Stop, Sort, Burn, Bury?

Independent Review of the Role of Incineration in the Waste Hierarchy in Scotland

Evidence Document

April 2022

Contents

1 Introduction

1.1 This Document

This document is a supporting document to the report of the Review of the Role of Incineration in the Waste Hierarchy. It should be read in conjunction with the Review Report. The purpose of this document is to outline the evidence received and considered by the Review. The evidence itself is not repeated here and can be found in the contributions the Review.

1.2 Stakeholder Engagement

At the outset, Dr Colin Church, Independent Chair of the Review, outlined his intention to ensure all stakeholders would have the opportunity to contribute their evidence and their views. Stakeholders had the opportunity to do this through the written Call for Evidence (the Call), stakeholder events, roundtable meetings, separate meetings with Dr Church and by emailing the Review mailbox.

The Call opened on 17 December 2021 and closed on 21 February 2022. The full Call document[1], which invited written submissions to the Review, briefly outlined evidence the Review was already aware of in relation to key topics, including a draft waste management capacity analysis conducted by Ricardo on behalf of ClimateXChange[2]. The Call invited stakeholders to respond to this evidence, including by providing further information on the accuracy of the evidence and modelling, assumptions, giving their views on which waste management options Scotland should consider in the future, and providing any evidence they held on the relevant topics.

Stakeholders were able to submit their response to the written Call through CitizenSpace or by email. Paper copies and alternative formats of the documents were made available free of charge which could then be used to return physical copies. Responses were also received and accepted which did not follow the format of the questions provided in the Call document.

Alongside the Call, stakeholders had the opportunity to contribute their evidence and views during three stakeholder online events which took place during January 2022. These events were attended by over 70 stakeholders, including representatives from community groups, environmental groups, individuals with an interest in incineration and waste management, industry and local authorities. More detail on those discussions is in Section 2.

Following the stakeholder events, a series of virtual Roundtable meetings were held. These were held on an invitation only basis and focused on specific groups, allowing

[1] The full Call for Evidence document is available at: https://www.gov.scot/publications/call-evidence-review-role-incineration-waste-hierarchy/
[2] Now published as Implementing Scotland's landfill ban, available at: https://www.climatexchange.org.uk/research/projects/implementing-scotlands-landfill-ban/

the Chair and Review team to discuss the issues surrounding the Review with stakeholders in more detail and ask further questions. The meetings held were with:

- Industry and trade bodies
- Local authorities
- Non-governmental organisations (NGOs) and community groups
- Other experts (including SEPA, Zero Waste Scotland and CIWM).

Stakeholders were also given the opportunity to arrange individual meetings and calls with the Chair of the Review, which several chose to do.

While the majority of stakeholder engagement had to take place virtually, as it became viable and safe, the Chair took the opportunity to meet some stakeholders in person. In March 2022, the Chair visited Millerhill Energy Recovery Facility and Levenseat sites and met with representatives from Dovesdale Action Group and Friends of the Earth Scotland.

1.3 Friends Of The Earth Email Campaign

Between the 8th December 2021 and the 21st February 2022, the Review received over 1000 emails through an email campaign organised by Friends of the Earth. The Review considered these emails, both in terms of the evidence they provided and evidence of the level of interest and strength of feeling regarding the issue of Incineration.

While there was some variation within individual responses, the majority used the following statement:

> "I am responding to the call for evidence from the Scottish incineration review because I am concerned about rapid rise of incineration of waste in Scotland.
>
> A permanent ban on new incinerators, including those already at the application stage is needed. Scotland already has too many incinerators: we should be reducing and recycling our waste, not burning it.
>
> The quickest and simplest way to reduce emissions from incineration would be to ban the burning of plastic waste. 99% of plastic is made from fossil fuels so burning it releases greenhouse gases directly into the atmosphere, contributing to climate change. This is incompatible with Scotland's net zero targets.
>
> Technology-based solutions, like carbon capture and storage, over promise and under-deliver. Tax payer money should not be spent on expensive solutions which will save small amounts of carbon. Instead we should be investing in reuse and recycling solutions which keep valuable materials cycling round our economy.

> As the Chair of the Scottish incineration review, please use this opportunity to create an exit strategy from incineration for Scotland."[3]

1.4 Review Publications

There are currently five elements to the Review's outputs:

- Call for Evidence, December 2022 – This invited stakeholders to provide comments on initial analysis from ClimateXChange (CXC) and evidence on a range of questions relating to the Review.[4]
- Review Report, submitted April 2022 – This document outlines the key considerations of the review and the recommendations the Review is making.
- A summary of the main recommendations of the Review to date (to follow).
- Evidence Report, submitted April 2022 – This report summarises the evidence considered by the Review, including responses to the Call and further evidence.
- Call for Evidence responses – As far as possible, the Review has published in full the responses received to the Call. Further information on the publication of responses can be found in the next section.

[3] Friends of the Earth Scotland Email Campaign Template. (2021) Previously available on Friends of the Earth Scotland Website: https://foe.scot/
[4] *Call for Evidence.* Review of Incineration. (2021). Available at: https://consult.gov.scot/environment-forestry/incineration-review-call-for-evidence/

2 Summary Of Stakeholder Event Feedback

There were several times and options available for the three stakeholder events, including lunchtime and evening slots, to allow as wide a range of stakeholders to participate as possible and ensure that those who held an interest in incineration while having other commitments during the regular working day would be able to participate.

The Review initially considered holding these events both in person and virtually to allow for wider participation and asked stakeholders to register interest to help us to understand demand. Unfortunately, due to Covid-19, it was not possible to hold any of the events in person, and instead all the events were held online, via MS Teams. There was also an opportunity to participate by telephone for anyone who did not have access to MS Teams.

The events were run in two sessions. Session one consisted of:

- An introduction to the Review by Dr Colin Church.
- A presentation on the ClimateXChange capacity analysis, led by Ricardo Environment and Energy.
- Discussion: how much capacity to manage biodegradable municipal waste do we need?
- Discussion: Where should capacity be located?

Session two consisted of:

- A presentation on the Options for Waste Disposal led by the Chartered Institution of Wastes Management (CIWM).
- A presentation on the Evidence on Impacts of Each Option, led by Albion Environmental.
- Discussion: What are the environmental, social, economic and health trade-offs of each option for waste management?

One event ran in a single block; the other two ran split at lunchtime and early evening.

