

District Heating carbon footprint calculator

Nottingham - 2022

Start	End
01/01/2022	31/12/2022

CO ₂ e Emission Gross factors			
Gas	0.18254	kg CO ₂ e / kWh	BEIS conversion factor 2022
Gas oil	0.25679	kg CO ₂ e / kWh	BEIS conversion factor 2022
Grid Supplied Electricity			
Industrial (Consumption-based)	0.2548	kg CO ₂ e / kWh	2022 marginal factors
Generation-based	0.2415	kg CO ₂ e / kWh	2022 marginal factors

Proportion of year on zero carbon electricity	25%	%
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Gas consumption (DH)	6,895	MWh
Gas Oil consumption (DH)	0	MWh
Electricity consumption (DH)	1,753	MWh
Electricity consumption (ERF)	9,577	MWh
Gas oil consumption (ERF)	2,185	MWh

ERF heat generation	90,120	MWh
ERF electricity generation	56,304	MWh
ERF total waste input	182,198	t
z ratio	6.3	
Waste generating heat	36,912	t
Electrical Generation Sacrificed	14,305	MWh
Electrical Generation Sacrificed [%]	20%	

Heat used by customers (incl. losses)	90,120	MWh
Heat Losses	6%	

Alternative gas consumption	106,024	MWh
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Assumptions:

- 1) 85% efficiency for gas and oil fired boilers
- 2) 1721MWh electrical consumption on DH Network
- 4) Alternative gas consumption is based on gas boilers located on customer premises

PRIVATE WIRE SUPPLY:

2022 Values	Units	Description	Data Source
17,579,750	kWh	Total private wire electricity supplied (F4) less import	Cust Services
6.3		z-factor of heat station turbine	Reference 2, Table GN28-1 Using EE steam pass-out pressure
8,314,000	kWh	Additional electricity used for heat station and FCC overheads (pumps etc.)	Logged by EnviroEnergy for ROC's
25,893,750	kWh	Total extra electricity that has to be sourced from the grid (compared to if district heating network wasn't there)	
0.2548	kgCO ₂ e/kWh	Long-run marginal electricity emissions factor (consumption-based)	BEIS Long run marginal emissions factor for 2020 (generation-based) - Reference 3
25%		Proportion of calendar year on zero carbon tariff for electricity	Switched to zero carbon tariff 1st October 2022
1,588,974.87	kg	Extra indirect CO ₂ e emitted	
0.2415	kgCO ₂ e/kWh	Long-run marginal electricity emissions factor (generation-based)	BEIS Long run marginal emissions factor for 2020 (generation-based) - Reference 3
4,245,435.20	kg	Extra CO ₂ e emitted (from displaced electricity)	
5,834,410	kg	Extra CO ₂ e emitted	
5,834,410	kg	Total 'extra' CO ₂ e emitted	
56,304,000	kWh	Total Electricity Generated (kWh) (Private Wire, London Rd + Eastcroft, spill to grid)	Logged by EnviroEnergy
0.1036	kgCO ₂ e/kWh	Overall electricity carbon factor	

References

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|---|---|---|
| 1 | Technical Note - Modelling Energy from | https://www.bregroup.com/sap/bre-technical-notes/ |
| 2 | CHPQA Guidance Note 28 - The | https://www.gov.uk/guidance/chpqa-guidance-notes |
| 3 | Data tables 1 to 19: supporting the toolkit | https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal |

	MWh	Emission (t CO ₂ e)
Electricity displaced	14,305	3,455
Gas consumption (DH)	6895	1259
Gas Oil consumption (DH)	0	0

	MWh	Indirect emission (t CO ₂ e)
Electricity consumption (DH)	1,753	335
Electricity consumption (ERF)	9577	1,830
Gas oil consumption (ERF)	2185	561

Total emission (t CO₂e)

7,440

Carbon intensity (kg CO₂e/ kWh)

0.0826

Compared to...

Direct emission (t CO₂e)

Gas consumption	19,354
Electricity consumption	3,400
Total	22,753

Tonnes CO₂e

Carbon saving	15,313
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Calculation

Electricity consumption at standard grid factor	3,399.57	tCO ₂ e
Private wire consumption at overall scheme electricity factor	1,821.67	tCO ₂ e
Carbon saved	1,577.90	tCO ₂ e

Grid electricity carbon factor	0.19338	kgCO ₂ e
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