EPC ATLAS

UK DATA BOOK 2026

What 17.62 Million Searchable EPC Records Reveal

Volume One — Deep Ten-Region England & Wales Research Edition

Revision 0.3 • 1,357,124,153 programmatic validation assertions • 28 August 2026

Scope: North East, North West, Yorkshire & Humber, East Midlands, West Midlands, East of England, London, South East, South West and Wales. These are searchable EPC Atlas records from the supplied England-and-Wales regional datasets; Scotland and Northern Ireland are outside this corpus.

Editorial note: purpose, evidence and revision discipline

Revision 0.3 incorporates the audited North West master and regenerates the research across ten regional datasets, while retaining the record-level intersection methodology introduced in v0.2. The book remains deliberately conservative. It describes searchable EPC Atlas records and source fields; it does not silently convert administrative records into a census of current homes.

Factual rule: Every number is directly counted, arithmetically derived from those counts, or explicitly labelled as an exploratory association. Correlation and odds ratios are descriptive unless an appropriate causal design exists.

The combined v0.3 evidence base represents all 17,624,989 searchable records and 1,357,124,153 retained and newly executed programmatic checks across row structure, field completeness, cross-field relationships, score logic, dates and analytical intersections. The assertion count is a measure of executed data checks, not a claim that the book contains one billion independent scientific hypotheses.

This edition covers all ten supplied England-and-Wales regional datasets. It is not a census of every current dwelling, and Scotland and Northern Ireland remain outside the corpus. North West originated from a richer 157-column master and was normalized into the same analytical definitions before combined totals were regenerated.

Contents

PART I — EVIDENCE BASE AND DEEP AUDIT

1. Corpus and source retention

The ten-region analytical corpus contains 17,624,989 searchable EPC Atlas records. For nine regional processed packs, the retained source-certificate totals are available from the v0.2 build manifests. North West was supplied as a 2,241,566-row, 157-column COMPLETE_MASTER; its pre-dedup source-certificate count is not stated in the supplied master/audit materials, so no North West retention percentage is invented.

Region	Searchable records	Source certificates	Retained
North East	827,299	1,097,917	75.4%
North West	2,241,566	Not stated	—
Yorkshire & Humber	1,634,405	2,135,656	76.5%
East Midlands	1,450,395	1,816,431	79.8%
West Midlands	1,690,040	2,171,059	77.8%
East of England	1,828,434	2,262,273	80.8%
London	2,639,163	3,335,072	79.1%
South East	2,692,971	3,337,884	80.7%
South West	1,718,113	2,131,040	80.6%
Wales	902,603	1,139,819	79.2%

Retention denominator: Across the nine regions with stated source-certificate counts, 15,383,423 searchable records are retained from 19,427,151 source certificates (79.19%). North West is excluded from that retention calculation only because the required pre-dedup denominator is not in the supplied master.

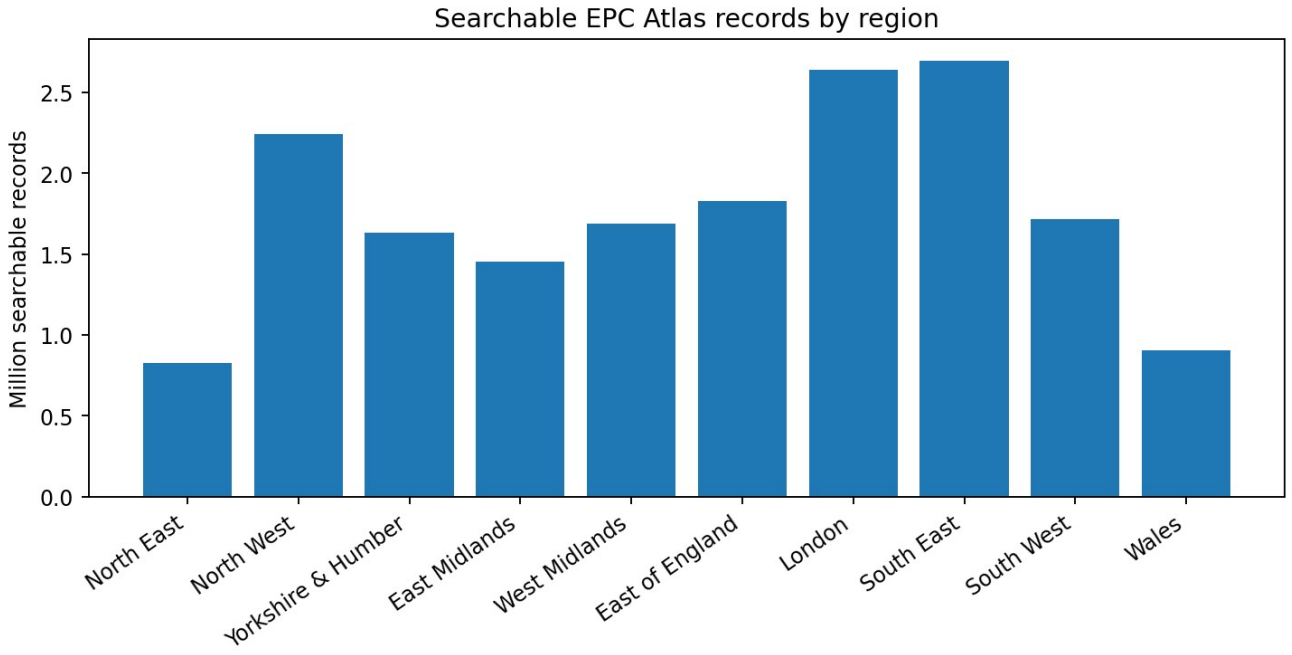

Figure 1. Searchable EPC Atlas records by region.

2. What changed in revision 0.3

Revision 0.3 adds North West as the tenth regional dataset and regenerates the combined evidence base. It preserves the multi-field methodology of v0.2 while adding a new denominator discipline for North West Solar PV, updated local-authority rankings, and new North West case-study leads.

ID	New analytical contribution	Type
F33	Ten-region corpus reaches 17.62 million	Direct count
F34	Ten-region D-or-below with potential A/B	Multi-field intersection
F35	Owner-occupied House improvement subset expands	Multi-field intersection
F36	North West D-or-below plus potential A/B	Regional direct count
F37	North West Solar PV completeness asymmetry	Data-quality / denominator finding
F38	Ten-region Solar PV coverage	Direct count / completeness
F39	North West certificate-age concentration	Regional grouped comparison
F40	East Lancashire wall-efficiency cluster	Local-authority exploratory finding
F41	Greater Manchester heating-efficiency concentration	Local-authority exploratory finding
F42	North West loft-depth intersection	Conditional denominator / intersection
F43	Ten-region UPRN collision register	Identity audit
F44	North West Lead_Rank integrity issue	Internal identifier audit
F45	Ten-region explicit off-gas denominator	Conditional denominator
F46	North West enters national local-authority rankings	Ranking update

Revision rule: The v0.2 nine-region edition is preserved as a historical snapshot. v0.3 regenerates ten-region totals and rankings from the harmonized analytical outputs rather than manually adding North West to published percentages.

3. Deep validation and data integrity

The v0.3 evidence base represents 17,624,989 searchable rows and 1,357,124,153 retained and newly executed programmatic assertions across the original nine-region deep pass and the normalized North West master. These checks cover field presence, score logic, dates, explicit categories, denominators and dozens of cross-field intersections.

Test / condition	Result	Status
Rows represented	17,624,989	PASS
Programmatic assertions	1,357,124,153	PASS
Future inspection dates after 28 Aug 2026	0	PASS
North West blank inspection dates	3	QUALITY FLAG
Potential numeric score lower than current	1,005	QUALITY FLAG
Potential letter worse than current	320	QUALITY FLAG
Nine-region potential rating with blank numeric score	8	QUALITY FLAG
Current numeric score >200	55	QUALITY FLAG
Potential numeric score >200	81	QUALITY FLAG

Score and date clarification: The eight blank-potential-score cases belong to the original nine-region packs. North West adds three blank inspection dates but no current/potential score-band mismatch where both numeric score and letter are present. Its epc_year field reflects source/lodgement-year semantics in many rows and is therefore not tested as if it were inspection year.

The original nine-region structural audit remains intact. North West separately parsed 2,241,566 rows with no malformed CSV records and no duplicated non-empty UPRNs within the region. A new internal sequence issue is documented: Lead_Rank contains 1,162 duplicated values and 1,162 missing sequence values, so it must not be treated as a unique record key until regenerated.

4. Field completeness and applicability

Field	Known / populated	Coverage	Missing / blank
Solar PV	17,022,721	96.58%	602,268
Tenure	17,614,301	99.94%	10,688
Floor area	17,624,978	100.00%	11
Main heating	17,624,976	100.00%	13
Age band	17,624,889	100.00%	100
Wall efficiency	17,624,883	100.00%	106
Window efficiency	17,624,883	100.00%	106
Local authority	17,575,751	99.72%	49,238
UPRN	17,376,658	98.59%	248,331
Main fuel	17,262,836	97.95%	362,153
Solar water	15,064,877	85.47%	2,560,112
Habitable rooms	15,064,877	85.47%	2,560,112
Ventilation	15,064,789	85.47%	2,560,200
Mains gas	13,209,966	74.95%	4,415,023
Roof type	12,214,417	69.30%	5,410,572
Numerical loft depth	8,902,805	50.51%	8,722,184

Coverage must not be confused with applicability. Roof and loft fields are naturally less complete in flat-heavy areas. The correct research treatment is to preserve Known, Unknown and—where the source semantics allow—Not Normally Applicable, rather than converting every blank into a negative result.

Off-gas denominator: Mains-gas status is known on 13,209,966 records (74.95%). Off-gas analysis therefore uses explicit No among known-status records, never Not-Yes across the whole corpus.

5. Identity, text and numeric anomalies

Issue	Scale	Rule
Cross-region UPRN collisions	26	Do not use raw UPRN as sole global primary key
North West Lead_Rank duplicates	1,162	Regenerate before using Lead_Rank as unique identity
North West Solar PV missing/unknown	602,268	Preserve Unknown; never convert to No
Repeated address + postcode groups	3,834 groups / 8,766 rows in retained nine-region audit	Many can represent legitimate separate units
Embedded literal TAB in quoted address	598 in retained nine-region audit	Regression-test every importer with a compliant TSV parser
North West missing UPRN	18,828	Keep internal EPC Atlas identity independent of raw UPRN
North West blank inspection date	3	Exclude from certificate-age denominator where needed
County / geography enrichment	North West ceremonial-county fields unpopulated	Derive county explicitly before county-level publication

The central engineering conclusion is unchanged: the packs show strong structural integrity, while the remaining problems are mainly the expected imperfections of large administrative datasets—external identifier collisions, source-text irregularities, missingness, applicability and a small number of extreme numeric values.

PART II — ENERGY PERFORMANCE AND THE BUILDING STOCK

6. Ten-region headline

Measure	Records	Share of corpus
Searchable records	17,624,989	100%
Current EPC D or below	8,567,591	48.61%
Current EPC E or below	2,262,411	12.84%
Potential EPC A/B	10,667,544	60.53%
D-or-below + potential A/B	4,318,888	24.50%
Solar PV: Yes	235,239	1.33%
Heat-pump evidence	299,719	1.70%
Owner occupied	9,047,744	51.33%
House	10,903,550	61.86%
Explicit off-gas among all records	2,260,152	12.82%
Triple Poor/Very Poor + EPC D↓	85,930	0.49%

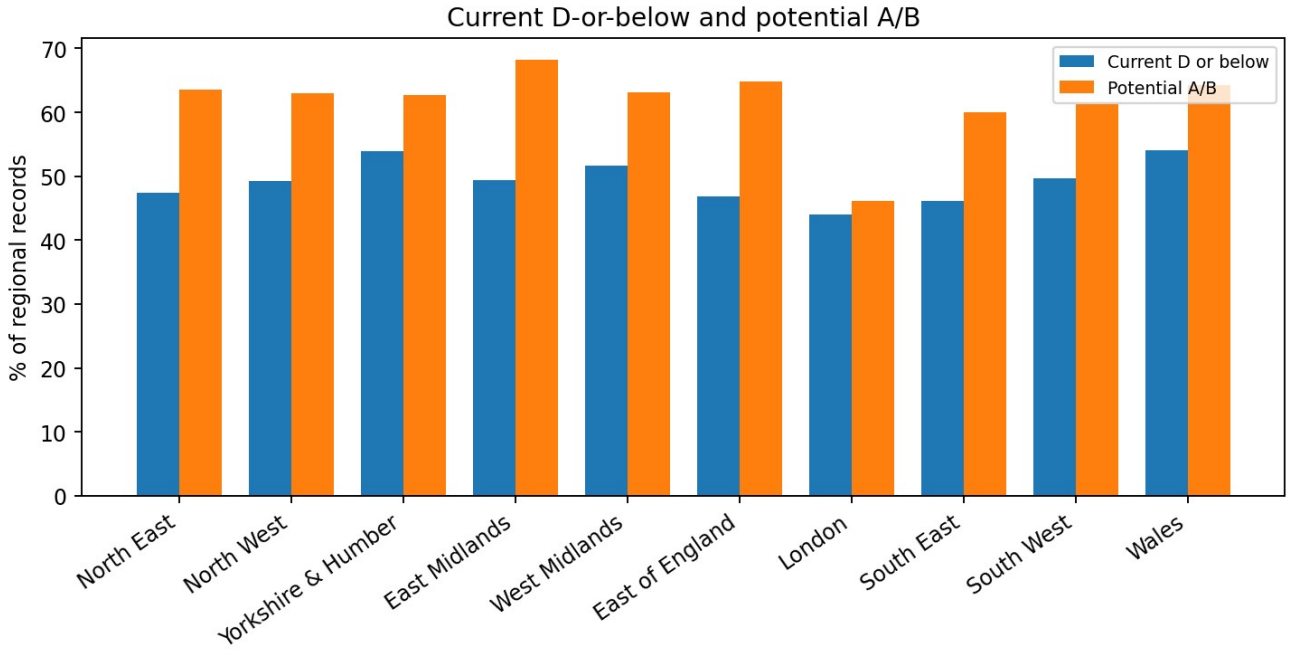

Figure 2. Current D-or-below and potential A/B shares by region.

