

**Case Study** 

## How We Helped Unlock Entry Into a \$2 Million+ U.S. Carbon Capture Market for an Automotive Client

### Objective

A global automotive and mobility ecosystem player partnered with us to evaluate the role of carbon capture, utilization, and storage (CCUS) technologies in accelerating decarbonization. The study aimed to assess how carbon capture solutions can reduce vehicle-related emissions, support sustainability targets, and create demand-side opportunities for captured CO<sub>2</sub>, enabling informed strategic and investment decisions.

### Our Strategic Approach

To translate carbon capture potential into actionable strategic choices, IeB evaluated the technological, commercial, and sustainability viability of CCUS solutions within the automotive ecosystem.

#### Technology & Application Assessment

Analyzed key carbon capture technologies applicable across automotive manufacturing, fuel production, and downstream mobility ecosystems. The assessment also considered capture materials and adsorption pathways, including temperature swing adsorption (TSA) and amine-based adsorbents, to evaluate capture efficiency, thermal management requirements, integration feasibility, and technology readiness for reducing vehicle lifecycle emissions.

#### Market & Demand Analysis for Captured CO<sub>2</sub>

Assessed current and emerging demand for captured CO<sub>2</sub> across industrial and mobility-linked applications in the U.S., identifying supply–demand dynamics, pricing considerations, and near-term commercial opportunities.

#### Sustainability & Decarbonization Impact Evaluation

Evaluated the contribution of CCUS technologies toward transportation sector decarbonization, including Scope 1, 2, and 3 emission reduction pathways. Assessed alignment with evolving sustainability goals and low-carbon transition strategies.

## Ecosystem & Commercial Pathway Mapping

Mapped key stakeholders across the CCUS ecosystem, including technology providers, automotive players, industrial CO<sub>2</sub> off-takers, and policy enablers. Identified viable commercialization routes for captured CO<sub>2</sub>, with a focus on scalable and revenue-generating use cases.

### Snippets

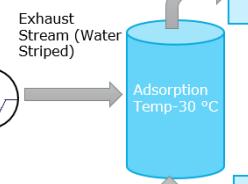
EPFL

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#### Carbon Capture System – On-board CO<sub>2</sub> Capture and Storage



Exhaust Stream



Preheating

Precooling

Compressor

##### CO<sub>2</sub> Capture - Material

- Temperature swing adsorption (TSA)
- Amine based adsorbent

##### CO<sub>2</sub> Capture - Technology

- Uses turbo-compressor system to compress and liquefy the captured CO<sub>2</sub> using waste heat of the exhaust gases

#### Technology Overview

Technology	Purity	CO <sub>2</sub> reduction	Challenges
On Board Carbon Capture (Adsorption)	99.5%	90%	All situations are considered ideal like exhaust variation and Rankine cycle

#### Economic Aspect

Indirect conversion	Direct conversion	Strategic alliance/JV
e-methane, e-fuel	Merchant market / Sequestration	

## Impact

This assessment translated decarbonization ambition into measurable commercial and sustainability outcomes by:

- Enabling the client to immediately access a \$2 million+ market opportunity for supplying captured CO<sub>2</sub> in the U.S.
- Diversifying revenue streams through CO<sub>2</sub> supply, potentially safeguarding 10–15% of annual revenue.

## Conclusion

Through a comprehensive evaluation of carbon capture technologies, market demand, and commercialization pathways, IeB helped the client identify both environmental and economic value in CCUS adoption. The insights empowered the client to reduce emissions, unlock new revenue opportunities, and strengthen its strategic positioning in the transition toward a low-carbon transportation ecosystem.



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#### We are located at

*India (HQ)*  
207-208 Welldone TechPark, Sohna  
Road Sector 48, Gurugram, Haryana  
122018

+91 124 429 4218

*London (UK)*  
5, Brayford Square, London, E1 0SG

+ 44 770 014 9056

*Delaware (USA)*  
8 The Green, Suite B, Dover, DE 19901  
+1 302 450 1418

For enquiries e-mail us at  
[contact@iebrain.com](mailto:contact@iebrain.com)

Find more about us at  
[www.iebrain.com](http://www.iebrain.com)

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