

ISSDC

Cemeteries
& Crematoria

Discover what's beneath.

Decarbonisation in the bereavement sector

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Discover what's beneath.

CDS Group the UK's largest cemetery and crematorium design and development company

CDS Group with its in house team of architects, engineers and planners are the UK's largest developers of cemeteries and crematorium.

CDS Group are working on new generation crematorium developments as well as refurbishments with electric cremation.

CDS Group are working with a number of councils on joint large scale cremation only facilities.



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CLEANING UP THE INDUSTRY

Decarbonisation in the bereavement sector

To be sure you will hit your targets by 2030 then:

“Your desire to change must be greater than your desire to stay the same, as the cost of getting to net zero must be weighed against the price of inaction.”

Decarbonisation in the bereavement sector

Factors for change:

- Regulation
- Self-regulation
- Technology drivers
- Economic (industry led) drivers
- Social drivers

The role of the EA in the bereavement sector

- The EA have appointed a team to be specifically responsible for the bereavement sector:
 - Burial
 - Cremation

A government environmental working group is being set up that includes representatives of the bereavement sector to assist in setting targets and ensuring a smooth transition, BUT the EA will implement regulatory powers to ensure targets are met.

The role of the EA in the bereavement sector (burial)

- Through legislation (under EPR)
 - Improving ground and surface water quality through:
 - Implementation of environmental permitting to larger cemeteries and those in high risk locations through:
 - Regulation by law, not by guidelines, through:
 - Annual permits
 - Requiring on going monitoring of water quality.
 - Consideration of the use of embalming products

The role of the EA/DEFRA in the bereavement sector (cremation)

- Through legislation (Part II activity under EPR)
 - Improving air quality
 - Abatement and withdrawing CAMEO (review on Mercury)?
 - Reduction in NOx emissions
 - Reduction in Carbon emissions
 - Reviewing cremation technology
 - Improved emissions monitoring through approved independent MCERTS companies

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Technology and tools to
achieve carbon net zero
targets (CREMATION)

Discover what's beneath.

Cremation -Using tools and technology to reduce carbon

Fossil fuels in perspective

- If you want one Watt of energy from solar panels, you need about 10 Watts of sunlight.
- If you want one Watt of energy from biomass, you need about 50 Watts of sunlight.
- If you want one Watt of energy from oil, it has taken over three million Watts of sunlight*.

*Scientific American (M. Lott 2013)

Cremation -Using tools and technology to reduce carbon

Fossil fuels in perspective

- The amount of plants that have gone into the fossil fuels we have burned since the Industrial Revolution began [in 1751] is equal to all the plants grown on Earth over 13,300 years."

