

Beyond Burial and Cremation: A Case for Eco-Friendly Funeral Reform



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Introduction: Understanding Sustainable Funeral Alternatives

Traditional burial and cremation have long been the default options for end-of-life care in the UK, but both come with significant environmental costs. However, these methods carry significant environmental impacts—from land consumption to high carbon emissions. Additionally, an inordinately high number of bodies in Northern Ireland are embalmed prior to burial. Embalming involves the use of chemicals like formaldehyde, phenol, and methanol, which are toxic and pose a considerable risk of leaching into groundwater and contaminating ecosystems. Despite most burials or cremations occurring within three days of death—when embalming may not be necessary—it remains standard practice.

As public awareness of these impacts grows, a new conversation is emerging around sustainable and dignified alternatives. This briefing outlines four key eco-friendly funeral practices gaining traction globally, each offering reduced emissions, lower land use, and greater harmony with natural cycles.

1. Natural Burial Also known as green burial, this method involves placing the body in a biodegradable coffin or shroud, without embalming, in a natural setting such as a woodland or meadow. Graves are often unmarked or identified with a simple plaque or GPS coordinate. The aim is to allow the body to decompose naturally, returning nutrients to the earth with minimal environmental disruption.

2. Pod Burial / Tree Pod Interment Pod burial is a symbolic and environmentally restorative alternative that uses biodegradable pods — often shaped like an egg or seed — in which the deceased is placed, sometimes alongside a sapling or tree seed. As the body decomposes, it nourishes the growing tree. This method promotes reforestation and can create living memorial forests over time.

3. Aquamation (Alkaline Hydrolysis) Aquamation uses a water-based solution of potassium or sodium hydroxide to gently break down the body over a matter of hours. The process mimics natural decomposition but is significantly faster and cleaner. The remaining bone fragments are processed into an ash-like powder and returned to the family, as with cremation. It produces no harmful gases and requires far less energy.

4. Terramation (Natural Organic Reduction) Terramation involves placing the body in a vessel filled with organic material such as wood chips, straw, and alfalfa. Over 30–45 days, natural microbial activity transforms the remains into nutrient-rich soil. This soil can be returned to the family or used in conservation projects, effectively turning human remains into a living legacy that helps restore the planet.

Other Emerging Methods

Promession (freeze-drying) is a conceptual method developed in Sweden, involving cryogenic freezing of the body, mechanical vibration to fragment remains, and vacuum dehydration. Though promising in theory — with low environmental impact and rapid decomposition — the process remains unproven at scale, and no fully operational facility currently exists. It serves as an example of the kind of technological innovation possible in sustainable death care, but it is not presently a viable option in Northern Ireland or elsewhere.

These methods represent a shift toward more sustainable, ethical, and emotionally resonant funeral choices. The remainder of this briefing explores the environmental, policy, and social implications of adopting such alternatives in Northern Ireland.

The Modern Funeral: A Brief History

While funeral practices are often viewed as long-standing cultural traditions, many elements of the “modern funeral” are relatively recent developments. Understanding the origins and evolution of current practices is essential when considering the introduction of alternative or environmentally conscious methods.

Purpose of Funeral Rituals

Funerals have historically served three primary functions:

- The respectful and timely disposal of the body
- The facilitation of grief and mourning
- The provision of a shared social or spiritual space for remembrance

These core functions remain consistent across cultures and time, but the means by which they are carried out have varied greatly.

The Emergence of the Modern Western Funeral

The contemporary model of the funeral—including embalming, formal viewing, open caskets, hearses, and the use of funeral directors—developed primarily in the **mid- to late-19th century**, particularly in the United States and later in Western Europe. Key factors in this evolution include:

- **The American Civil War (1861–1865):** Soldiers’ bodies had to be preserved and transported over long distances. This led to the widespread adoption of **chemical embalming**, particularly using arsenic and later formaldehyde.
- **Urbanisation and industrialisation:** As families became less involved in post-death care, professionalisation of funeral services grew.
- **Commercialisation:** The funeral industry expanded in the 20th century, reinforcing embalming and other services as standard, even when not strictly necessary.

