

Supporting resource 9: Business case guidance

This resource can be used independently or together with the **'Nitrous oxide toolkit: Reducing waste in NHS trusts'**.

What

This document provides tips and advice for developing a business case to reduce nitrous oxide waste in the NHS. This guidance is based on His Majesty's Treasury's Five Case Model and is split into five sections:

- The strategic case
- The economic case
- The commercial case
- The financial case
- The management case

Example text is shown in italics with square brackets indicating where trust specific information should be added. This text should be adapted and made locally relevant to each trust.

Who

This document is useful for project leads, clinical leads, or executive leads who wish to develop a business case for nitrous oxide waste reduction implementation.

When

This guidance can be used when the project is getting started and needs a business case to progress. Or at any point when there is a need to develop and present a case for spending, to align supply systems to clinical use.



Strategic case

This section should summarise the strategic context that the project/programme sits within including:

- the case for change
- alignment with national net zero priorities
- alignment with local green plan
- overview of current system
- recap of the business case ask

Useful toolkit sections and supporting resources

The following toolkit sections and supporting resources can help you to put together your strategic case:

- '[Nitrous oxide toolkit: Reducing waste in NHS trusts](#)' – Case for change
- '[Nitrous oxide toolkit: Reducing waste in NHS trusts](#)' – Understand nitrous oxide and nitrous oxide/oxygen mixture in the NHS
- '[Supporting resource 1: Nitrous oxide and nitrous oxide/oxygen mixture use and supply in the NHS](#)'

We have provided some example text below that can be adapted by trusts.

Example text: case for change

Nitrous oxide is responsible for the largest overall volume of emissions from anaesthetic and medical gases. Anaesthetic and medical gases account for 2% of the NHS's total carbon footprint. The NHS Long Term Plan committed to reducing emissions from these gases by 40%. This target cannot be achieved without action to reduce nitrous oxide emissions. Reducing the waste associated with this gas is a tangible and impactful way for the NHS to realise efficiencies, lower its carbon emissions and save money, whilst still ensuring this important clinical option is still available when needed.

Example text: alignment with national strategy

This business case directly supports NHS England's ambition to build a more sustainable health service in line with the targets outlined in the Climate Change Act and the Health and Care Act 2022, which placed new duties on NHS England, and all trusts, foundation trusts, and integrated care boards to contribute towards statutory emissions and environmental targets. The expected carbon reductions from this action will directly support NHS progress to meet its carbon reduction targets.

This is reflected in the 2024/25 standard contract with NHS trusts required to take action to mitigate nitrous oxide waste. Action on nitrous oxide waste also supports [NHS England guidance](#) published in 2023 that details the mitigations that NHS trusts should consider to protect staff by limiting their occupational exposure to nitrous oxide.

Example text: alignment with Royal College of Anaesthetists (RCoA) recommendation (theatres only)

This business case also supports the recommendation made by the RCoA that continuous supply of nitrous oxide to theatre suites via a pipelined supply is no longer essential. It recommends that Trusts and Health Boards decommission their nitrous oxide manifolds as soon as possible, switching to point-of-use cylinders where individual Trusts and Health Boards feel that access to nitrous oxide remains desirable. The statement can be found [here](#).

Example text: Overview of the current system

In 2023/24 [Trust Name] purchased [X] litres of nitrous oxide, at a cost of £[Y] and resulting in [Z] tonnes of CO₂ emissions. Additionally, [A] litres of pre-mixed nitrous oxide and oxygen were procured, at a cost of £[C] and equating to [B] tonnes of CO₂ emissions]. These gases are supplied through medical gas pipeline systems with ongoing maintenance and monitoring costs of £[D] annually.

Current supply to clinical departments includes:

- *[List of departments]*

We have identified:

- *Low/No utilisation rates in [Department X, Y, Z], that do not require a piped nitrous oxide supply / nitrous oxide and oxygen mixture supply and can be replaced with a portable cylinder system or none at all*
- *[Specific usage vs. purchase discrepancy data]*
- *[Opportunities to reduce procurement of nitrous oxide for remaining medical gas pipeline systems by ongoing optimisation of the system]*

Example text: business case ask

In line with NHS England commitments to optimise medicines usage and find efficiencies, this business case sets out the justification for this project which will enable the achievement of strategic objectives at a national and local level by:

- *reducing waste of nitrous oxide gas*
- *lowering costs associated with nitrous oxide supply and maintenance*
- *decreasing environmental impact from nitrous oxide emissions*

The investment in resource and equipment for this project is expected to be [cost] and have long term cost and carbon benefits.

Economic case

The economic case sets out to identify the proposal that delivers best public value. This is often structured as:

- a set of options that the team have considered that often include:
 - a “do nothing” option that sets out the consequences if no action is taken
 - a “preferred” option
 - an alternative option that has been considered but decided against – for example this could be an alternative cylinder system or focusing on specific clinical sites to start
- a recommendation of which option is most appropriate
- a more detailed description of the benefits of the recommended option

Useful toolkit sections and supporting resources

The following toolkit sections and supporting resources can help you to put together your preferred option:

- [‘Nitrous oxide toolkit: Reducing waste in NHS trusts’](#) – Ensure supply of gas is aligned to clinical use
- [‘Nitrous oxide toolkit: Reducing waste in NHS trusts’](#) – Continue to optimise systems
- [‘Supporting resource 6: Approaches and tools for understanding nitrous oxide supply and use’](#)
- [‘Supporting resource 2: Portable cylinder system options and equipment’](#)

We have provided guidance below to help teams cost the recommended option and benefits which can be tailored to each trust’s circumstances. We have also briefly outlined example text for a “rather than” option.