7. Current and potential EPC ratings

Region	Current D↓	Current E↓	Potential A/B
North East	47.41%	10.42%	63.51%
North West	49.22%	12.63%	62.92%
Yorkshire & Humber	53.86%	14.05%	62.67%
East Midlands	49.41%	13.09%	68.18%
West Midlands	51.67%	13.97%	63.11%
East of England	46.80%	12.97%	64.81%
London	44.01%	9.31%	46.07%
South East	46.11%	11.83%	60.07%
South West	49.74%	16.15%	61.31%
Wales	54.09%	17.56%	64.27%

Wales has the highest D-or-below share at 54.09%, while London is lowest at 44.01%. East Midlands has the highest potential A/B share at 68.18%; London is lowest at 46.07%. These are distributions of searchable EPC Atlas records, not an official estimate of current dwelling stock.

8. Numeric improvement deltas

The deep pass adds a direct comparison of current and potential numeric efficiency scores. To reduce the influence of extreme raw outliers, the delta distribution below is restricted to score changes between −200 and +200. Only 20 records lack a usable score pair for this bounded distribution.

Numeric potential-current change	Records	Share of all records
Potential lower than current	1,005	0.006%
No numeric change	1,921,172	10.90%
+1 to +5	2,132,782	12.10%
+6 to +10	2,378,254	13.49%
+11 to +20	6,897,661	39.14%
+21 to +30	2,894,604	16.42%
+31 or more	1,399,488	7.94%

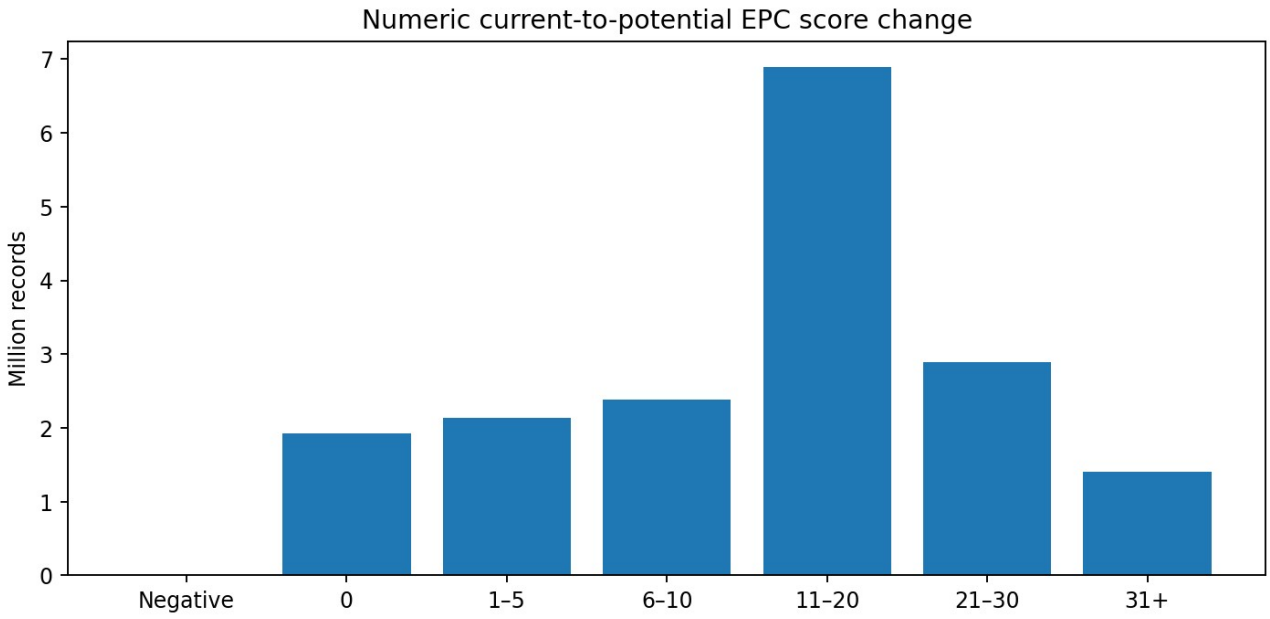

Figure 3. Distribution of numeric current-to-potential EPC score changes.

The modal delta group is +11 to +20 points, with 6,897,661 records. A further 2,894,604 increase by 21–30 points and 1,399,488 by more than 30 points. These are theoretical EPC score differences, not a costed or technically verified retrofit plan.

9. D-or-below with potential A/B

Exactly 4,318,888 records are simultaneously current EPC D-or-below and potential A/B. That is 24.50% of the whole corpus and 50.41% of all D-or-below records.

Region	D↓ + pot. A/B	Share all	Share of D↓	Also owner-occ. House
North East	208,010	25.14%	53.04%	107,412
North West	586,349	26.16%	53.15%	349,741
Yorkshire & Humber	484,102	29.62%	54.99%	272,628
East Midlands	418,064	28.82%	58.34%	228,735
West Midlands	473,095	27.99%	54.18%	290,480
East of England	462,280	25.28%	54.02%	254,372
London	405,277	15.36%	34.89%	234,070
South East	593,853	22.05%	47.83%	353,489
South West	416,834	24.26%	48.77%	230,243
Wales	271,024	30.03%	55.51%	160,361

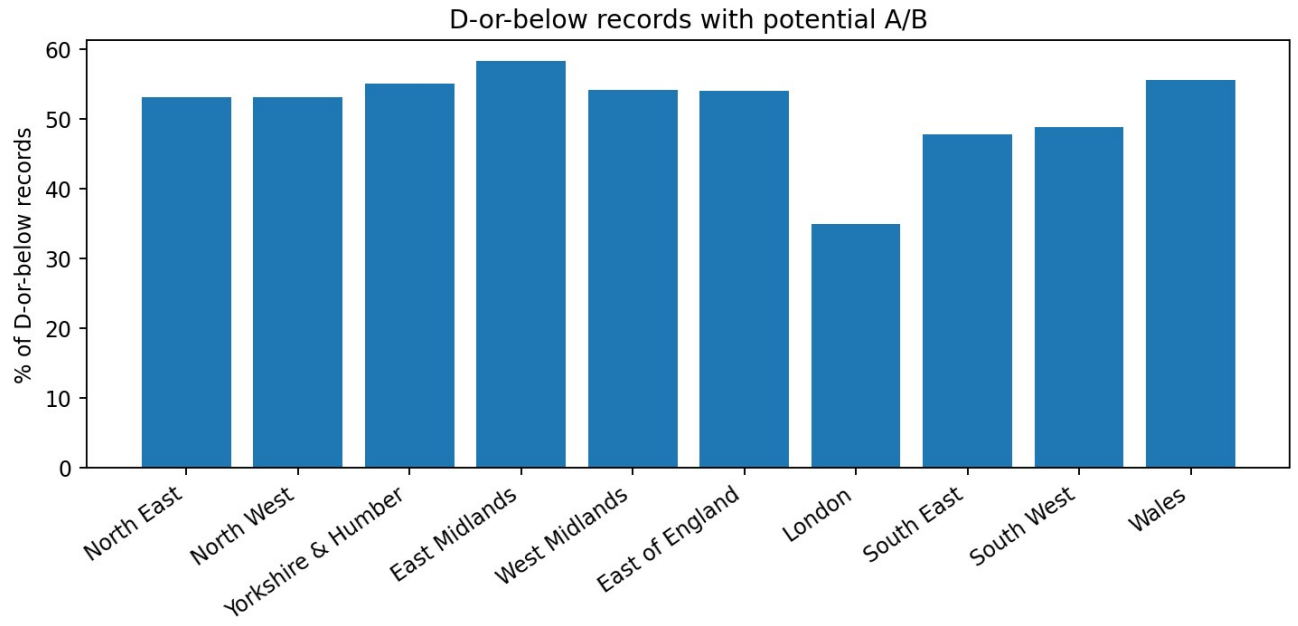

Figure 4. Share of D-or-below records that also show potential A/B.

A narrower intersection contains 2,481,531 records that are D-or-below, potential A/B, classified owner occupied and property type House. That subset is 14.08% of all records.

10. Property type and built form

Property type	Records	D↓	Potential A/B	Solar Yes	Heat-pump text
House	10,903,550	54.5%	74.2%	1.627%	1.89%
Flat	4,844,214	29.8%	30.0%	0.138%	0.91%
Bungalow	1,462,250	67.5%	74.0%	3.430%	3.14%
Maisonette	403,620	45.5%	11.1%	0.234%	0.74%
Park home	11,249	91.7%	0.7%	0.516%	1.00%
Missing	106	44.3%	18.9%	0.000%	0.94%

Houses are 54.52% D-or-below compared with 29.76% of Flats. The unadjusted odds of a House record being D-or-below are about 2.83 times the odds for a Flat record. Solar evidence is 1.627% of House records versus 0.138% of Flat records; North West Solar missingness is a specific denominator caveat for these all-record comparisons.

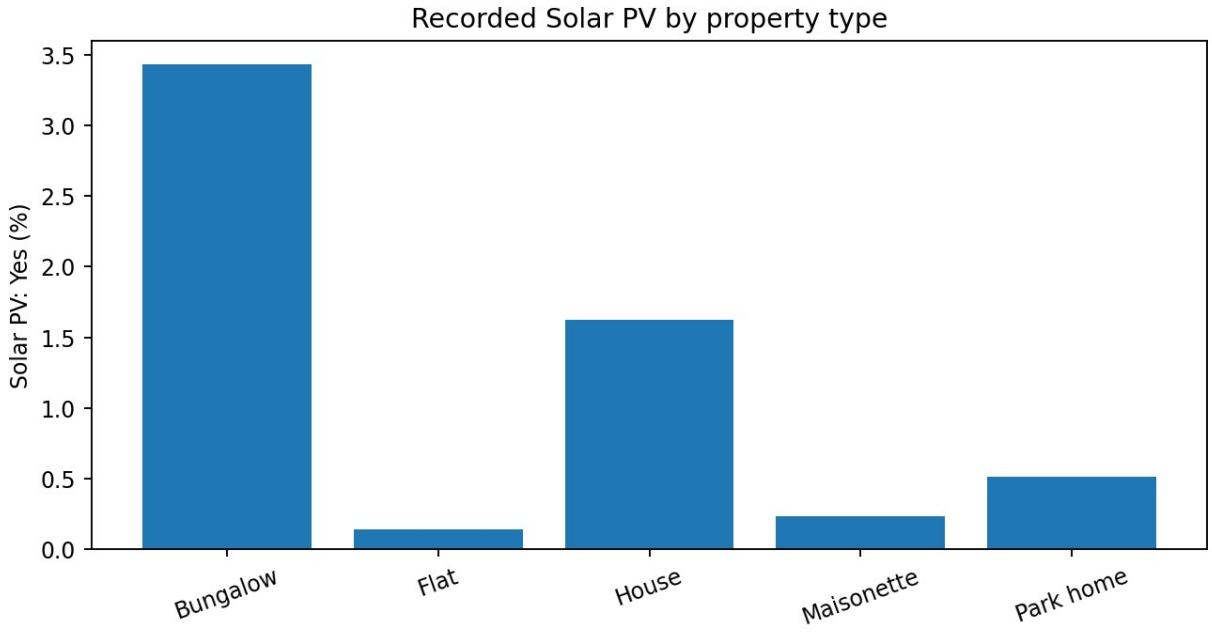

Figure 5. Solar PV: Yes share by property type.

10.1 Built form

Built form	Records	D↓	Solar Yes	Heat-pump text	Wall Poor/Very Poor
Semi-Detached	5,544,242	53.6%	1.50%	1.63%	34.1%
Mid-Terrace	4,776,414	45.4%	0.98%	0.79%	50.3%
Detached	3,931,977	51.2%	1.87%	3.30%	23.0%
End-Terrace	2,472,446	47.6%	1.23%	1.34%	35.3%
Not Recorded	343,555	25.9%	0.30%	0.87%	34.9%
Enclosed End-Terrace	234,582	37.8%	0.21%	0.56%	30.8%
Enclosed Mid-Terrace	194,378	27.5%	0.15%	0.60%	34.3%
Missing	127,395	7.0%	0.00%	2.80%	1.9%

Detached records have the highest Solar PV and heat-pump-text shares among the major recorded built forms, while Mid-Terrace records have the highest Poor/Very Poor wall share. Built-form comparisons are descriptive and partly reflect region, construction age and property-type mix.

11. Construction era

Revision 0.3 retains the harmonized the 242 raw construction-age values into broad non-overlapping analytical eras. Exact years outside 1500–2026 are placed in a separate Outlier/invalid year category rather than forced into a period.

