The Highland Council

Agenda Item	7
Report No	CP/27/23

Committee: **Communities and Place**

Date: **29 November 2023**

Report Title: **Long-term Waste Management**

Report By: **Executive Chief Officer, Communities and Place**

1. Purpose/Executive Summary

1.1 This report provides Members with key findings from the feasibility assessment study undertaken by SLR Consulting and Nevin Associates on behalf of The Highland Council concerning long-term waste management options, including the option of developing an energy-from-waste facility in Inverness.

2. Recommendations

2.1 Members are asked to:

i. **Note** the study findings which Council Officers have considered;
ii. **Consider and agree** the proposed next steps as reported at Section 5.2 of this report.

3. Implications

3.1 Resource Implications

a. On 2 March 2023 Highland Council identified the 2022/23 and 2023/24 resources available to the Longman Green Energy Hub Programme (to examine the potential for establishing an energy-from-waste facility at the site). The next steps identified at 5.2 in this Committee report will require limited expenditure, anticipated at a maximum of £10k.

b. More broadly, waste management is necessarily resource intensive in terms of finance, equipment, infrastructure and personnel to meet the statutory obligations for the safe and legally compliant management of waste streams. The study being reported in this Committee report has sought to identify the potential financial commitment necessary for the provision of long-term, non-recyclable waste management options (Section 4.6 below refers).

3.2 Legal Implications

The Council's Waste Management Service operates in a highly regulated environment. This regulatory regime covers the type of collection services that must be provided to

households and businesses, the operation of our landfill sites and other facilities, and how material can be processed. Within Scotland there is the significant regulatory issue of the ban on landfilling biodegradable municipal waste as introduced through the Waste Management (Scotland) Regulations 2012. There is to be full compliance by the end of 2025. This underpins the study of long-term waste management options being presented within this report to Committee today.

3.3 Community (Equality, Poverty, Rural and Island) Implications
The implementation of waste management services is undertaken in accord with Scottish Government legislation and takes community factors appropriately into account. There are no imminent Community implications arising from the feasibility study findings.

3.4 Climate Change / Carbon Clever Implications
The Highland Council through its successful application to the Recycling Improvement Fund will be making substantial improvements to the collection of materials suitable for recycling over the course of the next two years. There will remain, however, a substantial tonnage of waste that must be safely and legally managed. The ban on landfilling waste seeks to reduce emissions of managing such residual waste. Highland Council is in the process of diverting landfilled waste to other outcomes. The study being reported today has sought to assess options for the legally compliant management of the likely future tonnage (post 2030) that will not be covered by recycling.

3.5 Risk Implications

a. There is no immediate risk affecting Highland Council related to the findings of the study report being reported to Members today.

b. The study findings do, however, consider long-term waste management options which may apply a number of years from now. There is an inherent risk that circumstances in the intervening period (such as market conditions and legislation) could significantly affect the definition of a solution.

3.6 Health and Safety (risks arising from changes to plant, equipment, process, or people)
There are no specific implications arising from this report.

3.7 Gaelic Implications
The are no Gaelic implications at present. Where changes to services are developed, information will be produced to include Gaelic language in keeping with Council policy.

4. Long-term Waste Management

4.1 Background

4.1.1 It was notified under Item 10 of the 31 August 2023 Communities and Place Committee that the findings from the feasibility assessment study would be reported to the November 2023 Communities and Place Committee.

4.1.2 The study provides an updated examination of the potential for developing an energy-from-waste (EfW) facility at the closed Longman landfill site (Inverness), the site which hosts the Inverness waste transfer station. It examines, also, the option of using the services of energy-from-waste facilities outwith the Highlands to process the non-recyclable residual waste collected by Highland Council.

4.1.3 The study is part of a process involving many components - understanding the geo-technical conditions of the site (first stage is complete, with a more detailed examination

to be undertaken if the appraisal process continues), the ecology of the site and its potential to influence future development at the Longman site (undertaken), the long-term waste management options and the associated costs (the focus of the study being reported to this Committee today), and understanding whether there may be sufficient demand for the power and heat outputs of a potential energy-from-waste facility if it were located at the closed Longman landfill site (work to be carried out over the coming months through the Council's Climate Change and Energy Team).

4.1.4 As a result, there is no imminent decision to be made. It is important, however, that Officers and Members can share and discuss these findings to develop our knowledge and to help inform our decision-making when that is required.