**Jeff Dukes's Burning Buried Sunshine*

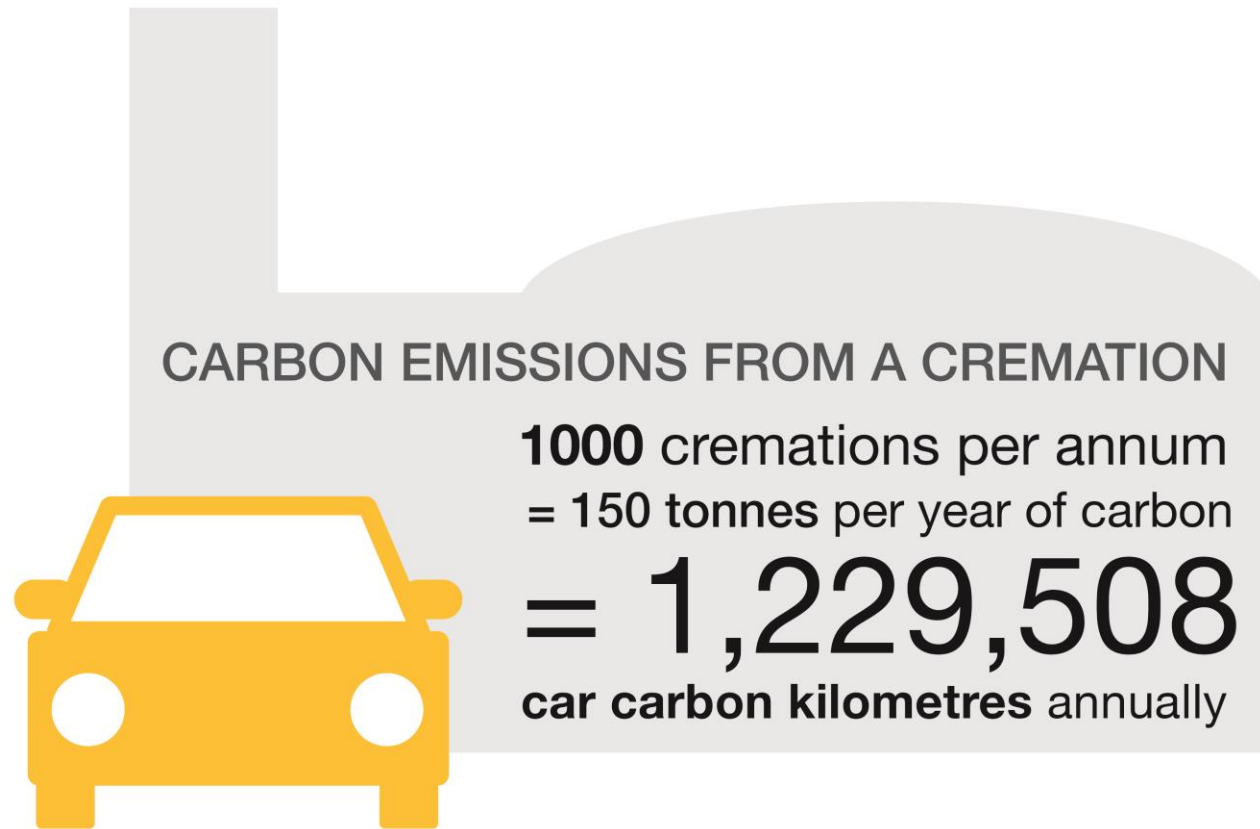
Cremation -Using tools and technology to reduce carbon

- Natural Gas (fossil fuel)
- Bio-LPG (through waste **A**naerobic **D**igestion, and biomass fuel crops)
- Green Energy Electric
- Resomation
- NewCremTech?
 - Selective Non-Catalytic Reduction (SNCR/DeNOx)

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Cremation - Using tools and technology to reduce carbon



Cremation -Using tools and technology to reduce carbon

- In 2018 in the UK there were 481,712 cremations
- Each cremation produces on average 150kg of CO₂ from gas consumption
 - = **72,256** tonnes of CO₂ PA
 - = **592,268,852** carbon car kilometres (14,807 times around the world)

 - =**272,045 kg (NOX)** PA from chipboard coffins
 - =**1,787,159,227** car kilometre equivalents of NOX (44,680 times around the world)

The background of the slide features a soft-focus image of green leaves and a butterfly. The butterfly is positioned in the center-right area, with its wings spread, showing a mix of white and light green patterns. The overall color palette is dominated by various shades of green, from deep forest green to bright, almost yellow-green, creating a natural and serene atmosphere.