The discussion in each event followed broadly the same lines. Stakeholders raised a number of considerations for the Review. The majority of these were also raised within written responses. Many stakeholders posed questions to representatives from Ricardo to better understand the modelling presented in the Call, as well as indicating areas for improvement within the Review's modelling.

Below is a list of some key points raised as part of these discussions. This list is not exhaustive nor a qualitative judgement of these points, and these points are not listed in any particular order. There are differing views among stakeholders and that was reflected in the stakeholder events.

Stakeholders raised the following points regarding capacity requirements:

- The market would not fund overcapacity, which would limit this risk.
- There is a need to consider why waste ends up in residual streams and a need to consider waste prevention and recycling in modelling.

- The waste within the waste streams should be considered – for example removing plastic from waste streams.
- The Review should consider the likelihood of Scotland achieving its recycling targets when assessing the capacity gap.
- The need for flexibility in capacity requirements should be considered.

Stakeholders raised the following points regarding the location of capacity:

- It is too late to consider location as the majority of capacity has already been built. Opportunities have been missed in this area.
- Transport mileage should be considered as a factor for location – how far is the facility from the waste and how far would waste travel to get to alternative facilities?
- Transport issues in rural areas need to be considered for all waste types, as it is a particular challenge.
- The 'out-of-sight, out-of-mind' approach which may have been preferable for landfill will not work for EfW facilities, which need to be located near the areas they would supply with heat.
- The Review should not consider the location of new incineration facilities, but instead should consider which should be closed down first.
- Location needs to be considered more strategically on a national level.
- The risk of contamination to local livestock and produce needs to be considered.
- Scottish Government should leave it to local planning processes to decide where infrastructure should go and remain technology neutral.
- There should be stricter guidance from Scottish Government for Local Authorities when it comes to decisions around waste infrastructure.

Stakeholders raised the following points regarding the Environmental, social, economic and health trade-offs,

- The planning system could be difficult to engage with for community stakeholders.
- Electrical energy from incineration is easily connected to the grid
- There are examples of heat networks and district heating that function very well.
- There is a need to be careful about sources of heat in the future as lifespan of housing is longer than that of an incineration plant.
- There is a discrepancy between the promised benefits to local communities in terms of energy offtake and the reality.
- The transport mileage for alternatives to incineration is significant and should be given consideration under carbon impacts for the alternatives.
- Traffic itself could also cause problems where drivers are not taking the approved route.
- The whole life impacts of products should be considered when choosing an end of life management.
- Perception of incinerator near other industries might deter potential buyers which would have economic consequences, e.g. milk from dairy farms locating close to incinerators.

- There are links between incineration and health issues.
- There is a potential psychological impact of living close to an incinerator is a concern even if no actual pollution is seen.
- Incineration has the potential to hinder circular economy and recycling.
- Incinerators can be a nuisance to communities through odour, vermin, light pollution, or visual impact.

3 Call For Evidence Responses

The following is a summary of evidence received, both in written and verbal formats, as part of the Call for Evidence for the Review. Where a number of responses is cited, this refers to the number of full written responses which addressed the issue. In addition, issues raised in verbal evidence (including from the stakeholder events) have also been incorporated as appropriate.

The Review received 57 separate responses to the Call, and over 1000 campaign emails as part of a mailing campaign run by Friends of the Earth Scotland responding to the announcement of the Review (see section 1.3). All were considered by the Review.

Of those who responded, these were the main categories:

- Environmental group – 4
- Individual – 9
- Local government – 11
- Not for profit environmental organisation – 7
- Other business – 11
- Professional body, trade organisation or governing body – 10
- Waste management operators - 5

The Review has published as much of the evidence submitted to the Review as possible[5]. On occasion, evidence or elements of evidence was not published. This occurred where the respondent had indicated this as their preference or where the Review was unable to confirm that the respondent was content that their response would be published.

The summaries below are intended as an outline of key issues raised by stakeholders and not an exhaustive list of every point made, nor a judgement of the quality or accuracy of the statements included. Responses were read in full and considered carefully by the Review secretariat and Chair.

The evidence received is organised according to the questions posed in the Call. Additional evidence is presented under the question to which the Review considered it best related. The first six questions of the written Call related to personal information, data protection and publication and as such these have not been summarised below.

This report uses a common terminology to indicate the proportion of responses that held a particular view:

- One – one
- A few – up to 25%
- Several – 26-49%
- Half – 50%
- Most – 49-75%
- Majority – 76-99%
- All – 100%

[5]Evidence submitted to the Review of Incineration. Available at: Incineration in the waste hierarchy review: call for evidence - Scottish Government - Citizen Space (consult.gov.scot)

3.1 Capacity To Manage Residual Waste In Scotland

Given Scotland's ambitions and current progress towards these, what capacity is required to manage residual waste in Scotland?

Question 7:
"How much capacity do you think we need to build given the current waste produced, managed and disposed of in Scotland, as well as Scotland's waste and recycling targets? What evidence do you have to support this?"

The Review received 40 written responses regarding this question.

Views regarding Scotland's capacity requirements varied, and included:

- Scotland already has sufficient capacity and should focus on other ways to reach waste targets.
- There might be additional capacity needed, where practicable and appropriately placed.
- The evidence available is incomplete and in need of refinement.

Several responses stated that Scotland has sufficient capacity already, when taking account of operational facilities as well as those in the pipeline (that is, facilities that are in construction, are fully consented or have planning permission). Some responses, predominantly amongst those from NGOs, stated that there is sufficient capacity even without including the pipeline. A few responses noted that Scotland is already on its way to achieving over-capacity, stating that this will become an issue from 2026 onwards (2023 if targets are achieved), and a few of those called for a moratorium on new capacity. Many responses also stated that the focus should be on reaching waste targets in other ways, rather than increasing incineration capacity.

Several responses provided the Review with their own capacity analysis. Some of these are summarised in

Table *1*.

