

WHR/ORC as part of Flue Gas Processing for Carbon Capture Readiness

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Abstract - The electric load of cement plants will increase in the years to come, to address the various decarbonation pathways that exist in the cement industry. Finer grinding will be needed with ternary cement, more SAF processing as the substitution rate increases, maybe oxygen and or hydrogen will have to be injected to boost combustion, ... and of course carbon capture itself.

Therefore, being able to self-generate a portion of its electricity – usually between 15 and 25% will be an important benefit for most plants. In case of the grid shutting down (voluntarily as part of an interruptible contract or not due to fires, flood, wind, ...) the plant can continue operating the pyro-processing portion. Even with relatively low electricity prices, when considering the cost of CO₂, installing a WHR/ORC system could make sense. The principle of such WHR/ORC will be described, with some case studies and numbers presented.

Furthermore, with carbon capture at the tail end of the plant, flue gas will have to be processed further (increasing CO₂ concentration, lowering temperature to close to ambient, very low NO₂, SO₂, dust, O₂, H₂O, ... - depending on the CC technology). WHR/ORC lowers the flue gas without the use of water. The better conditioned the flue gas the lower the CC plant CAPEX, OPEX, and footprint.

Some examples will be provided.