Embalming and Body Preservation

Modern embalming is not required by law in most jurisdictions. Its primary function is temporary preservation for cosmetic purposes, primarily when open-casket viewing or delayed burial is planned. It does not serve a medical, public health, or religious necessity in most cases.

Many religious traditions—including Islam, Judaism, Hinduism, and certain Christian denominations—do not embalm, favouring natural body preparation and rapid burial. In this context, embalming is a cultural and commercial practice, not a universal or time-honoured one.

This understanding helps to contextualise the growing interest in alternative methods such as **natural burial, aquamation, Terramation, and memorial forestry**, which are not radical departures from tradition, but rather **considered evolutions in response to contemporary needs**.

Environmental Impact Comparison: Traditional vs Alternative Funeral Methods

Comparison Table – Environmental Impact by Method (Per Individual)

Method	CO2 Emissions	Land Use	Toxic Waste	Energy Use
Burial	~50kg + ongoing	High (permanent)	Yes (formaldehyde)	Ongoing (grounds keeping)
Cremation	400–600kg	None	Yes (mercury, gases)	High
Aquamation	~40–60kg	None	No	Low
Terramation	Negligible/-1T	None	No	Low
Pod Burial	Comparable to Natural Burial	Medium (reforestation purpose)	No	Very Low

Note: All figures are based on international averages and estimates as of 2020–2024. Terramation’s negative CO2 reflects carbon savings from avoided cremation/burial and soil reuse.

1. Traditional Burial

- **Land Use:** Burials require long-term land allocation. Cemeteries are increasingly full, leading to land scarcity, particularly in urban areas.
 - *Source: ICCM, 2020* — Many UK councils project cemetery land exhaustion within 10–20 years.
- **Materials & Chemicals:**
 - Use of hardwood coffins, metal fixtures, concrete vaults.
 - Embalming fluids (formaldehyde) leach into soil, potentially contaminating groundwater.
- **Ongoing Maintenance:** Grass cutting, landscaping, water use, emissions from maintenance machinery.
 - *Estimated emissions:* Up to **50kg CO2 per burial** from materials and grounds keeping alone.

2. Cremation

- **Carbon Emissions:**
 - Average cremation emits **400–600 kg CO2** per body.
 - *Source: Natural Death Centre, 2019; Resomation Ltd white paper, 2020*
 - Includes fossil fuel use and energy-intensive process (~1.5–3 hours per cremation).
- **Toxic Pollutants:**
 - Releases mercury vapour from dental amalgams.
 - Nitrogen oxides, particulates, and other harmful gases.
- **Energy Demand:** Gas-powered furnaces or electric cremators still draw high power loads.

Northern Ireland Cremation Data:

- NI has two crematoria: **Roselawn (Belfast)** and **Antrim & Newtownabbey (Ballyearl)**.
 - Roselawn: ~3,500–4,000 cremations annually (operating well over design capacity).
 - Ballyearl: Opened in 2023, capacity ~1,560 annually. The facility was a **£5 million project**.
- Combined: **~5,000 to 5,500 cremations per year**.
- With each cremation producing 400–600 kg CO₂, this equates to **2,000 to 3,300 tonnes of CO₂ annually** from cremation in Northern Ireland alone.
- NI has the **lowest cremation rate in the UK (~23%)**, indicating that emissions and capacity could grow significantly with shifting trends.

3. Aquamation (Alkaline Hydrolysis)

- **Emissions:**
 - Reduces carbon output by **up to 90% compared to cremation**.
 - No mercury release; bones are sterile and returned as ash-like powder.
- **Water Use:**
 - Uses ~300 litres per cycle, but often **recycled within closed systems**.
 - No hazardous waste released into the environment.
- **Energy:**
 - Requires lower temperatures and less energy than cremation.