Facility name	Operational or pipeline?	Permitted capacity/t	Modelled Capacity/t	Stakeholder Capacities/t		
				RMAS	SESA	UKWIN
DERL (MVV Baldovie)	Operational	150,500	91,500	88,000	85,500	n/a
Dunbar ERF	Operational	325,000	300,000	280,000	285,000	387,770
Dundee ERF	Operational	110,000	110,000	110,000	99,750	286,450
Lerwick EfW	Operational	26,000	23,000	25,000	24,700	23,749
Millerhill	Operational	189,500	155,000	160,000	147,250	204,000
GRREC	Operational	200,000	120,000	130,000	142,500	149,000
Levenseat	Operational	250,000	110,000	110,000	164,500	109,650
Eco Deco Dumfries	Operational	70,000	15,300	n/a	21,000	70,000
Dalinlongart Compost	Operational	20,515	10,000	n/a	3,000	10,000
Moleigh, Kilmore	Operational	24,999	10,000	n/a	3,000	10,000
Lingerton Compost	Operational	36,500	10,000	n/a	3,000	10,000
Earls Gate Energy Centre	Pipeline – In Construction	236,500	201,025	205,000	194,750	260,300
Aberdeen Recycling & Energy Recovery (NESS)	Pipeline – In Construction	150,000	127,500	150,000	135,850	142,500
Westfield EfW	Pipeline – In Construction	250,000	212,500	250,000	228,000	260,300
Oldhall EfW (Dover Yard)	Pipeline – Fully Consented	180,000	153,000	180,000	176,225	237,500
South Clyde EfW (Fortum)	Pipeline – Fully Consented	352,000	299,200	352,000	n/a	318,750
Drumgray ERC (FCC)	Pipeline – Fully Consented	300,000	255,000	300,000	n/a	260,300
Glenfarg EfW (Binn Group)	Pipeline – Planning Granted	84,000	71,400	84,000	n/a	171,000
Inverurie (Agile Energy Recovery)	Pipeline – Planning Granted	200,000	170,000	200,000	n/a	142,500
Levenseat 2	Pipeline – Planning Granted	315,000	267,750	300,000	n/a	n/a
Killoch Energy Recovery Park	Pipeline – Proposed	166,000	141,100	166,000	n/a	n/a

Table 1 - Operational and Pipeline Incineration Facilities in Scotland and capacity estimates as provided in responses to Call for Evidence

Facility name	Operational or pipeline?	Permitted capacity/t	Modelled Capacity/t	Stakeholder Capacities/t		
				RMAS	SESA	UKWIN
DERL (MVV Baldovie)	Operational	150,500	91,500	88,000	85,500	n/a
Dunbar ERF	Operational	325,000	300,000	280,000	285,000	387,770
Dundee ERF	Operational	110,000	110,000	110,000	99,750	286,450
Lerwick EfW	Operational	26,000	23,000	25,000	24,700	23,749
Millerhill	Operational	189,500	155,000	160,000	147,250	204,000
GRREC	Operational	200,000	120,000	130,000	142,500	149,000
Levenseat	Operational	250,000	110,000	110,000	164,500	109,650
Eco Deco Dumfries	Operational	70,000	15,300	n/a	21,000	70,000
Dalinlongart Compost	Operational	20,515	10,000	n/a	3,000	10,000
Moleigh, Kilmore	Operational	24,999	10,000	n/a	3,000	10,000
Lingerton Compost	Operational	36,500	10,000	n/a	3,000	10,000
Earls Gate Energy Centre	Pipeline – In Construction	236,500	201,025	205,000	194,750	260,300
Aberdeen Recycling & Energy Recovery (NESS)	Pipeline – In Construction	150,000	127,500	150,000	135,850	142,500
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Oldhall EfW (Dover Yard)	Pipeline – Fully Consented	180,000	153,000	180,000	176,225	237,500
South Clyde EfW (Fortum)	Pipeline – Fully Consented	352,000	299,200	352,000	n/a	318,750
Drumgray ERC (FCC)	Pipeline – Fully Consented	300,000	255,000	300,000	n/a	260,300
Glenfarg EfW (Binn Group)	Pipeline – Planning Granted	84,000	71,400	84,000	n/a	171,000
Inverurie (Agile Energy Recovery)	Pipeline – Planning Granted	200,000	170,000	200,000	n/a	142,500
Levenseat 2	Pipeline – Planning Granted	315,000	267,750	300,000	n/a	n/a
Killoch Energy Recovery Park	Pipeline – Proposed	166,000	141,100	166,000	n/a	n/a

Several responses focused on the need to follow the waste hierarchy and circular economy principles and improve the performance of upstream activities focused on preventing waste and promoting reuse and recycling, and thus ensure better use of current capacity rather than building new. A few elaborated on this to say that there is need for new infrastructure but that this should be sorting and recycling rather than incineration infrastructure. A few responses expressed concern that incineration is not compatible with the principles of a circular economy. Additionally, a few responses noted that only incinerating unrecyclable residual waste should free up more incineration capacity. Some also pointed to the fact that high recycling rates and incineration of residual wastes are not mutually exclusive and provided examples of how this works in other countries. One response provided examples of how other countries tackled over-capacity, was this to occur, by importing wastes rather than accepting recyclables. One response suggested that the current drive for more incineration infrastructure was based more on financial profit than need.

A few responses argued that there is or may be a need for more capacity and recognised a capacity gap, along similar lines as presented by the call of evidence. They often cited the fact that the landfill related targets are not likely to be achieved by recycling alone, and not all waste can be segregated economically. A few responses noted that the move away from landfill will require more incineration capacity, with one response suggesting that incineration will actually lead to increased circularity. One response stated that existing capacity analysis presented in the Call falsely suggested that there is sufficient residual waste capacity, while another expressed a concern that the analysis presented to date uses cherry picked data to promote preconceived ideas about capacity requirements. They added that this could lull policy makers into a false sense of security that Scotland has sufficient residual waste treatment capacity to meet its waste policy objectives. A few responses argued that there might be a need for some additional capacity but only if it is meeting needs of rural and difficult to reach communities, and so is appropriately placed and practical.

Several responses did not lean either way but instead stated that the evidence available is incomplete and should be further refined. Examples of issues that respondents raised in relation to previous and required analysis included:

- RDF exports currently and for the future are uncertain thisshould be accounted for in the analysis, and there is a need to go beyond RDF and consider other solid recovered fuels.
- Satisfactory analysis has not been done for a scenario where targets are not achieved.
- There is need for analysis of residual waste composition.
- Modelling needs to look beyond 2025.
- There is concern that for some sites in particular, the current data represented capacity rather than throughput.

Question 8:
"It is suggested that the development of incineration capacity could lead to a 'lock-in' effect which will prevent waste from moving further up the hierarchy to be reused or recycled. What evidence do you have about these valid concerns? How do we prevent this lock-in effect, if it is a real risk?"

The Review received 37 written responses regarding the risk of 'lock-in' effect and how it could be prevented.

