

■ Nitrous Oxide Sustainability & Mitigation – Session Summary

Jonas outlines the growing sustainability and safety challenges associated with nitrous oxide (N₂O) and the solutions his clean-tech company provides to eliminate emissions. While N₂O remains valuable in healthcare for fast, effective pain relief and rapid patient recovery, it carries a CO₂-equivalent impact 270 times greater than CO₂ and poses workplace exposure risks. Regulatory attention is increasing across Europe and the US, with 100 ppm emerging as a practical exposure limit, though measurement becomes difficult below this threshold.

Beyond healthcare, industries such as recycling and pharmaceuticals are now unable to emit N₂O at all, driving rapid adoption of abatement systems. Jonas highlights a major hidden emission source: 15–20% of N₂O in returned cylinders is typically vented to atmosphere, urging the NHS to pressure suppliers to adopt safe residual-gas handling. He praises the Greener NHS initiative as global leadership and encourages wider international communication of the UK's progress.

About the Company

- Swedish clean-tech company specialising exclusively in **nitrous oxide (N₂O) abatement**.
- Established in 2013; originally focused on healthcare, now expanding into **recycling, pharma and industrial sectors**.
- Strong UK presence with multiple installations already in place.

Why Nitrous Oxide Matters

- Widely used in healthcare for **rapid, effective pain relief** with fast patient recovery.
- Enables efficient patient flow and higher throughput in settings like dentistry.
- However, N₂O has a **CO₂-equivalent impact 270× higher than CO₂**, making it a major greenhouse gas.
- Also a **workplace safety hazard**, with exposure limits increasingly scrutinised across Europe and the US.

Exposure Limits & Regulatory Landscape

- Growing international debate on acceptable exposure levels (20–100 ppm).
- UK, Sweden and Germany use **100 ppm** as the practical limit; France has only a recommendation.

- Below 100 ppm, accurate measurement becomes technically challenging.
- Post-COVID ventilation changes have made managing indoor N₂O levels more complex.

Industrial Shift Toward Zero Emissions

- Recycling sector now **prohibited from emitting N₂O**, driving rapid adoption of abatement systems.
- Pharma industry beginning to follow, especially around:
 - N₂O used in manufacturing processes.
 - **Residual gas in cylinders**, a major hidden emission source.

Critical Issue: Residual Gas in Cylinders

- **15–20% of purchased N₂O** is returned to suppliers due to low pressure.
- In most cases, this gas is **vented directly into the atmosphere**.
- A major, avoidable source of emissions.
- Jonas argues the NHS should **pressure suppliers** to adopt safe residual-gas handling.
- First European supplier has recently invested in such technology.

Global Healthcare Perspective

- Only **Sweden, Denmark, Singapore and the UK** currently treat N₂O emissions as a serious climate issue.
- US progress stalled due to political shifts.
- Jonas praises the **Greener NHS** initiative and urges the UK to communicate its leadership internationally.

Solutions Offered

- Scalable systems:
 - Single-patient units for low-use hospitals.
 - Centralised systems for multiple treatment rooms.
- Passive personal exposure monitors providing minute-by-minute readings and alarms.
- Technology converts N₂O into **nitrogen and oxygen** via catalytic decomposition.
- Reaction is **exothermic**, meaning systems require very little external energy.