4.2 Context

4.2.1 There is an evolving, ever-changing operating environment for waste management, the pace of change accelerating in recent years, reflecting the climate changing requirements of Scottish and UK Governments. Prominent changes include:

a. Government Policy/Legislation:
   i. SEPA requirement for immediate and separate management of waste streams containing Persistent Organic Pollutants (POPs).
   ii. Delayed implementation by Scottish Government of the Deposit Return Scheme in Scotland to October 2025 which will likely impact household waste tonnages as target recyclable materials are diverted.
   iii. Direct landfilling of biodegradable municipal waste prohibited in Scotland as from 31st December 2025.
   iv. The independent review of February 2023 - commissioned by Scottish Government – proposing measures to reduce the carbon impact of incineration, primarily by removing recyclates prior to incineration (via advance sorting) and supporting the inclusion of incineration within the UK Emissions Trading Scheme (UK ETS).
   v. UK Government's June 2023 confirmation that the EfW sector will become part of the UK ETS; the monitoring, reporting and verification stage being due to commence in 2026 and payments to be made from 2028 onwards.
   vi. UK Government intentions to implement Carbon Capture and Storage (CCUS) technology across the industrial sector, including the EfW sector.

b. Economic/Market Conditions
   i. Cost of borrowing increases.
   ii. Inflationary pressure on the cost of goods and services.
   iii. Substantial emerging merchant EfW processing capacity development pipeline in Scotland. (Note: merchant facilities sell residual waste processing capacity to customers which include local authorities and commercial organisations.)

c. Highland Council Changes to Waste Service Arrangements:
   i. Landfill ban solution – residual waste contract with Viridor, commencing January 2023.
   ii. Commencement of Highland Council's waste transfer operations at Granish (Aviemore) in January 2023 and at Longman, commencing April 2023.
   iii. Alterations to the collection, receipt and management of upholstered furniture once statutory guidance is published.
   iv. Implementation of kerbside twin-streaming collection services from 2024 through the Recycling Improvement Fund project.

v. Plans to shred bulky waste and residual waste received at household waste recycling centres to produce feedstock suitable for processing at the Viridor energy-from-waste facility in Dunbar.

4.2.2 Underpinning much of the change in waste management operations within Scotland is the impending ban on landfilling biodegradable municipal waste from 31 December 2025. Highland Council has a solution in place through its contract with Viridor. This began in January 2023 and runs until 2027. It has the potential to extend to the end of December 2030 if both parties agree to apply the extension provision built into the contract. This ensures that the biodegradable municipal waste – residual waste – collected by Highland Council will not go to landfill, but instead will be processed at a licensed energy-from-waste facility in Dunbar and will comply with the Waste (Scotland) Regulations prohibiting landfilling of such waste. Progressively, over the 2023-25 period, Highland Council is directing its residual waste tonnage to this facility.

4.2.3 The arrangement with Viridor covers the medium-term. Today's report and discussion is focused on the long-term, and an appropriate course of residual waste management beyond 2030.

4.3 Long-term Waste Management Options

4.3.1 There are two principal options open to Highland Council. Either to:

a. Send the residual waste, that which won't be recycled, to an energy-from-waste facility outwith the Highland area (akin to current practice through the Council's contract with Viridor). Most likely, it is thought at this juncture, to the Central Belt area of Scotland. (Note: The study uses Dunbar as a location for distance calculations purposes.)

b. Or process waste collected by The Highland Council at an energy-from-waste facility located locally, potentially at the closed Longman landfill site, Inverness.

4.3.2 Within the study undertaken by SLR Consulting Ltd and Nevin Associates on behalf of The Highland Council, the financial analysis of the first option represents an assessment of how the consultants consider the market for waste processing contracts with an EfW merchant facility might develop, factoring in the need to process further waste streams, such as bulky waste and waste containing Persistent Organic Pollutants, which currently tend to be landfilled.

(Note: a contract for waste processing would be secured through an appropriate tendering process. The service provider beyond the current contract could be any of the energy-from-waste facilities operational at that time. The assessment within the report is not based on an offer for future service delivery by the current service provider.)

4.4 Features and assumptions of Long-term Waste Management Options

4.4.1 Option 1, Send Residual Waste to a Merchant EfW Facility in Scotland:

a. An assessment of future market rates which may be encountered.
b. 2032 waste tonnage projection.
c. Processing the residual waste tonnage of 65,000 tonnes per year collected by The Highland Council.

d. Road haulage to a merchant EfW from The Highland Council's waste transfer stations.
e. No additional pre-sorting of waste at the EfW.
f. Fluctuating gate fee – contract review periods and operating environment changes.
g. 2023 prices used for cost projections.

4.4.2 It is thought that if an EfW were to be developed locally then a realistic operational date could be 2032. Therefore the study has sought to assess what the residual waste tonnage collected by The Highland Council would be by then. 65,000 tonnes is the mid-range estimate. This estimate seeks to take into account the potential effects from Recycling Improvement Fund changes, implementing the Deposit Return Scheme (despite its current delay), and the likely number of households.

4.4.3 At present the Scottish Government has not confirmed a requirement upon energy-from-waste facilities to undertake advanced sorting (also referred to as pre-treatment) to remove recyclable materials from residual waste they receive before it enters the incineration stage (although EfW operators are already required to ensure, as far as is practicable, that waste for incineration does not include hard plastics). Should this become a stipulation in the future, it is likely that it would push up the gate fee cost to Highland Council. It would similarly introduce a cost to Highland Council if developing its own energy-from-waste facility – affecting the capital infrastructure required and on-going operating costs of the process.

