

Energy Benchmarking Highland Council

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APSE Energy Benchmarking Presentation

With reference to:

- The problem of managing energy use
- Our approach
- Rubbish in, rubbish out – getting the data right

Highland Council Property Estate

Function	Number of Sites	Number of Buildings	Combined Floor Area
Schools inc Leisure & PPP	200	950	489,889m ²
Offices	47	195	60,630m ²
Depots	38	109	27,608m ²
Others	461	657	138,579m ²

Challenges

To the Property Estate:

- National & Organisational Net Zero target by 2045
 - Milestone targets
- Ageing built estate
 - Asset Rationalisation
- Property maintenance budget limitations
- Net Zero transition – heating systems
- Behaviour change

Benchmarking Development

Pre 2019:

- Predominately only CIBSE TM46 was utilised
 - Focus on key larger building types

2019:

- SEON commissions University College London to produce up to date and relevant benchmarks for Scottish Local Authorities
 - 27 of 32 LA submitted participated

2022:

- Zero Waste Scotland and SEON jointly commission Building Research Solutions to undertake Phase 2
 - Expansion to all public sector buildings
 - Greater use of AMR data

Our Approach

Initial Estate Review:

- Large quantity of data
- Benchmarks not always applicable
- Consideration to site
- Performance figures were “too good”

Agreed Next Steps:

- Continue provision
- To develop an interactive webpage interface (the “Energy Benchmarking Tool”)

Property Type	Carbon	Electricity	Heating	Water
Cemeteries				
Changing Rooms				
Community Centres	78%	67%	80%	57%
Day / Resource Centres	80%	36%	50%	86%
Depots	52%	35%	40%	50%
Town Halls		83%	33%	100%
Housing/Accommodation	86%	38%	100%	
Industrial	60%	50%		29%
Libraries	83%	62%	50%	20%
Museum / Art Gallery	100%	50%	100%	100%
Nursery	50%	50%		100%
Offices	76%	66%	43%	69%
PC	62%	43%		
Pier / Harbour				
Primary School	74%	54%	48%	70%
Recycling/Landfill	38%			
Residential Home	81%	53%	50%	100%
Secondary School	60%	58%	46%	81%
Shop				
Special Needs Centres	67%	100%	67%	100%
Sport & Leisure	77%	75%	45%	75%
Visitor Centres	67%	50%	33%	67%
All	69%	54%	49%	70%

Highland Council Energy Benchmarking Tool



Energy Performance Benchmarking

[Home](#)

[Annual Comparison](#)

[Energy Overview](#)

[Cost Overview](#)

[Property Portfolio](#)

[Map Tool](#)

[Help Page](#)

This energy performance reporting tool, created by the Energy Team of the Highland Council, is designed to provide meaningful analysis and information in relation to the energy consumption, costs, and relative performance efficiencies of the non-domestic property estate. It directly supports our Net-Zero Strategy, which has a target of zero emissions from council operations by 2045. For 2024/25, total emissions amounted to 27,619 tonnesCO₂e, of which over 60% is attributed to non-domestic properties, such as our schools, offices, and depots. Furthermore, it also supports the Council's aspiration towards greater openness and transparency with respect to the data we hold. It is recommended that first-time users refer to the help page section to aid in their navigation and understanding of this reporting tool.

The tool allows members of the public, Elected Members, and Council Staff to understand where our property related carbon emissions arise from and to also aid informed decision-making with regards to energy expenditure and net-zero obligations.

With over 1,100 properties there is a lot of data to display and functionality has been added to allow users to view or group properties by type, region, and also via an interactive map to make it more relatable to their needs. For each site, a "report card" is available, allowing individual site information to be collated. It should be noted that there are numerous factors which impact upon energy performance of an individual building; therefore, the performances detailed within should not be viewed in isolation, but considered within a wider context, e.g., whether a school undertakes catering or not, or a depot having shorter or longer operating hours. Data for the 2022/23, 2023/24, and 2024/25 financial years are available for review within this report. Functionality has been added to allow multi-year comparisons to be undertaken, permitting the council's long-term journey to Net Zero to be assessed.

Queries in relation to specific buildings, data, or use of the tool can be submitted to energy.engineering@highland.gov.uk

Number of Sites

1,115

Total Annual Energy Expenditure

£27,280,589

Annual Carbon Emissions

27,563 tCO₂e

To view data for individual sites, select "site name" below; otherwise, select "site type" to view benchmarking or energy data for specific building types.