Normalized era	Records	D↓	Potential A/B	Solar Yes	Heat-pump text	Wall Poor/VP
Pre-1900	1,459,636	81.8%	46.8%	0.85%	1.40%	91.6%
1900-1929	2,320,011	75.0%	49.4%	0.74%	0.40%	86.5%
1930-1949	2,100,124	71.3%	57.3%	1.28%	0.59%	61.9%
1950-1966	2,665,157	58.5%	55.3%	2.24%	1.00%	34.5%
1967-1982	2,815,998	52.4%	55.7%	2.02%	0.87%	24.4%
1983-1995	1,599,872	42.6%	57.1%	1.59%	0.79%	2.2%
1996-2006	1,383,186	21.3%	64.4%	1.12%	0.77%	1.9%
2007+	3,280,563	3.9%	84.9%	0.65%	5.58%	0.6%
Outlier/invalid year	342	2.6%	72.5%	0.00%	6.73%	0.0%
Unknown	100	53.0%	13.0%	0.00%	1.00%	1.0%

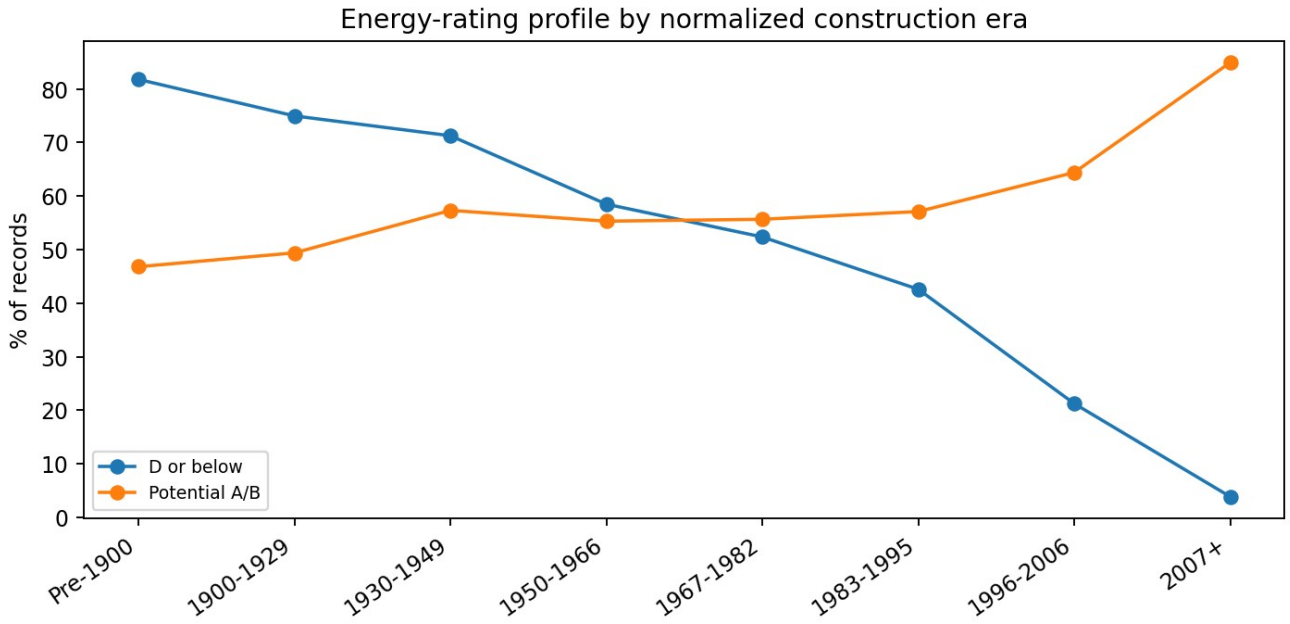

Figure 6. Current D-or-below and potential A/B by normalized construction era.

The strongest descriptive gradient remains construction era versus current EPC performance. Pre-1900 records are 81.79% D-or-below, 1900-1929 records 74.98%, and the broad 2007+ group 3.89%. Poor/Very Poor wall evidence is 91.59% for Pre-1900 and 0.64% for 2007+.

12. Floor area and habitable rooms

Floor area is populated on virtually the entire corpus. Revision 0.3 retains the 0-1,000 m² analytical range for distribution summaries while preserving raw values elsewhere. There are 17,622,828 valid values and 2,150 non-blank invalid/outlier values under this rule.

Region	Valid floor records	Median m²	Q1	Q3	90th pct.
North East	827,223	79	64	98	129
North West	2,241,372	79	63	99	132
Yorkshire & Humber	1,634,250	79	62	100	136
East Midlands	1,450,263	81	64	103	139
West Midlands	1,689,903	79	63	98	133
East of England	1,828,239	81	62	106	146
London	2,638,734	70	52	92	126
South East	2,692,400	81	62	108	151
South West	1,717,926	82	62	109	150
Wales	902,518	83	66	105	142

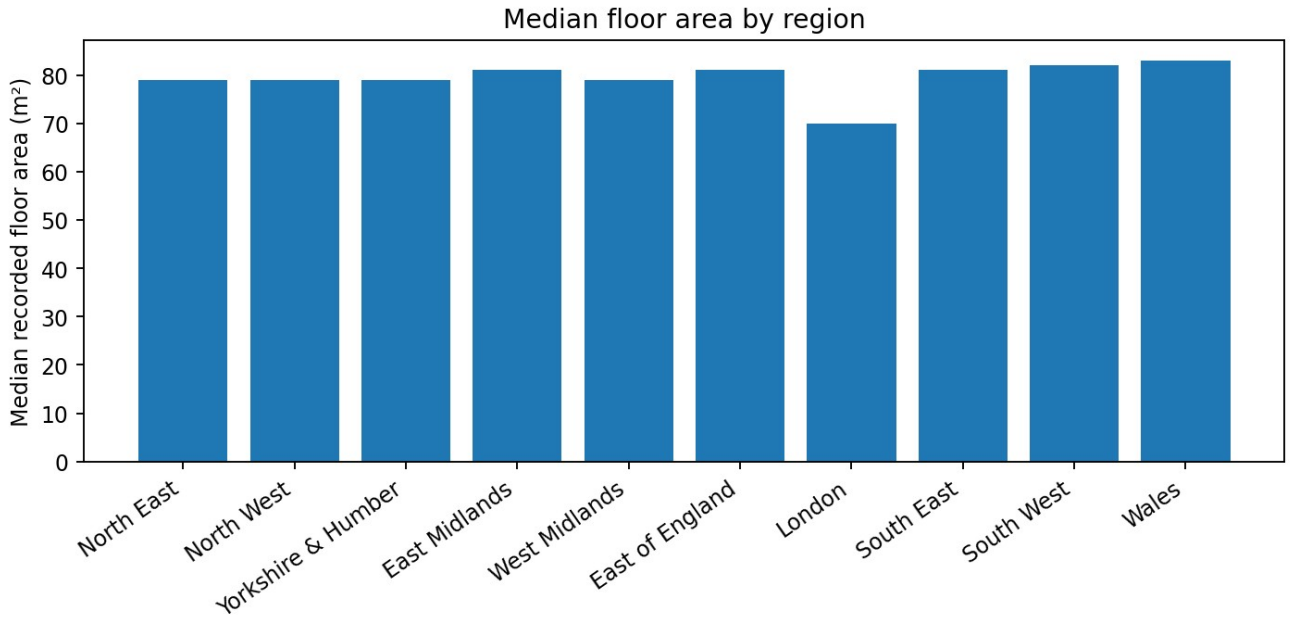

Figure 7. Median recorded floor area by region.

London has the lowest median recorded floor area at about 70 m². Wales is highest at about 83 m²; the other regions cluster around 79–82 m². Habitable-room medians are 3 in London and 4 in every other supplied region.

12.1 Technology evidence by floor-area band

Floor-area band	Records	D↓	Solar Yes	Heat-pump text	Owner occupied
<50 m²	2,266,976	37.4%	0.78%	0.90%	24.1%
50-74 m²	5,408,798	42.0%	0.95%	1.15%	41.2%
75-99 m²	5,306,020	53.5%	1.50%	1.41%	55.5%
100-149 m²	3,243,424	55.6%	1.59%	1.88%	69.0%
150-199 m²	844,505	57.9%	2.31%	4.01%	77.3%
200+ m²	553,105	57.6%	2.82%	8.54%	79.4%

Solar and heat-pump evidence both rise with the larger floor-area bands in this unadjusted comparison. The 200+ m² group shows Solar PV: Yes on 2.82% of records and heat-pump text on 8.54%. This should not be interpreted as a size effect without accounting for detached-house share, tenure, region, construction age and the North West Solar-PV completeness difference.

13. Tenure

Tenure classification	Records	D↓	Potential A/B	Solar Yes	Heat-pump text	House
owner-occupied	9,047,744	61.6%	61.5%	1.58%	1.20%	73.5%
rented (private)	3,437,146	53.5%	50.1%	0.48%	0.48%	48.1%
rented (social)	2,949,181	33.1%	50.9%	2.53%	1.75%	44.6%
unknown	2,180,230	8.2%	85.9%	0.05%	5.64%	58.5%
Missing	10,688	1.9%	75.1%	0.00%	1.75%	81.8%

Owner-occupied records have Solar PV: Yes on 1.582% compared with 0.476% of private-rented records. The unadjusted odds ratio is about 3.36. Owner-occupied records are also substantially more house-heavy, so this tenure association should not be read as causal.

Tenure semantics: The EPC tenure field is evidence recorded with the certificate. It is not a current Land Registry ownership check and should not be described as verified legal ownership.

14. Certificate age and inspection-year patterns

Certificate age	Records	D↓	Potential A/B	Solar Yes	Heat-pump text
<1 year	1,244,749	35.4%	33.9%	2.76%	3.79%
1-3 years	3,185,534	37.8%	62.3%	2.31%	2.94%
3-5 years	3,076,716	41.5%	63.3%	1.56%	1.81%
5-10 years	6,216,985	50.5%	61.7%	0.82%	1.09%
>10 years	3,901,002	64.2%	63.6%	0.73%	0.91%

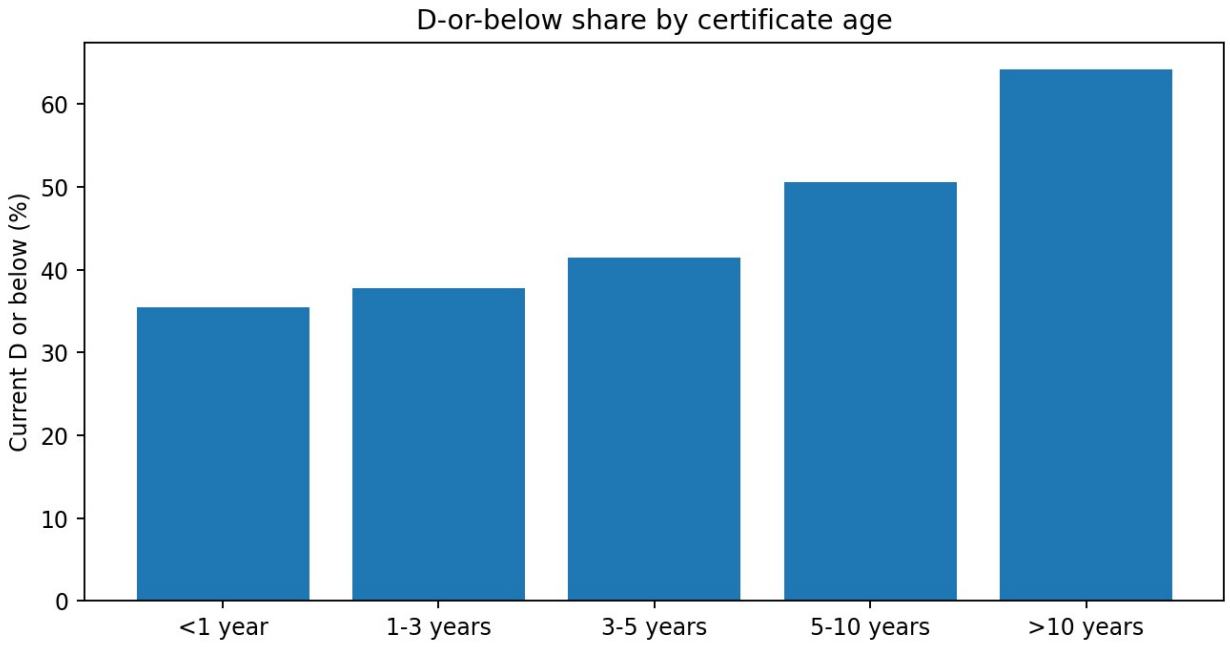

Figure 8. Current D-or-below by certificate age.

Records more than ten years old are 64.22% D-or-below, compared with 35.42% for records under one year. The unadjusted odds ratio is about 3.27. This is an association, not evidence that a property physically deteriorated. North West now has the highest regional >10-year certificate share at 25.45%.

14.1 Inspection-year technology evidence and a 2025–2026 discontinuity

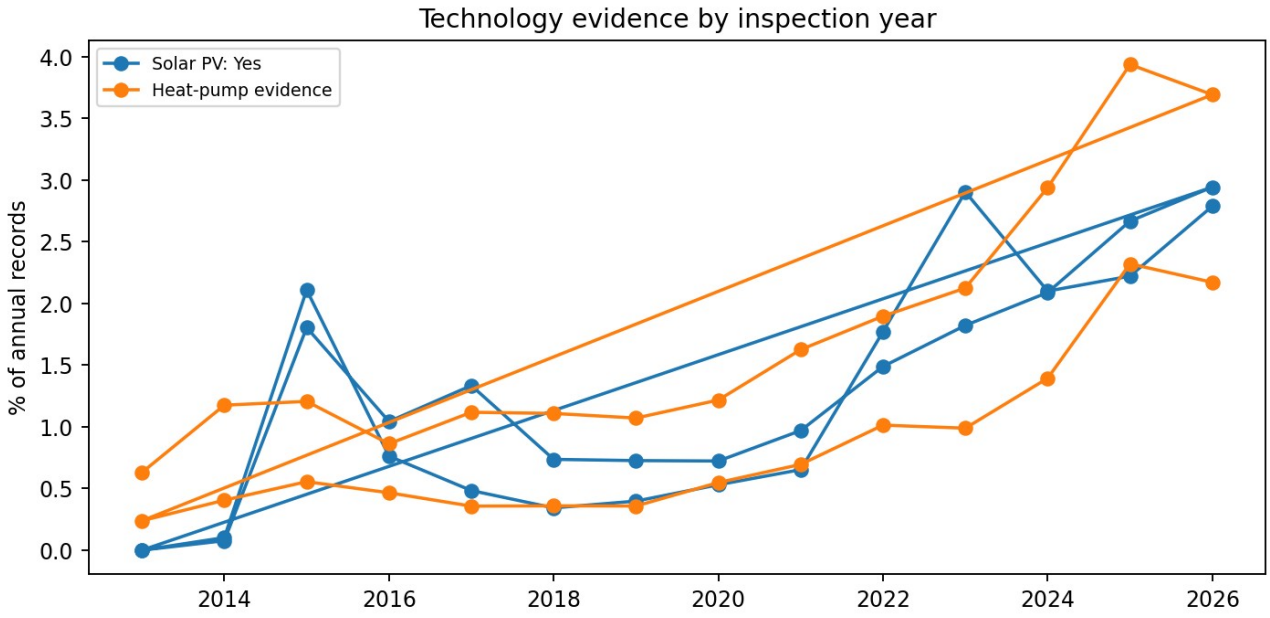

Figure 9. Solar PV and heat-pump evidence by certificate inspection year.