4.4.4 As a long-term contractual agreement there would be gate fee reviews at fixed points and, potentially, should there be an 'event' of sufficient magnitude, then there may be unscheduled reviews required. Because of the inflation volatility and the difficulty of forward projection during this period of economic turbulence, the financials within the study are quoted in current 2023 prices.

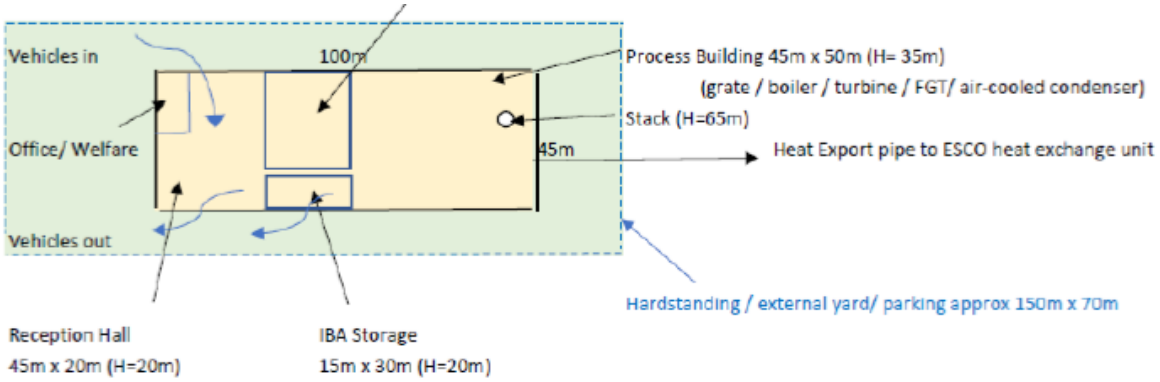
4.4.5 Option 2, Develop and Operate an Energy-from-Waste Facility at Longman, Inverness:

a. Standalone plant close to the waste transfer station.
b. Operating as a combined heat and power (CHP) plant.
c. 2032 waste tonnage projection.
d. Managing the projected residual waste tonnage collected by Highland Council of 65,000 tonnes per year.
e. Road haulage to the Longman site from The Highland Council's waste transfer stations.
f. No additional pre-sorting of waste at the EfW.
g. Fluctuating gate fee – contract review periods and operating environment changes.
h. 2023 prices used for cost projections.
i. Potential physical scale as per the layout sketches provided within the study report.
j. Would require Inverness Common Good willingness to enter into a ground lease.
k. Would need SEPA willingness to alter the Longman site's Waste Management Licence.

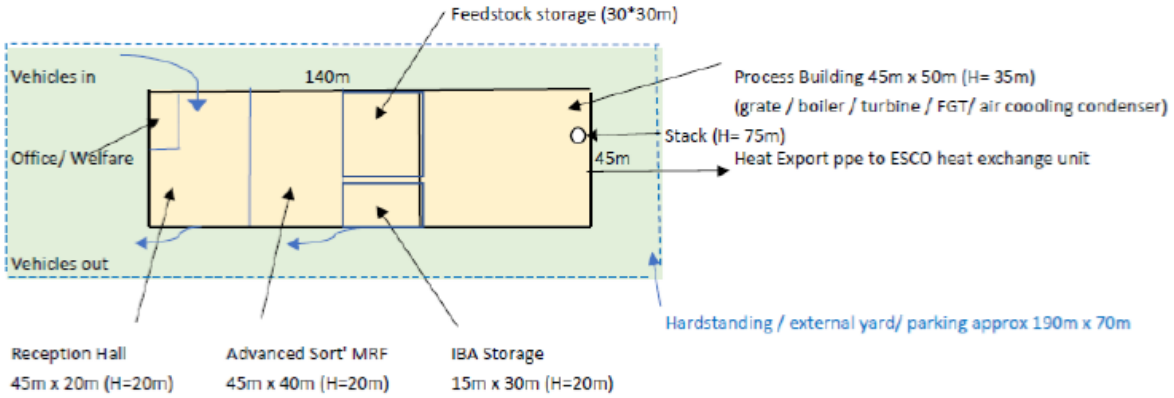
Figure 1: Longman EfW Plant, Indicative Layout/Configuration Sketches

<u>Without an advanced sorting step in the treatment process (65kta EfW)</u>

Feedstock Storage (30*30m)



With an advanced sorting step in the treatment process (65kta MRF / 62kta EfW)



4.4.6 Should an energy-from-waste facility be developed locally it will require to operate as a combined heat and power facility, that is, active use must be made of its electrical power and heat outputs. Currently it is stipulated by the Scottish Environment Protection Agency that plants should be actively deploying both outputs within seven years of commencing operations.

4.4.7 Electricity could potentially be exported immediately upon commencing operations directly to the grid or, should there be other businesses or Council operations developed on the Longman site, power purchase agreements could be developed.

4.4.8 It is envisaged that the heat offtake would be exported to specific business customers and/or to a district heating network potentially managed by a separate Energy Service Company (in which Highland Council could perhaps be a joint venture partner). An example of the latter is Midlothian Council's joint venture with Vattenfall, known as Midlothian Energy Limited, which will provide a low-carbon source of heating and hot water to around 3,000 homes, education and retail properties at Shawfair Town, in the north of the Midlothian Council area.