Views varied strongly on this question, and could be summarised as:

- Lock-in is a real risk and some local authorities in Scotland have already been locked in.
- Lock-in is not a risk, as it can be easily prevented and avoided.

Most responses in relation to the lock-in effect stated that it is a real risk. Several of these however noted that it can be prevented and suggested some ways of doing so which are listed below. Several responses stated that long term contracts and minimum tonnage clauses reduce the incentive to recycle or reuse. One response mentioned an example of the Millerhill Recycling and Energy Recovery Centre in Edinburgh, suggesting that since the plant has been commissioned, the recycling rates in Edinburgh have stalled. A few responses expressed concern that some local authorities might already be locked-in and provided some information.

Other reasons stated for why lock-in may be a real risk included:

- Market value is likely to be a determining factor for contracts and so lock-in might be a risk for larger assets.
- There is a limited opportunity for operational change during contract periods.
- Local authorities need access to capacity at a known cost as incineration is not flexible.
- Evidence from other countries shows lock-in is possible, however that the risk could be limited by a moratorium.

On the other hand, several responses stated that there was no evidence that the risk of lock-in has materialised in Scotland, the UK or the EU. One stated that there should be no risk of lock-in as guaranteed minimum tonnages (GMT) need to be set at the right level to allow for recycling and reduction. A few other responses, in particular from industry and local authority respondents, stated that the risk is dependent on contract negotiations and can be addressed through procurement processes. A few responses stated that market and economic reasons ensure that incineration and recycling are complementary rather than competing and provided examples where high recycling and incineration have existed alongside each other. One response also pointed out that not everything can be recycled and that where this is the case, incineration should be used to release energy back to society.

Several responses provided ways of how lock-in can be avoided. These included:

- Avoiding lock-in through agreement on acceptable guaranteed minimum tonnages.
- Following the waste hierarchy.
- Incentives to prevent waste.

- Providing an exit strategy from incineration for local authorities.
- Waste processing and recycling contracts being shortened to medium term.

One response noted that there are several legal safeguards introduced in Scotland to prevent lock-in, for example,. Environment Protection Act and Deposit Return Scheme.

A few responses also stated that there was no direct experience with lock-in and that there is more evidence needed to make an informed decision on whether it is a risk and how it could be prevented. A few responses noted that to avoid lock-in, market testing is carried out prior to undertaking any decisions surrounding commissioning of an incineration plant to ensure that there is demand as well as constant supply of waste available to keep the plant operational, without which incineration plants would not reach financial close.

Question 9:

"Are you aware of any evidence or data that could be used to improve the capacity analysis? It would be particularly helpful if you could provide us with data on:

- HH and C&I waste composition.
- C&I waste arisings, recycling and treatment.
- The potential developments of future RDF export markets.
- Composition and biodegradability of sorting residues from HH, C&I and C&D waste."

The Review received 36 written responses which suggested or provided additional specific pieces of evidence and data to consider. Most responses to this question provided suggestions of what data should be obtained to improve the capacity analysis. These suggestions included:

- Detailed waste composition analysis from local authorities.
- Expanding analysis beyond 2025 and incorporating a scenario for banning all biodegradable waste rather than just municipal.
- Waste reduction considerations, as well as analysis of impact of Extended Producer Responsibility (EPR) requirements and the Deposit Return Scheme (DRS).
- RDF and export data.

Some responses provided data themselves or other figures that could be used alongside their suggestions. The types of data the Review received included:

- Additional data for incineration capacities for Scottish plants.
- Data based on experience.
- Examples from other countries to show that incineration does not prevent recycling.
- Examples of how overcapacity has already been achieved.
- Modelling of capacity done by other organisations, e.g. SESA, SEPA (see Question 7).
- RDF export data suggesting that the capacity for these has been overstated in the initial analysis, as well as potential developments for RDF in the future.
- Results of Net Zero Innovation Competitions run by BEIS.

- Waste composition analysis, e.g. WRAP 2020 report as a broadly representative source.

One response expressed concern that figures that have been provided by waste management companies may be biased as a result of their commercial interests.

3.2 Residual Waste Management Options

What are the options for managing residual waste?

Question 10:
"What treatment options for residual waste should Scotland consider?"

The Review received 51 written responses regarding the alternative treatment options for residual waste that Scotland should consider.

The responses suggested a variety of options, and many provided comparison or reasoning behind these. The most suggested options were (ordered by number of mentions):

1. Incineration (including Energy from Waste).
2. Mechanical Biological Treatment (MBT).
3. Landfill.
4. Focus on segregation of recyclable, repairable and reusable materials at source.

A number of other options were suggested, including:

- Anaerobic digestion
- Bio-stabilisation
- Carbon capture and storage in relation to different waste treatments
- Combustion with front end recycling and separation technologies
- Gasification
- Hydrothermal Carbonisation
- Mixed waste hot enzyme wash out of organics
- Pyrolysis
- RDF export
- Solid Recovered Fuel (SRF)
- Tax adjustment.

In relation to incineration, several responses stated that it is above landfill in the waste hierarchy, is less carbon intensive and is a source of fewer emissions. One response stated that incineration is seen as a way to contribute to net zero and would be favoured by customers. A few responses also stated that incineration is proven to be a reliable and bankable technology, with one response stressing that there is no resilient alternative to incineration in relation to the management of residual waste. A few responses argued that while it is the only technology that can handle bulk, heterogeneous, mixed residual waste, it should be used for residual waste only. One response stated that only existing incineration plants should be used for the incineration of residual waste. A few responses also stated that the solution is dependent on location as commercial facilities within a reasonable geographical range are seen as the principal practical solution. One response also

suggested that a network of incineration plants providing power for plastic reprocessing plants should be an option.

On the other hand, several responses did not see incineration as the appropriate solution for residual waste. One response flagged concern for national green belt areas and stressed that any new facility application should include baseline analysis of the impact on soil, water, air and livestock within the proposed area affected. A few responses pointed out that incineration may undermine recycling as a waste management option and thus should not be seen as a transitional solution, using the example of recycling data in Edinburgh where it was suggested recycling rates decreased as incineration increased. One response also stated that incineration is unable to meet its energy efficiency promises, while another suggested that there is still a need to show that incineration is safer and more cost effective in energy generation than the alternatives when looking at the whole process.