Site Name

Site Type

Step 1 - Select site type

Car Park*	Hall	Offices	Shop*
Cemetery*	Housing/Accommodation	PC	Special Needs Centre
Changing Room/Pavilion	Industrial Type Activites	Pier/Harbour*	Sport Centre - Dry
Community/Youth Centre	Library	Primary School	Sport Centre - Wet
Day/Resource Centre	Misc*	Recycling/Landfill Centre*	Sport Facility
Depot/Yard	Museum/Art Gallery	Residential Home	Unmetered, Street & Communal*
EVCP*	Nursery	Secondary School	Visitor Centre

* Not included in benchmarking assessment

Step 2 - Select highlighted button

Energy & Benchmarking Breakdown

This energy performance reporting tool, created by the Energy Team of the Highland Council, is designed to provide meaningful analysis and information in relation to the energy consumption, costs, and relative performance efficiencies of the non-domestic property estate. It directly supports our Net-Zero Strategy, which has a target of zero emissions from council operations by 2045. For 2024/25, total emissions amounted to 27,619 tonnesCO₂e, of which over 60% is attributed to non-domestic properties, such as our schools, offices, and depots. Furthermore, it also supports the Council's aspiration towards greater openness and transparency with respect to the data we hold. It is recommended that first-time users refer to the help page section to aid in their navigation and understanding of this reporting tool.

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Cemetery*	Housing/Accommodation	PC	Special Needs Centre
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Depot/Yard	Museum/Art Gallery	Residential Home	Unmetered, Street & Communal*
EVCP*	Nursery	Secondary School	Visitor Centre

Step 2 - Select highlighted button

Energy & Benchmarking Breakdown

Site Name

Site Type

Filter by Site Type

Sport Centre - Wet

Filter by Location

All

Clear filters

View Data by:

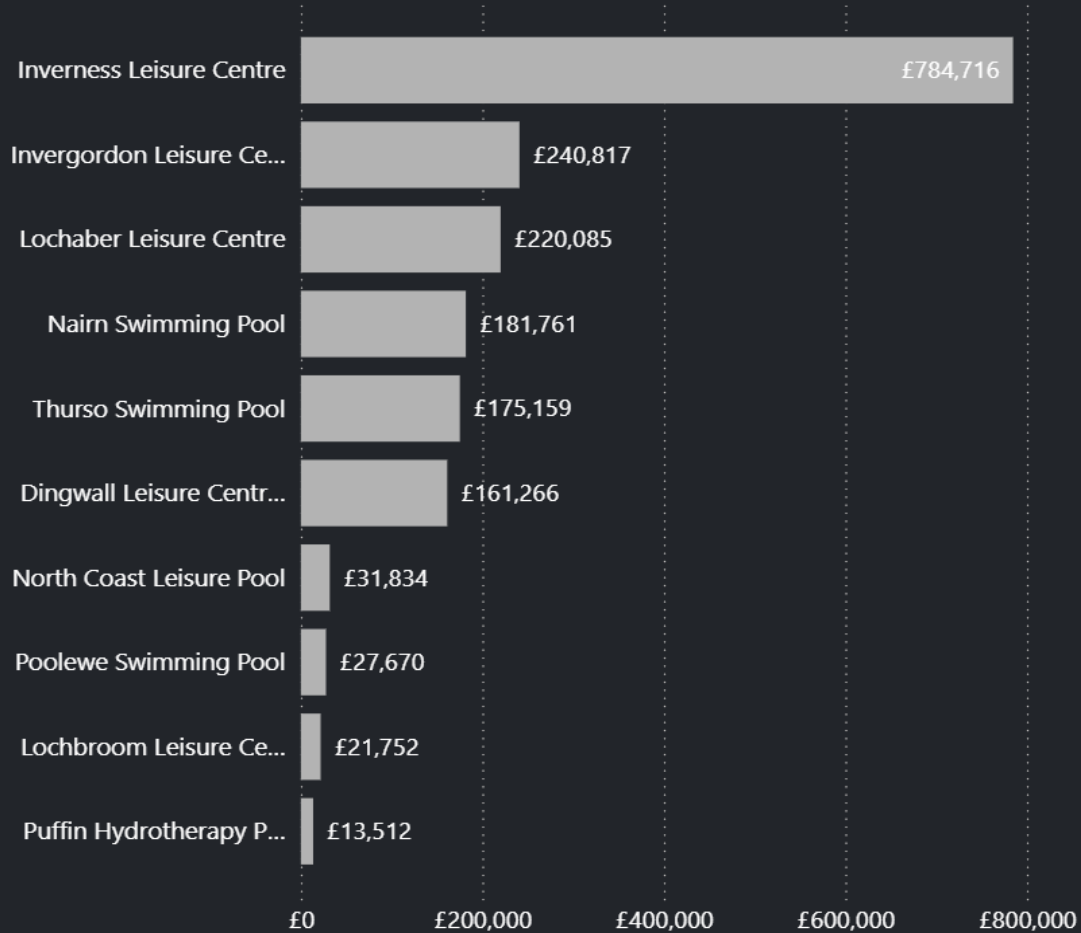
Site Type

Site Name

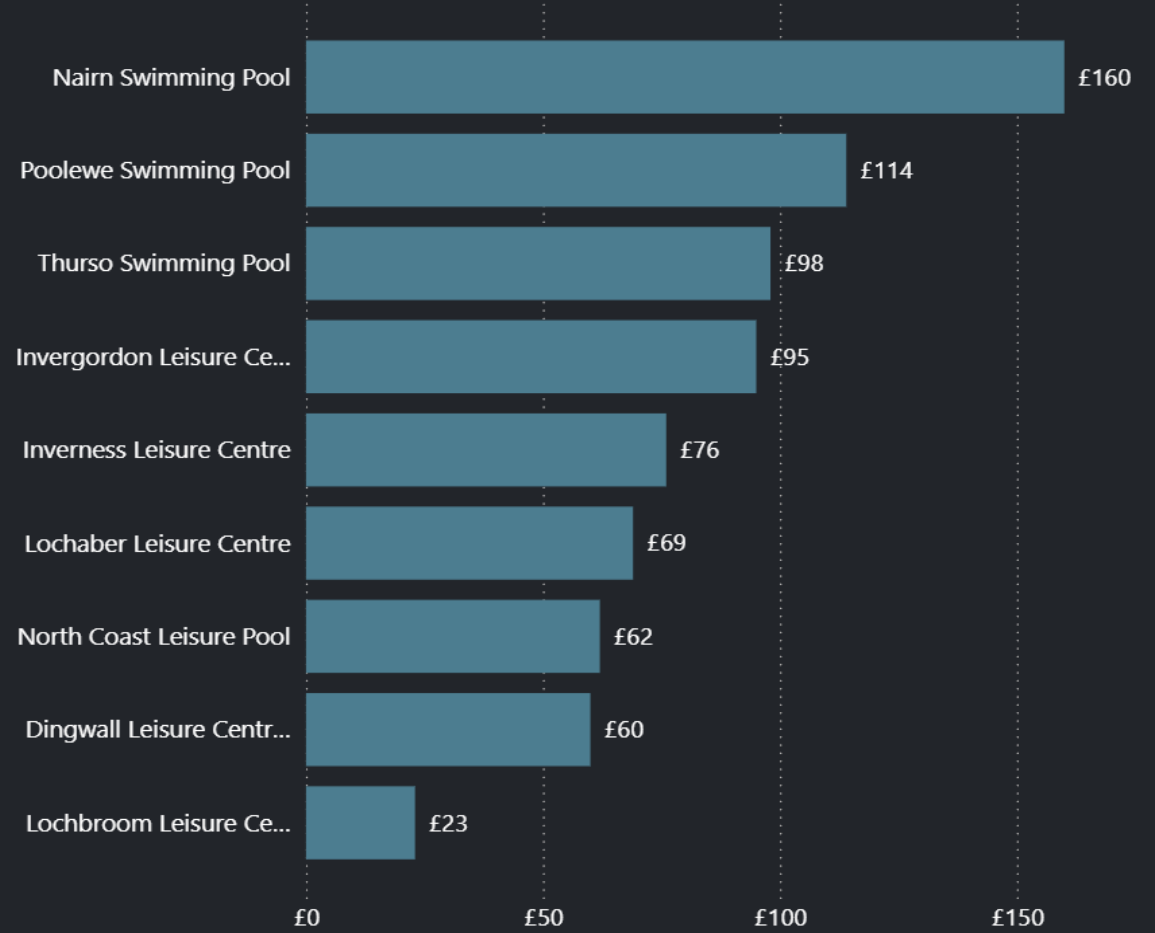
Enter building name...



Annual Cost (£)



Relative Cost (£/m²)



Select site to view report card

Filter by Site Type

All

Filter by Location

Inverness (City)

Clear filters

View Data by:

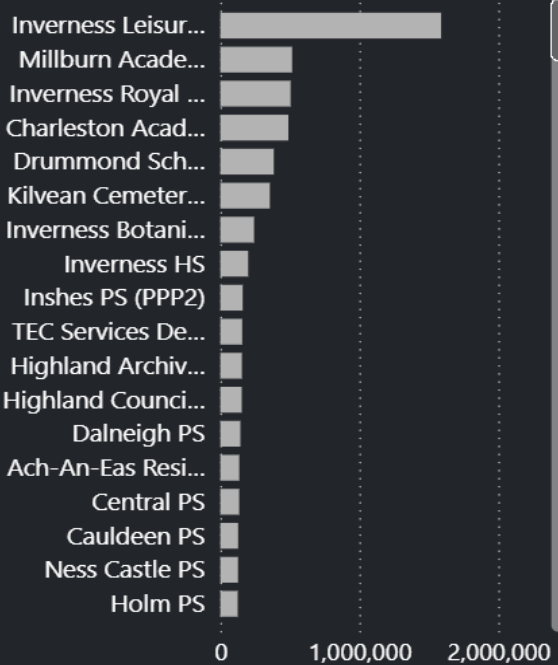
Site Type

Site Name

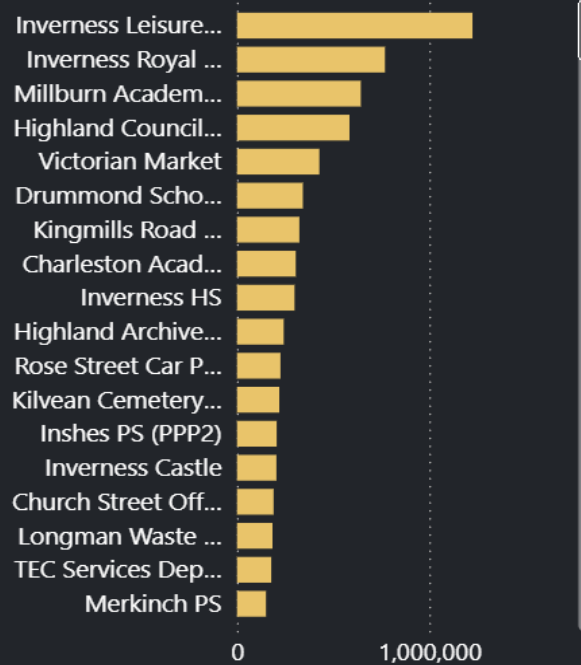
Enter building name...



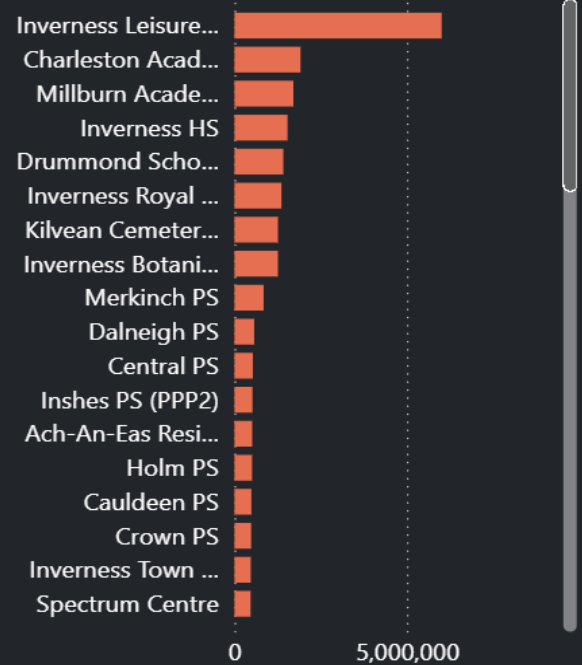
Carbon



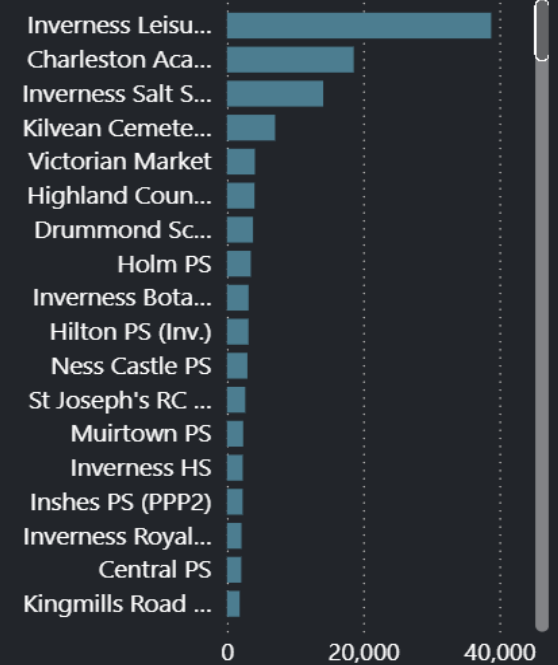
Electricity



Heat



Water



Number of Metered Sites: 157

Carbon Emissions (kgCO2e): 8,237,113

Number of Metered Sites: 147

Electricity Consumption (kWh): 11,218,765

Number of Metered Sites: 59

Heating Consumption (kWh): 27,763,380

Number of Metered Sites: 77

Water Consumption (m³): 150,065

Select site to view report card

Filter by Site Type

Filter by Location

Clear filters

Enter building name...