4.4.9 As mentioned at 4.4.3 above, the Scottish Government has not confirmed a requirement upon energy-from-waste facilities to undertake an advanced sorting step to remove recyclable materials from residual waste they receive before the incineration stage. Should this become a requirement it would reduce the tonnage of residual waste entering the grate, to circa 62,000 tonnes per year. The materials removed would be sold to reprocessors.

4.4.10 Relevant to both of the long-term waste management options, The Highland Council is not dismissing alternative forms of transport to move residual waste from its network of waste transfer stations to the processing destination. The feasibility study has sought to consider diesel-powered and low-emissions vehicles when examining the carbon impact of each of the two long-term waste management options; and the potential for using rail haulage in the future is being explored by the Waste Service.

4.5 Pros and Cons of Long-term Waste Management Options

4.5.1 Table 1: Option 1 – Long-term use of a Merchant EfW

Pros	Cons
No capital investment required	Highland Council would have increased exposure to uncertain market forces for gate fees and long-distance haulage rates
Potential market-place competition for Highland Council's feedstock	Potentially higher carbon footprint (than a Longman-located EfW)
Substantial EfW pipeline / Scottish merchant capacity post 2026	Long-distance HGV traffic
Contract term of 10-15 years likely to be available	Export of indigenous waste from the Highlands removes the opportunity to pursue wider long-term socio-economic benefit (on-site at Longman and for the locality)
Existing contract provides insight to processing sector sensitivities	
Sharing cost burden where legislative changes affect EfW operations	
'Frees' Longman site for other potential development interests	

4.5.2 Option 1 would not require capital investment; it would involve a draw on revenue expenditure (as is the case with the current management of residual waste through the contract with Viridor).

4.5.3 Six new merchant energy-from-waste facilities are currently under development in central Scotland. These, if all delivered as per intention, would introduce over 1.3m tonnes of residual waste processing capacity.

4.5.4 Therefore, the residual waste market position towards the end of this decade, just as Highland Council's contract with its current EfW service provider is concluding, may well be characterised by additional processing capacity within Scotland, sufficient to accommodate the likely tonnage of currently non-contracted residual waste arising from Scottish local authorities' collections.

4.5.5 It isn't possible to pinpoint merchant gate fees too far ahead (although the study has sought to make an informed assessment), but the pipeline of processing capacity in development is substantial and may influence contracts. Highland Council's current contract may provide some insight over its duration to processing sector sensitivities, as additional capacity becomes available in Scotland and as other market changes come through.

4.5.6 There are other possible developments looking at the Longman site which may require a substantial footprint. Highland Council is increasingly aware of the need to balance the demand and supply factors which will influence use of the site.

(Note: the support of Inverness Common Good Fund would be a requirement for any development of the site and, as a substantial proportion of the site remains under a Waste Management Licence, SEPA's approval for undertaking any future developments would need to be sought.)

4.5.7 Considering factors which may be less favourable to pursuing Option 1:

a. The gate fee with a merchant provider wouldn't be static and pressures will most likely come to bear on that fee to accommodate operating environment changes. Haulage rates would also be retendered periodically.

b. There will be more focus on carbon footprint impacts later in this paper, but for the moment calculations suggest that if energy from waste facilities are operating in combined heat and power mode then the environmental performance is more likely to be poorer when sending the waste outwith the area for processing.

c. Taking the residual waste collected by The Highland Council to an energy-from-waste processor in the Central Belt of Scotland requires numerous articulated lorry movements primarily using the A9 out of the Highlands. For a projected annual tonnage of 65,000 tonnes, it is likely that there would be circa 2,700 articulated lorry return journeys required per year.

d. More broadly, sending the waste outwith the area for processing forgoes the potential to use the energy-from-waste investment as a catalyst for supporting other developments.

4.5.8 Table 2: Option 2 – A Longman-located Energy-from-Waste Facility

Pros	Cons
Long-term, direct job creation to operate an EfW	Capital programme impact with Design, Build and Operate financing option
Opportunity for pursuing wider socio-economic benefit on-site and the locality	Capital investment requirement potentially for delivering heat and power outputs to customers
Funding model options – capital and non-capital	Potentially a lengthy planning process with uncertain outcome
Site is zoned for waste management activity, including potential EfW, within local development plan	Capacity justification
Potentially lighter carbon footprint than processing through a merchant EfW	Complex site regarding ground conditions and ecology.
Avoids transporting Highland Council collected waste out of the area	Greater cost burden implications where legislative changes affect EfW operations

4.5.9 The scale of the energy-from-waste facility required to process the anticipated 65,000 tonnes of residual waste which would be collected by Highland Council is considered small in market terms. Nonetheless, the facility would offer long-term employment opportunities directly (the study assesses at least 27 staff required), and construction phase business over a 3–4-year period. The site under review at Longman, Inverness, is considered suitable within both the current Inner Moray Firth Local Development Plan, and its proposed successor plan, for waste management facilities including an energy from waste operation.

