Analysis

EPC ratings and thermal storage: from RdSAP 10 to the Home Energy Model

How the engine behind the EPC is changing, and why it matters for anyone planning heating decarbonisation between now and 2030.

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1. In brief

EPC ratings sit underneath almost every decision in housing decarbonisation: minimum energy efficiency standards, funding eligibility, asset-management plans and the information buyers and tenants see. The methodology that produces those ratings is about to change engines. Existing homes are assessed today under RdSAP 10, a reduced-data method whose current specification took effect in June 2025. Its replacement, the Home Energy Model (HEM), was consulted on in early 2026, with reformed EPCs now planned for launch in the second half of 2027.

That switch matters enormously for thermal energy storage. Today's engine prices heating against a fuel-cost table frozen in 2012 and recognises only the legacy off-peak tariff structures of that era — it structurally cannot see a smart time-of-use tariff or a store that charges itself in the cheapest, cleanest hours. HEM simulates the home half-hourly, applies time-varying carbon factors, and names thermal storage explicitly in two of the four new headline metrics. This paper sets out what each engine actually does, with references, so that asset teams can judge the position for themselves.

2. How today's engine sees a thermal store: RdSAP 10

RdSAP 10 is a static monthly calculation, and the headline Energy Efficiency Rating (EER) on today's EPC is a cost-based metric. Three features of the current specification (V3.0, 9 June 2025) shape how any electric thermal storage system is scored.

Fuel prices are fixed at 2012 levels

The EER is calculated using the fuel prices in Table 32 of the RdSAP 10 specification, which the specification states are "the same as in Table 12 of the SAP 2012 specification" (§19.1). In that table, mains gas is 3.48p/kWh, standard-tariff electricity is 13.19p/kWh, and the 7-hour off-peak low rate is 5.50p/kWh. On the 2012 price basis, off-peak electricity is therefore assumed to cost about 58% more per kWh than gas.

The market has moved a long way since. At mid-2026 prices, gas under the July–September price cap is 7.33p/kWh, while smart time-of-use tariffs price overnight electricity at around 6.7–7p/kWh — parity or better. A cost-based rating computed on 2012 relative prices carries a structural bias in favour of gas and against off-peak electric storage that no longer reflects what households actually pay.

Only legacy tariff structures exist in the model

RdSAP recognises five electricity tariff situations: standard, 7-hour, 10-hour, 18-hour and 24-hour (§12). Which one applies is deduced from the meter and the heating system category — an electric CPSU is assigned the 10-hour tariff, storage heaters and electric water-storage boilers the 7-hour tariff — with the split between high-rate and low-rate consumption fixed by predefined fractions (Table 12a of SAP 10.2). A modern smart tariff, with half-hourly pricing on a single smart meter, is not representable.

The consequence is sharper than it first appears. Under §12, if a dwelling has storage-type heating but a single meter — which is exactly how a home on a smart time-of-use tariff presents — the assessor is instructed to "enter heating as panel heaters and/or immersion as single", with an addendum noting that a dual-rate appliance is present. In other words, a home intelligently charging a thermal store overnight

on a smart tariff can be assessed as if it were heated by direct-acting panel heaters at the standard rate, with a footnote.

A new product enters as its nearest legacy category

RdSAP's heating system list predates products like Hestora. A pressurised thermal store charging from off-peak electricity is recorded as its nearest equivalent — an electric water-storage boiler or electric CPSU — inheriting that category's assumed tariff and performance treatment. On the carbon side, the model applies a single flat emission factor for electricity (0.136 $kgCO_2e/kWh$, against 0.210 for gas) with no time-of-day variation, so charging in the cleanest overnight hours earns no additional credit.

None of this is a criticism of RdSAP as such: it is a reduced-data method built for consistency at scale, and it does that job well. But its price basis and tariff list were fixed before smart tariffs, flexibility markets or modern domestic storage existed. The result is that today's EPC can materially under-state the cost and carbon performance of a storage-based electric heating system — something the Government's own reform programme recognises.

3. What changes under the Home Energy Model

The Home Energy Model replaces SAP and RdSAP as the engine behind domestic EPCs. The HEM:EPC consultation (DESNZ, January–March 2026) sets out the proposed approach; conclusions are due later in 2026 alongside the full response to the 2024 Energy Performance of Buildings consultation, and following a March 2026 update the launch of reformed EPCs has moved to the second half of 2027. Two design decisions change the picture for thermal storage fundamentally.

First, HEM simulates the dwelling at half-hourly resolution, with a dynamic price signal and time-varying grid carbon intensity. The consultation is explicit about why:

> *"This makes it possible to simulate a dwelling's capability to generate electricity (with solar PV etc.), store energy (electric batteries and thermal energy storage technologies) and determine when it is used (smart load-shifting control) in response to time-of-use (TOU) tariffs and other varying signals. This was not possible within the SAP model."* — HEM:EPC consultation, Chapter 3, Smart Readiness Metric

Second, reformed EPCs will carry four headline metrics — fabric performance, heating system, smart readiness and energy cost — and thermal storage is written into the proposals for two of them.

The Heating System Metric

The proposed metric scores heating technologies on modelled efficiency and modelled emissions intensity, using carbon factors that vary between peak and off-peak. The banding principles are stated plainly: no home relying on a primary fossil-fuel heating system should be able to achieve a C; heat pumps and low-carbon heat networks always score C or above; and for electric heating the proposal draws precisely the line that matters for storage:

> *"Direct electric heating with no (or insufficient) thermal energy storage will always score a D or below. However, electric heating with thermal storage, where the efficiency and use of off-peak electricity results in lower annual emissions than an equivalent direct electric system will typically score a C or above."* — HEM:EPC consultation, Chapter 3, Heating System Metric

The C boundary is expected to be the compliance threshold for future minimum energy efficiency standards, which makes this line one of the most consequential sentences in the consultation for electric heating strategy.