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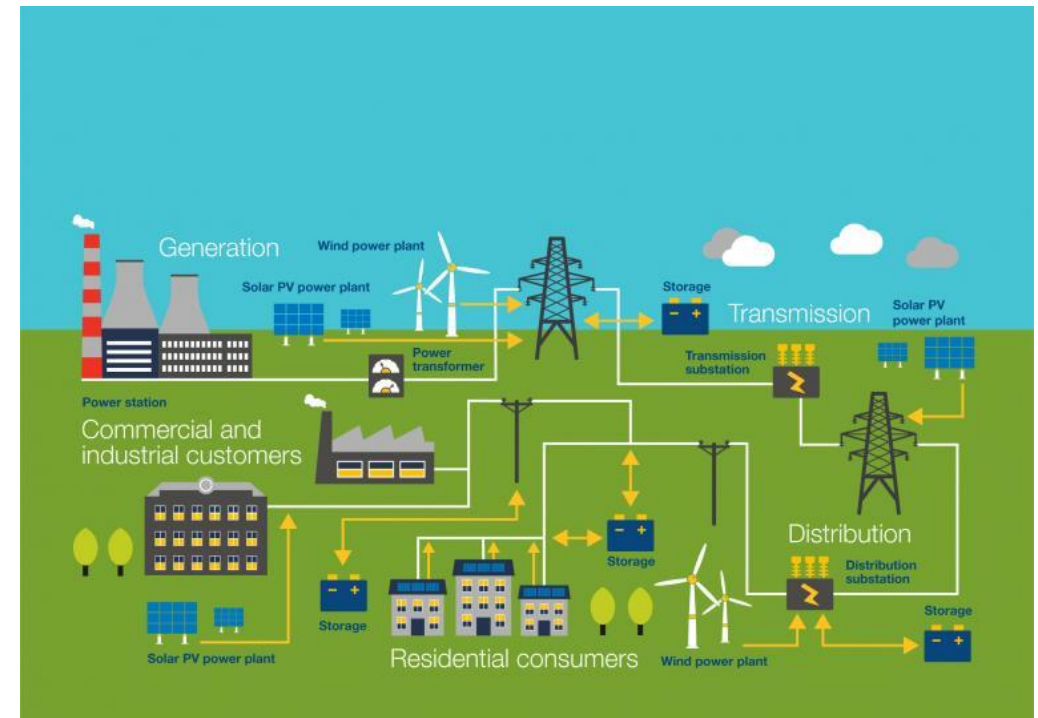
Electric Cremation

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Emissions

Electric cremation reduces CO₂ emissions by circa 50% on grid electricity in comparison to gas cremators operating on natural gas.

Electric cremation also reduces NO_x emissions by circa 33% in comparison to gas cremators on natural gas.



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Cremation -Using tools and technology to reduce carbon

- Electric cremation using zero carbon energy from sustainable sources will reduce carbon production from fuel consumption by **100%**!
- The remaining carbon is resultant from the body and the coffin, approximately 40kg.



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Cremation -Using tools and technology to reduce carbon

Discover what's beneath.

Huntingdon Crematorium first of two DFW electric cremators being installed



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Cremation -Using tools and technology to reduce carbon

Huntingdon Crematorium first and second DFW electric cremators being installed



Electric Cremation – Huntingdon Crematorium





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BioLPG Cremation

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BioLPG Cremation

On a local scale, BioLPG could provide a green alternative to electric cremation if electric supply is scarce, although large LPG tanks are required on site which must adhere to health and safety regulations and take up approximately 70sqm per 1,500 cremations.

As yet there are no BioLPG cremations undertaken in the UK



bioLPG feedstocks



Cooking oil, indigenous biomass, vegetable oil, waste, plant dry matter, sugar and starch.

BioLPG Cremation

BioLPG is a co-product of the biodiesel production process.

During manufacturing, the feedstocks undergo a series of complex treatments. They are combined with hydrogen in a process, called hydrogenolysis, which separates and purifies their energy content.

During the refining process, a variety of waste 'off-gases' are produced that contain propane or BioLPG.

For every tonne of biodiesel, 50 kg of BioLPG is generated from this gas stream. This co-product is then purified to make it identical to conventional propane.