4.5.10 Whilst an energy-from-waste facility's primary function is to process residual waste in a safe and legally compliant way, it does produce energy, both electricity and heat, which

can be applied to support other initiatives. The Council's Climate Change and Energy Team is assisting the Waste Service to identify possible demand centres for the uptake of heat and power from a potential Longman-located energy-from-waste facility. An energy-from-waste facility must achieve certain efficiency thresholds, which necessitate the use of both electricity and heat outputs. Therefore, the opportunity to engage in a viable market for heat and power outputs would be essential to identify within a planning application (should matters proceed to that stage) and to secure an operating permit from SEPA.

4.5.11 The socio-economic benefits could potentially include cost savings for Highland Council – for instance, using the electricity produced by the energy-from-waste plant in our own buildings. Or it could provide revenue by selling the power to the grid or through private wire arrangements (for instance, to the potential hydrogen production facility being assessed for the adjacent IN8 zone, the part of the Longman site being investigated by the City Region Deal for land remediation and its commercial development potential). Additionally, heat could be sold to an energy services company.

4.5.12 There are funding options should Highland Council seek to develop an energy-from-waste facility.

a. Under a Design, Build and Operate approach where construction and operation contracts are put in place, Highland Council would borrow capital for the construction – most likely through the Public Works Loan Board (noted in the 'Cons' column of Table 2 at 4.5.8 above given the capital programme pressures).

b. Deploying a Design, Build, Finance and Operate approach, a third party would typically finance the construction of the facility and charge THC a gate fee to access the services – this would be a non-capital approach to funding access to a locally-developed EfW service.

4.5.13 The relative carbon impacts of the two options will be explored at Section 4.7 below. However, the converse of a point made in 4.5.7 above relates to transport concentration. If developing an energy-from-waste facility at Inverness the need for transporting Highland Council's residual waste tonnage a distance outwith the area is removed.

4.5.14 There are less favourable factors associated with Option 2:

a. In addition to a potentially substantial capital requirement to deliver an energy-from-waste facility there could also be additional investment necessary to provide the infrastructure to convey heat and power outputs to demand centres. This, however, may not fall on The Highland Council entirely; and it could be the case that it may be fully funded by others, as other investors may express an interest in the energy management opportunity.
b. Whilst the local development plan identifies the site as potentially suitable for such a development, the site is a closed landfill. A waste transfer station has been developed on an adjacent plot, so development with appropriate geo-technical understanding to inform engineering solutions is possible. The consultants had access to information and engaged with engineering contacts with knowledge of the Longman site, within and external to Highland Council, to ensure their assessment and cost projections were being based on known and appropriate information. Nonetheless further detailed geo-technical studies would be required before any future tendering stage for building at a specific plot on the Longman site (should matters progress that far).

c. An Extended Phase 1 Habitat Survey has identified that there are no specific habitats that are of high intrinsic conservation value within the area of the Longman site which might potentially host an energy from waste facility. The site's ability to support a number of important species, however, means that it has significant ecological sensitivities. Ensuring any future development assessments (for an EfW or otherwise) take full cognisance of the ecological sensitivities, and an ability to suitably address National Planning Framework 4 stipulations, would be necessary and important inputs for a planning submission (should that in due course become an agreed course of action for The Highland Council).

d. The Scottish Government's perspective regarding any justification proposed for a Longman EfW's processing capacity would be a salient factor in securing development approval. The Scottish Government has kept in place the Energy from Waste/Incineration and Advanced Thermal Treatment Facilities Direction, initially issued on 17th November 2021 by the Chief Planner which requires planning authorities to advise Scottish Ministers of the receipt of new planning applications for Energy from Waste (Incineration and Advance Thermal Treatment) Facilities and notify them when they are minded to grant planning permission for Energy from Waste (Incineration and Advance Thermal Treatment) Facilities. Whilst The Highland Council is not yet at a stage where a decision is needed on whether to enter into all of the work that would be necessary to prepare and apply for planning permission, it is important to be aware of this requirement.

e. The Scottish Government has made it known within their June 2022 response to the independent report published in May 2022 that they do not generally support the development of further municipal waste incineration capacity in Scotland, with very limited exceptions, such as where a national or local need has been sufficiently demonstrated.