Inspection year	Records	D↓	Potential A/B	Solar Yes	HP text	Window Poor/VP
2013	791,410	64.5%	61.8%	0.00%	0.63%	10.6%
2015	923,101	61.9%	65.5%	1.80%	1.21%	6.8%
2019	1,216,459	49.8%	60.1%	0.73%	1.07%	7.8%
2021	1,289,994	45.5%	61.7%	0.97%	1.63%	6.4%
2022	1,388,024	42.0%	62.5%	1.49%	1.90%	5.9%
2023	1,320,227	39.8%	63.8%	1.82%	2.12%	5.4%
2024	1,386,146	38.2%	65.0%	2.09%	2.94%	4.9%
2025	1,421,328	36.8%	49.4%	2.67%	3.94%	23.2%
2026	648,229	36.4%	32.9%	2.94%	3.69%	41.6%

Methodology warning: Potential A/B and window-efficiency distributions change abruptly in 2025–2026. This is a candidate data-generation or methodology discontinuity. The book does not interpret it as a sudden physical change in the housing stock without separate verification of the source methodology.

PART III — TECHNOLOGIES, FABRIC AND CROSS-FIELD OPPORTUNITY

15. Solar PV

Across the ten regional datasets, 235,239 records are explicitly Solar PV: Yes. Solar-PV status is known on 17,022,721 records (96.58% coverage), so the Yes share is 1.335% of all records and 1.382% among known-status records. Of the Yes records, 143,115 (60.84%) are classified owner occupied and 177,404 (75.41%) are Houses.

Region	Solar PV: Yes	Solar-status coverage	Yes % all	Yes % known
North East	16,472	100.00%	1.991%	1.991%
North West	28,424	73.13%	1.268%	1.734%
Yorkshire & Humber	21,568	100.00%	1.320%	1.320%
East Midlands	27,533	100.00%	1.898%	1.898%
West Midlands	21,758	100.00%	1.287%	1.287%
East of England	30,531	100.00%	1.670%	1.670%
London	8,692	100.00%	0.329%	0.329%
South East	31,792	100.00%	1.181%	1.181%
South West	29,458	100.00%	1.715%	1.715%
Wales	19,011	100.00%	2.106%	2.106%

At property-type level, House records have Solar PV: Yes on 1.627% versus 0.138% of Flats. The unadjusted odds ratio is 11.98.

Evidence wording: Solar PV: Yes means the EPC Atlas field is explicitly positive. North West has 602,268 missing/unknown Solar-PV values, so all-record and known-status denominators are shown separately. The field does not verify current system condition, ownership, capacity or installation date.

15.1 Solar and other technologies

Intersection	Records	Conditional share
Solar + heat-pump text	17,086	7.26% of Solar Yes
Solar + Poor/Very Poor heating	14,203	6.04% of Solar Yes
Solar + current EPC D↓	44,688	19.00% of Solar Yes
Solar + potential A/B	159,590	67.84% of Solar Yes

The Solar PV + heat-pump-evidence overlap is 17,086 records (7.26% of Solar PV: Yes). This is useful evidence for combined-technology research, but certificate timing and North West Solar missingness mean it should not be described as a contemporaneous verified installed-system population.

16. Solar water

Solar-water status is populated on 15,064,877 records (85.47% coverage). There are 96,064 explicit Yes records, 0.55% of the whole searchable corpus.

Rank	Local authority	Region	Records	Solar water Yes
1	Powys	Wales	39,168	2.21%
2	Ceredigion	Wales	22,737	2.10%
3	South Norfolk	East of England	42,538	1.91%
4	Tandridge	South East	23,122	1.75%
5	South Hams	South West	31,353	1.70%
6	Merthyr Tydfil	Wales	17,355	1.68%
7	Uttlesford	East of England	25,724	1.68%
8	Mid Devon	South West	23,626	1.66%
9	East Hampshire	South East	35,303	1.64%
10	Woking	South East	30,216	1.61%
11	West Devon	South West	17,003	1.59%
12	Pembrokeshire	Wales	37,498	1.59%

Powys and Ceredigion have the highest Solar Water: Yes shares among local authorities with at least 15,000 records in this analysis. Because the field is 85.47% populated, specialist comparisons should preserve all-record and known-status denominators.

17. Heat-pump evidence

The harmonized v0.3 text classifier identifies 299,719 records (1.70%) whose main-heating description contains heat-pump evidence. This is 354 more than the earlier simple English-text count because the method also recognizes Welsh heat-pump wording and separates major source types.

Heat-pump text class	Records	Share all	D↓	Solar Yes	Explicit off-gas
0	17,325,270	98.299%	49.2%	1.26%	12.4%
Air/exhaust source	273,399	1.551%	16.4%	5.81%	36.8%
Ground source	23,875	0.135%	27.4%	4.64%	48.4%
Water source	1,832	0.010%	27.9%	5.40%	46.2%
Other/ambiguous heat pump	581	0.003%	3.8%	0.00%	2.1%
Community heat pump	32	0.000%	0.0%	0.00%	0.0%

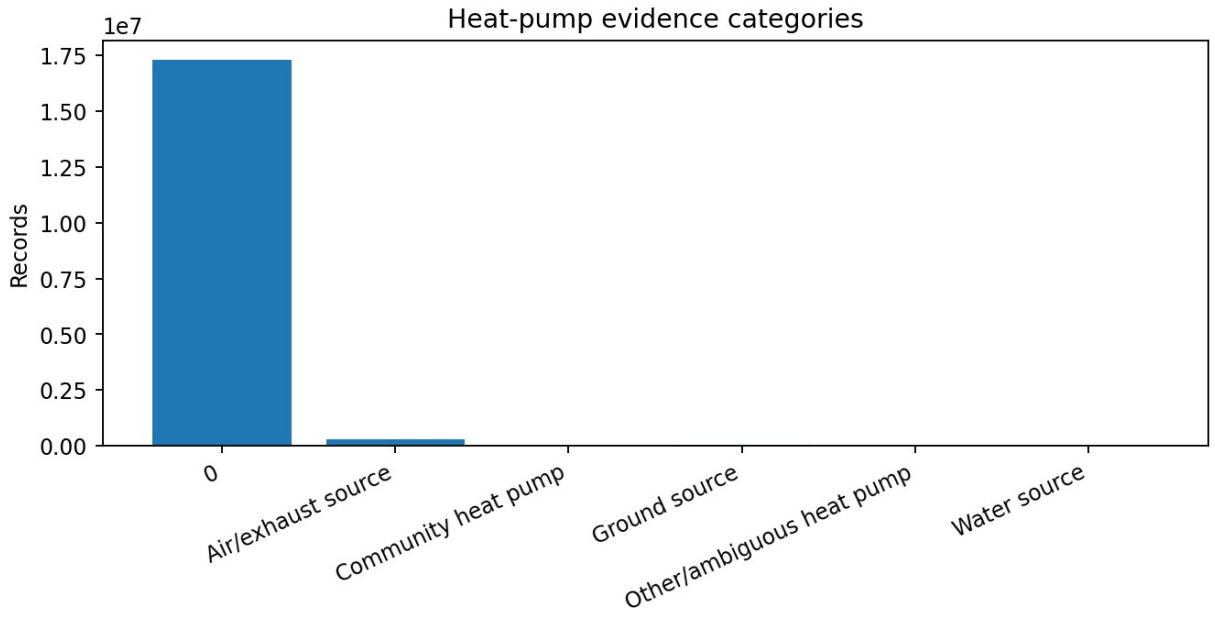

Figure 10. Heat-pump evidence categories in main-heating text.

Air/exhaust-source wording dominates with 273,399 records; ground-source wording appears in 23,875 and water-source in 1,832. Across all heat-pump-evidence records, 113,103 (37.74%) are explicitly mains-gas No.

18. Main fuel, mains gas and off-gas

Main-fuel values are normalized here into broad analytical groups while the raw source strings remain the authoritative source detail. The normalization is deliberately conservative and is designed for research grouping, not billing or technical system classification.

Normalized fuel group	Records	D↓	Solar Yes	HP text	Explicit off-gas
Mains gas	14,283,117	47.7%	1.30%	0.02%	1.3%
Electricity	2,171,210	48.5%	1.37%	13.65%	66.9%
Oil/biofuel	554,540	87.5%	2.58%	0.10%	81.6%
Unknown	362,153	1.3%	0.00%	0.08%	0.0%
LPG/LNG	123,654	82.7%	1.99%	0.12%	62.3%
Solid fuel/biomass	84,485	87.5%	2.88%	0.08%	70.4%
Community/heat network	38,846	86.0%	1.83%	0.00%	71.6%
No system/unknown	6,911	98.5%	0.00%	0.00%	0.0%
Biogas	60	25.0%	0.00%	0.00%	0.0%
Other	13	84.6%	0.00%	7.69%	84.6%

Mains-gas status is known on 13,209,966 records. Among that known-status subset, explicit No is 2,260,152, or 17.11%.

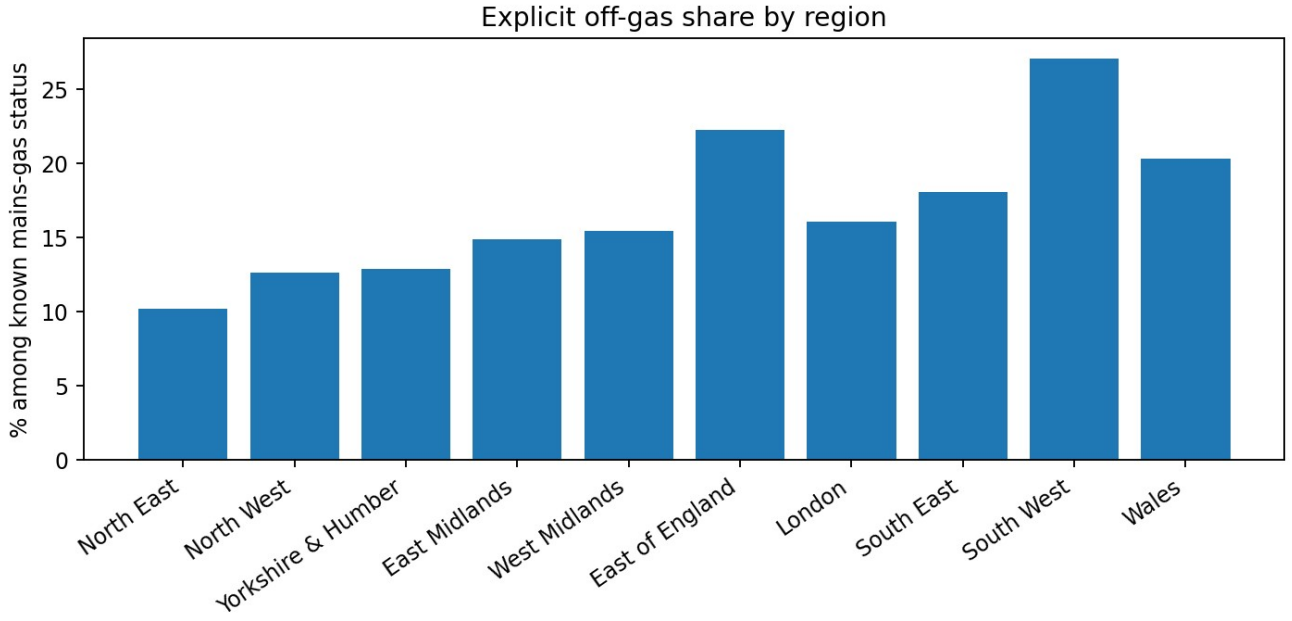

Figure 11. Explicit off-gas share among records with known mains-gas status.

Do not use Not-Yes: The 4,415,023 records without a mains-gas classification are Unknown, not automatically off-gas. Every off-gas percentage in this book uses explicit No; the ten-region known-status rate is 17.11%.

19. Walls and windows

Poor/Very Poor wall efficiency is recorded on 6,335,553 records (35.95%); Poor/Very Poor window efficiency on 1,687,960 (9.58%). The deep cross-tabs show that 5,096,436 D-or-below records also have Poor/Very Poor wall efficiency, and 1,180,235 D-or-below records also have Poor/Very Poor windows.

Region	Wall Poor/VP	Window Poor/VP	D↓ + wall poor	D↓ + window poor
North East	25.7%	7.9%	20.8%	5.0%
North West	34.0%	7.3%	28.2%	4.8%
Yorkshire & Humber	35.0%	8.1%	30.4%	5.5%
East Midlands	30.1%	6.9%	26.7%	5.2%
West Midlands	34.7%	8.2%	30.2%	5.9%
East of England	28.9%	7.7%	24.4%	5.8%
London	56.0%	17.1%	37.5%	11.0%
South East	31.0%	9.5%	25.2%	6.9%
South West	32.1%	9.8%	27.2%	7.6%
Wales	41.2%	8.0%	35.2%	6.0%

Construction era explains a large part of the descriptive wall pattern: Poor/Very Poor walls are recorded on 91.59% of Pre-1900 records, 86.54% of 1900-1929, and 0.64% of the broad 2007+ group. London remains a structural outlier because of its age and property-type composition.

20. Heating efficiency

Poor/Very Poor heating efficiency appears on 1,375,666 records (7.81%). Of these, 814,639 are also EPC D-or-below. Heating-efficiency interpretation is sensitive to technology: some normalized fuel groups show very different source-efficiency distributions, so raw fuel and heating descriptions should remain available for specialist analysis.

Region	Heating Poor/VP	Share	Also D↓	D↓ + heat poor
North East	31,285	3.78%	20,325	2.46%
North West	198,594	8.86%	87,463	3.90%
Yorkshire & Humber	120,557	7.38%	67,842	4.15%
East Midlands	87,558	6.04%	54,588	3.76%
West Midlands	127,579	7.55%	73,583	4.35%
East of England	147,647	8.08%	96,040	5.25%
London	203,532	7.71%	106,462	4.03%
South East	219,681	8.16%	133,051	4.94%
South West	164,997	9.60%	122,031	7.10%
Wales	74,236	8.22%	53,254	5.90%

21. Roof and loft evidence

Numerical loft depth is known on 8,902,805 records (50.51%). Among those, 2,604,699 (29.26%) are at or below 100 mm. Restricting the denominator to Houses and Bungalows gives 8,006,520 known-depth records, of which 2,336,683 (29.18%) are ≤100 mm.