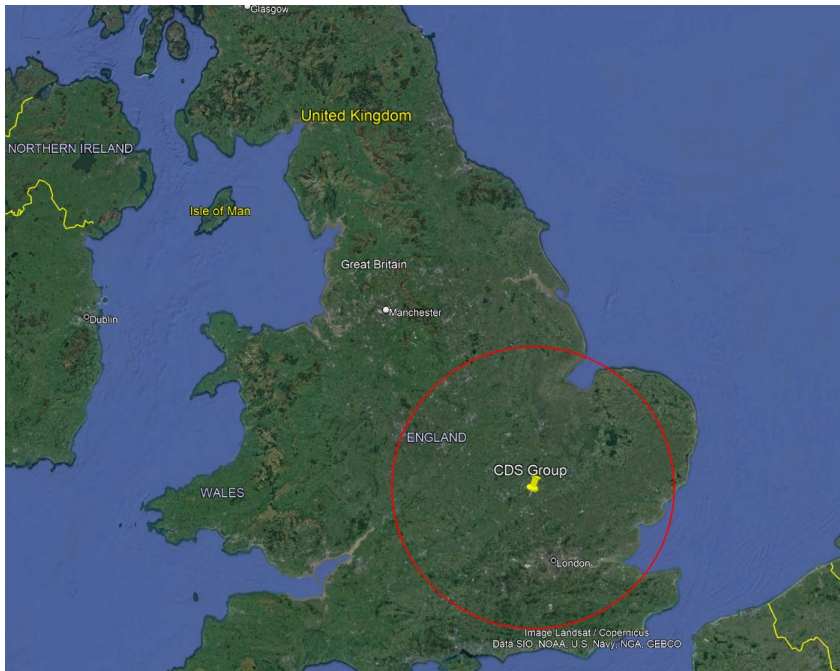
bioLPG feedstocks



Cooking oil, indigenous biomass, vegetable oil, waste, plant dry matter, sugar and starch.

BioLPG Cremation

7.5 billion litres of diesel are used by trucks in the UK every year
= 6,437,435 tonnes of Bio-diesel
= 4,740,379 hectares (All of UK arable production)



BioLPG, as a singular fuel source is unfeasible on a national scale due to land supply. This can result in offsetting to other poorer countries for production and bio-diversity destruction.





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Technology X

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Technology X



The background of the slide features a soft-focus photograph of green foliage. In the center-right, a white butterfly with delicate wing patterns is visible, perched on a leaf. The overall color palette is a range of greens, from deep forest green to bright, sunny yellow-green.

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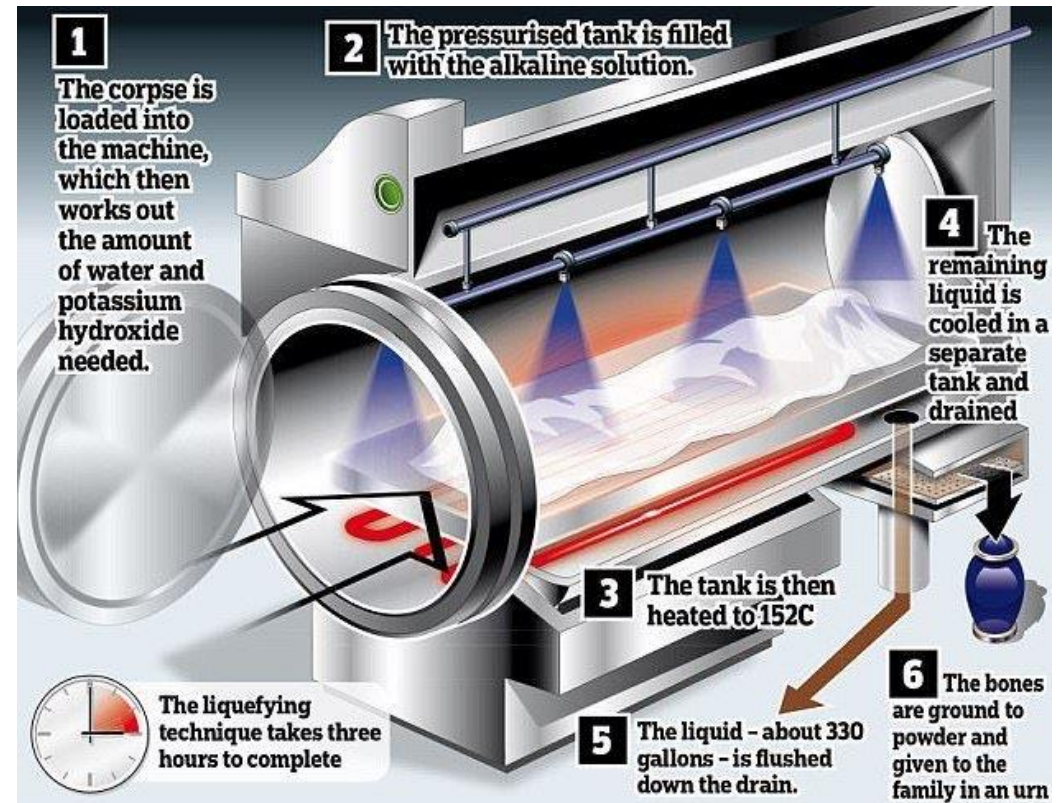
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Resomation

