Apatura Energy – West Hermiston

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1.0 Introduction

This design note has been prepared as an addendum to the original sustainability documents (as listed below) submitted as part of the planning process by Apatura for the proposed Data Centre at West Hermiston, Edinburgh. The focus of this document is to provide some additional context around the projected operational Greenhouse Gas (GHG) emissions associated with the proposed development. Furthermore, the document expands on the sustainability aspects of the project in line with NPF4 and local planning policy, highlighting the benefits associated with the development of a data centre at this location.

1.1 Existing Documentation

The documents listed below have been submitted to date, demonstrating the level of consideration given to and high importance placed upon the sustainability aspects as part of the planning process.

- ADC-CDL-XX-XX-T-SY-70220 – Energy Statement
- ADC-CDL-XX-XX-T-SY-70221 – Sustainability Statement
- ADC-CDL-XX-XX-T-SY-70222 – Operational Energy Statement
- ADC-CDL-XX-XX-T-SY-70223 – CCRA
- ADC-CDL-XX-XX-T-SY-70224 – GHG Emissions Report
- ADC-CDL-XX-XX-T-SY-70230 – Stage 2 WLECA Report

The sustainability team at Cundall worked closely with the wider design team as part of the development of the initial project proposals.

1.2 Scottish Policy and Planning

Datacentres have been identified in the "Green Industrial Strategy (2024)" as a target industry for investment. This is also highlighted in Scotland's Fourth National Planning Framework (NPF4). NPF4 identifies datacentres as National development that is described as a "fundamentally important utility".

The term "green data centres" noted in NPF4 has no clear definition but a response from Scottish Parliament in October 2025 it was stated 'To be considered a green data centre, planning authorities may wish to consider criteria such as the extent to which the data centre is powered from renewable energy sources; makes use of energy efficient technologies; seeks to minimise water consumption; and supports the re-use of excess heat.' The development already considers a number of these factors and has actively considered them and given intentions and improvements noted in the original reports. This will be explained in more detail and expand in this report.

2.0 Operational Energy

2.1 Overview

Due to the nature of data centres, the operational energy and associated carbon emissions make up the majority of the whole life cycle emissions associated with the building.

The standard metric for reporting energy efficiency of a data centre facility is the Power Use Effectiveness (PUE). This is the ratio of Total power used in the facility against the power required for IT equipment. It measures how effective the systems beyond the main IT Equipment serving the data centre are performing. This comprises cooling systems, lighting and ventilation throughout the facility inclusive of any administration support areas.

A typical PUE would be around 1.3 - 1.4 based on current designs and approaches for data centres. Achieving as low a PUE as possible reduces the energy demands of the datacentre.

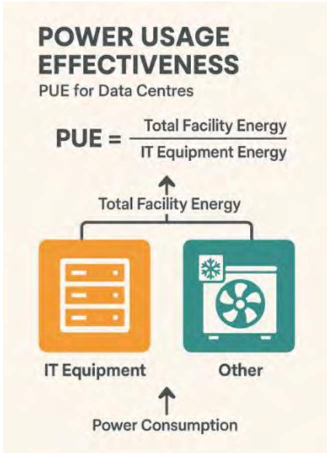


Figure 2-1: PUE Summary Diagram

Based on Cundall's experience in data centre design, we understand that the most efficient design proposals can realistically achieve PUE values of 1.1 – 1.2. This is a betterment of the range stated in the first edition of the UK Net Zero Carbon Buildings Standard (UK NZCBS), released in March 2026. This document lists a target value of 1.17 for a net zero aligned (high utilisation) data centre building starting operations in 2030.

Separate to the overall data centre building, the adjoining supporting office facility will be aligned with the UK NZCBS to achieve an EUI of 106 kWh/m², which is representative of a net zero aligned office building with longer operating hours that is starting operations in 2030. While this makes up a small proportion of the overall energy, this building typology can be optimised to ensure as efficient operation as possible.

