

# Reducing Electricity Use (Scope 2 Emissions) @ Aalborg Portland Cement

## CLIENT & AFFILIATION



## GOAL

To find pathways for Aalborg Portland (Denmark's largest cement producer and CO<sub>2</sub> emitter) to achieve its 2050 net-zero target

## HOW?

1. Performing a sensitivity analysis under different scenarios and carbon capture technologies
2. Analyzing economic and emissions trade-offs

## RECOMMENDATIONS

1. Invest in Grid-Aligned Solutions
  - Use Cryocap to support Denmark's cleaner electricity mix.
2. Choose Long-Term Viable Technologies
  - Cryocap (+ Oxyfuel) balances cost and emissions.
3. Phase Deployment with Public Buy-In
  - Start with Cryocap or Oxyfuel + Compression. Scale to Cryocap + Oxyfuel by 2050

## METHODS

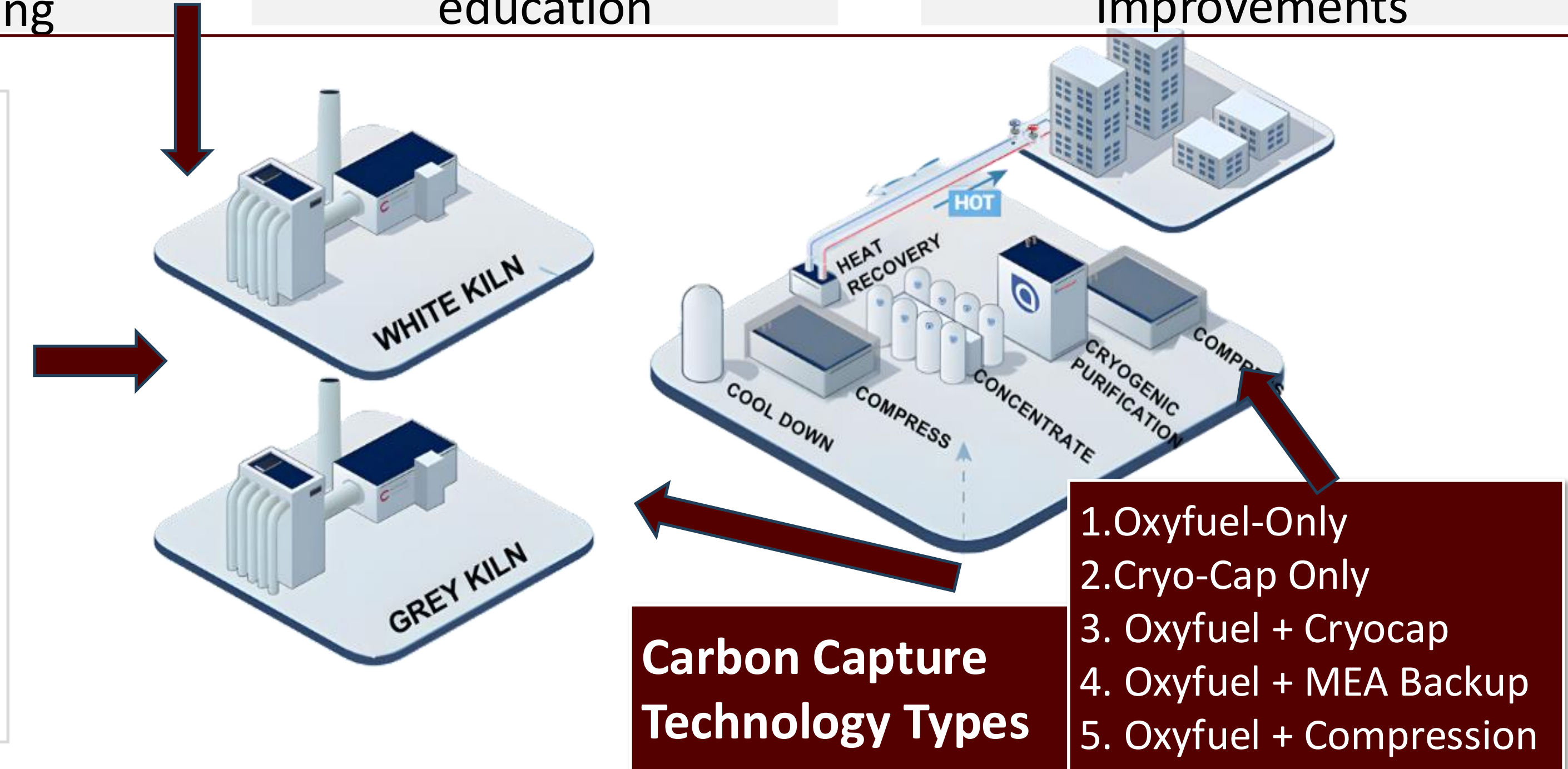
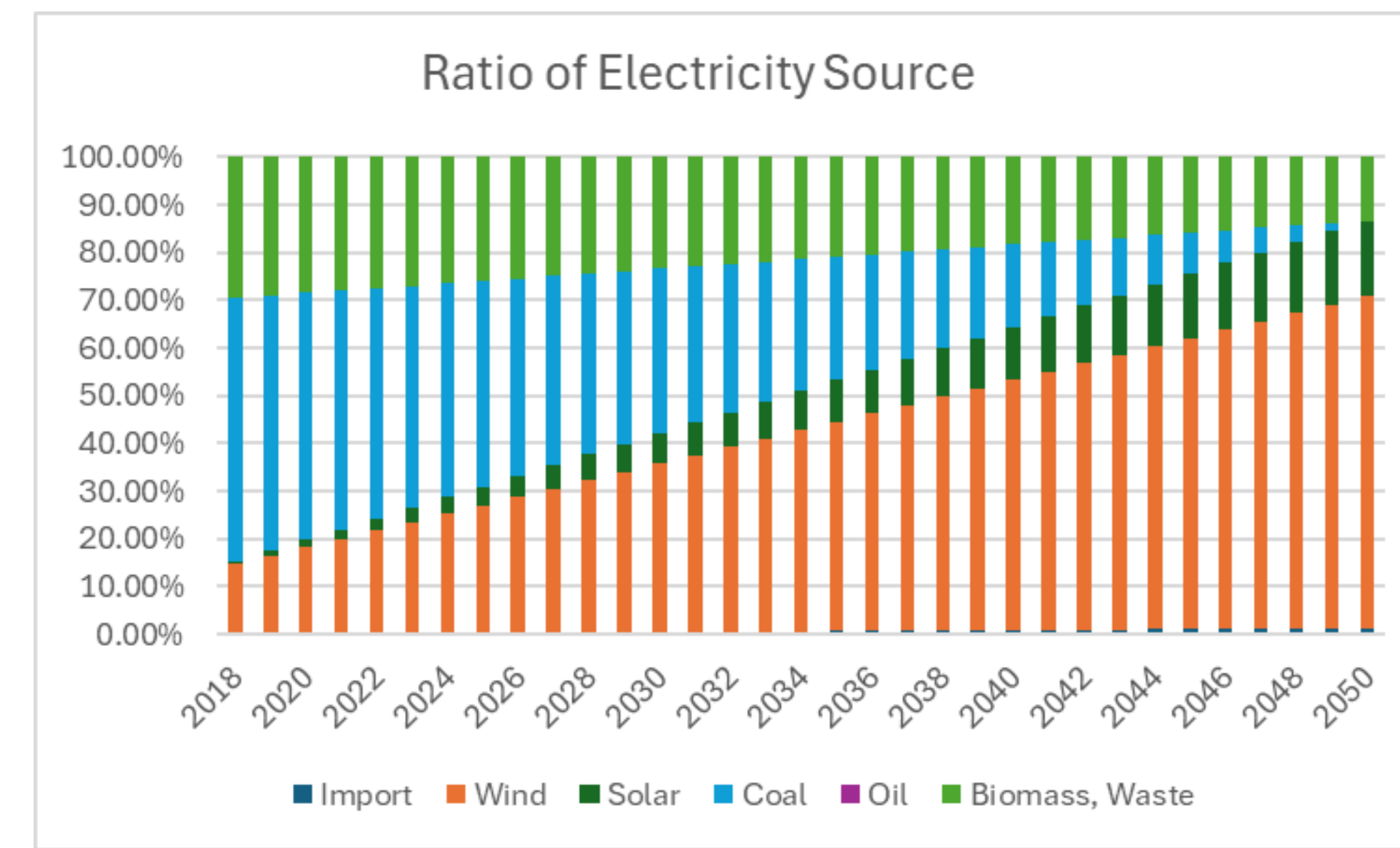
- Evaluated 5 carbon capture scenarios using the client's projected electricity mix.
- Compared direct CO<sub>2</sub> emissions, energy use, and total system cost across technologies.
- Applied an equity framework to inform technology investment

