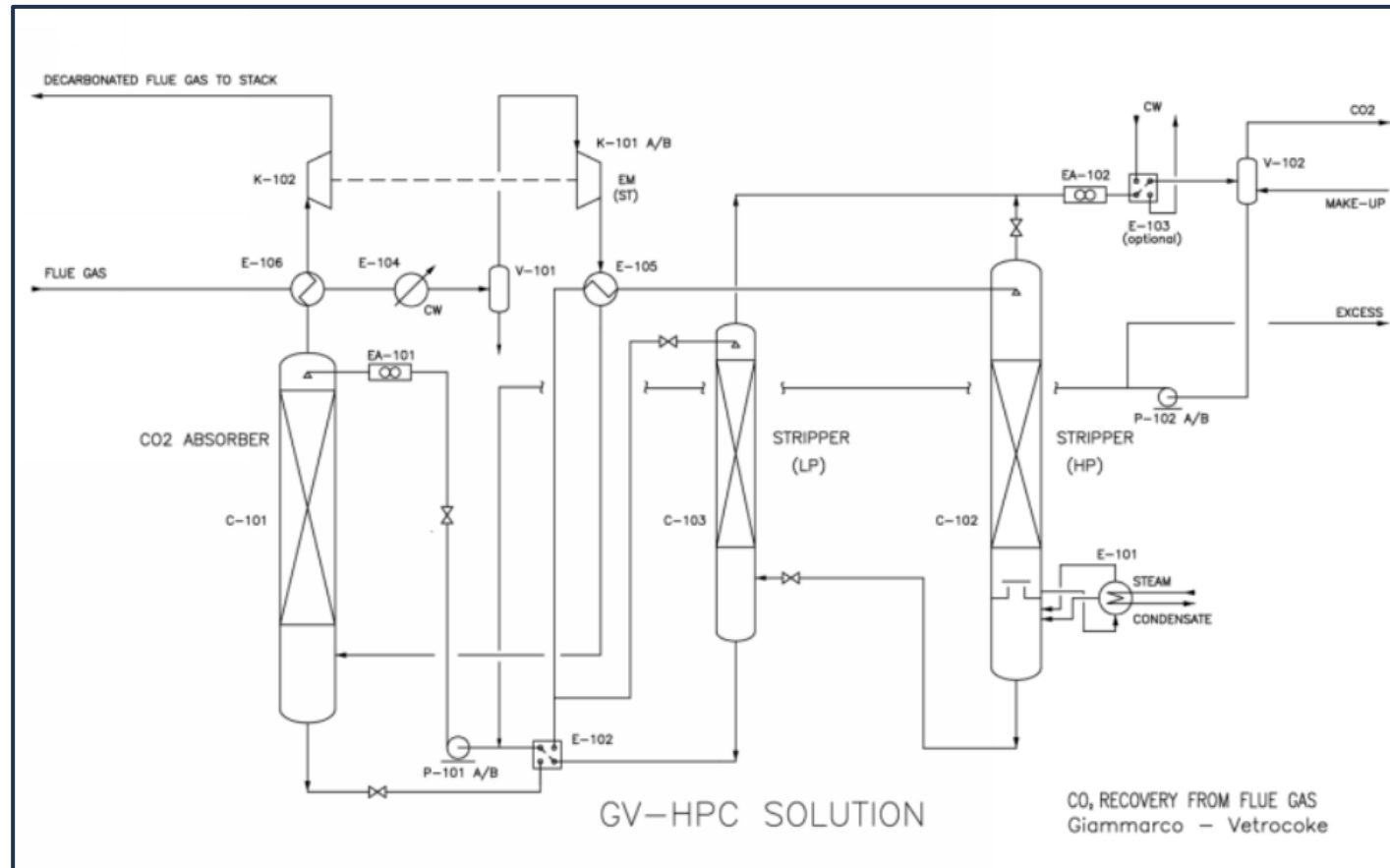
- Higher pressures required






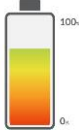

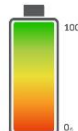
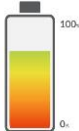
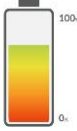
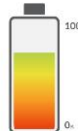