Primary School

All



Carbon

Electricity

Heat

Water

Cost

Electricity Consumption (kWh)

Site Name	2022/23	2023/24	2024/25	Annual Change (kWh)
Abernethy PS	71,356	50,534	44,536	-5,998 ↘
Acharacle PS	78,875	109,832	107,460	-2,372 →
Achiltibuie PS	55,348	57,991	48,373	-9,618 ↘
Aldourie PS	79,516	54,380	69,763	15,383 ↗
Altnaharra PS (Mothballed)	17,500	17,559	17,490	-69 →
Alvie PS	68,035	113,098	78,501	-34,597 ↓
Applecross PS	10,262	10,254	5,648	-4,606 ↓
Ardersier PS	64,291	67,138	67,891	753 →
Ardgour PS	88,690	79,628	76,694	-2,934 →
Ardross PS	138,251	86,641	101,516	14,875 ↗
Arisaig RC PS	16,925	21,414	20,676	-738 →
Auchtertyre PS	102,251	106,771	95,048	-11,723 ↘
Auldearn PS	76,388	86,438	80,548	-5,890 ↘
Aviemore PS	258,715	295,281	227,785	-67,496 ↓
Avoch PS	72,562	0	100,712	100,712
Badcaul PS (Mothballed)	55,813	14,202	4,180	-10,022 ↓
Ballachulish PS	145,899	146,649	146,850	201 →
Balloch PS	53,831	62,502	61,895	-607 →
Balnain PS	80,674	70,863	52,213	-18,650 ↓
Banavie PS	34,841	30,569	29,664	-905 →
Beauly PS	171,878	129,733	122,026	-7,707 ↘
Ben Wyvis PS	154,443	154,598	115,798	-38,800 ↓
Total	14,396,459	14,135,192	13,078,557	-1,056,635 ↗

Sites with Large FY23/24-24/25 Increase

12

Sites with Large FY23/24-24/25 Decrease

35

- ↗ 30%+ increase
- ↗ Increase 5%-30%
- Consistent
- ↘ Decrease 5%-20%
- ↓ 20%+ decrease