2.2 Scotland Geographical Benefits

There are multiple benefits associated with locating a data centre facility in Scotland, including key factors directly linked to the impact on operational energy and associated emissions. This includes:

1. Cooler climate – helps to reduce cooling demand and achieve higher efficiencies for cooling systems.
2. Abundant renewable energy – use of energy closer to the source helps minimise transmission losses and costs while benefiting from an electricity grid which has a higher contribution from renewables across the country.

2.2.1 Climatic Impact on PUE

The effective use of cool air is a key enabler of saving energy linked to mechanical systems as has been demonstrated in project examples in the Nordic regions, helping to achieve low PUE values. It has been noted that a saving of 10-15%[1] is achieved in the PUE when comparing datacentres in Southern and Northern Europe. Measures such as minimising air leakage can reduce fan power consumption while minimising the recirculation of hot air back into IT equipment to allow target temperatures to be raised, reducing the energy associated with cooling systems.

Free cooling must be used wherever possible to achieve the energy efficiency targets. The cooler climate in Scotland will help to take advantage of this for a higher proportion of the year through solutions such as:

1. Direct free cooling where outdoor air is brought directly into the facility alongside careful monitoring of humidity and air quality
2. Indirect solutions where the outside air is used to cool the heat transfer medium used in the cooling circuit.

[1] ICIS, https://www.icis.com/explore/resources/data-centres-hungry-for-power/

3.0 Operational Carbon

3.1 Renewable Energy Generation

As previously noted in Section 2, Scotland has a much greater proportion of renewable energy supplying the grid. This is summarised in the graph below in Figure 3-1. The graph below shows the increase in renewable energy in recent years, primarily due to the rise of onshore and offshore wind energy.

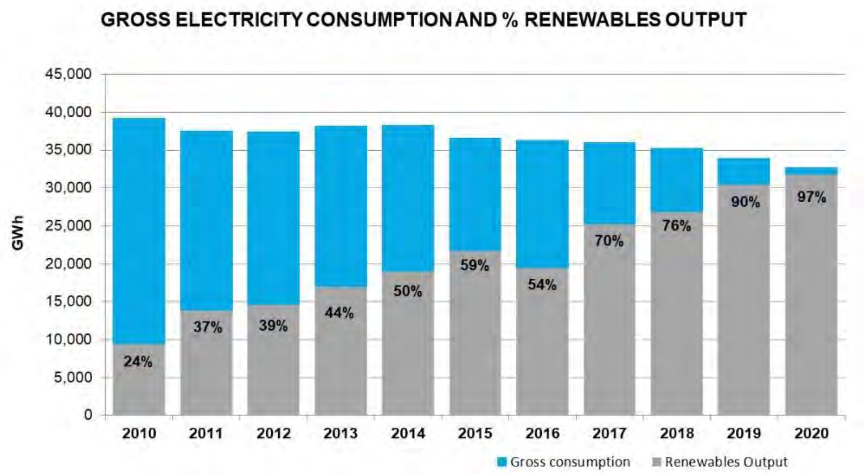


Figure 3-1 - Proportion of energy generation in Scotland. Source: Department for Energy Security and Net Zero Energy Trends

The generation mix for Scotland is dominated by renewable and other low-carbon technologies. In 2024, **37.9 TWh (73.1%)** of electricity generation came from **renewable sources**, while **47.4 TWh (91.5%)** came from **low-carbon technologies** including renewable generation and nuclear power[2]. Figure 3-2 illustrates the share of renewables and low-carbon electricity generation in Scotland is significantly higher than in other UK nations.