Region	House/bungalow loft known	≤100 mm	≤100 among known	≤100 + D↓
North East	436,166	79,287	18.18%	58,121
North West	1,119,528	278,235	24.85%	205,611
Yorkshire & Humber	818,189	182,503	22.31%	142,731
East Midlands	804,049	191,054	23.76%	145,920
West Midlands	860,519	242,182	28.14%	183,959
East of England	912,469	291,248	31.92%	213,829
London	500,614	235,229	46.99%	177,377
South East	1,207,052	462,640	38.33%	328,182
South West	838,862	247,295	29.48%	181,754
Wales	509,072	127,010	24.95%	96,271

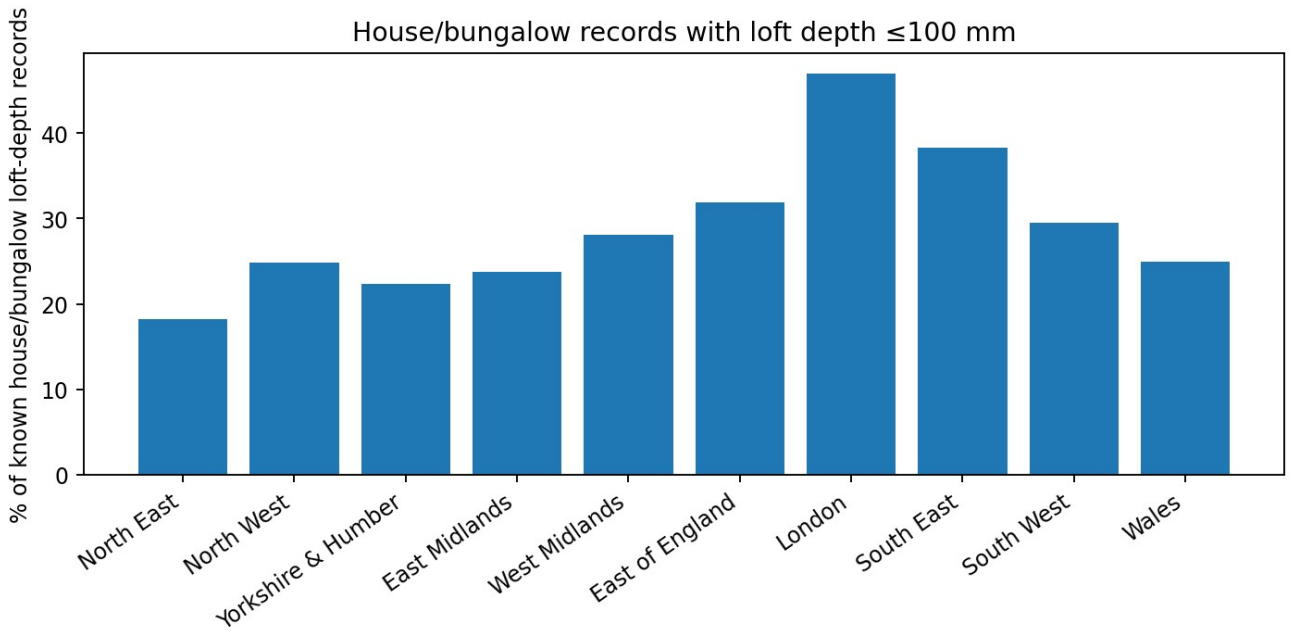

Figure 12. House/bungalow numerical loft depths at or below 100 mm.

Across the full corpus, 1,733,755 house/bungalow records are both D-or-below and ≤100 mm. Among owner-occupied Houses, 1,502,389 have ≤100 mm and 1,153,528 of those are also D-or-below.

Applicability: Missing loft depth is not zero insulation. Flat-heavy areas have much lower applicability/recording, so low-loft analysis should be anchored to property types and known numerical values.

22. Multi-condition overlaps

The strongest new contribution in revision 0.2 is the systematic use of record-level intersections. The table below shows selected populations that cannot be obtained by adding independent headline counts.

Intersection	Records	Share all
D↓ + potential A/B	4,318,888	24.50%
D↓ + owner occupied	5,571,737	31.61%
D↓ + owner occupied + House	4,317,231	24.49%
D↓ + potential A/B + owner occupied + House	2,481,531	14.08%
D↓ + wall Poor/VP	5,096,436	28.92%
D↓ + window Poor/VP	1,180,235	6.70%
D↓ + wall + window Poor/VP	918,719	5.21%
Wall + window + heating Poor/VP	88,423	0.50%
Triple Poor/VP + D↓	85,930	0.49%
Triple Poor/VP + D↓ + potential A/B	27,721	0.16%
D↓ + pot A/B + owner House + loft≤100	803,344	4.56%

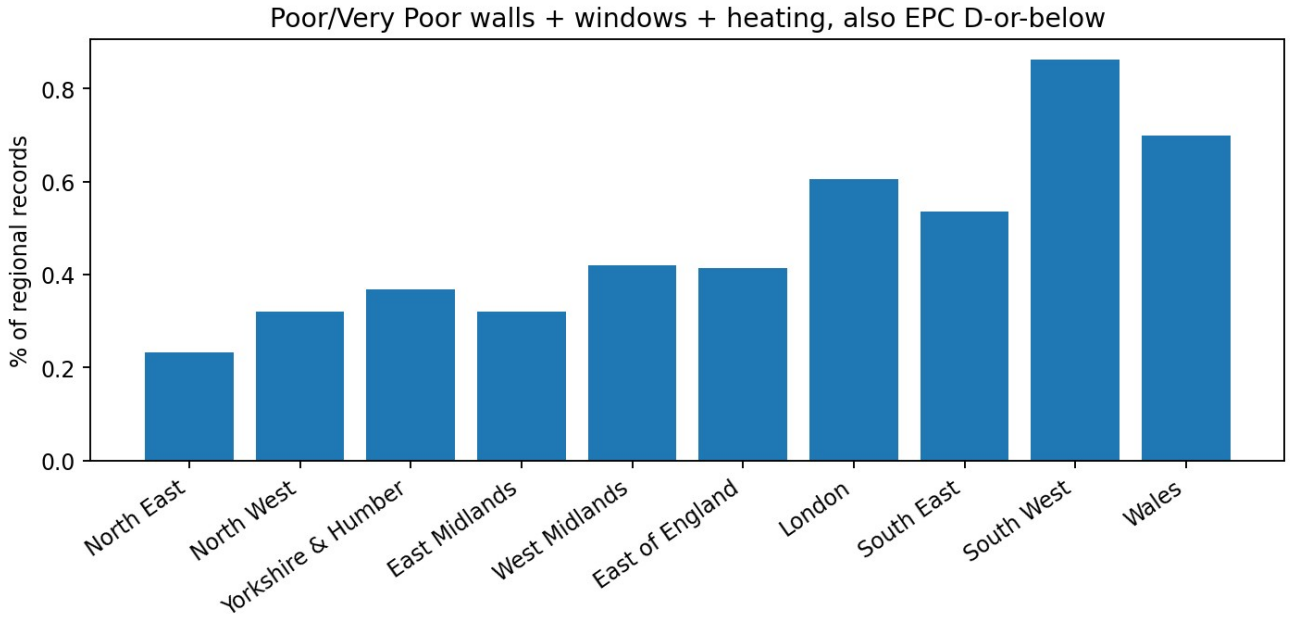

Figure 13. Triple Poor/Very Poor element ratings plus current EPC D-or-below by region.

The triple-poor population contains 88,423 records; 97.18% are also D-or-below. Of the triple-poor D subset, 32.26% have potential A/B.

23. Statistical relationships worth investigating

The correlations below are ecological local-authority associations using authorities with at least 15,000 searchable records. They are useful for hypothesis generation but do not identify causal effects at property level.

Variable A	Variable B	Pearson r
House share	Solar PV: Yes share	+0.426
Flat share	Solar PV: Yes share	-0.507
10+ year certificate share	D-or-below share	+0.443
Poor/VP walls	D-or-below	+0.347
Poor/VP heating	D-or-below	+0.089
Explicit off-gas among known	Heat-pump text	+0.854
Solar PV: Yes share	Heat-pump text	+0.343

The strongest selected local-authority relationship remains explicit off-gas share among records with known mains-gas status versus heat-pump-text share (r≈+0.854). This is consistent with a plausible substitution pattern, but it is an ecological correlation and should not be presented as proof that off-gas status causes heat-pump adoption.

Unadjusted record-level odds ratios add context: House versus Flat Solar PV odds ≈11.98; owner-occupied versus private-rented Solar PV odds ≈3.36; >10-year versus <1-year D-or-below odds ≈3.27.

PART IV — REGIONAL CHAPTERS

24. North East

North East contains 827,299 searchable records, 4.69% of the ten-region corpus.

Metric	Regional share
Current EPC D or below	47.41%
Potential A/B	63.51%
D↓ + potential A/B	25.14%
Solar PV: Yes	1.991%
Heat-pump evidence	0.85%
Explicit off-gas among known	10.20%
House	69.15%
Flat	18.67%
Wall Poor/Very Poor	25.73%
Window Poor/Very Poor	7.92%
Heating Poor/Very Poor	3.78%
10+ year inspection	25.17%
House/bungalow loft ≤100 among known	18.18%

Within the ten-region comparison, North East ranks 10 on absolute D-or-below count, 9 on Solar PV: Yes count and 10 on heat-pump-evidence count. Percentage rankings are discussed through the tables below rather than treating region size as performance.

Within-region high measure	Local authority	Records	Share
D↓ + potential A/B	County Durham	165,433	29.08%
Solar PV: Yes	Sunderland	91,900	5.73%
Heat-pump text	Northumberland	100,811	2.24%
Explicit off-gas	Northumberland	100,811	24.20%
Triple poor + D↓	Northumberland	100,811	0.68%

North East: deep intersections and cautions

Intersection	Records	Conditional / all share
D↓ + potential A/B	208,010	53.04% of regional D↓
D↓ + potential A/B + owner House	107,412	12.98% all
D↓ + wall Poor/VP	172,297	20.83% all
D↓ + wall + window Poor/VP	23,216	2.81% all
Triple Poor/VP + D↓	1,917	0.23% all
Solar + heat-pump text	701	4.26% of Solar
Explicit off-gas + D↓	38,064	4.60% all
House/bungalow ≤100 mm + D↓	58,121	7.03% all

This regional chapter should be read as a profile of the supplied searchable records. Local composition, certificate age, source methodology and missingness can all influence the apparent regional distribution.

25. North West

North West contains 2,241,566 searchable records, 12.72% of the ten-region corpus.

Metric	Regional share
Current EPC D or below	49.22%
Potential A/B	62.92%
D↓ + potential A/B	26.16%
Solar PV: Yes	1.268%
Heat-pump evidence	0.87%
Explicit off-gas among known	12.59%
House	69.06%
Flat	22.77%
Wall Poor/Very Poor	33.95%
Window Poor/Very Poor	7.26%
Heating Poor/Very Poor	8.86%
10+ year inspection	25.45%
House/bungalow loft ≤100 among known	24.85%

Within the ten-region comparison, North West ranks 3 on absolute D-or-below count, 4 on Solar PV: Yes count and 8 on heat-pump-evidence count. Percentage rankings are discussed through the tables below rather than treating region size as performance.

Within-region high measure	Local authority	Records	Share
D↓ + potential A/B	Pendle	27,927	35.79%
Solar PV: Yes	Warrington	60,399	3.95%
Heat-pump text	Westmorland and Furness	71,884	2.99%
Explicit off-gas	Westmorland and Furness	71,884	28.06%
Triple poor + D↓	Westmorland and Furness	71,884	1.31%

North West: deep intersections and cautions

Intersection	Records	Conditional / all share
D↓ + potential A/B	586,349	53.15% of regional D↓
D↓ + potential A/B + owner House	349,741	15.60% all
D↓ + wall Poor/VP	632,311	28.21% all
D↓ + wall + window Poor/VP	77,248	3.45% all
Triple Poor/VP + D↓	7,192	0.32% all
Solar + heat-pump text	1,420	5.00% of Solar
Explicit off-gas + D↓	109,248	4.87% all
House/bungalow ≤100 mm + D↓	205,611	9.17% all

North West contains 2,241,566 searchable records and adds a distinctive evidence-quality issue: Solar-PV status is known on only 73.13% of records. It also has the highest regional share of certificates more than ten years old (25.45%) and substantial D-or-below + potential A/B evidence (586,349 records).

26. Yorkshire & Humber

Yorkshire & Humber contains 1,634,405 searchable records, 9.27% of the ten-region corpus.

Metric	Regional share
Current EPC D or below	53.86%
Potential A/B	62.67%
D↓ + potential A/B	29.62%
Solar PV: Yes	1.320%
Heat-pump evidence	1.21%
Explicit off-gas among known	12.84%
House	70.12%
Flat	19.13%
Wall Poor/Very Poor	34.97%
Window Poor/Very Poor	8.09%
Heating Poor/Very Poor	7.38%
10+ year inspection	23.98%
House/bungalow loft ≤100 among known	22.31%

Within the ten-region comparison, Yorkshire & Humber ranks 4 on absolute D-or-below count, 7 on Solar PV: Yes count and 7 on heat-pump-evidence count. Percentage rankings are discussed through the tables below rather than treating region size as performance.

Within-region high measure	Local authority	Records	Share
D↓ + potential A/B	Calderdale	62,591	34.30%
Solar PV: Yes	Barnsley	75,315	2.58%
Heat-pump text	North Yorkshire	193,440	3.76%
Explicit off-gas	North Yorkshire	193,440	29.15%
Triple poor + D↓	North Yorkshire	193,440	1.18%

Yorkshire & Humber: deep intersections and cautions

Intersection	Records	Conditional / all share
D↓ + potential A/B	484,102	54.99% of regional D↓
D↓ + potential A/B + owner House	272,628	16.68% all
D↓ + wall Poor/VP	496,801	30.40% all
D↓ + wall + window Poor/VP	63,199	3.87% all
Triple Poor/VP + D↓	6,005	0.37% all
Solar + heat-pump text	1,529	7.09% of Solar
Explicit off-gas + D↓	92,964	5.69% all
House/bungalow ≤100 mm + D↓	142,731	8.73% all

This regional chapter should be read as a profile of the supplied searchable records. Local composition, certificate age, source methodology and missingness can all influence the apparent regional distribution.

27. East Midlands

East Midlands contains 1,450,395 searchable records, 8.23% of the ten-region corpus.