Select site to view report card

Filter by Site Type

All

Filter by Location

All

Clear filters

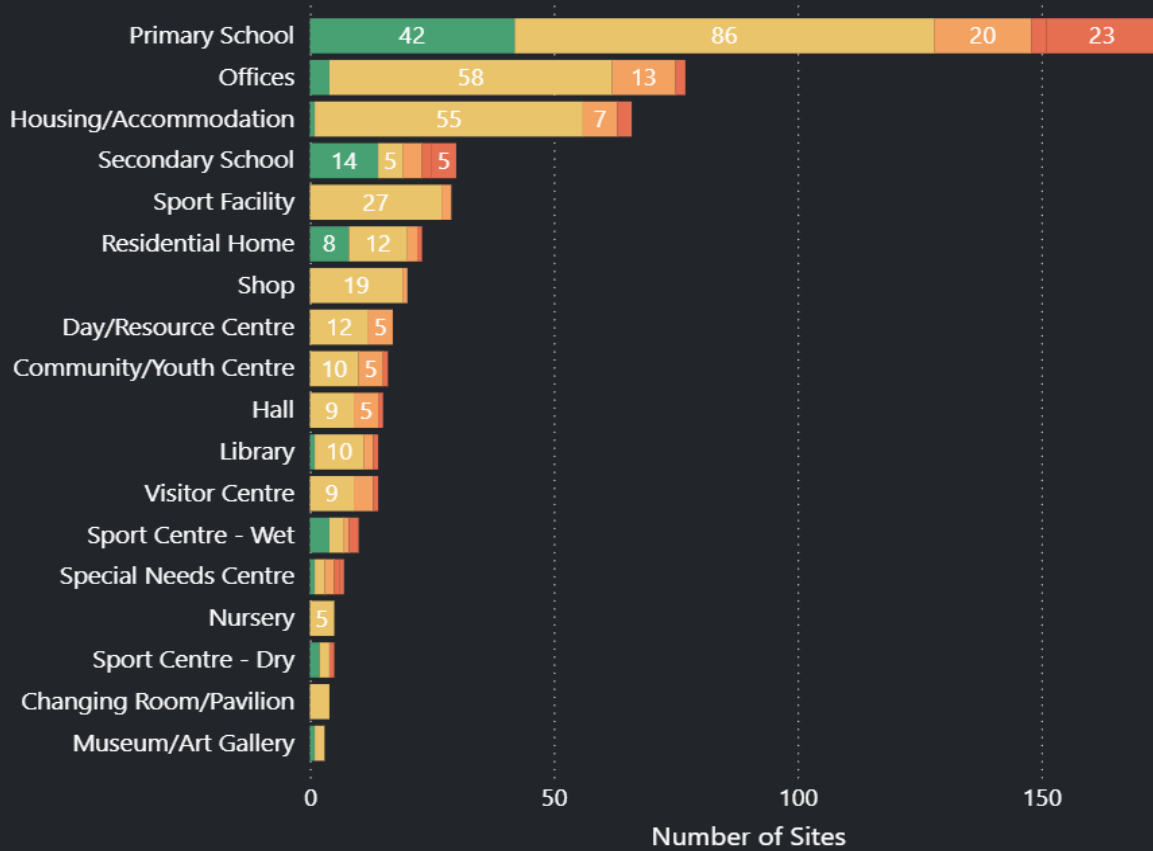
View Data by: **Heating Fuels**

Renewables Overview

Enter building name...



Main Heating Fuel ● Biomass ● Electricity ● Gas ● LPG ● Oil



Heating Fuel Selector

Biomass Electricity Gas LPG Oil

529

Sites with Selected Heating Fuel(s)

Site Reference	Site Name	Primary Heating Fuel	Additional Heat Sources
1 King Street	1 King Street	Gas	N/A
HR 05948	1 Lichfield Court	Electricity	N/A
HR 06070	1 Quayside Court	Electricity	N/A
HR 06050	10 Balnacraig Road	Electricity	N/A
HR 06069J	10 Queen Mother House	Electricity	N/A
HR 02723	100 Torvean Avenue	Electricity	N/A
HR 06042	11 Lochiel Road	Gas	N/A
HR 06069K	11 Queen Mother House	Electricity	N/A
HR 06052	12 Balnacraig Road	Electricity	N/A
HR 05308	12 Grant Street	Electricity	N/A
HR 06069L	12 Queen Mother House	Electricity	N/A
122 Milnafua	122 Milnafua	Gas	N/A
13 Hilton Village	13 Hilton Village	Electricity	N/A
HR 05309	14 Grant Street	Gas	N/A

Select site to view report card

Carbon Emissions (kgCO₂e): 27,562,706

Electricity Consumption (kWh): 55,806,824

Heat Consumption (kWh): 86,705,846

Water Consumption (m³): 627,639

Filter by Site Type

All ▼

Filter by Location

All ▼

Clear filters

View Data by:

Heating Fuels

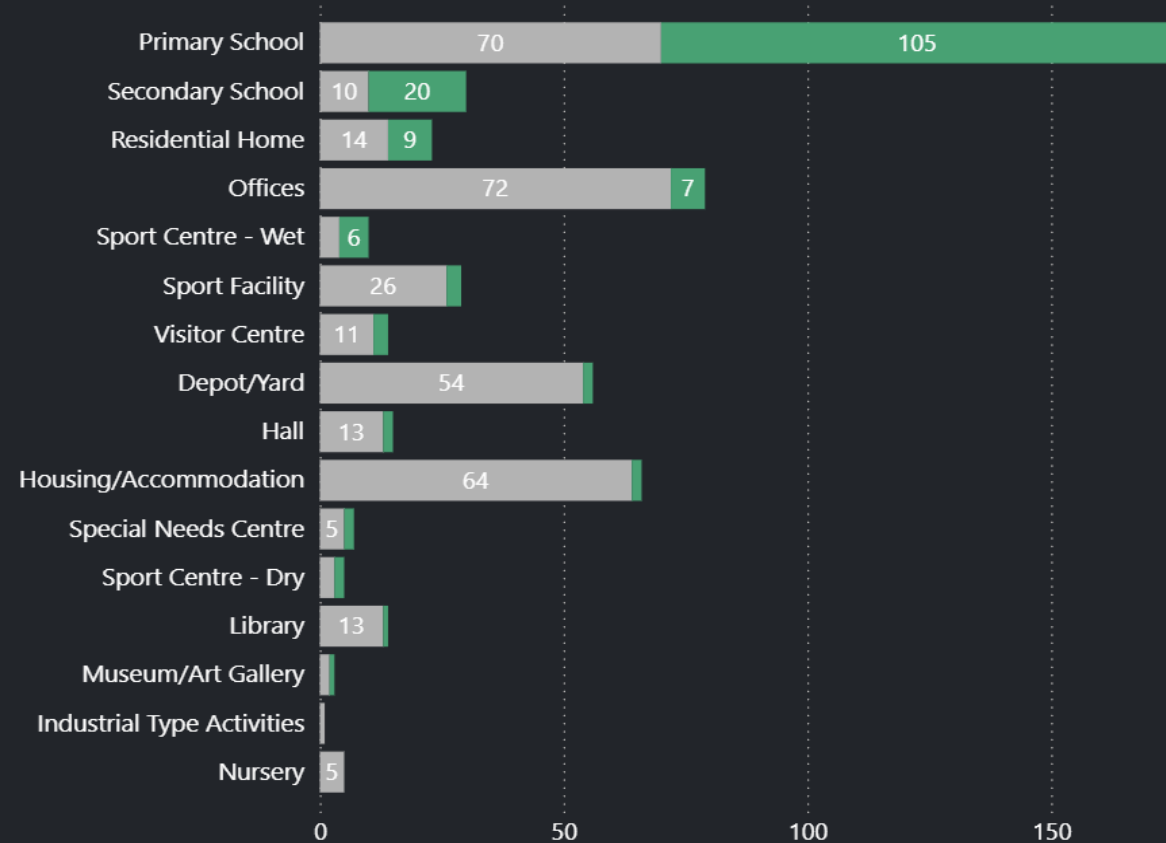
Renewables Overview

Enter building name...



● Sites without Renewables ● Sites with Renewables

[View Solar PV Overview](#)



Renewables Selector

ASHP
 Biomass
 Gas CHP
 GSHP
 Hydro
 PV
 Solar Thermal

168

Sites with Selected Renewable(s)

Site Reference	Site Name	Renewable Technologies	Primary Heating Fuel Source
1 King Street	1 King Street	None	Gas
HR 05948	1 Lichfield Court	None	Electricity
HR 06070	1 Quayside Court	None	Electricity
HR 06050	10 Balnacraig Road	None	Electricity
HR 06069J	10 Queen Mother House	None	Electricity
HR 02723	100 Torvean Avenue	None	Electricity
HR 06042	11 Lochiel Road	None	Gas
HR 06069K	11 Queen Mother House	None	Electricity
HR 06052	12 Balnacraig Road	None	Electricity
HR 05308	12 Grant Street	None	Electricity
HR 06069L	12 Queen Mother House	None	Electricity
122 Milnafua	122 Milnafua	None	Gas
13 Hilton Village	13 Hilton Village	None	Electricity
HR 05309	14 Grant Street	None	Gas

Select site to view report card

Carbon Emissions (kgCO₂e): 27,562,706

Electricity Consumption (kWh): 55,806,824

Heat Consumption (kWh): 86,705,846

Water Consumption (m³): 627,639

Filter by Site Type

Primary School

Filter by Location

Sutherland

Clear filters

[Return to Renewables Overview](#)

Enter building name...



Site Reference Number	Site Name	PV Generation 2024/25 (kWh)
HC 00071	Tongue PS	3,697
HC 00090	Brora PS	3,658
HC 00089	Durness PS	2,257
HC 00066	Melvich PS	1,258
HC 00084	Stoer PS (Mothballed)	0
Total		10,870



Select site to view report card

5 Sites with Solar PV

Wick Joint Campus

Building Information

Site Reference: **HC 00020**

Floor Area (m²): **29,511**

Annual Cost: **£648,536**

Relative Cost (£/m²): **£22**

Occupant Number/School Roll: **721**

Occupancy: **95%**

Primary Heating Fuel Source: **Biomass**

Other Heating Fuels: **LPG**

Renewable Technologies: **Biomass**

Site Commentary:

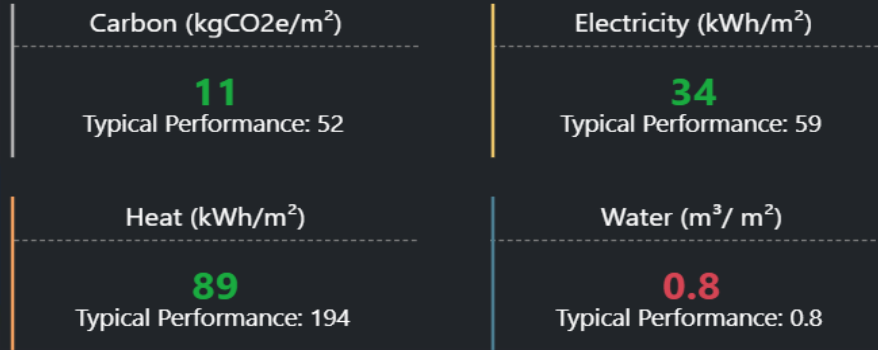
Electricity: **N/A**

Heating: **N/A**

Site / (Water): **(Non-standard operating hours)**

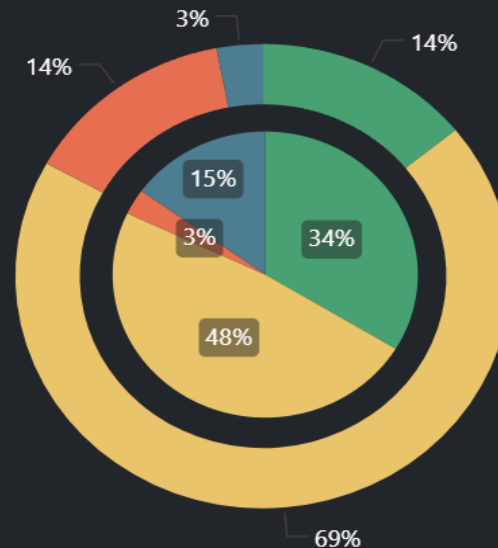
Benchmark Performance

Site Type: **Secondary School with Pool**



Carbon Emissions (Outer ring) & Utility Costs (Inner Ring)