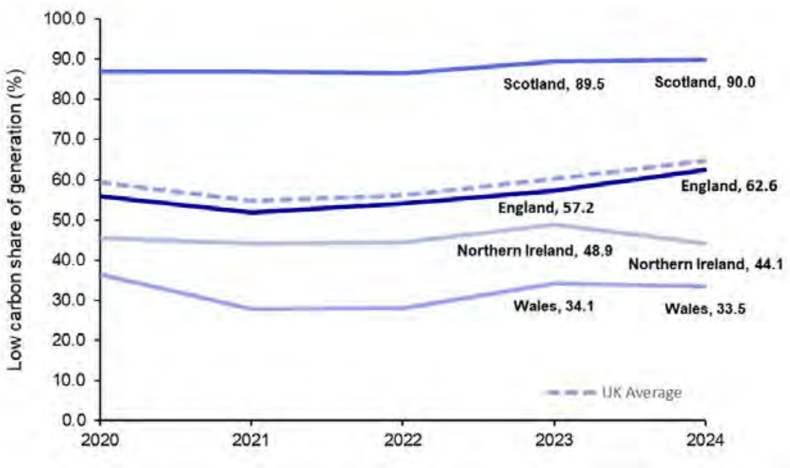


Figure 3-2 - Low carbon share of electricity by country 2020 to 2024. Source: UK Government Energy Trends Collection 18th December 2025

The high proportion of renewable generation results in a comparatively low carbon intensity for electricity produced in Scotland. Scottish Government statistics estimate that in 2023 the average emissions intensity of electricity generated in Scotland was approximately 20.7 gCO_2e/kWh, calculated from total generation emissions divided by total electricity generated[3] - this compares to 171 gCO_2e/kWh[4].

[2]Scottish Government (2023). *Record renewable electricity output.*https://www.gov.scot/news/record-renewable-energy-output/
[3] Scottish Government, 2025 - https://www.gov.scot/publications/energy-statistics-for-scotland-q1-2025/
[4] *DESNZ, 2025 - https://www.gov.uk/government/publications/clean-power-2030-action-plan/*

The increase in renewable generation has had a significant impact on the carbon emissions factor (CEF) associated with the electricity grid in Scotland. The graph below summarises how this has reduced significantly from around 390 gCO_2e/kWh in the year 2000 to approximately 21 gCO_2e/kWh in 2023.

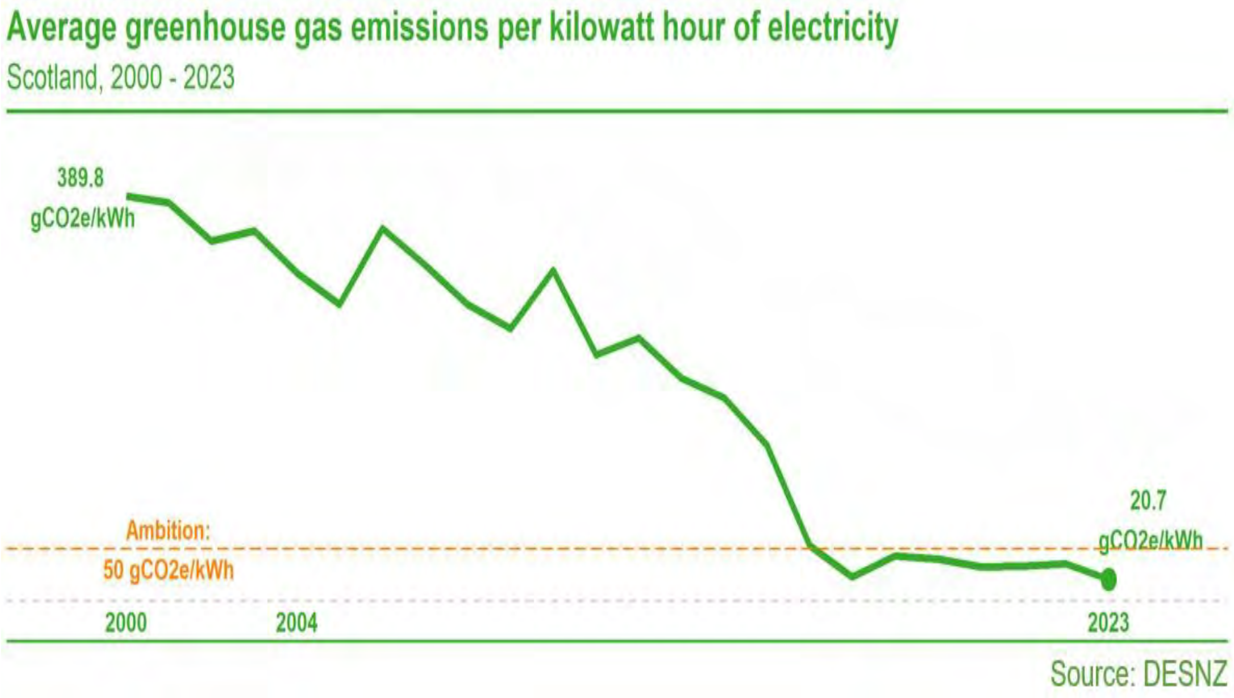


Figure 3-3 - Scottish Grid Carbon Factor. Source: Department for Energy Security and Net Zero

