

Public Sector Building Decarbonisation

Crematoria Decarbonisation

Best Practice Guide

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This report has been published by the **North West Net Zero Hub** with funding from the department of **Department for Energy Security and Net Zero**.

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Contact the NW Net Zero Hub for advice and support via the Hub mailbox at NWNZHub@liverpoolcityregion-ca.gov.uk or get in touch via our [web pages](#).

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Introduction

The NW Net Zero Hub provided support to the Lancashire Councils to assess the options for the crematoriums in the region and develop a strategy for transition to low carbon operation. This study involved sites from across Lancashire and provided a background for this guide.

Background

Crematoria are generally one of the single largest carbon emitters in a Local Authority estate and would generally be fuelled by gas burners providing the primary means of operation.

The options for change are currently limited with electric cremators the most direct replacement available from a list of opportunities available at each site;

- Electric Cremators
- Hybrid Cremators
- Bio-LPG Cremators
- Hydrogen fuelled Cremators
- Microwave Cremation
- Alternative methods

Provision of equipment and access to fuel supplies are challenging for all of the choices and it is important to plan well in advance of any change as infrastructure will be needed to be arranged on all of the options.

It is essential to note that switching from natural gas cremators will have an impact on the operation of any site in terms of the process period and organisational arrangements for the use, there may be significant differences in the time period to get the units ready (warm-up) and the heat retention within the devices. Careful consideration is required across the whole process as well as the building and any physical restrictions to accommodate the alternative cremators.

New cremators will still have regulatory requirements for Abatement and NOx and should have these elements included within any site design.

Electric cremators have been the most regularly used alternative and availability of new models is a growth sector in the industry along with innovation to improve efficiency and practical use of the units. Microwave technology is emerging as an alternative and could be more efficient than traditional electric units, these are light-weight units and may allow a quicker cycle than standard electrical units.

Hybrid options may operate on natural gas and electricity, incorporating the elements of both within a single unit and allowing the operator to switch between or combine the sources of heat to gain efficiencies in emissions.

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Bio-LPG or Bio-Gas might seem like a more direct replacement for the natural gas cremators, but the operation and infrastructure will be significantly different for each and large storage tanks are likely to be required on site. The supply of Bio-LPG is limited and will not be widely available.

Hydrogen Gas is a clean alternative for natural gas, but efficiency in manufacture drives the use to larger consumption and volume to be competitive. There are presently no manufacturers offering hydrogen powered units although there are associated trials being carried out on the process it is unlikely to be an option in the near term.

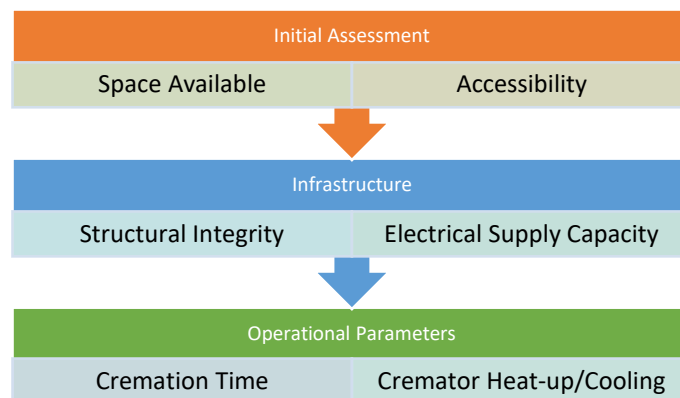
Decarbonisation therefore will be led by the change to electric cremators and this guide is intended to review the steps required to move to that technology.

Site Considerations

There are a number of vital site considerations necessary when considering a change to provision of electric cremators;

- Space requirements and accessibility
- Building Structure
- Electrical infrastructure
- Operating parameters

Cremators are not of a common footprint or access arrangement, there are some that have a single door and others that have an opening at both sides, units can be twinned in a larger external casing and there needs to be clear and safe operating capacity around the units.



The initial planning step should be to consult with a manufacturer to determine the space requirements in the compartment that it is proposed to install the new cremators. Most suppliers will be able to provide a detailed outline of the units that they supply to allow an overlay of the provision so that not only the main unit space can be reviewed, but all other requirements for associated plant needs to be checked. There must be room for

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ventilation, heat recovery, abatement and other provisions as well as a clear buffer for movement and safe maintenance.

The building height will be a factor here as cremator units can have a large amount of plant located above the unit and this can be vital in deciding which manufacturer to select.