4.6 Cost Comparisons for the Long-term Waste Management Options

4.6.1 Table 3: Projected Costs Comparison (CHP), 2023 Prices

Cost	**Option 1: Merchant EfW**	**Option 2 (DBO): Longman EfW**	**Option 2 (DBFO): Longman EfW**
Capital borrowing requirement	N/A	£109m	£81m borrowing + £20m equity
Amortised capital	N/A	£6.8m	£7.2m + £2.4m (12%) equity return
Opex and life-cycle maintenance	£6.1m	£8m	£8.2m
Transport	£4.5m	£2.1m	£2.1m
Energy revenues	N/A	-(£4.1m)	-(£4.1m)
Net annual cost (Year 1)	£10.6m	£12.8m	£15.8m
Net cost per tonne	£164	£196	£246
Cost to Highland Council over 25 years	£268m	£320m	£402m

a. The set of costs identified in Table 3 above assumes 65,000 tonnes of residual waste is being processed in an energy-from-waste facility operating in combined heat and power mode. The prices are quoted as 2023 prices.

b. Distinguishing a potential Longman EfW as operating in combined heat and power mode is important as within the study report the consultants state that “The financial analysis makes it clear that an ERF plant only makes economic and financial sense if it incorporates a heat offtake plan such as a District Heating scheme to optimise its efficiency.” (Note: ERF is an abbreviation for Energy Recovery Facility which has the same meaning within the study report as EfW, Energy-from-Waste.)

c. DBO = Design, Build and Operate. Under this financing option, the Council would raise the funding required to build the EfW plant from the Public Works Loan Board (PWLB), repayable over 25 years. The PWLB loan would be repayable over 25 years, equating to the plant’s estimated lifetime following UK Government Greenbook guidance (although, if properly maintained and legally permissible, an EfW facility could be operational for many years beyond that). Under DBO, the Council would retain ownership of the plant, and would enter into a fixed price Design and Build contract with a prequalified contractor to build and commission the plant (a capital programme implication), and a separate Operating and Maintenance (O&M) contract to run the plant (a revenue budget cost). The O&M contract could be with the construction and commissioning contractor, at least for an initial period.

d. DBFO = Design, Build, Finance and Operate. the Council would enter into a 25-year Project Agreement with a selected private sector partner, who would then be responsible for raising the funding required to build the plant, and for operating it over a 25-year period (as noted above the operational lifespan of an EfW facility could extend beyond that timeframe). At the end of the agreement, the EfW plant would either be handed over to the Council (for continued operation under a new or continued Operating and Maintenance contract) or decommissioned, at the Council's option. Comparatively higher market borrowing rates (relative to Highland Council's Public Works Loan Board weighted average) cause this option's projected cost to be more expensive.

e. The amortised capital figure for the DBFO option is an imputed annual average, as actual cash payments of dividends and loan principal by a project company will vary from year to year, rather than be on an annuity basis.

4.6.2 Table 4: Costs Comparison (Advanced Sort and CHP), 2023 Prices

Cost	**Option 1: Merchant EfW**	**Option 2 (DBO): Longman EfW**	**Option 2 (DBFO): Longman EfW**
Capital borrowing requirement	N/A	£120m	£88m borrowing + £22m equity
Amortised capital	N/A	£7.5m	£7.7m + £2.4m (12%) equity return
Opex and life-cycle maintenance	£7.7m	£8.4m	£8.5m
Transport	£4.5m	£2.2m	£2.2m
Recycling and Energy revenues	N/A	-(£5.5m)	-(£5.5m)
Net annual cost (Year 1)	£12.2m	£12.6m	£15.3m
Net cost per tonne	£190	£192	£237
Cost to Highland Council over 25 years	£310m	£314m	£387m

a. The set of costs within Table 4 assumes an advanced sorting stage is part of the EfW's residual waste management process. This would result in 62,000 tonnes of residual waste being processed in an energy-from-waste facility operating in combined heat and power mode. The prices are quoted as 2023 prices.

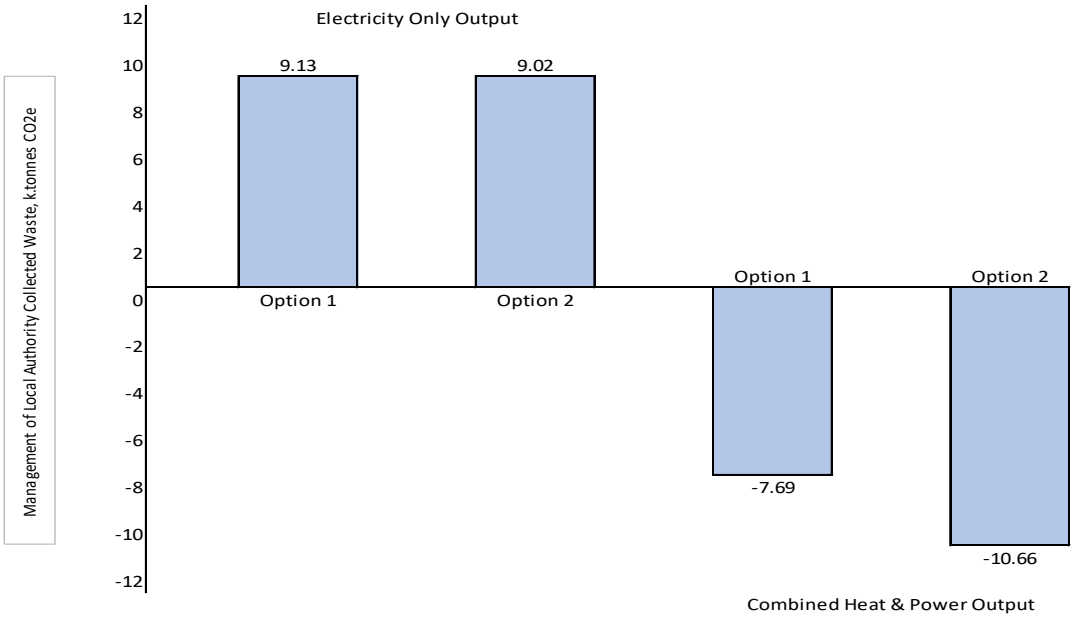
b. Notes b – e from 4.6.1. apply.