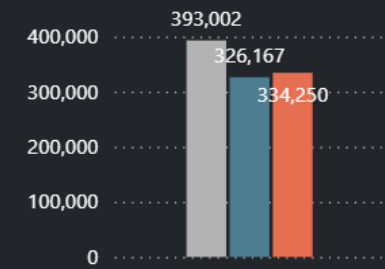
● Biomass ● Electricity ● Gas ● LPG ● Oil ● Water



Annual Carbon and Utility Changes

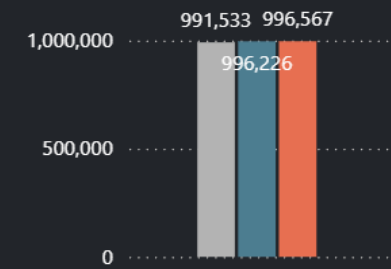
Carbon (kgCO₂e)

● 22/23 ● 23/24 ● 24/25



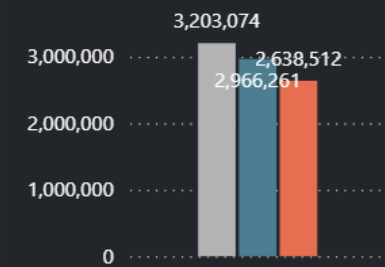
Electricity (kWh)

● 22/23 ● 23/24 ● 24/25



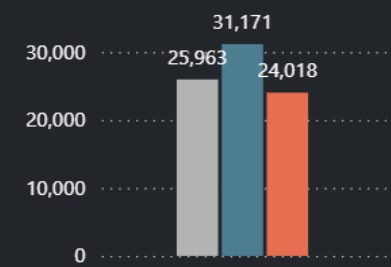
Heating (kWh)

● 22/23 ● 23/24 ● 24/25



Water (m³)

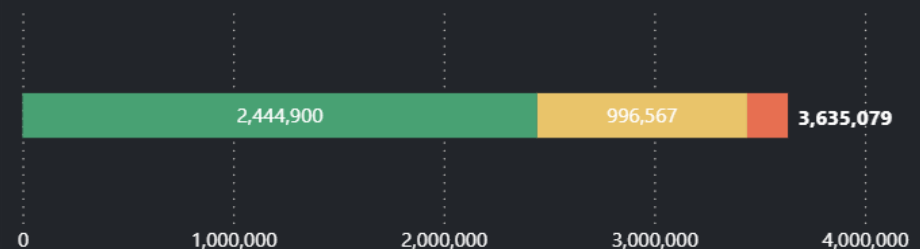
● 22/23 ● 23/24 ● 24/25



Utility Consumption (kWh)

* Water consumption not included

● Biomass ● Electricity ● Gas ● LPG ● Oil



Power BI

Overview

- Posh pivot table
- Data import/integration
- DAX coding language
- Part of Office 365 suite

Power BI

Why use PowerBI

- Clear Data Presentation
- Design flexibility
- Easy to learn; hard to master
- Many data connection methods
- Office 365 Integration

Power BI

Lessons learned:

- Slow Processing
- Refresh, refresh, refresh
- Optimise dashboard performance
- Power Query Basics
- Templates for inspiration
- Understanding Data relationships

Rubbish In => Rubbish Out

- Consumption data
- Building information
- System information
- Application of benchmarks
- Comparing apples with apples
- Assumptions

Lessons Learned 1

- Historical data is your friend
 - Don't switch utility billing system!
- Be careful of floor areas
- Utility invoicing – accurate?
 - Gas
 - Electricity
 - Water
 - LPG/Biomass/Oil
- Golden thread

Lessons Learned 2

- Mixed heating systems
- SEON/Scottish public sector benchmarks used consistently.
 - Carbon performance?
- How to demonstrate success
- Boots on the ground
- Benchmarking is not a game of perfect

Benchmarking Links

- Highland Council
 - Google search
 - “Highland Council Energy Performance”
- Scottish Public Sector
 - <https://www.zerowastescotland.org.uk/resources/scottish-public-sector-benchmarking-tool>



Thank you Mòran taining



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