

# Company Profile: Remediate

## Remediate

### History

Remediate, founded in 2017, is a UK-based carbon dioxide utilization company focused on commercializing an algae-based CO<sub>2</sub> capture solution. The microalgae grown is then utilized as a value-added powder for animal feed. In 2023, Remediate received a £2.1 million DESNZ (Department for Energy Security and Net Zero) grant for its LightArc pilot project at Vale Nickel Refinery in Swansea (UK) in partnership with ForFarmers (a European feed company catering to conventional and organic livestock farming). This highlights Remediate's end-to-end approach, organizing both the initial carbon capture stage and the final carbon dioxide utilization offtake.

### Technology

Remediate's technology harnesses the natural capacity of microalgae to absorb CO<sub>2</sub>, by taking flue gas from industrial flue stacks and using it to accelerate

the growth of microalgae in bioreactors. Remediate's modular, plug-and-play bioreactor solution can be scaled to any carbon capture requirement of the emitter. Compared to other carbon capture technologies, Remediate reports lower energy and lower capital requirements. The microalgae carbon dioxide utilization product yields a protein rich powder that can be used for fish feed or animal feed. One tonne of feed is produced for every 2 tonnes of CO<sub>2</sub> utilized.

Remediate's process involves five key steps:

**1. CO<sub>2</sub> collection at source.** Flue gases with CO<sub>2</sub> concentrations greater than 20% can be fed to microalgae (NO<sub>x</sub> and SO<sub>x</sub> levels will be minimal due to current pollution control regulations followed by emitters). The CO<sub>2</sub> is combined with water to form carbonic acid before being delivered to the photobioreactor.

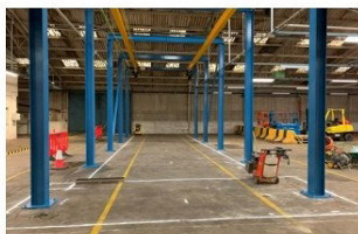
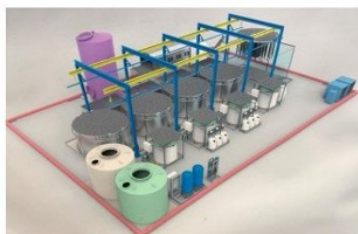
**2. Mixing & Recipes.** Remediate has refined the process of delivering input ingredients to the algae. These

ingredients include correct levels of CO<sub>2</sub>, nutrients, and vitamins. Circadian cycles are also precisely controlled. Remediate has developed a range of specific 'Growth Protocols' - a library of proven process steps which recreates the optimal conditions to cultivate the specific species of microalgae which expresses the required biochemical composition at the optimum harvest rate.

**3. Culturing.** Culturing of microalgae takes place within Remediate's photobioreactor, designed to ensure maximum microalgae exposure to photons during their growth period. Patent pending design of LED lights, internal topology, aeration, and CO<sub>2</sub> dosing ensures "far greater productivity compared to industry averages" according to Remediate. Good thermal management also ensures low-cost operations.

**4. Command & Control.** At the core of Remediate's process is a machine-learning AI command and control system. Remediate's proprietary algorithms monitors hundreds of sensors across the

From concept....



...to Reality



installation, identifying the optimal time to harvest, based on the microalgae growth profile feeding back to the operational SCADA (supervisory control and data acquisition) system when to open and close valves. This cloud-based system also informs the maintenance department of impending failures and manages the cleaning regimes.

**5. Harvesting.** Rapid dewatering and drying of the microalgae to produce a shelf stable product is the final step in Remediiate's process. Patented technology in this area enables Remediiate to deliver this step in minutes in place of hours, at an "order of magnitude lower costs" than traditional methods. Additionally, the majority of the water extracted is recycled back to the system (Remediiate reuses 95% of water). Microalgae is farmed daily.

Remediiate's microalgae solution is deployed at Vale's nickel refinery in Wales, currently capturing ~5 tonnes per year of CO<sub>2</sub> in a real industrial setting. A facility capturing 36,000 tonnes per annum of CO<sub>2</sub> using Remediiate's technology would require a land footprint of 1 hectare.

## Business model

Remediiate is rolling out a business model based on SPVs (Special Purpose Vehicles - an alternative fundraising structure that allows multiple investors to pool their capital and make a single investment, which acts as a separate legal entity to limit financial risk). The emitter provides a CO<sub>2</sub> supply contract to the SPV, and no upfront CAPEX (capital expenditure) is required by the emitter, except for the initial feasibility study and demonstrator units. The microalgae offtaker provides the SPV with an offtake agreement. The SPV in turn provides