c. The capital borrowing requirement would be higher for Option 2 at the Longman site as there would be additional building costs and process machinery capex required to provide the pre-treatment stage.

d. Net annual cost for Option 2 reduces where there is an advanced sort step in the process as additional revenue is projected to be generated through selling the recyclates. The net annual cost for Option 1 is higher where an advanced sort process is incorporated into the service offering as Highland Council would bear a share of the pre-sort process costs without a counter-balancing recyclate revenue receipt (this would go to the merchant operator).

4.7 Carbon Impact Comparison of the Options

4.7.1 Figure 2: Carbon Dioxide Equivalent Impact of 65,000 tonnes of Residual Waste Processed through an EfW ($ktCO_2e$)



a. The lifecycle assessment software 'Waste and Resource Assessment Tool for the Environment' (WRATE) was used by the consultants to prepare the environmental impact of the management of the projected residual waste tonnage collected by Highland Council throughout the Highland area from 2032.

b. The WRATE software is specifically designed to model the environmental impacts of waste and waste management processes.

c. The x-axis '0' = net zero carbon.

d. $ktCO_2e$ = thousand tonnes of carbon dioxide equivalent (a measurement of the total greenhouse gases emitted, expressed in terms of the equivalent measurement of carbon dioxide

e. As an Aide Memoire, Option 1 is to send the residual waste to an EfW facility outwith the Highlands and Option 2 is to develop an EfW at the Longman site in Inverness.

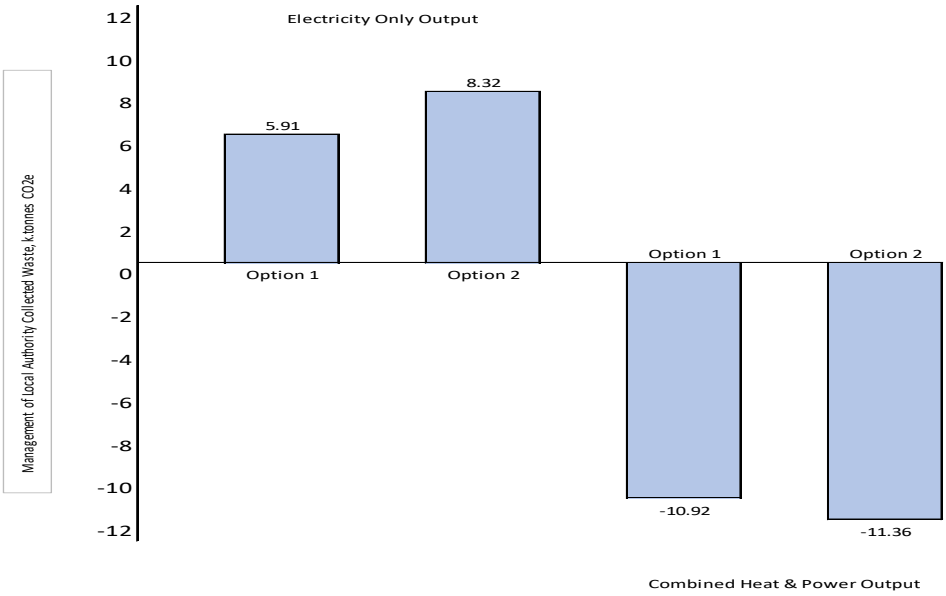
f. The use of diesel-powered vehicles is reflected in the carbon impact calculations for Figure 2. Whilst the transportation of waste produces a carbon burden, it is relatively small in comparison to the carbon impact of the waste management activity itself.

g. The WRATE assessment identifies that an EfW in electricity output only mode, with no advanced sorting step within the process, might generate a carbon burden of 9.02 – 9.13 $ktCO_2e$. This aspect of electricity output only is provided solely for comparison purposes; a Longman-located energy-from-waste facility would not be expected to operate long-term in this capacity.

h. Where Combined Heat and Power (CHP) technology is installed and operational (a condition which a new EfW is presently expected to reach within seven years of becoming operational as notified within SEPA's 'Thermal Treatment of Waste Guidelines 2014'), then the modelling suggests that an EfW with no advanced sorting built into the process might produce a net avoided carbon burden within the range of -7.69 to -10.66 $ktCO_2e$. Whilst the process of aggregating the waste at transfer stations and transporting the residual waste to an EfW incurs a carbon burden that would be outweighed by the process of treatment, recovery and recycling within the EfW process.

i. When comparing each scenario by site, Central Belt of Scotland EfW and Longman EfW have marginal differences in the electricity only scenario. Where the EfWs operate in CHP mode (which it is expected that a Longman EfW would need to do) there is a wider variation within the results. Longman shows a greater environmental benefit as it avoids a comparatively more significant transport burden of travelling greater distances.