4. Terramation (Natural Organic Reduction)

- **Carbon Reduction:**
 - Estimated **1 metric tonne CO₂ savings per person** compared to cremation.
 - This figure includes:
 - Avoided cremation emissions (~500 kg).
 - Avoided embalming and casket materials.
 - No land maintenance emissions.
 - **Carbon sequestration** potential via composted soil used in conservation or rewilding projects.
- **Land Preservation:**
 - Soil returned to families or used in conservation projects.
 - No long-term land occupation.
- **Process:**
 - Body placed in a vessel with organic material (e.g. wood chips, straw).
 - Transforms into soil in ~30–45 days.

5. Natural Burial Grounds:

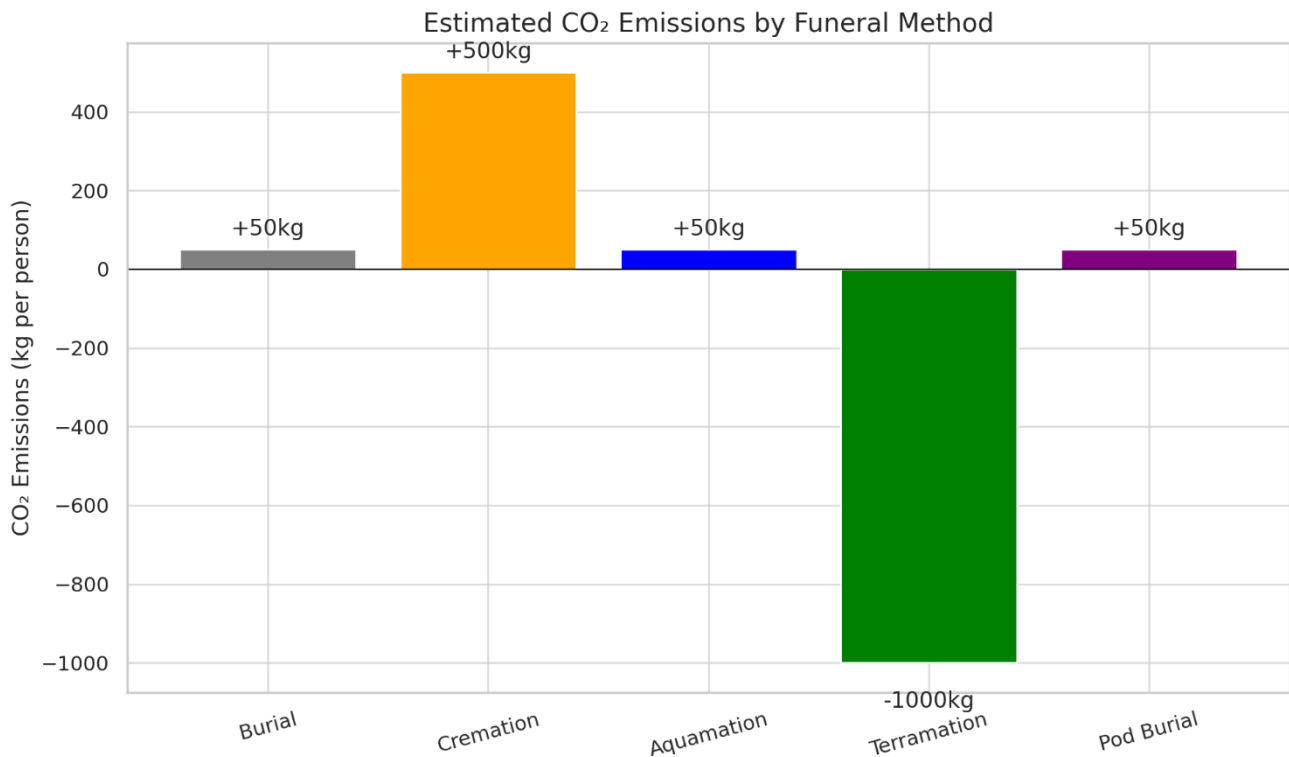
- Increasingly popular in the UK and Ireland, these sites offer burial without embalming, concrete vaults, or heavy headstones.
- Typically located in woodland or meadow settings; graves are marked with biodegradable memorials or GPS coordinates.
- Require minimal land preparation and virtually no ongoing maintenance — reducing emissions and operating costs for councils.