This pattern of grid decarbonisation in Scotland can be compared with the CEF for the United Kingdom (UK) as shown in Figure 3-4. While this graph only reports figures to 2020, it demonstrates the significant reduction in carbon associated with the grid in Scotland compared to the UK average.

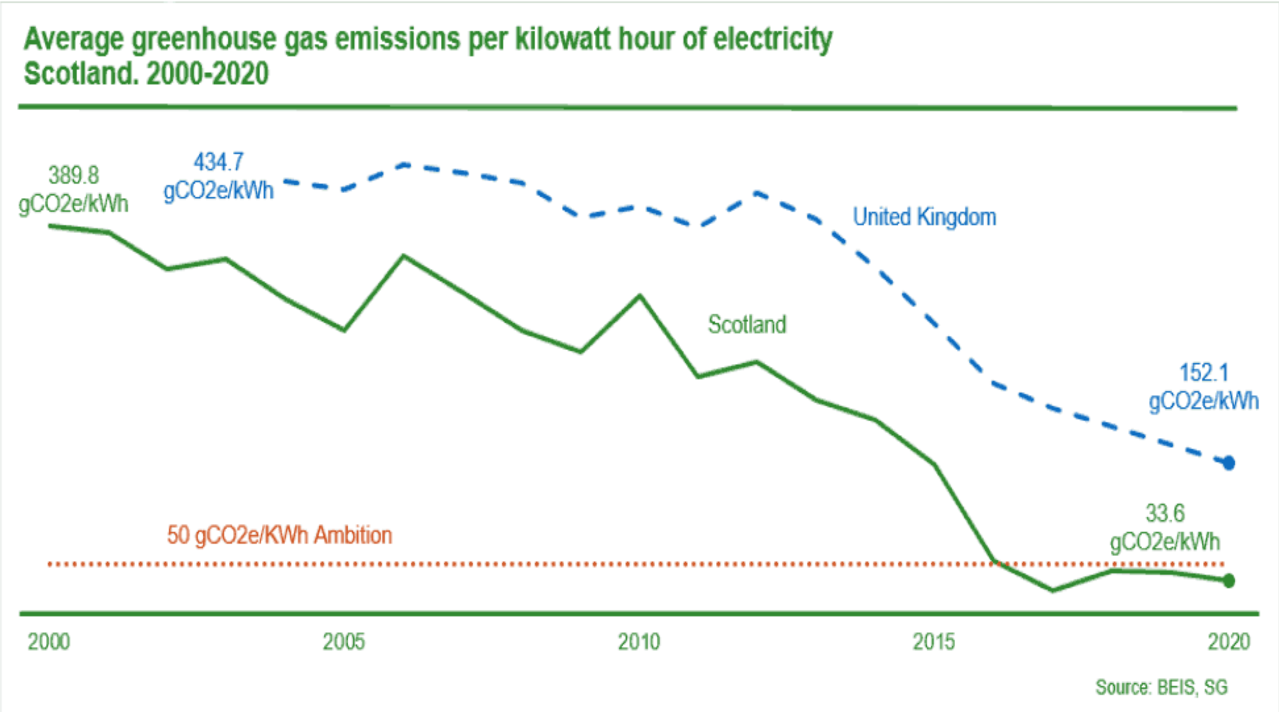


Figure 3-4 - Comparison of UK vs Scottish carbon grid factors. Source: Scottish Government

3.2 Electricity Grid Carbon Factor Projections

The Government publishes carbon factors for future years; however, this is based on the UK blend of energy. Carbon factors for initial years of site operations 2029 to 2035 (assuming a potential start on site in 2029) are summarised below. Please note that these values are shown in $kgCO_2e/kWh$ in alignment with the original data source – this value is also consistent with the appropriate metric for assessing cumulative whole life carbon emissions.