In relation to MBT, the majority of responses expressed concern that it is not a viable option for management of residual waste, noting that it is unlikely to allow Scotland to successfully implement the landfill ban. Some responses stated that industry appetite is low as sites across the UK continue to close, with one response giving landfill tax as a reason for this. One response stated that MBT is unlikely to be compatible with targets for separate food waste collection, while another pointed out that MBT treatment requires another end-of-life solution. On the other hand, one response argued that all facilities should front end their treatment with MBT.

Another option mentioned by several responses was landfill. While most responses that mentioned landfill note that it is at the bottom of the waste hierarchy, has the highest carbon impact for biodegradable waste, and should be considered as a last option, some responses pointed out that it is an important option for resilience planning or as a disposal mechanism until longer term measures can come into place.

Several responses also acknowledged the need to focus on better segregation of recyclable, repairable and reusable materials according to the waste hierarchy and circular economy principles, adding that this should be done systematically with upstream interventions, specifically:

- Removal of plastic from residual waste for recycling.
- Mechanical pre-treatment.
- Food waste separation and composting.
- Removal of metal and inert materials.

Question 11:
“What emerging technologies are there for small scale residual waste treatment to support remote and island communities?”

The Review received 15 responses regarding small scale residual treatment options to support remote and island communities.

The examples included:

- Anaerobic digestion.

- Baling residual waste in island and rural communities for onward transport for treatment/incineration.
- Encouraging repair, upcycling, exchange and community composting.
- Hydrothermal carbonisation.
- In vessel composting.
- Low cost MBT with residual waste sent to incineration.
- Mobile recycling solution.
- Multi-waste feedstock treatment centre.
- Small scale CHP district heating.
- Small scale hydrogen technology.
- Small scale incineration, with the Gremista plant in the Shetland Isles provided as an example.
- Using biostabilisation.
- Using waste as resource for local businesses, for example paper mills/smelters.

A few responses stated that the main issue in relation to island and rural communities is the economy of scale and the fact that small-scale local solutions are often more expensive.

Another response stated that transporting waste to incineration on the mainland is not a viable option for island communities due to transport costs, unavailability of space on ferries to carry waste, and no availability of incineration facilities with port access, so there would always be additional costs and emissions associated with further transport.

Question 12:
"What data can you share with the Review on the costs of operating any options for managing residual waste in Scotland, especially costs based on real experience?"

The Review received 16 written responses regarding the costs of operating any options for managing residual waste in Scotland.

Several responses stated that publicly available data from Letsrecycle and WRAP is broadly representative. The Review also received more detailed data in relation to:

- Costs of incineration.
- Cost of landfills.
- Cost of transfer and transport.
- Cost when sharing operating costs for an MBT plant.
- Gate fee costs in relation to different management options.
- Import and export costs of RDF and SRF
- Tax costs.

The additional data submitted was generally marked as confidential. The Review was able to use it for its analysis but is not able to publish this data.

One response also noted that the cost to society and the environment should also be considered alongside the financial costs. This is considered in questions 14-18 below.

Question 13:
"What data can you share with the Review on the wider costs associated with options for managing residual waste in Scotland, especially where those costs have materialised?"

The Review received 6 responses regarding the wider costs associated with options for managing residual waste in Scotland.

These responses included information on:

- Gate fees for different management options.
- Haulage costs.
- Landfill restoration costs.
- Pre-treatment costs.
- Transfer station costs.

The additional data submitted was generally marked as confidential. The Review was able to use it for its analysis but is not able to publish this data.

One response noted that limiting this review to costs in Scotland might produce unrepresentative data and suggested including data from operations in similar jurisdictions such as England and Wales.

3.3 Trade-Offs

What are the environmental and social trade-offs of those residual waste management options?

Question 14:
*"*Do you have any evidence that the Review should consider in comparing the carbon impacts of options for residual waste treatment? E.g. compositional analyses of waste streams, case studies, or reports on carbon impact."

The Review received 41 responses regarding comparing the carbon impact of options for residual waste treatment.

The complexity of the issue was raised in a few responses, highlighting the many variables to determining carbon impact including:

- Biodegradability of residuals in MBT systems and fate of the residues.
- Displacement of carbon and fossil fuels from downstream uses.
- Fate of aggregates from incineration and the aggregates displaced.
- Relative resilience of each system in providing other societal services, such as ensuring waste does not accumulate and pose a wider health risk.
- The composition of resulting residual waste.
- The management systems in place prior to residual waste production.
- What energy generation is displaced, efficiency of its use and level of integration of power with renewable energy sources in private grid systems offering additional grid system reliability from the production of baseload power.

In one response a local authority provided results of a carbon impact comparison using Waste and Resource Assessment Tool for the Environment (WRATE). Several responses suggested that optimum solutions would be to seek to reduce waste arisings through reduced consumption, improved product design, increased recycling participation rates through improved and more consistent messaging and with incineration for residuals with incentivised carbon emission mitigation including high energy use efficiency (heat and power) and reduced incineration of non-biogenic waste (plastics). A point raised by several responses was that compositional analysis is required to be able to set a baseline for the effectiveness of current systems as Defra estimates and Zero Waste Scotland figures are now out of date. Additionally, detailed carbon flow data at a whole system level would be needed to fully inform this review.

A few responses stated that waste incineration releases hazardous air pollutants into environment, including carbon monoxide, acid gases, nitrogen oxides and dioxins. One response stated that without coal, incineration will be the leading cause of CO_2 emissions. Another response stated that incinerators often perform significantly worse than modelled for planning applications and environmental permits. Furthermore, a few of responses called for a ban on burning plastics and new incinerators.

A few responses noted that, according to some studies, emissions from incineration are on average 25-30% lower than landfill. However, a few responses noted that these studies did not fully investigate the potential carbon saving of removing plastics from the residual waste stream, the impact of district heating and Carbon Capture and Storage. Several responses stated comparisons should consider biogenic and fossil carbon and benefits/burdens of whole value chain.

One response stated that historically Councils have used incineration as an essential component of carbon reduction in waste management and that incineration provides an opportunity to capture far more of the recyclable material than any other waste treatment.

Question 15:
"What other aspects should the Review consider when assessing the environmental impacts of residual waste treatment options?"

The Review received 24 responses suggesting other aspects to consider when assessing the environmental impacts of residual waste treatment options:

- Bio-aerosols from bio-stabilisation.
- Biodiversity net gain (considers land use, effect on Sites of Special Scientific Interest).
- Carbon impacts of waste treatment.
- Full legacy of emissions from landfill.
- Impacts on groundwater, odour, litter, dust, noise, vermin, air quality from diffuse emissions, point sources, visual impact, light pollution and vibration.
- Natural capital net gain.
- Overall energy balance of treatment options.