The Smart Readiness Metric

This new metric rates the dwelling's capability to generate, store and shift energy. Its proposed technology list names our category directly: "thermal energy storage systems which have smart functionality: including heat batteries, storage heaters, and hot water cylinders", alongside solar PV, electric batteries and smart controls. One of the two options under consultation for the C boundary

would require some level of energy storage alongside microgeneration to reach a C at all — recognising, in the consultation's words, the flexibility and bill-savings benefits of installing them together. The metric would also take account of the property's grid connection, including single- or three-phase supply and fuse capacity.

The Energy Cost and Fabric Performance Metrics

The energy cost metric will be reported as an estimated annual bill in pounds, based on prices at the time of assessment rather than a frozen table — so a store that buys the year's heat in the cheapest windows shows its value directly in the number a tenant or buyer sees. Fabric performance is deliberately system-independent (calculated with a standardised reference system), so it neither rewards nor penalises the heating choice — fabric is measured on its own merits, as it should be.

For continuity, certificates will also carry a legacy version of today's EER until at least the end of 2029, calculated on the old cost methodology, while policies that reference EPCs transition to the new metrics.

4. The two engines side by side

	RdSAP 10 (today)	HEM:EPC (proposed, H2 2027)
Time resolution	Static monthly calculation	Half-hourly simulation across the year
Energy prices	Fixed 2012 table (gas 3.48p; off-peak elec 5.50p low rate)	Cost metric in £ at prices current at assessment
Tariffs	Standard / 7-, 10-, 18-, 24-hour legacy structures only; fixed high-rate fractions	Time-of-use tariffs and dynamic price signals modelled directly
Carbon	Single flat factor per fuel (electricity 0.136 $kgCO_2e/kWh$)	Grid intensity varies by time of day; off-peak charging earns its measured credit
Thermal storage	Recorded as nearest legacy category (storage boiler / CPSU); smart charging invisible; single-meter smart-tariff homes can be assessed as panel heaters	Named technology in Heating System and Smart Readiness metrics; storage-based electric heating "will typically score a C or above"
Headline output	Single cost-based EER band	Four metrics: fabric, heating system, smart readiness, energy cost (£); legacy EER retained to end-2029

5. What this means in practice

Three common situations illustrate the swing. In a gas-heated house, today's cost-based EER flatters the boiler because it is priced at 3.48p/kWh; under the proposed Heating System Metric no fossil-fuel-reliant home can reach a C, while a thermal-store retrofit charging off-peak sits in typically-C-or-above territory and scores again on smart readiness — particularly alongside rooftop solar. In an oil-heated rural home the same logic applies with a worse starting point for the incumbent fuel. And in a home on direct electric heating — where much fuel poverty is concentrated — the proposals draw the starkest line of all: direct electric without storage is capped at D, while adding storage that shifts consumption off-peak typically lifts the home to C or above.

Two honest caveats. These are consultation proposals: band boundaries and final metric design await the government response, and the consultation itself notes that no interactive tool yet exists to estimate a given dwelling's ratings under the proposed system. And the swing will vary property by property — fabric, occupancy and system sizing all matter. The full reference code for HEM has been published, and we are working through an archetype-by-archetype analysis using it; we will publish worked examples when that analysis is complete.

One point of substance rather than caveat: Hestora's own system model is built on the same physics as HEM. We have implemented HEM's dynamic thermal model — the five-node method of BS EN ISO 52016-1, with HEM's heat-transfer coefficients and mass-distribution classes, matching the government's published reference code — inside our product simulator, and validated it against reference behaviours. Our product simulations and HEM assessments therefore speak the same language, which is not something a spreadsheet built on the old static methodology can say.

6. What it means for social landlords planning 2026–2030

- **Measures installed now will live under both regimes.** Reformed EPCs are planned for the second half of 2027, with the legacy EER shown alongside until at least end-2029. A heating measure chosen purely to optimise today's cost-based EER — on 2012 prices — risks scoring poorly on the metrics that will define compliance for most of its life.
- **Storage helps on both proposed compliance paths.** The minimum-standards proposals give landlords discretion between the smart readiness and heating system metrics — and smart thermal storage contributes to both, which few other single measures do.
- **The direction of travel is explicit.** Half-hourly modelling, time-varying carbon and named recognition of heat batteries are not speculative readings of the consultation — they are its stated design. The open questions are boundaries and weightings, not whether storage is recognised.

Hestora is designed for exactly the behaviour HEM measures: a 40 kWh pressurised water store that buys a full day's heat in the cheapest overnight window, delivered through the home's existing radiators, with a control system that is being developed to interpret smart-grid signals and time-of-use tariffs. Our sizing and carbon methodology are already built on half-hourly data — a year of smart-meter readings from 200 British homes and a full year of NESO half-hourly carbon actuals — the same resolution HEM itself uses.

References

- RdSAP 10 Specification V3.0, BRE, 9 June 2025 — §12 (electricity tariff), §19 and Table 32 (fuel prices, emission factors), Table 30 (addenda).
- The Home Energy Model: Energy Performance Certificates — HEM methodology for assessing existing dwellings and producing new EPC metrics, DESNZ consultation, 21 January – 18 March 2026, Chapters 1–3, including the 17 March 2026 update on launch timing.
- SAP 10.2 specification, BRE — Table 12/12a (tariff structure and high-rate fractions), referenced by RdSAP 10.
- Hestora white paper and sector briefings, August 2026 — www.hestora.net/resources.

Questions on this analysis, or on the monitored pilot beginning in November 2026: jim@hestora.net · www.hestora.net