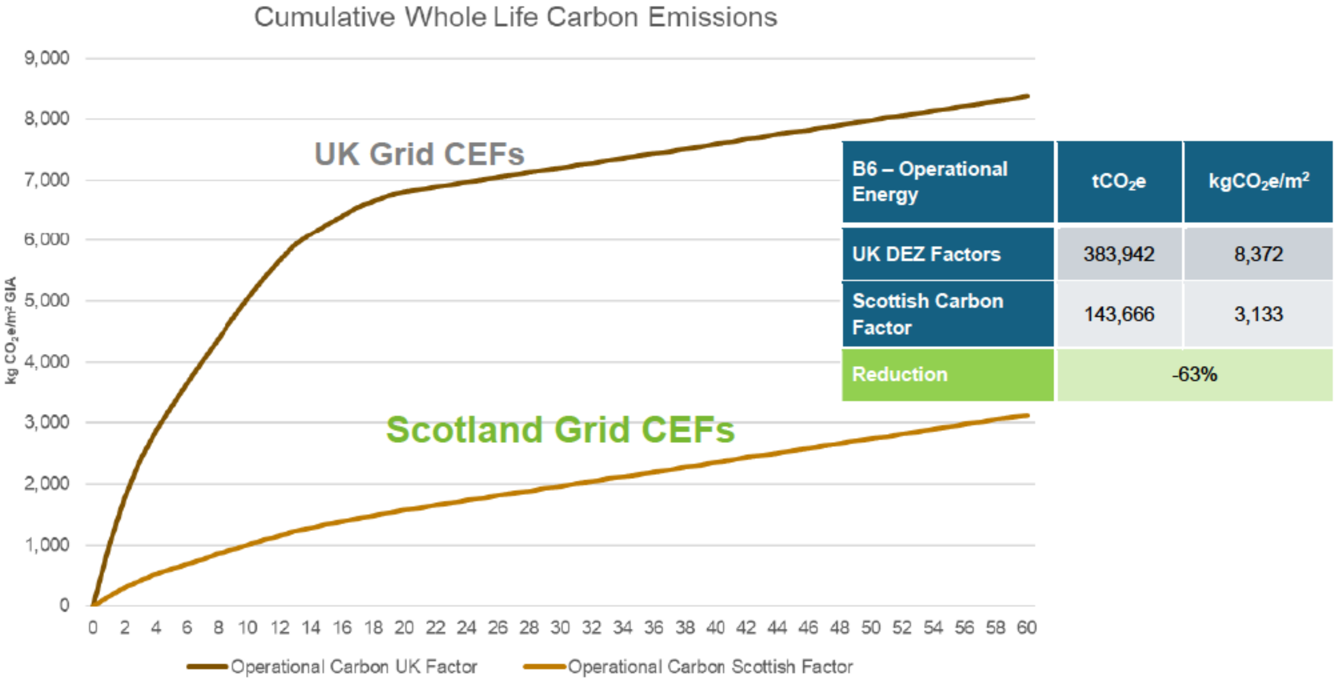
Year	DESNZ Factor ($kgCO_2e/kWh$)	Projected Scottish Factor ($kgCO_2e/kWh$)
2029	0.053	0.0088
2030	0.049	0.0082
2031	0.041	0.0071
2032	0.032	0.0061
2033	0.025	0.0051
2034	0.02	0.0044
2035	0.02	0.0043

Table 3-1 - Future Carbon Factors, DESNZ and Cundall projection

As there is no prediction for the carbon factors specific to the electricity grid in Scotland, we have applied a consistent proportional reduction aligned with the published UK factors on a trajectory towards achieving a value of 0.002 $kgCO_2e/kWh$ in 2050. Beyond 2050, we have assumed that the UK grid has equivalent renewable capacity and therefore both have equivalent factors as a conservative assumption to allow for some residual carbon at this stage.

3.3 Operational GHG Emissions Projections

The application of a grid carbon emissions factor specific to Scotland results in a significant reduction in the projected lifecycle emissions over the building lifecycle as outlined in the graph in Figure 3-5 below.