- Scale and availability of markets for both recyclates and residual waste from waste treatments.
- Service delivery.
- Social value.
- Residues produced and options to manage them.
- Technical feasibility and reliability of the technology.

A few responses highlighted that the wider environmental and energy policy positions and related targets need to be considered when the impacts of waste treatment are being reviewed and decided upon within the appropriate time frame. One response suggested that if Scotland moved forward with the existing capacity in its current locations, then hauling residual waste becomes the only option for rural councils to access this treatment capacity. A few responses suggested the full 'cradle to grave' journey of waste should be considered, including the impact of manufacturing goods which become residual waste and transport.

A few responses indicated that in terms of transport impacts, Scottish Government policies and intentions to decarbonise transport in the medium-term should be taken into account. They highlighted that decarbonising transport would also address other air pollution concerns such as the impact of nitrogen oxides on health outcomes.

Zero Waste Scotland noted in its response that it is currently working on the development of the Scottish Waste Environmental Footprint Tool (SWEFT), which will evaluate environmental impacts of waste generated and managed in Scotland. SEPA' s response stated that a full lifecycle assessment would provide a more complete view of the options andthe trade-offs and listed the controls on operational conditions and application of Best Available Techniques which it oversees.

One response called for Scotland to make the reporting of incineration greenhouse gas emissions more transparent and start attributing incineration emissions to the waste sector as part of its Climate Change Plan. One response also added that the cost of early action is lower than the cost of climate change.

Question 16:
"Do you have any evidence that the Review should consider in comparing the other (non-climate) environmental risks of options for residual waste treatment in Scotland?"

The Review received 15 responses regarding other (non-climate) environment risks of options for residual waste treatment in Scotland.

There was a wide variety of topics covered in the responses. A few related to the financial impact, such as:

- CHP and biostabilisation have high costs that are being passed on to Local Authorities.
- Heat networks based on incinerators are expensive and unreliable for the communities forced to use them.
- Measure factors that affect the financial viability and performance of MBT and incineration.

- Need to consider the operational and financial viability of alternatives to incineration that are capable of meeting our carbon reduction targets.

Opportunities were highlighted in a few responses as follows:

- Adopt the European model of “Ash recycling”, where ash is seen as a resource (mineral and precious metals source) could lead to a commercial switch to “recovery”, which is currently prohibited by the complexities of “waste classification”.
- Gas emissions - Putting a stop to bad practice immediately is the best way to improve standards.
- Introducing a waste carbon tax to cover CCS, and the BMW ban should be expanded to reduce the amount of waste being landfilled.
- Make the most of low-cost community initiatives to prevent waste.
- Maximising recycling of residual waste in cement manufacture in Scotland could deliver social and economic benefits, as well as environmental ones.
- More use should be made of landfill gas capture.

Concerns raised in a few responses related to air pollutants such as dioxins, nitrogen oxides (NOx) and ultrafine particulates being harmful to both human health and the environment. Responses also raised that carbon capture, use and storage (CCS) has societal risks due to piping carbon dioxide which poses a risks from land disturbance and water contamination. A few other responses were concerned with carbon dioxide leaking from a pipeline being a potential physiological hazard for humans and animals. Additionally, a few responses raised the effects on biodiversity and stemming production of single-use plastics as an area for consideration. Issues relating to landfills such as groundwater and gas and additional considerations of persistent organic pollutants (POPs) were highlighted by a few responses. Another few responses suggested that the term ‘Energy from Waste’ is misleading to local residents and that planning guidance should be reviewed.

A few of the responses emphasised that risks of current treatment options have been considered widely over many decades and the current regulatory system has addressed these. Some of these suggested that of the current technologies available, incineration offers the most comprehensive treatment measure for all forms of biodegradable wastes, but noted incineration has adverse impacts on recycling rates. Several responses stated that there should be considerations given to using system specific Life Cycle Assessments (LCA) to address the issue of residual waste management in an evolved system of integrated recycling systems. They also stated that biodiversity net gain, natural capital net gain, social value, service delivery, air pollution, and full legacy of emissions from landfill should be determined. Others stated that the impact on soil, water and air quality as a consequence of emissions on the surrounding environment should be established.

Another response stated that the Scottish Waste Environmental Footprint Tool (SWEFT, Zero Waste Scotland) could be used to review LCA indicators.

Question 17:
"Do you have evidence or experience of the community impacts (positive and negative) of different residual waste treatment options, e.g. landfilling compared to incineration, that you could share?"

The Review received 30 responses regarding community impacts of different residual waste treatment options.

There were several negative impacts stated in responses. Responses provided a wide range of considerations regarding community impacts and are ordered by number of mentions.

In relation to landfill sites, responses raised the following potential negative impacts:

- Odour as a significant environmental cause of public complaints of people living near waste treatment facilities which can affect their quality of life and wellbeing. SEPA states that there are three operational landfills that are currently classified as having ongoing community impact.
- Substances causing the odours, even if they are not harmful to health, may be a source of stress and anxiety.
- Communities proximate to landfills being affected by wind-blown litter, dust and detritus, vermin, traffic on rural roads and noise from vehicles.
- Poor landfill management resulting in the release of landfill gas which has potential health impacts.
- Very few community benefits received from landfill operations.

In relation to incineration facilities, responses raised the following potential negative impacts:

- Complaints during construction, commissioning and operation include noise, vibrations, odours, flies, light pollution, visual impacts of the chimney and building, traffic, poor relations with operators and problems with district heating schemes.
- Concerns that incinerators have little or no chance of low-cost heat and no community incentive payment as the windfarm operators provide.
- Costs where residents may be tied into paying above market price for their heating.
- Perception that incinerators impact farming communities, conservation villages and nearby peat bogs.
- Disamenity effect of incineration far exceeds that of landfills due to population density. The effect on the value of housing assets is significant as far as it can be discerned.

Responses relating to other residual waste treatment options included potential negative impacts:

- A number of extensive studies show there are negligible air quality and public health impacts from the use of residual wastes in cement manufacturing.
- MBT facilities also have odour risk issues and potential for fly problems.