Metric	Regional share
Current EPC D or below	49.41%
Potential A/B	68.18%
D↓ + potential A/B	28.82%
Solar PV: Yes	1.898%
Heat-pump evidence	1.83%
Explicit off-gas among known	14.86%
House	71.91%
Flat	15.06%
Wall Poor/Very Poor	30.15%
Window Poor/Very Poor	6.91%
Heating Poor/Very Poor	6.04%
10+ year inspection	21.96%
House/bungalow loft ≤100 among known	23.76%

Within the ten-region comparison, East Midlands ranks 8 on absolute D-or-below count, 5 on Solar PV: Yes count and 4 on heat-pump-evidence count. Percentage rankings are discussed through the tables below rather than treating region size as performance.

Within-region high measure	Local authority	Records	Share
D↓ + potential A/B	Erewash	31,572	37.50%
Solar PV: Yes	Bassetlaw	38,393	4.23%
Heat-pump text	South Holland	30,382	5.18%
Explicit off-gas	East Lindsey	48,200	40.92%
Triple poor + D↓	Derbyshire Dales	21,691	1.13%

East Midlands: deep intersections and cautions

Intersection	Records	Conditional / all share
D↓ + potential A/B	418,064	58.34% of regional D↓
D↓ + potential A/B + owner House	228,735	15.77% all
D↓ + wall Poor/VP	386,886	26.67% all
D↓ + wall + window Poor/VP	53,764	3.71% all
Triple Poor/VP + D↓	4,635	0.32% all
Solar + heat-pump text	2,651	9.63% of Solar
Explicit off-gas + D↓	104,055	7.17% all
House/bungalow ≤100 mm + D↓	145,920	10.06% all

East Midlands retains the highest potential A/B share and one of the highest House shares. It also has the highest regional proportion of D-or-below records that simultaneously show potential A/B, making the region especially important for studying the gap between current and potential EPC performance.

28. West Midlands

West Midlands contains 1,690,040 searchable records, 9.59% of the ten-region corpus.

Metric	Regional share
Current EPC D or below	51.67%
Potential A/B	63.11%
D↓ + potential A/B	27.99%
Solar PV: Yes	1.287%
Heat-pump evidence	1.23%
Explicit off-gas among known	15.44%
House	70.03%
Flat	20.91%
Wall Poor/Very Poor	34.73%
Window Poor/Very Poor	8.20%
Heating Poor/Very Poor	7.55%
10+ year inspection	23.44%
House/bungalow loft ≤100 among known	28.14%

Within the ten-region comparison, West Midlands ranks 5 on absolute D-or-below count, 6 on Solar PV: Yes count and 6 on heat-pump-evidence count. Percentage rankings are discussed through the tables below rather than treating region size as performance.

Within-region high measure	Local authority	Records	Share
D↓ + potential A/B	Staffordshire Moorlands	24,800	40.88%
Solar PV: Yes	Stoke-on-Trent	74,150	2.62%
Heat-pump text	Malvern Hills	24,664	5.07%
Explicit off-gas	Herefordshire, County of	56,293	38.79%
Triple poor + D↓	Herefordshire, County of	56,293	1.64%

West Midlands: deep intersections and cautions

Intersection	Records	Conditional / all share
D↓ + potential A/B	473,095	54.18% of regional D↓
D↓ + potential A/B + owner House	290,480	17.19% all
D↓ + wall Poor/VP	509,999	30.18% all
D↓ + wall + window Poor/VP	71,874	4.25% all
Triple Poor/VP + D↓	7,089	0.42% all
Solar + heat-pump text	1,285	5.91% of Solar
Explicit off-gas + D↓	126,761	7.50% all
House/bungalow ≤100 mm + D↓	183,959	10.88% all

This regional chapter should be read as a profile of the supplied searchable records. Local composition, certificate age, source methodology and missingness can all influence the apparent regional distribution.

29. East of England

East of England contains 1,828,434 searchable records, 10.37% of the ten-region corpus.

Metric	Regional share
Current EPC D or below	46.80%
Potential A/B	64.81%
D↓ + potential A/B	25.28%
Solar PV: Yes	1.670%
Heat-pump evidence	3.21%
Explicit off-gas among known	22.22%
House	64.13%
Flat	21.93%
Wall Poor/Very Poor	28.94%
Window Poor/Very Poor	7.73%
Heating Poor/Very Poor	8.08%
10+ year inspection	21.02%
House/bungalow loft ≤100 among known	31.92%

Within the ten-region comparison, East of England ranks 6 on absolute D-or-below count, 2 on Solar PV: Yes count and 1 on heat-pump-evidence count. Percentage rankings are discussed through the tables below rather than treating region size as performance.

Within-region high measure	Local authority	Records	Share
D↓ + potential A/B	Castle Point	21,623	40.23%
Solar PV: Yes	Peterborough	66,048	5.85%
Heat-pump text	Mid Suffolk	31,548	11.73%
Explicit off-gas	Mid Suffolk	31,548	52.57%
Triple poor + D↓	North Norfolk	35,326	1.40%

East of England: deep intersections and cautions

Intersection	Records	Conditional / all share
D↓ + potential A/B	462,280	54.02% of regional D↓
D↓ + potential A/B + owner House	254,372	13.91% all
D↓ + wall Poor/VP	445,969	24.39% all
D↓ + wall + window Poor/VP	76,678	4.19% all
Triple Poor/VP + D↓	7,575	0.41% all
Solar + heat-pump text	2,386	7.82% of Solar
Explicit off-gas + D↓	206,621	11.30% all
House/bungalow ≤100 mm + D↓	213,829	11.69% all

East of England combines a relatively low D-or-below share with the highest regional heat-pump-evidence share. Its local authorities also dominate the top off-gas and heat-pump rankings, making it a priority region for deeper analysis of fuel availability, rurality and heating technology.

30. London

London contains 2,639,163 searchable records, 14.97% of the ten-region corpus.

Metric	Regional share
Current EPC D or below	44.01%
Potential A/B	46.07%
D↓ + potential A/B	15.36%
Solar PV: Yes	0.329%
Heat-pump evidence	0.85%
Explicit off-gas among known	16.05%
House	32.27%
Flat	60.48%
Wall Poor/Very Poor	56.00%
Window Poor/Very Poor	17.06%
Heating Poor/Very Poor	7.71%
10+ year inspection	17.88%
House/bungalow loft ≤100 among known	46.99%

Within the ten-region comparison, London ranks 2 on absolute D-or-below count, 10 on Solar PV: Yes count and 5 on heat-pump-evidence count. Percentage rankings are discussed through the tables below rather than treating region size as performance.

Within-region high measure	Local authority	Records	Share
D↓ + potential A/B	Havering	65,642	30.76%
Solar PV: Yes	Waltham Forest	77,902	1.32%
Heat-pump text	Westminster	95,571	2.17%
Explicit off-gas	Tower Hamlets	113,236	33.31%
Triple poor + D↓	Kensington and Chelsea	65,046	2.83%

London: deep intersections and cautions

Intersection	Records	Conditional / all share
D↓ + potential A/B	405,277	34.89% of regional D↓
D↓ + potential A/B + owner House	234,070	8.87% all
D↓ + wall Poor/VP	989,100	37.48% all
D↓ + wall + window Poor/VP	266,958	10.12% all
Triple Poor/VP + D↓	15,978	0.61% all
Solar + heat-pump text	338	3.89% of Solar
Explicit off-gas + D↓	131,334	4.98% all
House/bungalow ≤100 mm + D↓	177,377	6.72% all

London remains the structural outlier: 60.48% of records are Flats, Solar PV: Yes is only 0.329%, and wall Poor/Very Poor is 56.0%. Yet among London House/Bungalow records with known numerical loft depth, nearly 47% are at or below 100 mm—showing why applicability-aware denominators reveal patterns hidden by the flat-heavy regional average.

31. South East

South East contains 2,692,971 searchable records, 15.28% of the ten-region corpus.

Metric	Regional share
Current EPC D or below	46.11%
Potential A/B	60.07%
D↓ + potential A/B	22.05%
Solar PV: Yes	1.181%
Heat-pump evidence	1.95%
Explicit off-gas among known	18.07%
House	61.68%
Flat	27.41%
Wall Poor/Very Poor	31.02%
Window Poor/Very Poor	9.54%
Heating Poor/Very Poor	8.16%
10+ year inspection	20.79%
House/bungalow loft ≤100 among known	38.33%

Within the ten-region comparison, South East ranks 1 on absolute D-or-below count, 1 on Solar PV: Yes count and 3 on heat-pump-evidence count. Percentage rankings are discussed through the tables below rather than treating region size as performance.

Within-region high measure	Local authority	Records	Share
D↓ + potential A/B	Medway	78,221	28.23%
Solar PV: Yes	Isle of Wight	46,027	2.25%
Heat-pump text	West Oxfordshire	34,163	5.33%
Explicit off-gas	West Berkshire	45,104	34.73%
Triple poor + D↓	Brighton and Hove	92,644	2.64%

South East: deep intersections and cautions

Intersection	Records	Conditional / all share
D↓ + potential A/B	593,853	47.83% of regional D↓
D↓ + potential A/B + owner House	353,489	13.13% all
D↓ + wall Poor/VP	678,190	25.18% all
D↓ + wall + window Poor/VP	140,888	5.23% all
Triple Poor/VP + D↓	14,422	0.54% all
Solar + heat-pump text	2,428	7.64% of Solar
Explicit off-gas + D↓	231,206	8.59% all
House/bungalow ≤100 mm + D↓	328,182	12.19% all

This regional chapter should be read as a profile of the supplied searchable records. Local composition, certificate age, source methodology and missingness can all influence the apparent regional distribution.

32. South West

South West contains 1,718,113 searchable records, 9.75% of the ten-region corpus.

Metric	Regional share
Current EPC D or below	49.74%
Potential A/B	61.31%
D↓ + potential A/B	24.26%
Solar PV: Yes	1.715%
Heat-pump evidence	3.13%
Explicit off-gas among known	27.06%
House	63.57%
Flat	23.19%
Wall Poor/Very Poor	32.10%
Window Poor/Very Poor	9.75%
Heating Poor/Very Poor	9.60%
10+ year inspection	22.34%
House/bungalow loft ≤100 among known	29.48%

Within the ten-region comparison, South West ranks 7 on absolute D-or-below count, 3 on Solar PV: Yes count and 2 on heat-pump-evidence count. Percentage rankings are discussed through the tables below rather than treating region size as performance.

Within-region high measure	Local authority	Records	Share
D↓ + potential A/B	Torridge	22,794	30.98%
Solar PV: Yes	South Hams	31,353	3.55%
Heat-pump text	Cornwall	184,152	7.67%
Explicit off-gas	Cornwall	184,152	51.31%
Triple poor + D↓	West Devon	17,003	1.76%

South West: deep intersections and cautions

Intersection	Records	Conditional / all share
D↓ + potential A/B	416,834	48.77% of regional D↓
D↓ + potential A/B + owner House	230,243	13.40% all
D↓ + wall Poor/VP	466,800	27.17% all
D↓ + wall + window Poor/VP	102,843	5.99% all
Triple Poor/VP + D↓	14,812	0.86% all
Solar + heat-pump text	2,480	8.42% of Solar
Explicit off-gas + D↓	258,150	15.03% all
House/bungalow ≤100 mm + D↓	181,754	10.58% all

South West has high heat-pump evidence, the highest regional Poor/Very Poor heating share, and the highest explicit off-gas share among records with known status. Cornwall, Torridge and West Devon recur across several indicator extremes.

33. Wales

Wales contains 902,603 searchable records, 5.12% of the ten-region corpus.

Metric	Regional share
Current EPC D or below	54.09%
Potential A/B	64.27%
D↓ + potential A/B	30.03%
Solar PV: Yes	2.106%
Heat-pump evidence	2.10%
Explicit off-gas among known	20.27%
House	70.18%
Flat	17.85%
Wall Poor/Very Poor	41.19%
Window Poor/Very Poor	8.04%
Heating Poor/Very Poor	8.22%
10+ year inspection	23.86%
House/bungalow loft ≤100 among known	24.95%

Within the ten-region comparison, Wales ranks 9 on absolute D-or-below count, 8 on Solar PV: Yes count and 9 on heat-pump-evidence count. Percentage rankings are discussed through the tables below rather than treating region size as performance.

Within-region high measure	Local authority	Records	Share
D↓ + potential A/B	Rhondda Cynon Taf	66,412	38.48%
Solar PV: Yes	Flintshire	42,946	5.43%
Heat-pump text	Ceredigion	22,737	9.51%
Explicit off-gas	Ceredigion	22,737	69.64%
Triple poor + D↓	Powys	39,168	2.47%

Wales: deep intersections and cautions

Intersection	Records	Conditional / all share
D↓ + potential A/B	271,024	55.51% of regional D↓
D↓ + potential A/B + owner House	160,361	17.77% all
D↓ + wall Poor/VP	318,083	35.24% all
D↓ + wall + window Poor/VP	42,051	4.66% all
Triple Poor/VP + D↓	6,305	0.70% all
Solar + heat-pump text	1,868	9.83% of Solar
Explicit off-gas + D↓	107,785	11.94% all
House/bungalow ≤100 mm + D↓	96,271	10.67% all

Wales combines the highest D-or-below and Solar PV: Yes shares in the ten-region comparison. Ceredigion, Gwynedd, Powys and Isle of Anglesey recur across multiple extreme rankings, but the pattern is not one-dimensional: high solar/heat-pump evidence coexists with older certificates and lower current EPC bands in some areas.

PART V — LOCAL-AUTHORITY FINDINGS

34. D-or-below and potential A/B

The D↓ + potential A/B intersection is one of the most informative new metrics because it identifies records that are currently in the lower four EPC bands while the certificate's potential rating is A or B.

Rank	Local authority	Region	Records	D↓ + pot. A/B
1	Staffordshire Moorlands	West Midlands	24,800	40.88%
2	Castle Point	East of England	21,623	40.23%
3	Rhondda Cynon Taf	Wales	66,412	38.48%
4	Erewash	East Midlands	31,572	37.50%
5	Blaenau Gwent	Wales	18,179	37.25%
6	Broxtowe	East Midlands	31,194	36.45%
7	Gwynedd	Wales	35,841	36.18%
8	Pendle	North West	27,927	35.79%
9	Hyndburn	North West	24,539	35.59%
10	Stoke-on-Trent	West Midlands	74,150	35.58%
11	Oadby and Wigston	East Midlands	15,123	35.40%
12	Ceredigion	Wales	22,737	35.05%
13	Derbyshire Dales	East Midlands	21,691	34.92%
14	Powys	Wales	39,168	34.89%
15	Rossendale	North West	20,707	34.54%

Staffordshire Moorlands leads this ranking at 40.88% of its searchable records, followed by Castle Point at 40.23%. Pendle and Hyndburn now enter the upper national table after North West is added. The list is not a ranking of retrofit need or local policy performance.

