

Climate Challenges Case Study Series

ON-SITE GREEN HYDROGEN USING WASTE CARBON

WITH OSSUS BIORENEWABLES AND A LARGE STEEL MANUFACTURER

ABOUT THE STARTUP



Ossus Biorenewables is a green hydrogen company, that supplies process industries with on-site, on-demand green hydrogen at USD 0.5-1.2 per kilogram using the waste carbon in effluents available on-site.

SERVICES

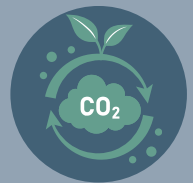
- **On-Site On-demand Green Hydrogen:** Producing affordable green hydrogen (at USD 0.5–1.2/kg) directly at industrial sites using waste carbon from effluents.
- **OB HydraCel Bioreactors:** Deploying retrofittable, autonomous bioreactors that minimize power consumption, downtime, and carbon footprint while converting waste into hydrogen.

VALUE PROPOSITION

- **On-Site Green Hydrogen Production:** Eliminates the need for storage, compression, and transportation by producing green hydrogen directly at industrial sites using waste carbon in effluents on-site.
- **Cost-Competitive:** Delivers green hydrogen at price points comparable to or below traditional Steam Methane Reformation, enabling cost-effective decarbonization for industries.
- **Effluent Recycling:** Provides an added environmental benefit by making recycled industrial effluents available for reuse after green hydrogen extraction, promoting circular economy practices.



Founded in 2017

Domain: Carbon
Capture Utilization and
StorageHeadquarters in
Mumbai, MaharashtraWebsite:
[Ossus Biorenewables](https://ossusbiorenewables.com)

THE PILOT

ESTIMATED IMPACT

Deployment:

Bioreactor producing 1 Ton Green
H₂ / Day Recycling 400 KL Effluent

4000 TPA

Reduction In Net Co₂
Emissions

**USD 1.4 / kg**

Cost of Green Hydrogen
Production

**INR 43 Lakhs**

Annual Savings In Water
Treatment Charges



GREATER IMPACT

5040 TPA

Minimum Production Of
Green H₂, If OB Hydracel
Reactors Scaled To Full
Capacity

**19800 TPA**

Coke Replaced In Blast
Furnace

**59400 TPA**

Reduction In Net Co₂
Footprint



ABOUT THE CORPORATE

Location: India

Industry: Steel Manufacturing

CHALLENGES

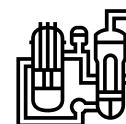
- **High Carbon Emissions in Steel Production:** The steel sector in India relies heavily on coal-based coke, contributing significantly to CO₂ emissions, which need urgent reduction to meet climate goals.
- **Resource Limitations for Hydrogen Production:** Conventional methods, such as electrolyzers, require large amounts of ultrapure water and energy, which are unsustainable given India's limited water and energy resources.
- **Scaling Hydrogen Production:** Meeting India's ambitious green hydrogen targets (7.5 MMTPA by 2030) requires innovative solutions to overcome the inefficiency of existing technologies like water splitting.

SOLUTIONS

- **On-Site Green Hydrogen:** Ossus's OB HydraCel bioreactors convert industrial effluents available on-site into hydrogen and combines microbial electron generation and electrochemical hydrogen production for fueling blast furnaces.
- **Effluent Recycling and Reuse:** Recycling industrial effluents by consuming their organic and inorganic content during hydrogen production, enabling water reuse on-site.
- **Low Energy and Carbon Footprint:** The OB HydraCel bioreactors use minimal energy (0.76 kWh/kg of hydrogen) and produce just 1 gram of CO₂ per gram of hydrogen.

OUTCOMES

- **On-Site, On-Demand Green Hydrogen Supply:** The project scaled from lab to field deployment, producing 30 kilograms of hydrogen daily from 6,000 liters of industrial effluent, demonstrating efficient on-site production, eliminating logistical challenges like transport and storage.
- **Reduction in Coke Dependency:** Replaced a portion of coke with green hydrogen, reducing reliance on conventional carbon-intensive inputs.
- **Lower CO₂ Emissions:** ~ 30 - 50% reductions in carbon dioxide emissions aligned with industrial decarbonization goals.
- **Effluent Recycling:** Effluent generated on-site at the steel manufacturer's plant was used to produce green hydrogen for fueling blast furnaces.
- **Cost-Effective Hydrogen:** Provided green hydrogen at a competitive price as opposed to traditional methods, proving its financial feasibility.



Onsite, On-Demand Green Hydrogen



Cost Competitive



Circular Economy