B6 – Operational Energy	tCO_2e	$kgCO_2e/m^2$
UK DEZ Factors	383,942	8,372
Scottish Carbon Factor	143,666	3,133
Reduction	-63%	

Figure 3-5 - 60-year operational carbon projections based on UK and Scotland grid Carbon Emissions Factors (CEFs)

As noted in the table within Figure 3-5 above, a potentially **significant reduction of 63% in operational carbon emissions** is estimated through consideration of a Scotland specific grid carbon emissions factor compared to a UK wide value over 60 years.

3.4 Role of Local Electricity Demand

Electricity-intensive infrastructure located closer to renewable generation can support more effective use of available low-carbon electricity within the system. Data centres are increasingly recognised as part of national critical infrastructure, and projections of future electricity demand incorporate substantial growth in digital infrastructure and AI-related computing requirements.

Locating data centres in regions with significant renewable generation offers several potential system-level benefits:

- Greater utilisation of locally available renewable electricity
- Reduced reliance on transmitting electricity long distances across constrained network boundaries
- Reduced system losses associated with transmission and distribution
- Reduced curtailment of renewable generation during periods of high output

Electricity transmission and distribution inevitably involve energy losses across the network. Government fuel mix disclosure data incorporates allowances for these losses when calculating delivered electricity emissions.[5]

Locating large electricity demands closer to generation can therefore reduce avoidable network losses and improve overall system efficiency.

Major transmission reinforcement projects, including new north–south transmission corridors and subsea links, are planned to increase export capacity from Scotland in the coming decade. However, aligning electricity demand with areas of high renewable generation can still provide system-level efficiency benefits.

3.5 Network Charging Signals

Electricity network charging structures also reflect the spatial imbalance between generation and demand within Great Britain. Transmission Network Use of System (TNUoS) charges vary by geographic zone to reflect the cost of connecting generation and transporting electricity across the transmission system.

In the 2025/26 TNUoS charging schedule (latest data available at the time of writing), Scottish generation zones carry some of the highest locational tariffs in Great Britain, reflecting the distance between major generation resources in northern Britain and the primary demand centres further south.

Zone	Tariff (£/kW)
North Scotland	23.984
Lothian & Borders	15.568
North East England	7.784
Southern England example zone	~0 to negative

Table 3-2 - Selected TNUoS generation tariffs (2025/26)

TNUoS charges vary annually and are currently subject to ongoing regulatory reform, which may alter locational charging structures in future.

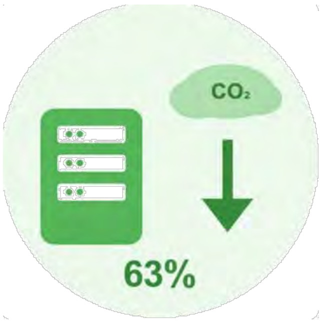
While generation charges do not directly determine data centre operating costs, they provide an indication of the structural system challenge: large volumes of generation located far from demand increase the cost of operating the transmission system. **Increasing electricity demand closer to renewable generation resources can help address this imbalance.**

[5] UK Government (DESNZ). *Fuel Mix Disclosure Data Tables*. https://www.gov.uk/government/publications/fuel-mix-disclosure-data-table

4.0 Conclusions & Next Steps

4.1 Energy & Carbon Impact

There are benefits linked to the development of data centre projects in Scotland which supports the proposals for the site at West Hermiston in Edinburgh. This includes:



1. **Cooler climate** enabling opportunities for free cooling solutions, reducing energy associated with cooling and helping to maximise the efficiency of any cooling plant.
2. **Abundant renewable energy** allowing the site to benefit from lower carbon electricity closer to the renewable technology source.

We have demonstrated that the consideration of the carbon emissions factor specific to a site location in Scotland results in an estimated **63% reduction in annual operational carbon emissions over 60 years** when compared to the UK-grid average.

4.2 Strategic Implications for Data Centre Development

Data centres are increasingly recognised as part of national critical infrastructure, supporting digital services, economic activity and emerging AI-driven computing demand.