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Resomation

Variable	Result
Capital Cost (Average)	A single system cost is - £350k , a dual system cost is £550k
Maintenance Costs (Average)	Unknown
Lifetime	Unknown
Cremation Time	3-3.5 hours (180-210 minutes)
Lead times from purchase	Unknown
Manufacturers	Resomation, Aquamation
Process	The process uses 1200 litres per cycle
Installation Experience	Currently only operating in the USA commercially



Cremation - Using tools and technology to reduce carbon

Emissions*

Cremation Activity	Carbon	NOx
Natural Gas	Red	Light Red
Bio-LPG	Green to Red Gradient	Red
Green Energy Electric	Yellow	Yellow
Resomation	Green to Red Gradient	Green to Red Gradient
NewCremTech?	Yellow	Yellow

*Excludes Life Cycle Analysis

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Technology and tools to
achieve carbon net zero
targets (BURIAL)

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Burial - Technology and tools to achieve carbon net zero targets

Great things are happening!

Design

- Low carbon and recycled materials for construction
- Greater emphasis on bio-diversity not all about maximising burials
- Increase in carbon sequestration planting
 - Specialist grasses (Carbon Grass) and trees

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Burial - Technology and tools to achieve carbon net zero targets

CHIPBOARD/MDF COFFINS

Assuming most coffins are constructed from Chipboard/MDF:

42,000m²

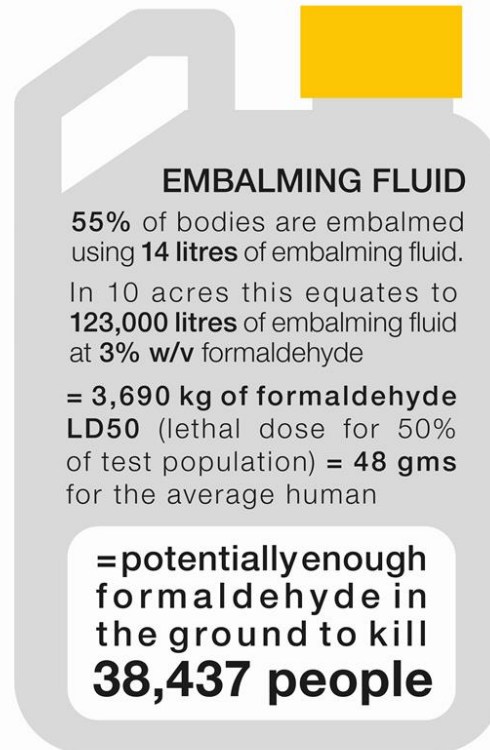
of Chipboard/MDF would be used in a 10 acre cemetery

**= that's
four rugby
pitches**

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Burial - Technology and tools to achieve carbon net zero targets



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Burial - Technology and tools to achieve carbon net zero targets

Discover what's beneath.

BLACK
GRANITE
IMPORTED
HEADSTONES

680 tonnes
of granite headstones
in 10 acres

=

282 tonnes
of carbon

=

2,311,475
carbon kilometres for
an average family car



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Burial - Technology and tools to achieve carbon net zero targets

NITROGEN IN THE BODY

Approx **2 kg** per body
assume 16,000
burials in 10 acres =
32 tonnes of nitrogen =
sufficient to fertilise
392 acres of wheat



Burial - Technology and tools to achieve carbon net zero targets

Great things are happening!

Coffins

- UK produced wood for coffins to replace chipboard
- Cardboard coffins
- Natural Products – Willow, mycelium, woollen

Burial - Technology and tools to achieve carbon net zero targets

Great things are happening!

Memorials

- Local stone not imported granite
- Recycled glass
- Wooden memorials





**YOUR WORLD
YOUR FUTURE
YOUR CHILDREN
YOUR CHOICE**



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THANK YOU

Part of the CDS Group