34.1 Owner-occupied House subset

Rank	Local authority	Region	Records	D↓ + pot A/B + owner House
1	Blaenau Gwent	Wales	18,179	25.39%
2	Rhondda Cynon Taf	Wales	66,412	24.27%
3	Erewash	East Midlands	31,572	24.10%
4	High Peak	East Midlands	24,862	23.67%
5	Rossendale	North West	20,707	22.79%
6	Calderdale	Yorkshire & Humber	62,591	22.70%
7	Staffordshire Moorlands	West Midlands	24,800	22.67%
8	Oadby and Wigston	East Midlands	15,123	21.94%
9	Neath Port Talbot	Wales	40,042	21.80%
10	Derbyshire Dales	East Midlands	21,691	21.68%
11	Broxtowe	East Midlands	31,194	21.65%
12	Caerphilly	Wales	47,842	21.45%
13	Blaby	East Midlands	26,495	21.37%
14	Merthyr Tydfil	Wales	17,355	21.25%
15	Havering	London	65,642	21.18%

35. Off-gas and heat-pump geography

Rank	Local authority	Region	Records	Explicit off-gas among known
1	Ceredigion	Wales	22,737	69.64%
2	Powys	Wales	39,168	54.50%
3	Mid Suffolk	East of England	31,548	52.57%
4	North Norfolk	East of England	35,326	52.30%
5	Cornwall	South West	184,152	51.31%
6	Torridge	South West	22,794	50.95%
7	Isle of Anglesey	Wales	21,859	50.29%
8	Gwynedd	Wales	35,841	48.36%
9	King's Lynn and West Norfolk	East of England	42,012	47.33%
10	West Devon	South West	17,003	47.32%
11	South Hams	South West	31,353	46.76%
12	South Norfolk	East of England	42,538	45.47%
13	Breckland	East of England	42,285	45.10%
14	Pembrokeshire	Wales	37,498	44.37%
15	Forest of Dean	South West	24,377	42.95%

Ceredigion is the strongest explicit off-gas result among >=15,000-record local authorities at 69.64% of known mains-gas status. Several rural authorities across Wales, East of England and South West remain above 50%.

35.1 Heat-pump evidence

Rank	Local authority	Region	Records	Heat-pump text
1	Mid Suffolk	East of England	31,548	11.73%
2	Ceredigion	Wales	22,737	9.51%
3	Breckland	East of England	42,285	9.16%
4	King's Lynn and West Norfolk	East of England	42,012	8.62%
5	Uttlesford	East of England	25,724	7.77%
6	Cornwall	South West	184,152	7.67%
7	Babergh	East of England	26,789	7.46%
8	South Norfolk	East of England	42,538	7.41%
9	Torridge	South West	22,794	7.11%
10	East Cambridgeshire	East of England	26,470	7.05%
11	Cotswold	South West	28,492	6.36%
12	South Cambridgeshire	East of England	48,090	6.35%
13	Powys	Wales	39,168	6.31%
14	North Norfolk	East of England	35,326	6.25%
15	Maldon	East of England	18,384	5.61%

The local-authority correlation between off-gas share among known-status records and heat-pump-text share is approximately +0.854. This is a strong ecological association but not a causal estimate.

36. Loft-depth concentrations

The local-authority ranking below uses only House/Bungalow records with a numerical loft depth, which is more defensible than dividing by every property record.

Rank	Local authority	Region	Records	House/bungalow ≤100 mm among known
1	Islington	London	76,986	55.34%
2	Kensington and Chelsea	London	65,046	54.66%
3	Camden	London	77,296	53.62%
4	Merton	London	56,570	51.49%
5	Wandsworth	London	115,721	51.23%
6	Barnet	London	115,234	51.22%
7	Hammersmith and Fulham	London	72,628	50.76%
8	Richmond upon Thames	London	52,254	50.62%
9	Lambeth	London	112,918	50.47%
10	Kingston upon Thames	London	46,975	49.98%
11	Sutton	London	55,940	49.72%
12	Tower Hamlets	London	113,236	49.24%
13	Ealing	London	104,052	48.73%
14	Crawley	South East	28,865	48.66%
15	Runnymede	South East	24,886	48.58%

London authorities dominate this conditional low-loft ranking. That does not contradict London’s low overall loft-field completeness: the regional housing stock is flat-heavy, but where a House/Bungalow loft depth is actually recorded, many authorities show a high ≤100 mm share.

37. Multi-element inefficiency

Rank	Local authority	Region	Records	Triple poor + D↓
1	Kensington and Chelsea	London	65,046	2.83%
2	Westminster	London	95,571	2.78%
3	Brighton and Hove	South East	92,644	2.64%
4	Powys	Wales	39,168	2.47%
5	Ceredigion	Wales	22,737	2.43%
6	Gwynedd	Wales	35,841	2.35%
7	West Devon	South West	17,003	1.76%
8	Cornwall	South West	184,152	1.67%
9	Herefordshire, County of	West Midlands	56,293	1.64%
10	Camden	London	77,296	1.56%
11	Torridge	South West	22,794	1.56%
12	Pembrokeshire	Wales	37,498	1.56%
13	Hastings	South East	31,175	1.55%
14	Isle of Anglesey	Wales	21,859	1.52%
15	North Devon	South West	32,213	1.50%

Kensington and Chelsea, Westminster and Brighton and Hove lead the triple Poor/Very Poor + D-or-below ranking. These records simultaneously have Poor/Very Poor walls, windows and heating efficiency plus current EPC D-or-below; the indicator should not be interpreted as a building survey.

38. Repeated local-authority standouts

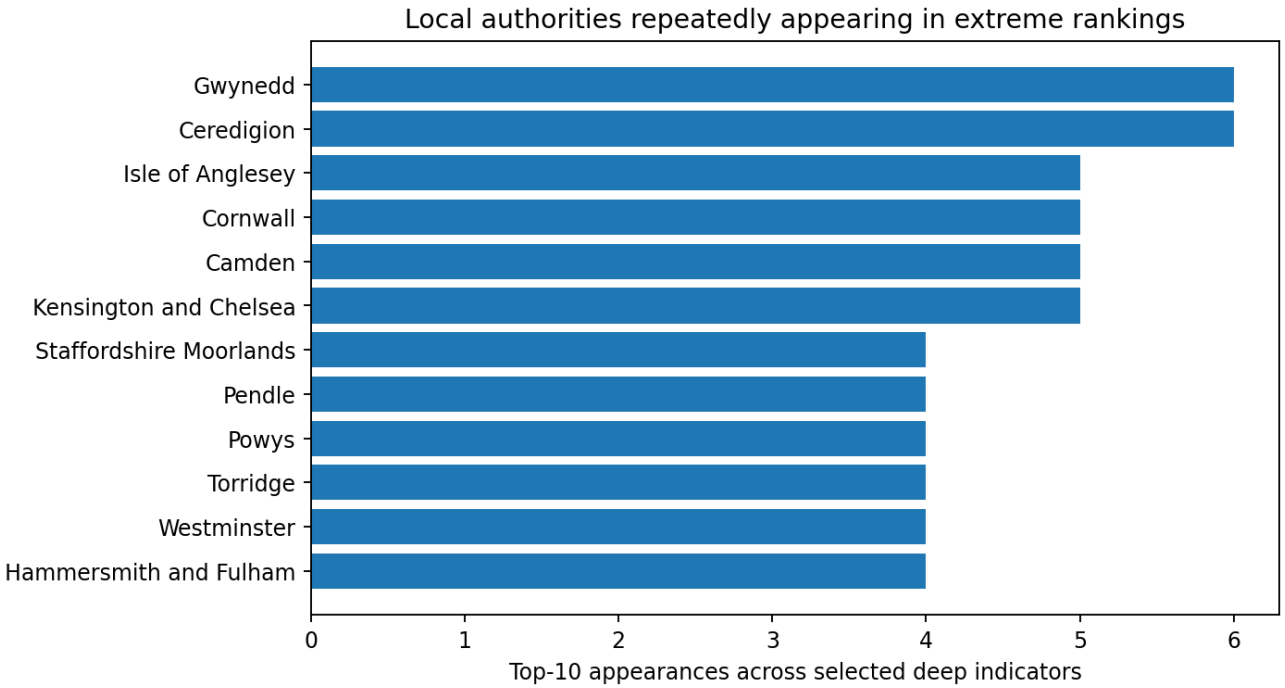

Figure 14. Local authorities appearing repeatedly in the top ten of selected deep indicators.

Local authority	Region	Top-10 appearances
Gwynedd	Wales	6
Ceredigion	Wales	6
Isle of Anglesey	Wales	5
Cornwall	South West	5
Camden	London	5
Kensington and Chelsea	London	5
Staffordshire Moorlands	West Midlands	4
Pendle	North West	4
Powys	Wales	4
Torridge	South West	4
Westminster	London	4
Hammersmith and Fulham	London	4
Lambeth	London	4
North Norfolk	East of England	3
Hyndburn	North West	3
West Devon	South West	3
Rhondda Cynon Taf	Wales	3
Blaenau Gwent	Wales	3
Islington	London	3
Wandsworth	London	3

Gwynedd appears most often in the selected top-ten indicator tables with 6 appearances. North West's Pendle also enters the repeated-standout set. This is not a composite performance score: it is a flag for places that deserve multi-indicator case-study analysis.

38.1 North West case-study leads

North West adds two especially useful exploratory case-study leads. These are not causal conclusions; they are combinations that survive simple record-count and denominator checks and therefore justify deeper adjusted analysis.

Local authority	Records	Wall Poor/VP	D↓ + potential A/B
Pendle	27,927	61.12%	35.79%
Hyndburn	24,539	57.04%	35.59%
Burnley	29,834	52.79%	34.39%
Rossendale	20,707	51.35%	34.54%
Wirral	95,247	48.19%	31.91%
Lancaster	39,522	43.85%	32.16%

East Lancashire cluster: Pendle, Hyndburn, Burnley and Rossendale combine high Poor/Very Poor wall-efficiency shares with high D-or-below + potential A/B shares. The book treats this as an EPC-evidence cluster, not as a survey of building condition.

Local authority	Records	Heating Poor/VP	10+ year certificates
Salford	102,392	26.46%	18.49%
Manchester	187,263	20.27%	19.32%
Liverpool	166,596	13.71%	20.90%
Blackpool	50,589	11.60%	27.17%
Westmorland and Furness	71,884	10.89%	22.50%
Trafford	64,254	10.61%	30.13%

Greater Manchester lead: Salford and Manchester show unusually high Poor/Very Poor heating-efficiency shares. v0.3 flags this for deeper adjustment by property type, fuel, community heating, construction era and certificate year before any causal explanation is offered.

PART VI — INTERPRETATION AND NEXT RESEARCH PHASE

39. What the data cannot tell us

Question / variable	What the current data supports
Current legal ownership	Tenure is EPC evidence, not a Land Registry title check.
Current occupancy	A certificate records a point in time; the present occupier may differ.
Current equipment condition	Solar/heat-pump evidence does not verify that a system is present, operational or owned today.
Installation date	Inspection year is not the same as technology installation year.
Retrofit suitability	An EPC is not a building survey or technical installation assessment.
Retrofit cost	No verified quotation, property-specific engineering design or cost model is present.
Household income / fuel poverty	Not contained in these packs.
Planning constraints / conservation status	Not contained in these packs.
Actual metered energy use	Not contained in these packs.
Current market value	Not contained in these packs.
Measured carbon emissions today	Certificate calculations are not a live measurement.
UK completeness	All ten supplied England-and-Wales regional datasets are represented, but this is not a census of every current dwelling; Scotland and Northern Ireland remain outside the corpus.

These gaps are not weaknesses that should be hidden. They define the boundary between what EPC Atlas can establish from the supplied evidence and what would require linkage to another authoritative dataset or direct property verification.

40. Publication rules

Rule	Reason
Say “records”, not automatically “homes”	Administrative EPC evidence can be historical and duplicated across source certificates.
Preserve denominators	Known-status, applicable-property and all-record denominators answer different questions.
Explicit No ≠ missing	Critical for mains gas, Solar PV, roof and loft.
Text evidence ≠ verified installation	Critical for heat pumps and other technology descriptions.
Do not globally dedupe on UPRN	26 cross-region collisions are in the ten-region register.
Do not globally dedupe on address + postcode	Many repeated building addresses represent separate units.
Normalize for readers, preserve raw values	Age, heating/fuel and multilingual descriptions need a public taxonomy with traceability.
Quarantine extreme numeric values for averages	Raw source outliers can distort means and models.
Treat 2025–2026 as a methodology-review boundary	Abrupt distributions require external source-method verification before trend claims.
Separate finding from hypothesis	Correlation, odds ratios and plausible explanations are not causal proof.

41. Open questions and missing information

1. How much of the House-versus-Flat Solar PV difference remains after simultaneously controlling for region, tenure, construction era and inspection year?

2. Why does explicit off-gas share correlate so strongly with heat-pump text at local-authority level, and how much persists at property level?

3. What official methodological or source-format change explains the abrupt 2025–2026 potential-rating and window-efficiency discontinuity?

4. Which local authorities combine high D-or-below + potential A/B with high owner-occupied House shares after accounting for certificate age?

5. How does low loft depth vary within the same construction era and property type, rather than across the raw regional mix?

6. Can trustworthy property identity be established well enough to measure superseded certificates directly and distinguish current from historic evidence?

7. How do social-rented records compare after controlling for property type and inspection year?

8. How much do adjusted national relationships change once North West Solar-PV missingness is modelled explicitly rather than treated as ordinary absence?

9. Which external datasets can defensibly add deprivation, planning constraints, housing value, measured consumption or installer-market context without overclaiming identity linkage?

10. Can the research series create stable local-authority profiles with uncertainty/completeness indicators rather than simple league tables?