A few responses highlighted that society overall benefits from having safe management of residual waste given its regularity and scale. A few responses noted that there is little public concern or objection voiced about incineration facilities once

they are operational.. Another response stated that community impacts and numbers of complaints will vary from site to site, depending on the proximity of the facilities/sites to sensitive receptors as well as how well they are designed, maintained and operated.

A few responses stated that planning permission requires Human Health Risk Assessment Reports to be completed by operators, and these are publicly available. In its response, SEPA outlined the guidance it has for dealing with complaints around some of the issues listed above and provided further information about the permitting process and how it limits community impact.

Further responses related to the perception that waste treatment is a negative activity. They suggested that more could be done to raise awareness and build relationships with local communities, as there is a lack of trust in operators due to previous record of poor relations or compliance. A few responses also noted that community benefits are often a required element of local authority contracts.

The positive impacts for communities in responses included:

- Community benefits such as funding for local groups
- Education and training opportunities
- Job creation during construction and operations, as well as potential apprenticeships and local supply chain opportunities.
- Scottish Landfill Communities Fund benefitting community projects
- The provision of low and stable cost heat, including in communities suffering fuel poverty

Question 18:
*"*Do you have evidence (reports, studies, data) that could help to inform consideration of the public health implications of different treatment options?"

The Review received 21 responses regarding the public health implications.

Several stated that most studies relating to incineration facilities have identified limited health impacts as the facilities are making only a small contribution to local concentrations of pollutants. Conversely, several other responses state that there are negative health impacts from incinerators. These responses stated that the impacts would affect individuals living and working in the vicinity, stating studies have highlighted the impact of particulates on air quality and health.

One response shared concerns regarding higher rates of adult and childhood cancers and of birth defects relating to incinerators. It also highlighted concern relating to particulate pollution contributing to heart disease, lung cancer and other respiratory diseases.

Other comments relating to incineration facilities included:

- Concern relating to burning plastic wastes producing toxic pollutants.
- Health outcomes and the risk of dioxin and furans being significantly influenced by location of facilities.
- Reports demonstrating no effect on specific health outcomes do not demonstrate no effect.

- That in urban areas, emissions are dwarfed by transport emissions, in rural areas the emissions are diluted significantly.
- Under reporting from low-income areas.

Comments relating to other treatment options included:

- In relation to cement manufacturing, air quality and public health impacts from the use of residual wastes are negligible.
- Odour can have a negative effect on quality of life and wellbeing in affected communities causing stress and anxiety.
- Odour remains a significant environmental cause of public complaints of people living near landfill sites.

One response stated that rigorous and peer reviewed academic research would be necessary to provide a definitive answer on the public health implications on all waste treatment options, so both operators and the public alike can be assured over the safety of the operations. Furthermore, greater public transparency on emissions monitoring and real time monitoring with public access could alleviate public fears.

Another response stated there are strict emissions limits imposed and monitored by SEPA for all operational incineration facilities and noted that human health impact assessments are included in incineration applications recording potential impacts to human health from dioxins and odour.

3.4 Location

How do we decide where capacity should be located, and in what form?

Question 19:
"What are the main considerations in deciding where capacity should be located, and in what form?"

The Review received 34 responses commented on considerations for deciding where capacity should be located.

The written responses raised several suggestions for what should be considered when deciding where capacity should be located. These include:

- Carbon footprint of the site and how this could change, for example, one response noted that consideration should also be given to the impact of decarbonisation of transport when determining location brownfield sites and other treatment options for waste locally, for example the burning of waste in the cement making process to decarbonise the manufacturing of cement.
- environmental and social impact, noting that facilities shouldn't impact local receptors.
- Opportunities to provide energy, including heat networks.
- Potential benefits to the community.
- Proximity to potential heat users (mix of housing and industrial/commercial)
- Realistic opportunities for implementing CCUS.

- The importance of proximity to both where the waste is generated (high volume) and transport (e.g. road and rail).

A few responses stated that ultimately commercial viability is likely to determine the location of residual waste treatment facilities, and others stated a need for a more coordinated approach to planning, for example to consider capacity requirements at national and regional scales, with suggestions including a national strategy and encouraging 'clusters' of local authorities to work together. A few responses emphasised the need for a more coordinated approach by highlighting that current capacity is located in the central belt and on the east coast. Responses also highlighted the need to consider remote and island communities in a coordinated approach, for example, there are additional difficulties for island authorities that rely on ferry services if treatment facilities cannot accept direct deliveries from sea transport. In the stakeholder events, many participants noted that, given the number of incineration facilities that have already received planning permission in Scotland, it was likely that 'the horse has already bolted' in terms of a more strategic approach to location at this time.

A few responses stated that a focus on planning and location may not be necessary, since it is likely there is sufficient incineration capacity (operational and in the planning system) to meet Scotland's requirements, a view shared by many participants in the stakeholder events. One response suggested that instead work is focused on creating an exit strategy to determine the order in which incineration facilities should be closed. There was also a call for clarity on Scotland's residual waste policy.

3.5 Improving Carbon Performance

What can be done to improve existing residual waste treatment facilities in terms of carbon performance and societal impact?

Question 20:
"Do you have evidence to support consideration of options to decarbonise the current residual waste treatment infrastructure in Scotland?"

The Review received 26 responses to this question.

Key considerations in order of mentions highlighted in the responses were:

- Prioritise recycling and reuse, these are preferable economically, environmentally, and socially.
- A strategic approach is needed to decarbonise the sector aided by the development of a residual waste reduction plan.
- Measures to decarbonise residual waste are reliant in part on the success of policy drivers elsewhere in the system.
- A more transparent reporting of the carbon emissions of incineration is required.

A few responses highlighted the need for producers and consumers to reduce the amount of waste they create. A few other responses noted there is a need for enhanced design for recyclability in post-customer packaging and products.

Regarding policies, a few responses stated that the residual waste tonnages should decline slightly over time as Government policies take effect. DRS and EPR schemes were noted as being likely to reduce the amount of fossil carbon entering incineration facilities. One response stated that the Thermal Treatment of Waste Guidelines already require pre-treatment of municipal waste to remove dense plastics prior to incineration. It added that the Landfill Ban is an important part of decarbonisation in the waste sector; diverting biodegradable waste from landfill while increasing landfill gas capture rates will help towards decarbonising this waste treatment option. One response called for a ban on the burning of plastic waste.

Separate collections for household, commercial and industrial waste plastics was a key topic for a few responses. They highlighted that this would capture nearly all waste plastics to be treated, maximising the value of the material and removing non-biogenic carbon sources and be key to decarbonising incineration.