**Distributive:** Evaluated emissions and energy trade-offs

**Procedural:** Recommended transparent, inclusive decision-making

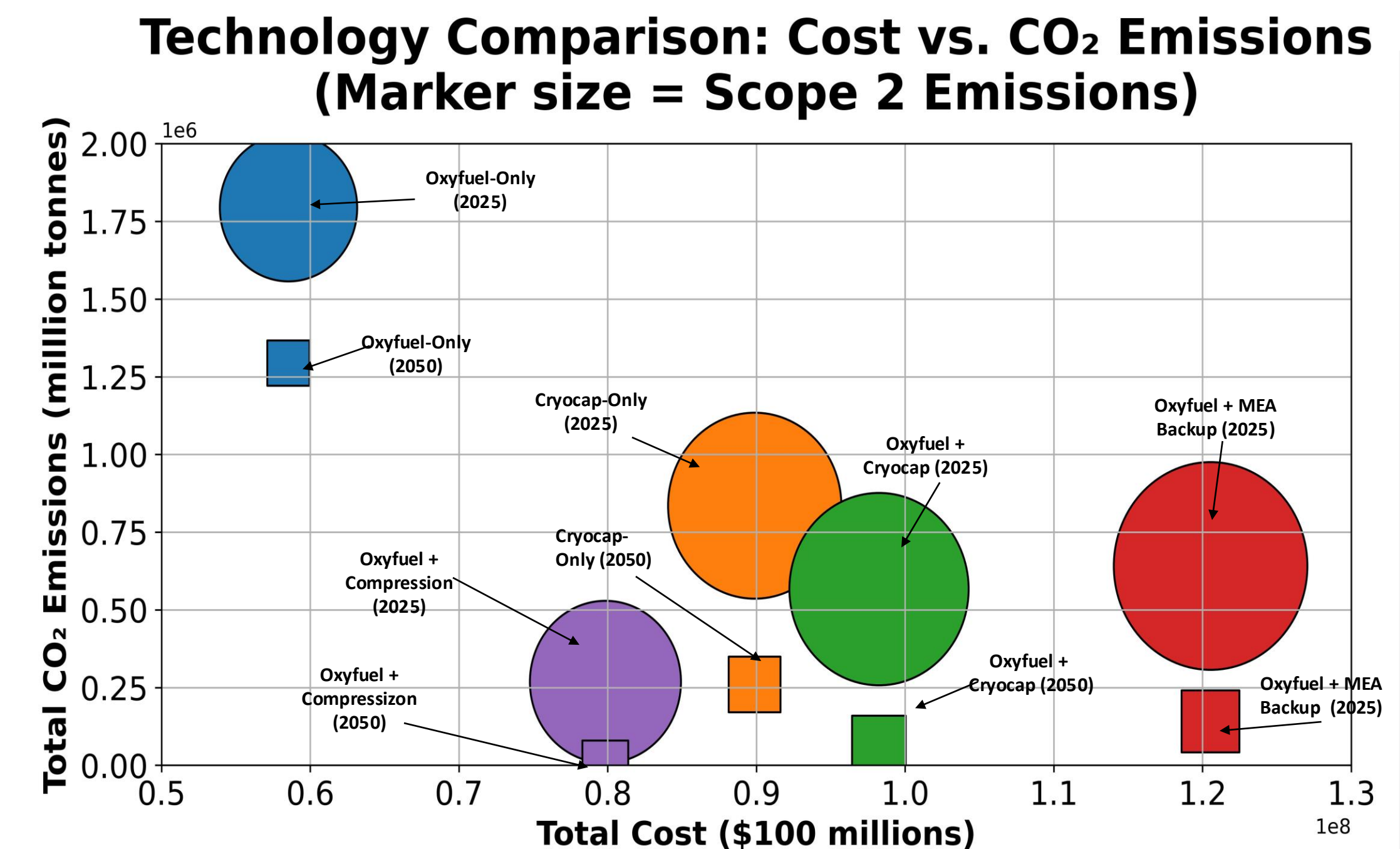
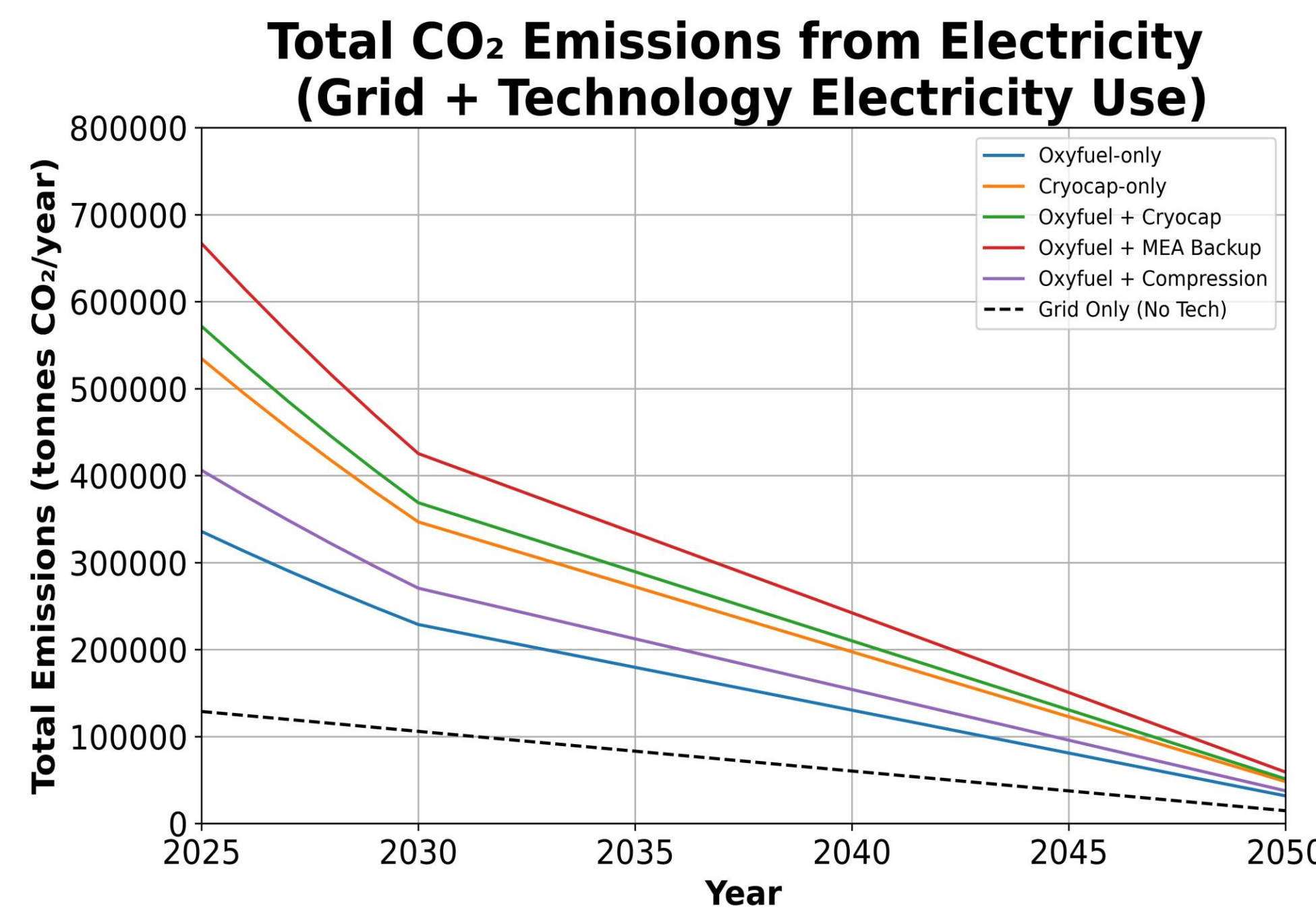
**Recognition:** Emphasized public outreach and CCS education

**Restorative:** Targeted long-term climate and air quality improvements



## RESULTS & CONCLUSION

- Cryocap-only and Oxyfuel + Cryocap deliver the highest CO<sub>2</sub> reductions by 2050.
- Oxyfuel-only is low-cost but emits significantly more CO<sub>2</sub> over time.
- Oxyfuel + Compression offers the best early-phase but is unlikely to scale.



## References

- Asgharian et al. (2024)**  
The role of cryogenic carbon capture in future carbon-neutral societies.
- Carrasco et al. (2019)**  
Experimental investigations of oxyfuel burner for cement production application.
- Gallego Dávila & Aagesen (2024)**  
How to accelerate CCS deployment in the cement industry.