Appendix A — Regional deep metric table

Region	Records	D↓	Pot A/B	D↓+potAB	Solar	HP text	Off-gas known	Triple poor+D
North East	827,299	47.4%	63.5%	25.1%	1.99%	0.85%	10.2%	0.23%
North West	2,241,566	49.2%	62.9%	26.2%	1.27%	0.87%	12.6%	0.32%
Yorkshire & Humber	1,634,405	53.9%	62.7%	29.6%	1.32%	1.21%	12.8%	0.37%
East Midlands	1,450,395	49.4%	68.2%	28.8%	1.90%	1.83%	14.9%	0.32%
West Midlands	1,690,040	51.7%	63.1%	28.0%	1.29%	1.23%	15.4%	0.42%
East of England	1,828,434	46.8%	64.8%	25.3%	1.67%	3.21%	22.2%	0.41%
London	2,639,163	44.0%	46.1%	15.4%	0.33%	0.85%	16.0%	0.61%
South East	2,692,971	46.1%	60.1%	22.1%	1.18%	1.95%	18.1%	0.54%
South West	1,718,113	49.7%	61.3%	24.3%	1.71%	3.13%	27.1%	0.86%
Wales	902,603	54.1%	64.3%	30.0%	2.11%	2.10%	20.3%	0.70%

Appendix B — Data-quality audit register

Check	Status	Finding
Nine-region structural audit	PASS	No broken regional pack/checksum/schema failures in retained v0.2 audit.
Rows represented in v0.3	PASS	17,624,989
Programmatic assertions	PASS	1,357,124,153
North West CSV structure	PASS	2,241,566 rows / 157 columns; no malformed rows
North West Lead_Rank	FLAG	1,162 duplicate values and 1,162 missing sequence values
North West Solar PV	CAUTION	602,268 missing/unknown values
Cross-region UPRN collision	FLAG	26 values
North West missing UPRN	KNOWN GAP	18,828
North West inspection date	QUALITY FLAG	3 blank dates
Potential numeric lower than current	FLAG	1,005
Potential letter worse than current	FLAG	320
Current score >200	QUALITY FLAG	55
Potential score >200	QUALITY FLAG	81
Mains gas missing	CAUTION	4,415,023
Solar PV missing	CAUTION	602,268
Roof type missing	APPLICABILITY / GAP	5,410,572
Numerical loft depth missing	APPLICABILITY / GAP	8,722,184
2025–2026 distribution discontinuity	REVIEW	Potential rating / window-efficiency patterns require method-source verification.

Appendix C — Normalized analytical definitions

Term	Definition
D or below	Current EPC letter D, E, F or G.
Potential A/B	Potential EPC letter A or B.
D↓ + potential A/B	Record simultaneously satisfying both definitions.
Solar PV: Yes	Explicit Yes in EPC Atlas solar-PV field. North West missing values remain Unknown; known-status and all-record denominators are separated.
Heat-pump evidence	Main-heating text containing recognized English or Welsh heat-pump wording; categorized as air/exhaust, ground, water, community or other/ambiguous.
Explicit off-gas	mains_gas = N. Unknown is excluded.
Triple Poor/Very Poor	Wall efficiency, window efficiency and main-heating efficiency each in Poor or Very Poor.
House/Bungalow loft known	Property type House or Bungalow with numerical loft depth.
Low loft ≤100 mm	Numerical loft depth at or below 100 mm.
Normalized age	Pre-1900; 1900–1929; 1930–1949; 1950–1966; 1967–1982; 1983–1995; 1996–2006; 2007+; plus explicit outlier/unknown groups.
Certificate age	Relative to 28 August 2026: <1, 1–3, 3–5, 5–10, >10 years.
Local-authority ranking threshold	At least 15,000 searchable records.

Appendix D — Major new findings register

F01 — Meaningful automated validation scale

The deep v0.2 pass evaluated 1,184,523,571 programmatic row/field/relationship assertions across all 15,383,423 searchable records.

Caution: Assertion count is the number of concrete boolean/data checks evaluated, not a claim of one billion independent research hypotheses.

F02 — D with potential A/B

3,732,539 records are currently EPC D or below and have potential EPC A/B, equal to 24.26% of the corpus and 50.00% of D-or-below records.

F03 — E with potential A/B

737,644 records are EPC E or below and have potential EPC A/B, 37.27% of E-or-below records.

F04 — Owner-occupied house improvement subset

2,131,790 records simultaneously meet four evidence conditions: current EPC D or below, potential A/B, owner-occupied tenure classification and House property type.

Caution: Tenure is the EPC evidence classification, not legal title verification.

F05 — Low-loft owner-house subset

705,603 records add numerical loft depth ≤100 mm to the D↓ + potential A/B + owner-occupied + house intersection.

Caution: Only records with a numerical loft depth can enter this count.

F06 — House/bungalow low-loft rate

Among 6,886,992 house or bungalow records with numerical loft depth, 2,058,448 (29.89%) are at or below 100 mm.

F07 — Low loft and current D

1,528,144 house/bungalow records are both EPC D-or-below and have numerical loft depth ≤100 mm; this is 74.24% of the low-loft house/bungalow subset.

F08 — Triple poor fabric/heating overlap

81,091 records are simultaneously Poor/Very Poor for walls, windows and heating. 78,738 (97.10%) are also EPC D-or-below.

F09 — Triple poor with potential A/B

25,203 records combine triple Poor/Very Poor element ratings, current EPC D-or-below and potential A/B.

F10 — Solar by property type

Solar PV: Yes is recorded on 1.664% of House records and 0.126% of Flat records; the unadjusted odds are about 13.45 times higher for houses.

Caution: Unadjusted association; housing age, tenure, geography and certificate year can confound it.

F11 — Solar by tenure

Solar PV: Yes is recorded on 1.624% of owner-occupied records and 0.491% of private-rented records; unadjusted odds ratio ≈3.34.

Caution: Tenure is EPC classification; association is not causal.

F12 — Solar owner share

Of 206,815 Solar PV: Yes records, 128,131 (61.95%) are classified owner-occupied and 155,647 (75.26%) are Houses.

F13 — Solar and heat-pump evidence overlap

15,666 records contain both Solar PV: Yes and heat-pump evidence in the main-heating description, 7.57% of Solar PV: Yes records.

F14 — Expanded heat-pump text method

The broadened text method identifies 280,303 heat-pump-evidence records (1.82%), including Welsh heat-pump wording that the earlier simple English-text search could miss.

Caution: Not a verified current installed-stock count.

F15 — Heat pump and explicit off-gas

104,841 heat-pump-evidence records are explicitly mains-gas No, representing 37.40% of heat-pump-evidence records.

Caution: Mains-gas field is missing for about one quarter of all records.

F16 — Explicit off-gas denominator

Among 11,550,472 records with known mains-gas status, 2,051,287 are explicit No, a known-status rate of 17.76%.

Caution: Unknown must not be treated as No.

F17 — Certificate age and EPC D

EPC D-or-below is 63.58% among records older than ten years versus 35.81% among records under one year; unadjusted odds ratio ≈3.13.

Caution: Certificate age is correlated with property age, data-generation period and other factors; do not infer deterioration.

F18 — Construction era gradient

The normalized age analysis shows a strong descriptive gradient: Pre-1900 records are 81.53% EPC D-or-below, compared with 3.89% for the broad 2007+ group.

Caution: The 2007+ group combines several source-era bands and exact years.

F19 — Construction era and wall efficiency

Poor/Very Poor wall efficiency is recorded on 91.90% of Pre-1900 records and 88.31% of 1900-1929 records, but only 0.62% of the normalized 2007+ group.

F20 — Floor area differences

Median recorded floor area ranges from about 70 m² in London to 83 m² in Wales; every other analysed region has a median of 79–82 m².

F21 — Large floor area and technology evidence

In records with valid floor area, the Solar PV: Yes and heat-pump-text shares rise with the size bands; the 200+ m² band shows 2.87% Solar PV: Yes and 8.88% heat-pump evidence.

Caution: Large-property composition differs by tenure, age and region.

F22 — Potential-score improvement distribution

Among records with usable numeric current/potential score pairs, the largest delta group is +11 to +20 points (5,916,831 records). Another 2,514,622 improve by +21 to +30 and 1,233,566 by more than +30.

Caution: Extreme raw scores are quality-flagged; delta categories use a bounded plausible range.

F23 — Score-delta negative cases

Only 936 records (0.0061%) have a lower potential numeric score than current; 300 have a worse potential letter.

F24 — Potential rating with missing numeric value

Eight records carry potential rating A but have no numeric potential-efficiency score. When both score and letter are present, the deep check found no band-rule mismatch.

Caution: Do not treat the eight blank-score rows as score-band contradictions.

F25 — Recent-year discontinuity warning

Inspection-year cross-tabs show abrupt changes in potential A/B and window-efficiency distributions in 2025–2026. This is a data-generation/methodology discontinuity candidate and should not be interpreted as a sudden physical change in housing stock without external methodological verification.

F26 — Solar evidence by inspection year

Solar PV: Yes rises from 0.73% in 2019 records to 2.09% in 2024, 2.67% in 2025 and 2.94% in 2026 records.

Caution: Inspection year is certificate timing, not installation year.

F27 — Heat-pump evidence by inspection year

Heat-pump evidence rises from 1.07% in 2019 records to 2.94% in 2024, 3.94% in 2025 and 3.69% in 2026 records.

Caution: Certificate timing is not installation timing; methodology changes may affect wording.

F28 — Local off-gas concentration

Among local authorities with at least 15,000 records, Ceredigion has the highest explicit off-gas share among records with known mains-gas status at about 69.64%.

F29 — Local D + potential A/B concentration

Staffordshire Moorlands has the highest D-or-below plus potential A/B share among ≥15,000-record local authorities at about 40.88%.

F30 — Recurring local-authority outliers

Ceredigion appears in the top ten of seven of the deep-audit indicator rankings, more than any other ≥15,000-record local authority in the selected ranking set.

Caution: Top-ten appearance counts depend on the selected indicator list and are not a quality league table.

F31 — Local off-gas and heat-pump relationship

Across ≥15,000-record local authorities, explicit off-gas share among known-status records has a strong positive Pearson correlation (about +0.856) with heat-pump-text share.

Caution: Local-authority correlation is ecological and does not prove property-level causation.

F32 — House share and solar after deeper LA analysis

Across ≥15,000-record local authorities, house share and Solar PV: Yes share correlate about +0.458; flat share and Solar PV: Yes about −0.539.

F33 — Ten-region corpus reaches 17.62 million

The harmonized analytical corpus now contains 17,624,989 searchable EPC Atlas records after addition of North West's 2,241,566 records.

Caution: All supplied England-and-Wales regional datasets are represented; Scotland and Northern Ireland remain outside this corpus.

F34 — Ten-region D-or-below with potential A/B

4,318,888 records are current EPC D or below and potential A/B, equal to 24.50% of the corpus and 50.41% of D-or-below records.

Caution: Potential rating is EPC evidence, not a verified retrofit plan.

F35 — Owner-occupied House improvement subset expands

2,481,531 records combine D-or-below, potential A/B, owner-occupied tenure classification and House property type.

Caution: Tenure is EPC evidence, not a current legal-title check.

F36 — North West D-or-below plus potential A/B

North West contains 586,349 records simultaneously current D-or-below and potential A/B, 26.16% of its searchable records and 53.15% of its D-or-below records.

Caution: North West originated from a richer 157-column master and was normalized to the shared research definitions.

F37 — North West Solar PV completeness asymmetry

North West contains 28,424 Solar PV: Yes, 1,610,874 No and 602,268 Unknown/missing records. Solar-PV status is known on 73.13% of North West records.

Caution: North West Solar PV percentages must preserve both all-record and known-status denominators.

F38 — Ten-region Solar PV coverage

Across ten regions, 235,239 records are Solar PV: Yes. Solar-PV status is known on 17,022,721 of 17,624,989 records (96.58%).

Caution: Do not convert the 602,268 North West missing Solar-PV values to No.

F39 — North West certificate-age concentration

North West has 570,554 records with inspection dates more than ten years old, 25.45% of its corpus, the highest regional share among the ten datasets.

Caution: Certificate age is associated with source era, property mix and methodology; it does not prove physical deterioration.

F40 — East Lancashire wall-efficiency cluster

Pendle, Hyndburn, Burnley and Rossendale combine high Poor/Very Poor wall-efficiency shares with high D-or-below plus potential A/B shares, creating a repeated East Lancashire multi-indicator cluster.

Caution: This is a cluster in EPC evidence, not a building-survey finding or a local-authority performance judgement.

F41 — Greater Manchester heating-efficiency concentration

Poor/Very Poor heating-efficiency evidence is 26.46% in Salford and 20.27% in Manchester, markedly above the North West regional rate of 8.86%.

Caution: Requires deeper adjustment for property type, fuel, community heating, construction age and certificate year before causal interpretation.

F42 — North West loft-depth intersection

Among 1,119,528 North West House/Bungalow records with numerical loft depth, 278,235 are at or below 100 mm; 205,611 of those are also EPC D-or-below.

Caution: Missing loft depth is not zero insulation and must be excluded from the known-depth denominator.

F43 — Ten-region UPRN collision register

The cross-region UPRN collision register rises provisionally from 23 to 26 values after North West is compared with the nine existing regional datasets.

Caution: Raw UPRN must not be the sole EPC Atlas global primary key.

F44 — North West Lead_Rank integrity issue

North West contains 1,162 duplicated Lead_Rank values and 1,162 missing sequence values even though underlying certificate numbers are unique and no within-region non-empty UPRN duplicates were found.

Caution: Regenerate Lead_Rank before using it as a database or campaign identity key.

F45 — Ten-region explicit off-gas denominator

Mains-gas status is known on 13,209,966 records and 2,260,152 are explicit No, giving 17.11% explicit off-gas among known-status records.

Caution: Unknown mains-gas status is excluded, never treated as off-gas.

F46 — North West enters national local-authority rankings

Pendle and Hyndburn enter the upper national D-or-below + potential A/B rankings; Pendle also appears repeatedly across selected top-ten indicator tables.

Caution: Ranking inclusion depends on the >=15,000-record threshold and selected indicators.

End note

Revision 0.3 is the first ten-region regeneration of Volume One. It preserves v0.2 as the historical nine-region edition, incorporates North West through a documented normalization layer, and strengthens denominator handling where source completeness differs. Future revisions should continue to regenerate combined totals from harmonized source outputs rather than manually patching published tables.

END OF WORKING MANUSCRIPT v0.3