6. Pod Burial / Bios Urn Concepts:

- The deceased is placed in a biodegradable pod, often paired with a tree seed or sapling.
- As the pod decomposes, it provides nutrients to the tree — creating a living memorial and promoting reforestation.
- Public response to these concepts has been largely positive due to their **symbolism, simplicity, and dignity**.

Public Preference:

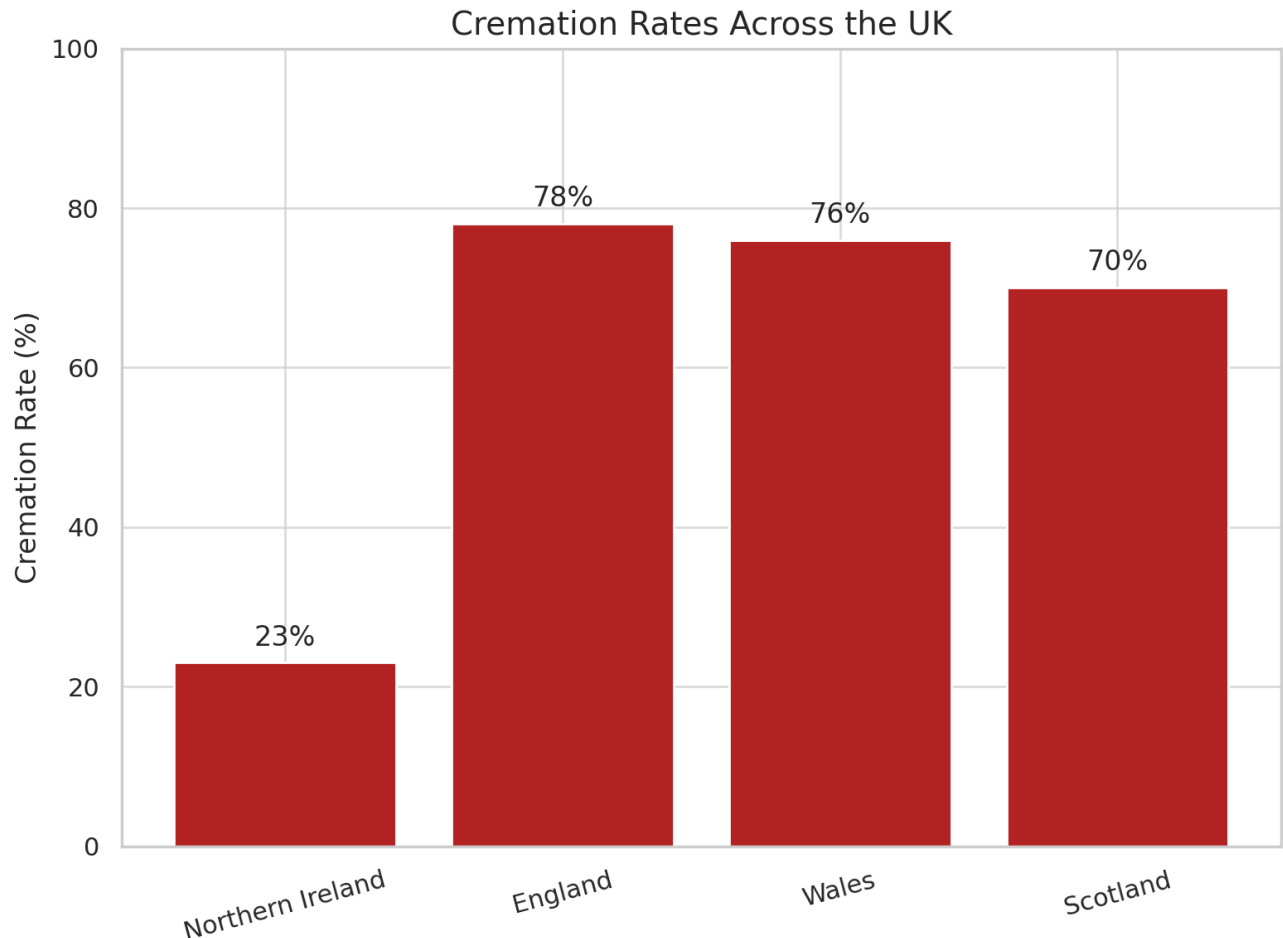
- While Aquamation and Terramation offer substantial environmental benefits, they are still perceived by many as unfamiliar or “clinical.”
- In contrast, **natural burial and tree pod interment** are seen as gentler, more **emotionally resonant** options.
- This makes them ideal for early adoption or pilot schemes that can introduce the broader public to sustainable alternatives without the barrier of discomfort.