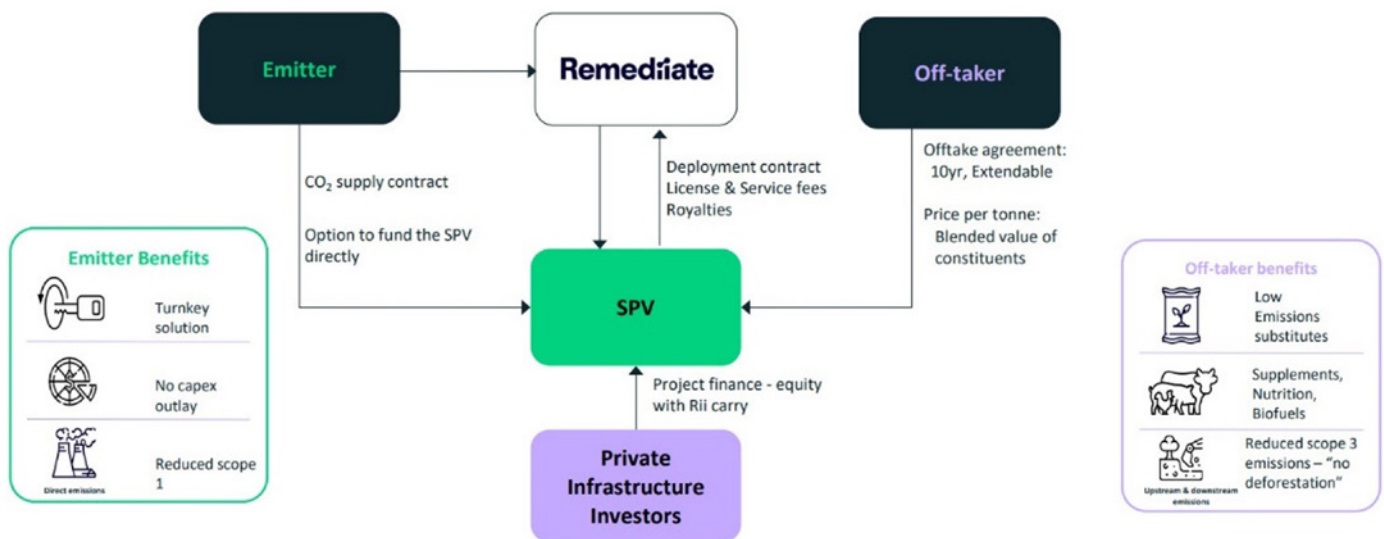
Remediiate with a deployment contract, license and service fees, and royalties.

Remediiate has secured offtakers for its animal feed and has signed LOIs (letters of intent) with ForFarmers (1 million tonnes per annum offtake) and AB Agri. The company is now seeking emitters to enable this scale up (targeting facilities emitting 40,000 tonnes per annum of CO<sub>2</sub> or larger). Remediiate reports its animal feed product has no associated green premium. The microalgae powder commands a premium price over soymeal typically used for animal feed - £1400 per tonne vs £400 per tonne - to reflect the additional beneficial micronutrients and vitamins already present within the microalgae (which would otherwise need to be added to the compound feed).

Full profile is available as part of an IDTechEx Market Intelligence Subscription. Contact [research@IDTechEx.com](mailto:research@IDTechEx.com) for more information or visit [www.IDTechEx.com/CCUS](http://www.IDTechEx.com/CCUS).

## A profitable business model underpins mass adoption

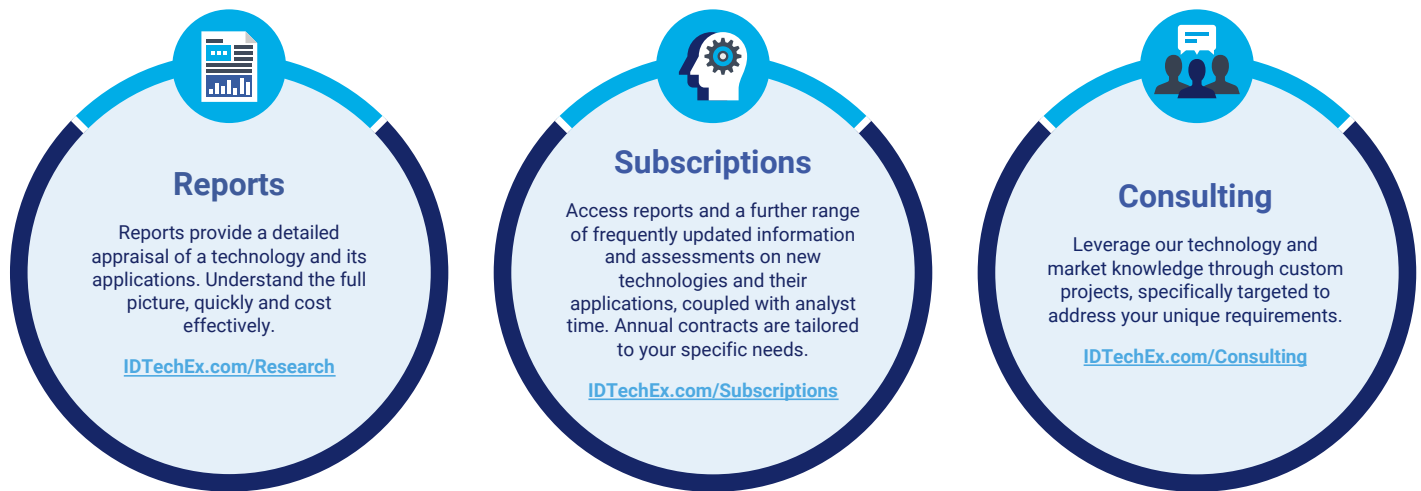
Remediiate develops and runs the project, owned by a Special Purpose Vehicle (SPV), equity financed by private infrastructure investors. Remediiate is responsible for operations and maintenance of the plant. Delivered via SPVs, funded by project finance.



Remediiate's SPV business model. Source: Remediiate.

# About IDTechEx

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## Eve Pope Senior Technology Analyst

### Bio

Eve Pope is a Senior Technology Analyst at IDTechEx, focusing primarily on sustainability and carbon capture, utilization, and storage (CCUS). Before joining IDTechEx, Eve graduated from the University of Cambridge with a MA in Natural Sciences. She is based in London, UK.

### Education

Eve was awarded a MA degree in Physical Natural Sciences from the University of Cambridge. Through her degree she gained wide-ranging chemical and technical expertise, alongside strong analytical skills, with a focus on atmospheric gases and aerosols.

### Research

At IDTechEx, Eve's research covers a broad range of sustainability topics. She has technical and market expertise in areas including CCUS (carbon capture, utilization, and storage), CDR (carbon dioxide removal), cement decarbonization, sustainable data centers, and gas separation membranes.

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