



## Reducing Greenhouse Gas Emissions from Intensive Farming – A Case Study in the UK

Donata Magrin<sup>1</sup>, Dr. Fabio Galatioto<sup>1</sup>, Alan Leonard<sup>2</sup>

<sup>1</sup> ISCLEANAIR GLOBAL SOLUTIONS – IGS LTD., United Kingdom

<sup>2</sup> Ricardo Energy & Environment, United Kingdom

### Abstract

The vision for the project presented in this article was to support the agricultural sector to reduce environmental pollution generated by intensive livestock farming to help it achieve NetZero targets. In fact, agriculture and animal feeding operations contribute by nearly 11% of the total global anthropogenic greenhouse gases (GHGs) emissions where the major GHGs produced by the agricultural sector are methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O) and carbon dioxide (CO<sub>2</sub>). In 2021, agriculture was the source of 11% of the total UK GHG emissions, equal to about 47.9Mt of CO<sub>2</sub> equivalent and 49% of all methane emissions. In contrast, agriculture only accounted for about 1.9% of total carbon dioxide emissions.

The project we present here aimed at demonstrating the ability of a novel air pollution abatement (APA) system, filterless and water-based, to extract carbon dioxide and methane directly from indoor air at the emission source (an operational farm housing).

It is advised that CO<sub>2</sub> concentrations should be controlled below 3000ppm to preserve animal welfare. Therefore, control systems are required for maintaining adequate indoor air quality in livestock facilities.

A ventilation-controlled room was monitored over 100h under summer conditions, and actual concentrations were measured using precision reference systems at different locations within the site as well as at the inlet/outlet of the APA system. Results showed a consistent reduction in mean indoor concentrations for both CO<sub>2</sub> and CH<sub>4</sub>. This research findings can contribute to meeting current GHGs concentration regulations in livestock buildings while enabling the reuse of these gases from the treatment water.

**Keywords:** carbon dioxide; global warming; livestock; methane; mitigation