BOC
A Linde company

EXCIDIO® Performance Evaluation: Environmental & Occupational Protection in Maternity Care

Awareness of nitrous oxide's occupational exposure risks and its contribution to greenhouse gas emissions, has increased substantially in recent years. As healthcare services modernise, there is a clear need for practical, effective solutions that reduce emissions and support staff without disrupting patient care.

BOC is proud to introduce the **EXCIDIO nitrous oxide conversion unit** – an innovative device designed to capture exhaled ENTONOX®/ nitrous oxide and catalytically convert it into its harmless component gases, nitrogen and oxygen.

To evaluate the effectiveness of this new technology, we conducted a controlled laboratory test simulating a typical labour scenario. A total of 534 L of gas was passed through EXCIDIO over three hours – representing average ENTONOX use during labour.[i,ii] The device's performance in this high impact clinical setting was then evaluated.

Performance results

N_2O conversion efficiency	95% conversion
CO_2e saved per labour	129 kg CO_2e saved
Start-up time	<20 minutes
Energy consumption in use	~200 watts

EXCIDIO uses a catalytic conversion process to crack nitrous oxide molecules. Operation is simple: pressing 'Start' initiates a short warm up phase, after which the device is ready for use. **Any ENTONOX exhalation tubing can be connected directly,** allowing exhaled gas to be safely broken down in real time. Throughout operation, **the unit remains quiet and unobtrusive** in the clinical environment.

These results demonstrate that **EXCIDIO is a highly effective tool for removing exhaled nitrous oxide** during labour. When used continuously, it supports greener healthcare delivery while promoting good occupational health practices.

References

i https://www.bjanaesthesia.org/article/S0007-0912(22)00261-6/fulltext
ii https://pubmed.ncbi.nlm.nih.gov/32452155/

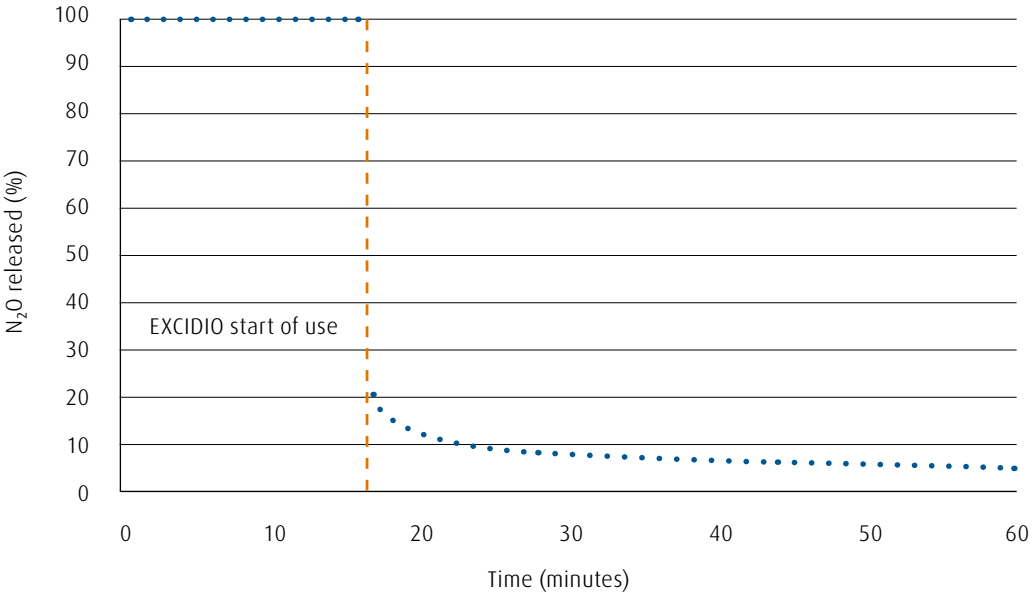
EXCIDIO and Greenhouse Gas Mitigation

ENTONOX remains a safe and effective analgesic, but its environmental footprint is significant: each nitrous oxide molecule has **a global warming potential 273 times greater than CO_2.**[iii]

To quantify EXCIDIO's environmental benefit, we modelled a typical labour using 3 L/min ENTONOX over three hours. The resulting data show how rapidly **N_2O levels fall once the device begins use.**

The graph below illustrates the decline in global warming effect of treatments using ENTONOX when EXCIDIO is introduced, highlighting how quickly EXCIDIO can have a positive impact in the environment.

Exhaled N_2O released: before and after EXCIDIO



After the initial warm up phase, power consumption decreases as **the catalytic reaction becomes self sustaining.** Over the three hour test, EXCIDIO consumed less than 1 kWh – equivalent to under 200 g CO_2e[iv] – while **preventing 129 kg CO_2e** from entering the atmosphere.

High performance insulation allows the device to retain heat, enabling rapid relocation between rooms and reducing subsequent start up times to less than five minutes. Despite its robust performance, EXCIDIO remains **a cost effective solution** and is **80% recyclable** at end of life.