Cost Comparison: Public and Local Authority Spending

Council & Public Authority Costs

- **Burial Site Maintenance:**
 - Long-term grounds keeping, landscaping, road/path upkeep, waste disposal
 - *Estimated cost to councils:* £300–£700 per burial plot over 10 years
 - Expansion costs: acquiring and developing new cemetery land
 - Ongoing maintenance contributes to additional emissions (machinery, water use, chemical treatments).
- **Crematoria Capital & Operating Costs:**
 - Cremator units: £1m+ for new facility
 - Gas/electricity usage: High, especially for older systems
 - Mercury abatement equipment required under UK environmental law
 - Ballyearl Crematorium cost **£5 million** to build (2023)
- **Natural Burial Sites:**
 - Minimal infrastructure; some operated privately or via conservation charities
 - One-time setup per plot; no long-term maintenance or headstones
 - Reduced emissions over time due to no ongoing fuel, water, or chemical use



Policy Landscape – UK and International Comparisons

1. United Kingdom

- **England & Wales:**
 - Aquamation not yet legalised, though proposals have been discussed.
 - Natural burials increasing in popularity, with over 270 sites listed by the Natural Death Centre.
- **Scotland:**
 - Government has consulted on Aquamation since 2022, supported in principle but pending regulatory framework.
 - Prominent pilot interest in green alternatives.
- **Northern Ireland:**
 - No legal provision currently exists for Aquamation or Terramation.
 - Public and legislative awareness remains limited.

2. United States

- Aquamation legal in over 20 states.
- Terramation (Natural Organic Reduction) legal in California, Washington, Oregon, Colorado, Vermont, and New York.
- Rapid uptake in states with strong environmental legislation.

3. Canada

- Aquamation widely accepted and regulated, including for state funerals (e.g., Desmond Tutu in South Africa also opted for it).
- Terramation under pilot schemes in British Columbia and Ontario.

4. Australia & New Zealand

- Aquamation legal and used in several states/territories.
- Often marketed as “water cremation” and regulated as a low-emissions alternative.

5. Europe

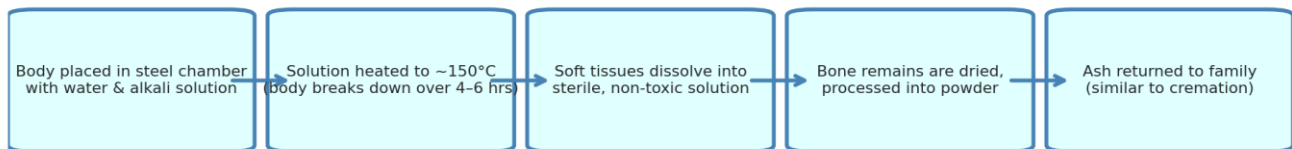
- Limited uptake of Aquamation or Terramation.
- Sweden and the Netherlands conducting feasibility studies.
- Barriers include cultural norms and established cremation infrastructure.

Summary: Globally, the momentum is clear: Aquamation and Terramation are emerging as credible, scalable, and publicly supported alternatives to traditional funeral practices. The regulatory gap in Northern Ireland stands in contrast to international best practice.

