THE DOT FACTOR

AI & ADVANCED ANALYTICS FOR CCU - CARBON CAPTURE AND UTILIZATION IN THE CEMENT INDUSTRY

SHAPING SUCESS STORIES BY

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THE CHALLENGE

The cement industry faces a myriad of challenges in the decarbonization journey:

IMPROVING ENERGY EFFICIENCY AND DEMAND-SIDE RESPONSE

IMPROVING THE CLINKER TO CEMENT RATIO

OPTIMAL CARBON TRADING AND HEDGING (PRIMARY & SECONDARY MARKETS)

PROMOTING THE USE OF BIOMASS AND WASTE AS FUELS

ADOPTING HEAT RECOVERY S AND SOLAR THERMAL TECHNOLOGIES

DEPLOYMENT OF CCU: AFTER BEING GENERATED IN THE CEMENT KILN, CO_2 CAN BE CAPTURED OR PURIFIED FROM KILN FLUE GASES (OXY-FUEL CAPTURE TECHNOLOGIES). CAPTURED CO_2 CAN BE USED AS FEEDSTOCK FOR THE PRODUCTION OF CHEMICALS AND FUELS BY REACTING IT WITH H_2

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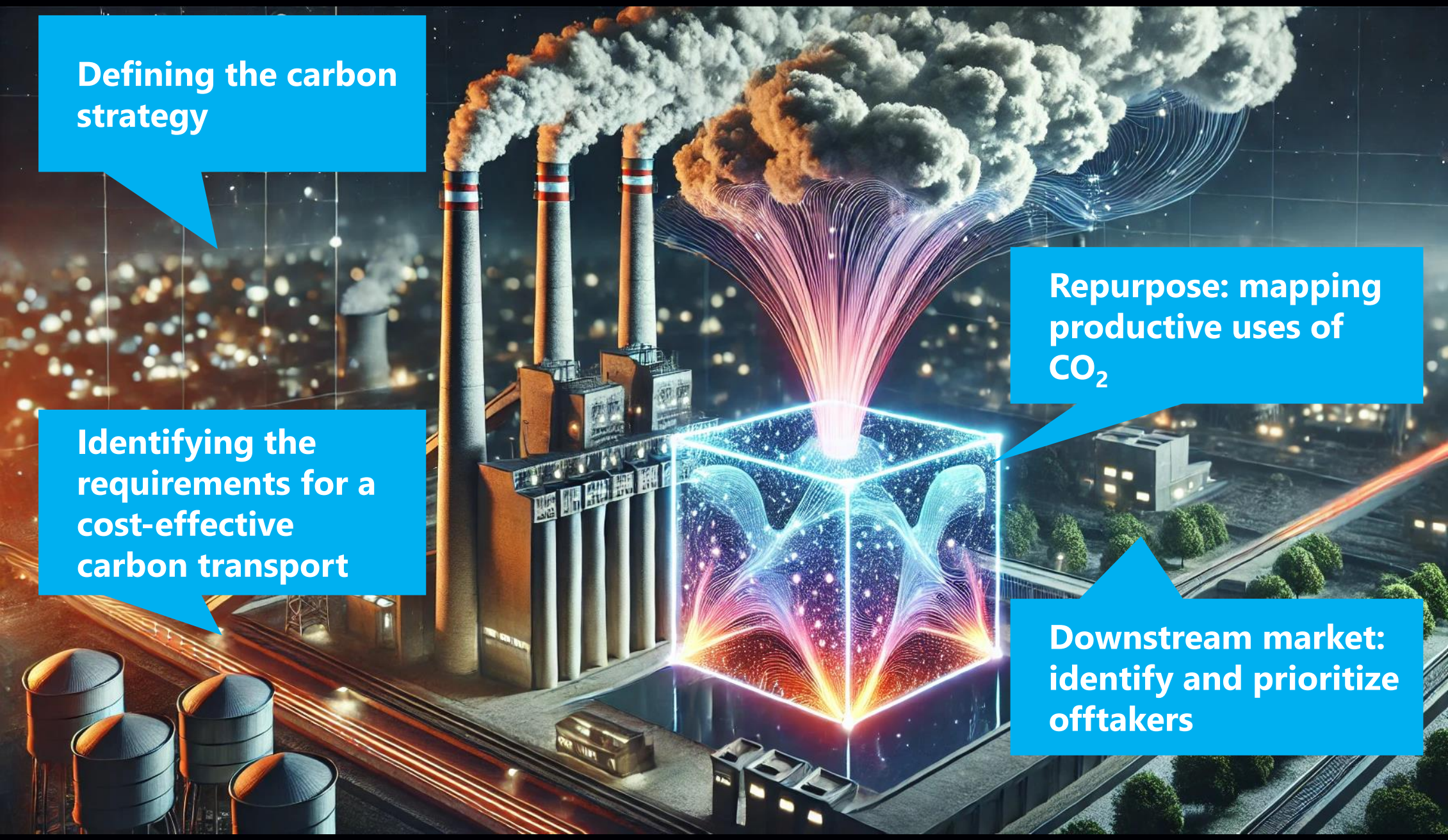
THE CHALLENGE