It is essential to know building structure as there is a large variance between models and technology (21-25Tonnes). A structural survey would be a preparatory step to consider switching to electric cremators.

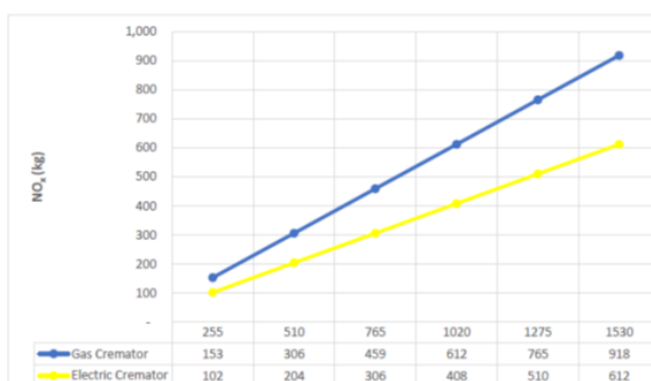
The electrical infrastructure will require revision to accommodate the additional supply requirements of the cremator as this is substantial (up to 600A/400v ac.). It is essential to contact the supply authority to determine the capacity at the site and establish what (if any) upgrading is required for the switch to electric units. This can be a substantial cost and time consideration for a replacement and it is essential to be aware of the impact.

The operational parameters of electric cremators differ from that of natural gas units in several ways and it is essential that consideration is given to the cremation time and the period of pre-heat and cooling.

Cremator Benefits

Making the change to electric cremators is intended to provide savings in emissions to the atmosphere and have a long-term benefit to the climate. Electric cremators will have significantly lower carbon emissions than the natural gas units and there is also benefit from reduced NO_x gasses which also benefits the greenhouse as reductions.

Cremations per day	Gas Cremator CO ₂ /Cremation (Natural gas cremation)	Electric Cremator CO ₂ per cremation (Grid electricity)	Electric Cremator CO ₂ per cremation (Green electricity tariff)
1	268kg	111kg	0kg
2	151kg	50kg	0kg
3	113kg	28kg	0kg
4	96kg	19kg	0kg
5	85kg	14kg	0kg
6	71kg	11kg	0kg



It should be noted that NO_x emissions vary with temperature and the window between ~920-1100°C is where there is optimised performance from the cremator.

Cost

Electric cremators are now available from a range of manufacturers in different designs and configurations, the table below sets out a sample of types that can be obtained as replacements for natural gas units.

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All information provided by Cremator Manufacturers (Jan 2024)	Redacted – Subject to NDA	DFW Electric Cremator	IFZW Electric Cremator	Crematech Electric Cremator	FT Hybrid Cremator
HQ/ Factory Location	NDA	Alkmaar - Netherlands	HQ - Zwickau – Germany	Gorinchem - Netherlands	Leeds - UK
Maintenance Contractor	NDA	Subcontracted to Combustion Solutions	IFZW	To be Confirmed	FT
Capital Cost per Cremator (£) exc VAT (£: £ Jan 2024)	NDA	Single End: £778,000 Double End: £806,000	£900,000 - £1,000,000 (Newer Model)	£640,000 - £650,000	£667,500
Modular Installation	Yes	No	Yes	No	Yes
Average Time Taken for a Single Cremation	90 minutes	110 minutes	90 to 120 (105) minutes	120 minutes	120 minutes
Weight of Cremator (kg)	15,500	21,000	25,000	22,000	Unconfirmed
Peak Electrical Load	NDA	3 x 200A (400V)	3 x 160A (100KW)	3 x 160A	150A
Dimensions of a Cremator (m²)	NDA	Single End is 4285 (L) x 2480 (W) x 3300 (H)	80-110 m²	10.2m x 7m	Same footprint as FT III and FTG
Estimated Timescales for Delivery (as of Jan 2024)	NDA	9 to 12 months from order	6 months	9 months from order	4 to 5 months
UK Case Study	NDA	Yes	No	No	Unknown

The final selection for the site will be dependant on a number of factors and the information provided is intended to be a guideline only for initial stage consideration.

Further Advice and Help

The Net Zero Hubs can provide advice and support to organisations considering the change from natural gas to electric crematoria. A number of specialist consultants can be contacted for detailed advice and APSE offer support to its members on crematoria.

References

The information that informed this guide was derived from a study carried out by the NW Net Zero Hub on behalf of Lancashire region Local Authorities and completed by CDS Group, Bedfordshire.

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