Forecasts of future electricity demand in Great Britain incorporate significant growth in digital infrastructure alongside electrification of transport, heating and industrial processes.

Furthermore, it should be noted that the development of a data centre development aligns with the NPF4 stating that data centres are a National Development that help deliver the National Spatial Strategy. The development of such a facility also helps to support the continued development of Scotland's strength as a global leader in data science and research activities.

Scotland's electricity system combines three characteristics that are particularly relevant to electricity-intensive digital infrastructure and to the efficient operation of the wider electricity system:

1. A very high share of **low-carbon electricity generation**
2. Electricity generation **significantly exceeds local demand**
3. **Transmission constraints** that can limit the export of renewable electricity to other regions of Great Britain

While transmission network reinforcements are planned to increase north–south transfer capacity over the coming decade, aligning electricity demand with areas of strong renewable generation can complement these investments and support more efficient operation of the electricity system overall.

In summary, it is important to reinforce some of the benefits linked to the use of local renewable generation:

- **Reducing transmission losses/costs** – use of energy near source location helps to minimise energy losses during long distance transmission and distribution and other carbon costs associated with infrastructure required to support this transmission of energy over longer distances.
- **Demand management** – by locating high-energy consuming facilities such as the proposed data centre at West Hermiston in Edinburgh, this helps to relieve pressure on other parts of the UK where the electricity capacity available is not sufficient to support such a development.
- **Reducing renewable energy wastage** – the energy demand associated with a new data centre development will help to avoid the requirement for curtailment where the output from renewables is deliberately reduced due to insufficient demand on the network. As of the end of September 2025, Scotland had 17.8 GW of operational renewable capacity (source: Scottish Government).

4.3 Next Steps

Following the optimisation of the design to minimise energy consumption as far as possible, the additional measures noted below can be explored to ensure the energy and carbon impact of the proposed data centre development is optimised as far as is reasonably practical.

4.3.1 Waste Heat for District Heating Networks

The potential future contribution of waste heat into surrounding heat networks, for example with Heriot-Watt University is to be explored in more detail. Early conversations have taken place between Apatura and Vattenfall who are heat network specialists with extensive existing experience across the UK.

One of the most effective ways to achieve effective carbon reduction linked directly to the new development can be achieved through the provision of heat directly to surrounding users of heat energy, helping to directly reduce the carbon associated with the heating of these buildings.

Initial engagement between Apatura and the City of Edinburgh Council LHEES team alongside other stakeholders has taken place to identify an opportunity for excess heat generated from the data centre development to be used as part of a district heating network in the area. This process will help support the development of a blueprint to facilitate practical delivery of waste heat to existing and proposed development land.

There is already allowance as part of the masterplan for future district network connections at the edge of the site and discussion noted above will continue as the design develops.

4.3.2 Power Purchase Agreements (PPAs)

A Corporate PPA is a direct agreement between a company and a renewable energy generator, such as a solar or wind farm, to buy electricity at a predetermined price over a set period. Unlike traditional energy purchases from utilities, Corporate PPAs provide more control over energy sources and costs - it guarantees a buyer for the electricity, securing predictable revenue for developers to secure funding for renewable energy projects, while offering companies stable, lower-cost, renewable energy.

PPA's will be explored to understand the opportunities for this site and the Apatura portfolio. This route forward offers several benefits ensuring the commitment to reducing carbon through the procurement of energy generated from renewable sources.

4.3.3 Carbon Offsetting

Offsetting options may include nature-based, high priority actions linked to land restoration etc. This would be a longer-term option; however, would ensure that a real benefit that can be reported is targeted.

4.3.4 Embodied Carbon

There is scope to reduce the embodied carbon of the building. This can be achieved by ensuring material use is minimised, exploring opportunities of reused steel sections (95% lower carbon) and using materials with high recycled content for the structure and façade. There is potential for a 10-20% reduction based on the current baseline figures reported. This will be reviewed and be subject to technical requirements, project program and availability of materials. Further details are included in the Stage 2 Whole Life Embodied Carbon report (Ref: ADC-CDL-XX-XX-T-SY-70230).