A few responses noted that the Climate Change Committee highlights that incineration facilities will need to abate their emissions through CCUS in the future to achieve Net Zero. They went on to say that the carbon budget is clear that this will take some time to achieve. One response stated that decarbonisation of the grid has been so successful that incineration technologies can no longer be considered low carbon solutions and that decisions on future management must be based on the most current and accurate data possible to ensure climate change impacts are minimised.

A few responses noted that carbon emissions from incineration plants could be reduced in the immediate future by diverting fossil-based plastic materials from the feedstock and pre-treating residual waste in a materials recycling facility (MRF). However, one response stated that the materials removed are contaminated and high capture rates are difficult to achieve due to the non-homogeneous nature of residual household waste, requiring treatment and reprocessing facilities to be developed.

Several responses stated another option for decarbonisation of incineration would be deploying CCUS technology to remove emissions to the atmosphere. They stated that the CO_2 captured from these facilities could potentially be used to produce renewable fuel which would help decarbonise the waste fleet or could be used in other sectors of the economy to help offset their emissions. Additionally, several responses stated that implementing modifications to increase heat recovery, for example from stack emissions and the potential to extract heat from post-turbine steam, which is currently vented to atmosphere, could be encouraged. One response stated that there is a need to drive innovation in distributed and co-located heat use to support district heating. It went on to state that this would help reduce the dependence on fossil-based heating systems (oil and gas).

In addition to heat and electricity, a few responses stated that the incineration process can also produce air pollution control residues (APCR), incinerator bottom ash (IBA) and the potential for metals recovery. They suggested that these materials are capable of delivering carbon savings through the displacement of virgin aggregates (product extraction and production) for the construction sector. They also stated that there remains a reluctance from designers and specifiers to utilise secondary aggregates. A few responses highlighted that progress with Quality protocols and End of Waste status would assist in opening new markets. They also stated that fiscal incentives to utilise aggregates (i.e. revision of aggregates tax) would also help incentivise their use, adding that counting genuinely recycled materials (including aggregates, metal recovered from IBA and APCR processing) towards recycling targets (as is done in Wales) would again be a positive step towards hitting targets and incentivising their use.

A few responses acknowledged that CCUS is a costly approach at the scale of emissions generated by incinerators, that can be addressed as effectively in other ways and at lower cost. Another response added that there is significant loss of electricity revenue due to a large proportion of the electricity generated by the incineration facility being required to power the capture plant. They added that the technology is in its infancy and to stimulate development of such technologies the UK Government is likely, in the long term, to need to either support the development and/or levy some form of carbon tax on incineration facilities. A few responses called for the Scottish Government to review the Industrial Carbon Capture Contract being developed by BEIS, to consider how existing incineration infrastructure could be appropriately supported for retrofitting CCS and delivering negative emissions, as well as, supporting fiscal instruments (primarily subsidy) to encourage development of technology to a point where it becomes competitive.

Another response highlighted waste derived fuels in cement manufacturing to displace coal and suggested that this should be prioritised over the use of RDF to generate electricity, or the use of BMW to generate gas for domestic heating, as other technologies exist to decarbonise electricity and domestic heating. The response also suggested that in future, cement plants will need to be fitted with carbon capture technology to reduce the high proportion of process emissions associated with the breakdown of calcium carbonate raw materials at high temperature. The capture of emissions from waste biomass fuels will result in the removal of emissions from the atmosphere, thus contributing even more to Scotland's net zero ambition.

Question 21:
"Do you have evidence of the main barriers and drivers of decarbonisation of this infrastructure?"

The Review received 18 responses covering the main barriers and drivers of decarbonisation. These responses raised several suggestions for the main barriers including:

- CO_2 stripping being high cost and energy intensive.

- Cost and technical feasibility.
- Few CO_2 outlets for utilisation or storage.
- Getting the public to fully engage in their kerbside infrastructure.
- High cost of CCUS.
- Lack of a reliable and bankable revenue stream for the commercial use of technologies.
- Lack of legislative drivers across the industry.
- Uncertainty of capacity required.

Several respondents commented on the lack of strategic policy, planning, procurement, and regulatory integration. They added that this is preventing Scotland from maximising the benefits of resource management systems for society and the reduction of environmental impacts. A few responses called for the introduction of legislative drivers across the industry such as a tax on carbon emissions which could incentivise front-end sorting of waste. One response stated that there is a need for a national strategic oversight capability to properly integrate the various stakeholders to create system coherence through appropriate regulation, guidance, data, research & development, fiscal incentives, and messaging.

One response highlighted that some policies disincentivise decarbonisation, stating that the Green Gas Levy encourages diversion from landfill to Anaerobic Digestion (AD). It added that this prejudices against co-processing BMW in cement manufacturing and provides financial benefit to AD that displaces cement manufacturing from the market for this bio-resource. Furthermore, it stated that the Renewables Obligation for power and the Renewable Heat Incentive also pushes biomass towards numerous smaller consumers that utilise heat indirectly and therefore less efficiently.

One other response stated that investing in CCUS for incinerators would create an additional barrier to the achievement of a low-carbon circular economy, by exacerbating the lock-in effect of incinerators, and would come at the expense of the significant environmental, economic and social benefits that such a transition would deliver.

The main drivers (in order of mentions) for decarbonisation included in the responses were:

- Zero Carbon targets for government and local authorities.
- DRS and EPR.
- Societal expectations of Zero Carbon targets.

Additionally, a few of the responses noted that the clear and primary objective should be to reduce, recycle and recover.

4 Other Evidence Considered By The Review

The Review also considered a number of other sources, including those submitted to us in response to the Call for Evidence. Information on other evidence considered is provided below.

4.1 Review Commissioned Documents

The Review commissioned additional research to assist in its analysis. This included:

- *Incineration Review: Capacity Analysis*. Ricardo Environment and Energy. (2022)
- *Incineration Review: Options Appraisal.* Ricardo Environment and Energy. (2022)
- *Municipal Solid Waste Incineration and Reported Health Effects: Rapid Evidence Review.* Public Health Scotland. (2022)

4.2 Additional Evidence Considered

This list is not exhaustive and does not include sources identified by Ricardo in its capacity modelling and options appraisal, which are included in the bibliography of those documents. Inclusion in this list indicated evidence which was brought to the attention of the Review and is not a qualitative judgement.

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