Public Sentiment and Cultural Shifts – Demand for Alternatives and Green Innovation

- **Changing Attitudes:** Surveys show growing discomfort with the environmental impact of traditional funerals, particularly among younger generations and environmentally conscious demographics.
- **Rise in Secularism:** Increasing numbers of people in Northern Ireland and across the UK identify as non-religious or spiritual but unaffiliated. This has led to a desire for more personal, environmentally aligned end-of-life options.
- **Public Interest in Green Alternatives:**
 - The Natural Death Centre reports a year-on-year rise in interest for natural burials.
 - Direct cremation and alternative methods surged in demand following the COVID-19 pandemic, with families prioritising simplicity, affordability, and ecological impact.
- **Polling Indicators:**
 - A 2021 UK YouGov poll found that **64% of respondents would consider a greener funeral option** if it were available.
 - In Scotland, public consultation feedback on Aquamation was overwhelmingly supportive of legalisation.
- **Accessibility Gap in NI:**
 - Despite this rising interest, Northern Ireland currently offers no lawful access to Aquamation or Terramation.
 - Families seeking these options must either settle for higher-emission methods or travel abroad, which is impractical and emotionally taxing.

Summary: The public is ready. The culture is shifting. The only missing piece is legislation that reflects evolving values around sustainability, dignity, and personal choice at the end of life.

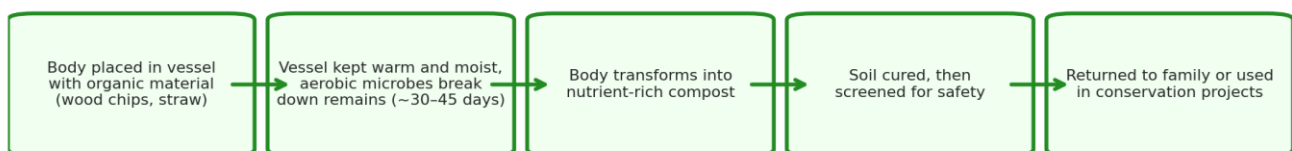


Aquamation Process Flow Chart

Recommendations for Policy and Legislative Action

- 1. Legislate for Aquamation and Terramation in NI**
 - Follow examples from Scotland and the US by creating a legal framework that allows alternative methods with clear regulatory oversight.
- 2. Promote Eco-Friendly Burial Options in Public Cemeteries**
 - Allocate designated space for natural burial grounds.
 - Pilot biodegradable pod/tree options in council-maintained green spaces.
- 3. Incentivise Sustainable Practices**
 - Offer reduced fees or grants for families choosing low-emission options.
 - Reduce business rates for private or charity-operated eco-funeral services.
- 4. Educate Funeral Directors and the Public**
 - Fund training and certification pathways for funeral professionals on alternative methods.
 - Launch public awareness campaigns tied to environmental and financial impacts of traditional funerals.
- 5. Support Local Innovation and Partnerships**
 - Encourage NI universities and green startups to partner on Terramation or water cremation trials.
 - Work with environmental NGOs and religious/community groups to ensure broad-based support and adaptation.

Closing Note: Northern Ireland has a chance to lead with compassionate, cost-effective, and environmentally responsible end-of-life choices. By expanding what is possible, we offer dignity not just in death — but in legacy.



Terramation Process Flow Chart

Appendix: References and Data Sources

- ICCM (Institute of Cemetery and Crematorium Management), UK Reports (2020–2023)
- Natural Death Centre UK, Annual Reports (2019–2023)
- Resomation Ltd, White Papers and Technical Reports (UK and US data)
- Bio-Response Solutions (USA), Aquamation Technology Specifications
- Recompose, Seattle – Terramation process and carbon impact estimates
- UK Government ONS Data – Funeral Costs and Burial Trends (2021–2024)
- NI Crematoria Capacity Reports: Roselawn & Ballyearl (2023–2024)
- YouGov UK Green Burial Survey (2021)
- Scottish Government Public Consultation on Aquamation (2022)
- Natural Burial Grounds Directory, Natural Death Centre (current listing)
- NI Environmental Statistics Report (DAERA, 2022)
- Sustainable NI and APG on Climate Action, briefing engagement (2025)

***“Let's talk of graves, of worms, and epitaphs; Make dust
our paper and with rainy eyes write sorrow on the bosom
of the earth.”***

—Richard II, William Shakespeare