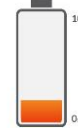
Smaller plant layout



GV Technology – Low Energy Scheme

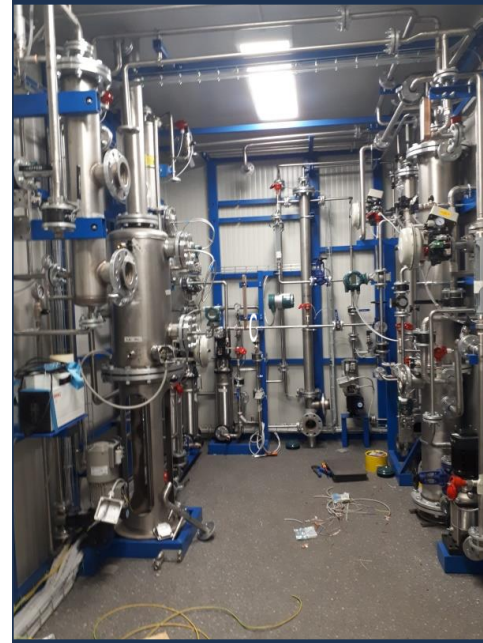


GV – Summary of Schemes

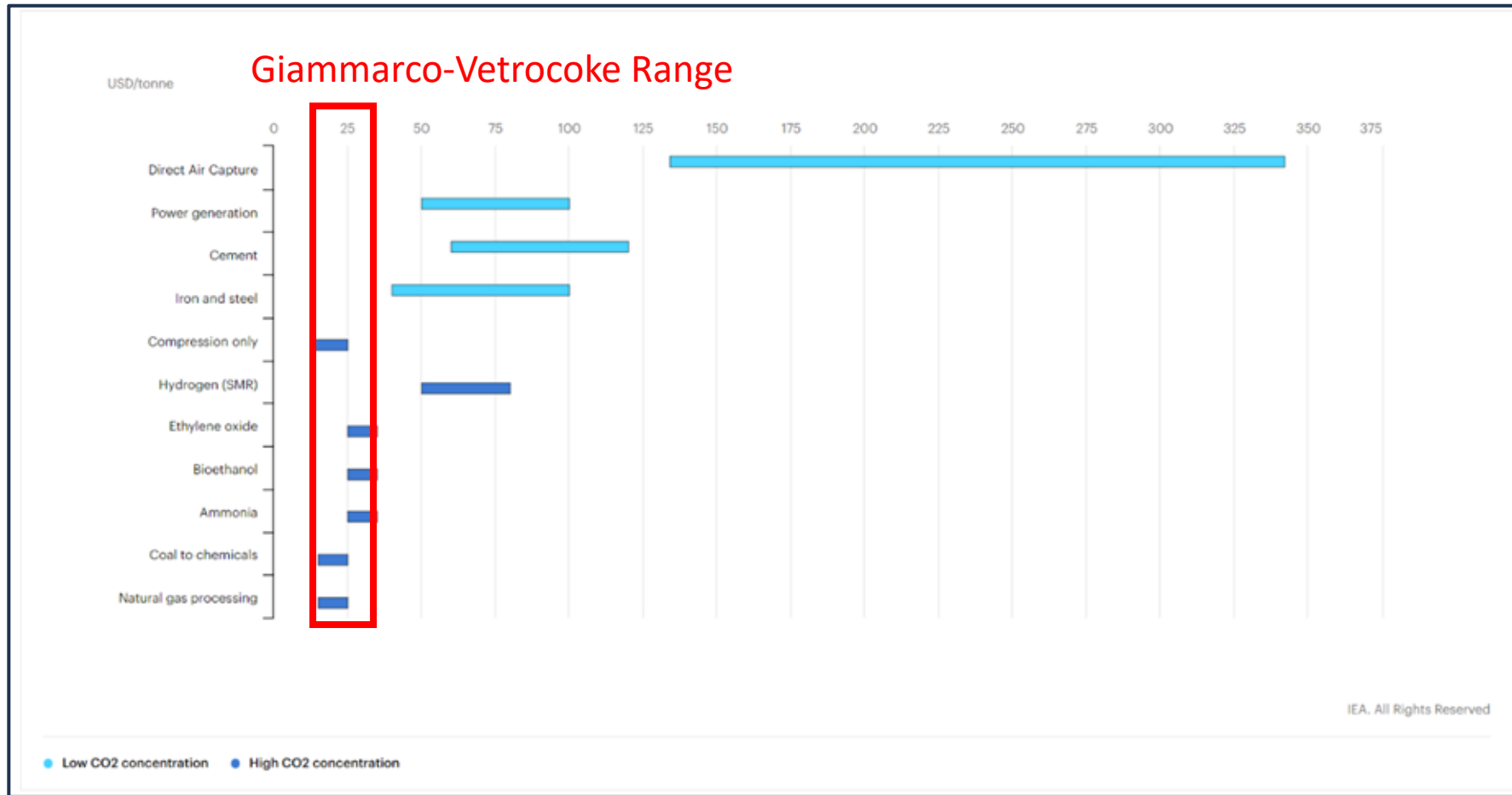
SCHEMES	ELECTRIC CONSUMPTION 	THERMAL CONSUMPTION 	THERMAL RECOVERY 
Conventional			
Low-Energy			
Auto-Thermal Capture			
Vacuum Press. Regen.		 Waste heat!	

GV - R&D and Future Outlooks

1. Autothermal solution
2. Vacuum solution
3. Research on the Field: Demo and Pilot Unit



GV - costs



Costs [€/Ton]
Strongly dependent on the amount of CO2 in the gas (around €15-30/t CO2)



GV – Who we are

Engineering and Licensing company
devoted to **CO2 Removal** only since 1955.

Full **in-house** property



GV - References

400 plants built worldwide

Multiple industrial fields of application of the technologies

Experience in **biomethane** with Green Methane



GV - Offering to Customers

- Process design package
- License, know-how
- Constant technical assistance



Looking For

Customers in high CO2 emission sectors such as:

- Power
- Steel
- Biomass CHP and BM
- Pulp and paper
- Glass
- Waste to energy
- Cement
- Blue H2

Partnerships with consultants and EPC



**Thank You
for the Attention! 😊**