Guidance for calculating the costs and benefits of your preferred option

The overarching toolkit is designed to support teams to understand their current use of nitrous oxide and develop their preferred option for reducing waste. This option can then be outlined in this section of the business case.

The table below is designed to help teams think through the costs and savings associated with different project elements.

Implications and considerations

Area	Costs	Savings	Implications/Considerations
Staff	<ul style="list-style-type: none"> Project team time Training costs 	<ul style="list-style-type: none"> Reduction in porter time for cylinder management Potential reduction in manual handling Potential reduction in maintenance staff time 	<ul style="list-style-type: none"> Calculate staff time costs based on hourly rates and estimated hours for each role involved Consider long-term staff efficiency gains
Infrastructure	<ul style="list-style-type: none"> Decommissioning costs for medical gas pipeline systems Potential storage system costs for cylinders if not already in place Potential building modifications for new storage areas Signage and labelling for new systems Ongoing maintenance for remaining pipeline systems 	<ul style="list-style-type: none"> Reduced ongoing maintenance costs for decommissioned pipelines and simplified systems Potential space savings from removed pipeline infrastructure Possible repurposing of former storage areas Reduced need for specialist pipeline maintenance skills Simplified management of system changes / requirement changes re compliance, configuration etc 	<ul style="list-style-type: none"> Get quotes for decommissioning from contractors Assess space requirements for storage systems Estimate annual maintenance costs for remaining systems Calculate maintenance cost savings based on historical routine maintenance and equipment replacement costs of removed pipeline Consider future flexibility of infrastructure Evaluate potential for repurposing freed-up space

Equipment	<ul style="list-style-type: none"> • Portable cylinder system setup costs • New smaller cylinders (E size) • Cylinder regulators and connectors • Safety equipment (e.g., cylinder restraints, signage) 	<ul style="list-style-type: none"> • Savings from reduced procurement of large cylinders • Reduced replacement costs due to less wear on pipeline systems 	<ul style="list-style-type: none"> • Calculate based on number of areas transitioning to a portable cylinder system • Compare costs of small vs large cylinders from suppliers, noting the likely significant reduction in volume of procured gas due to significant waste reduction • Consider lifecycle costs of new equipment
Gas Procurement	<ul style="list-style-type: none"> • Possible need for more diverse cylinder inventory which can alter cost per volume 	<ul style="list-style-type: none"> • Significant savings from reduced waste • Savings from optimised gas delivery systems • Potential changes in delivery frequencies and associated costs • Optimised gas procurement due to accurately managed orders 	<ul style="list-style-type: none"> • Calculate: (Current annual gas volume) x (1 - expected reduction %) ÷ 1,800 = number of E cylinders needed • Multiply by E cylinder cost from supplier • Consider impact on procurement processes and potential efficiencies
Environmental Impact	<ul style="list-style-type: none"> • Potential costs for improved ventilation or scavenging systems 	<ul style="list-style-type: none"> • Carbon savings from reduced gas waste • Reduced environmental impact from fewer deliveries • Potential energy savings from simplified systems 	<ul style="list-style-type: none"> • Calculate CO₂ equivalent savings: (Annual gas volume saved) × (CO₂ equivalent factor for nitrous oxide) • Assess impact on Trust's overall carbon reduction targets

Commercial case

The purpose of the commercial case section of the business case is to describe the procurement strategy and how this will be managed. Most trusts have delivered nitrous oxide waste reduction schemes through their inhouse sustainability, estates or improvement teams therefore this section is likely to be brief.

We recommend that teams include in their commercial case any impact on existing commercial contracts. This could include reducing or shortening a contract, PFI considerations or contracted APs.

Financial case

The financial case should outline the affordability of the case and where the budget for this work sits. Funding sources may include:

- existing estates budgets (including underspend)
- external grants funding including from NHS Hospital charities

Management case

This section should set out how the project will be managed including:

- a high-level plan for achieving the desired outcome, with key milestones and major dependencies (e.g. Interface with other projects)
- the key roles, with named individual as the SRO
- outline contingency plans e.g. Addressing failure to deliver decommissioning of medical gas pipeline system on time
- the major risks identified and outline plan for addressing them

Useful toolkit sections and supporting resources

The following toolkit sections and supporting resources can help you to put together your preferred option:

- [‘Nitrous oxide toolkit: Reducing waste in NHS trusts’](#) – Get started on reducing waste
- [‘Supporting resource 3: project management templates’](#)

Risks will differ by trusts, but common risks include:

- potential resistance to changes in gas supply
- potential operational disruption during transition periods

Example text: methodology and project management

The project draws on learning and best practices from successful implementations at other NHS trusts from the NHS England Nitrous Oxide Waste Reduction toolkit. It provides a structured approach to significantly reducing nitrous oxide waste, delivering environmental, financial and safety benefits. The project will involve:

1. *Establishing project governance and a multidisciplinary team*
2. *Conducting baseline assessments of nitrous oxide usage and supply systems*
3. *Transitioning low-use areas to portable cylinder systems*
4. *Decommissioning unnecessary medical gas pipeline infrastructure*
5. *Optimising remaining piped systems and cylinder management*
6. *Implementing clinical best practices and staff training*
7. *Setting up ongoing monitoring and maintenance protocols*

The [project management templates supporting resource](#) can support the team to develop a detailed project plan that can be included in the business case as an annex or summarised in the business case. The risk matrix may also be useful to include.

Example text: governance and management

The project will be overseen by the Medical Gas Committee, with executive sponsorship from [role]. A dedicated project team will manage implementation, working closely with clinical, estates, facilities and procurement teams.

The nitrous oxide toolkit outlines the potential key responsibilities of different team members. This can be used to develop this section of the business case.