4.7.2 Figure 3: Carbon Dioxide Equivalent Impact of 65,000 tonnes of Residual Waste Processed through an EfW ($ktCO_2e$)



a. For the analysis summarised in Figure 3 it is assumed that by 2032 haulage vehicles will utilise low emission fuels. The study report identifies the example of using biomethane as a fuel for haulage vehicles, and the finding that this could reduce greenhouse gas emissions by up to 85%. The carbon burden calculations were remodelled by the consultants using this reduction in transport emissions.

b. The WRATE assessment identifies that an EfW in electricity output only mode (again provided for comparison purposes only), with no advanced sorting step within the process, might generate a carbon burden of 5.91 – 8.32 $ktCO_2e$. The WRATE model therefore identifies taking the waste outwith the area to be processed may have a lower overall environmental impact in this specific instance given the larger scale of plant operating efficiencies and a considerable reduction in the transport carbon burden.

c. Whereas in CHP mode the EfW might produce a net avoided carbon burden within the range of -10.92 to -11.36 ktCO_2e. In this circumstance the modelling suggests that the Longman EfW may perform better.

d. Notes a – e from 4.7.1 above also apply.

4.7.3 As noted at 4.4.3 above, the Scottish Government has not confirmed a requirement upon energy-from-waste facilities to undertake advanced sorting of the residual waste they receive. It should be noted, however, that the WRATE modelling of scenarios where the EfWs deployed an advanced sorting step in their treatment process, shows comparatively better environmental impact performances.

4.7.4 In summary, the carbon impact assessment within the study identifies that:

a. With regard to energy recovery, options utilising CHP facilities are likely to perform more efficiently than those operating in 'electricity only' mode.

b. Where like for like facility performances are assumed (the CHP scenarios), a solution which is proximate to the point of waste generation will outperform one which requires longer haulage distances.

c. The WRATE modelling shows that the use of haulage vehicles with low carbon emission fuels to a Central Belt location could potentially outperform the more localised treatment of waste at a Longman EfW (should the plant efficiencies be as assumed in the modelling and depending on the actual carbon performance of the low emissions fuel used).

4.7.5 The consultant's report, however, cautions "...against comparing the options and identifying a preferred option based on the results of this carbon assessment alone, as there are a number of assumptions applied at this feasibility stage that if changed could alter the scale and order of the results."

5. Summary and Next Steps

5.1 Summary:

a. There has been, and continues to be, significant environment-related change for the waste management sector.

b. The current medium-term contract which Highland Council has represents good value, but operating environment changes will impact upon it.

c. The principal, long-term future options are to continue to use a Merchant EfW or seek to develop an EfW locally (Longman, Inverness being the most likely option currently).

d. Option 1 - Merchant EfW – (akin to current practice), potential competition for Highland Council's feedstock from the late 2020s but price uncertainty through exposure to market forces.

e. Option 2 – Longman EfW – potential for direct and wider socio-economic benefit.
    i. A viable heat and power plan would be necessary: “The financial analysis makes it clear that an ERF plant only makes economic and financial sense if it incorporates a heat offtake plan such as a District Heating scheme to optimise its efficiency.”

    ii. The Scottish Government does not generally support the development of further municipal waste incineration capacity in Scotland, with very limited exceptions where a national or local need has been sufficiently demonstrated. National Planning Framework 4 policies and Longman development site ecology sensitivities would require much consideration to shape an acceptable development proposal.

f. No imminent decision required on the long-term investment.

5.2 Next Steps:

a. Gather information, with the assistance of the Council’s Climate Change and Energy Team, on the likelihood of there being viable demand centres for the heat and power outputs of a Longman-located energy-from-waste facility, alongside the investment costs which may be applicable to reach and serve those demand centres. Aim is to be informed on these matters by the end of financial year 2023-24.

b. Continue the engagement with Scottish Government to obtain their view on the findings of the feasibility study set against the context of their current position towards new EfW developments. Aim to secure this perspective during the current financial year.

c. Contact SEPA to determine their perspective on the potential for an EfW development at the Longman site of the scale projected within the study report. Aim to secure this view by the end of this calendar year.

d. Apply for by the end of 2023-24 pre-application planning advice for a potential energy-from-waste facility at the Longman site.

e. Prepare a perspective for the end of the first quarter of 2024/25 as to whether there seems to be reasonable grounds to recommend progressing, or halting, the assessment of an Inverness-located energy-from-waste facility towards preparing for a planning application. And should there appear to be grounds for recommending progressing, an outline budget and timescale requirement for progressing to the point of submitting a planning application.

f. Report the recommendations formed from undertaking these Next Steps to a subsequent meeting of the Communities and Place Committee.

Designation: Executive Chief Officer Communities and Place

Date: 10 November 23

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