Key environmental takeaways

- Cuts 95% of N_2O emissions
- Saves 129 kg CO_2e per labour
- Drops emissions within 20 minutes of start up
- Uses under 1 kWh in three hours
- Produces less than 200 g CO_2e during operation
- Self sustaining reaction reduces power draw
- 80% recyclable at end of life
- Avoids need for costly ventilation upgrades

References

iii https://ghgprotocol.org/sites/default/files/2024-08/Global-Warming-Potential-Values%20%28August%202024%29.pdf
iv https://www.rensmart.com/Calculators/KWH-to-CO2 Accessed March 2026

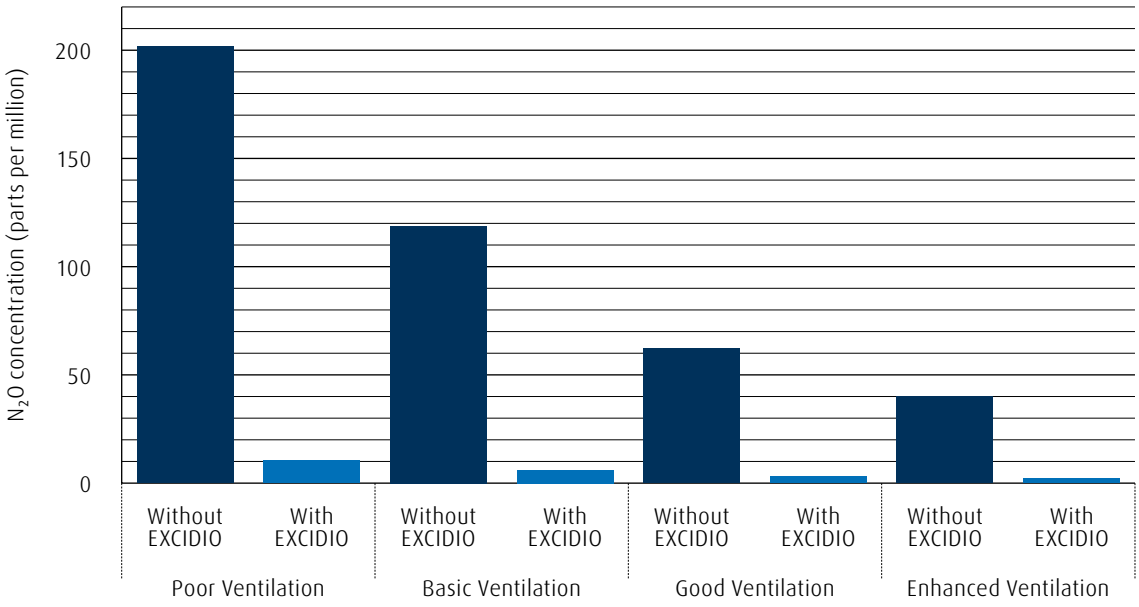
EXCIDIO and Occupational Health Performance

While reducing greenhouse gas emissions is essential, any technology used on labour wards must also safeguard the wellbeing of clinical staff. For this reason, we evaluated **EXCIDIO's impact on occupational exposure to nitrous oxide.**

Nitrous oxide exposure limits set by national and international bodies are designed to protect midwives, nurses, and other healthcare workers.[v,vi,vii] However, labour environments can exceed these limits without active mitigation.

The graph below compares room level N_2O concentrations in a standard labour room with and without EXCIDIO under a range of ventilation conditions. **The results show a substantial reduction in exposure,** even in poorly ventilated rooms (2 ACH).

EXCIDIO occupational nitrous oxide levels



Calculations are based on a small labour room (3 × 3 × 2.2 m) and an ENTONOX flow rate of 3 L/min, consistent with standard labour practice. All exhaled nitrous oxide is assumed to be captured by EXCIDIO. Conditions modelled: Poor ventilation (2 ACH), Basic ventilation (3.4 ACH), Good ventilation (6.5 ACH[viii]), and Enhanced ventilation (10 ACH). EXCIDIO does not monitor room level nitrous oxide concentrations and is intended to complement rather than replace good occupational health practices aimed at minimising staff exposure to nitrous oxide.

When benchmarked against alternatives such as advanced gas management systems, ventilation upgrades, or major pipework changes, EXCIDIO offers **a simple, rapid, and cost effective** way to address both environmental and occupational health concerns related to ENTONOX use.

This testing demonstrates that EXCIDIO provides an effective drop in solution for reducing greenhouse gas emissions and supporting safer working environments. **To learn more about how EXCIDIO can help meet your healthcare sustainability and safety goals, contact your BOC Healthcare Account Manager.**

References

v HSE EH40/2005 Workplace exposure limits
vi ACGIH® Threshold Limit Values (TLVs®) and Biological Exposure Indices (BEIs®).
vii National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limits (RELs).
viii https://www.sciencedirect.com/science/article/abs/pii/S0360132313000851

Notices

BOC Healthcare
Customer Service Centre, Priestley Road, Worsley, Manchester M28 2UT, United Kingdom
Tel 0800 111 333, Fax 0800 111 555, medicalbda@boc.com, bocgases.co.uk/healthcare

HLC/706615/CST/0526