Key priorities include:



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THE ANSWER

Planning CCU projects through bigdata engineering and AIML, developing a decision-aid methodology that encompasses

1 mapping strategic levers for carbon decarbonization

2 drawing the supply chain for the carbon cluster in the defined area

3 streamlining the set of commercial feasible carbon uses

4 developing an AI-based model for prioritization of potential offtakers

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THE ANSWER

Predictive lead scoring and clustering

SECTOR

REVENUES

INDUSTRIAL PROCESS

PRODUCTS

INDUSTRIAL OUTPUT

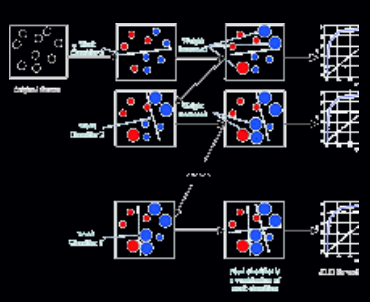
LOCATION

~90% accuracy

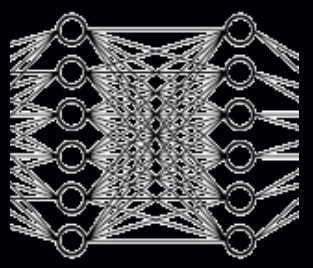
COMPANY'S OPERATING MODEL

E-fuel prediction (kton)
…
…
…

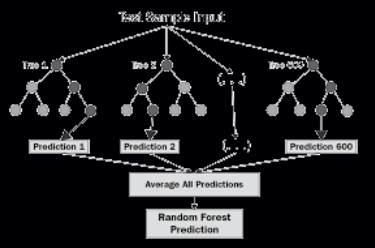
Grandient boosting tree



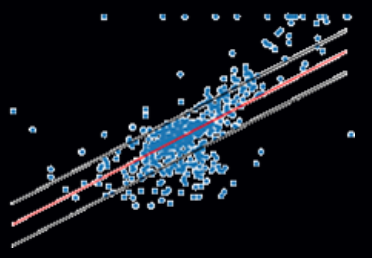
Neural networks



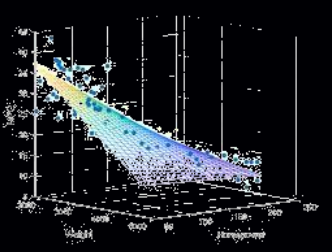
Random forest



Support vector regression



Multiple linear regression



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THE IMPACT

1

Increased revenue through enhanced carbon offtake agreements: capturing untapped CO_2 markets (e.g., beverage and agriculture sectors) could expand the client base by ~15%

2

Reduction of carbon emissions: CCU could reduce ~50% of cement production emissions, and improve ESG performance of offtakers by ~20%, while supporting global decarbonization

3

Optimized supply chain for CO_2 deliveries: reduction in logistics costs by ~25% through optimized delivery routes and predictive demand analysis per offtaker cluster and site

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