

NBRP Assessment

Document 2 — Transversal thematic analysis

Cross-country analysis across 6 Member States — Stream by stream

Belgium-Wallonia · Bulgaria · Denmark · Portugal · Romania · Spain

⚠ Source of scores and methodological note

All scores in this document are derived from the NBRP PDFs (ground truth), post-audit — NBRP_final_v3_audited.xlsx. Scores assessed on a 0-3 scale across 8 dimensions (Explicitness, Maturity, Quantitative ambition, Delivery credibility, Social robustness, Scalability, Integration, Evaluability) for each of 19 topics. Topic scores are arithmetic means across the 8 dimensions. Stream averages are means across topic scores within each stream. Scores reflect what the NBRP documents contain, not the maturity of national policies outside the NBRP.

0. Purpose, scope and how to read

- **Purpose.** This document synthesises cross-country patterns across the 6 NBRPs analysed, organised by stream (S1 → S5). Country-specific fiches are in Document 1; the executive narrative, flagship practices and conclusions are in Document 3.
- **Scope.** The analysis is based exclusively on the content of the NBRP PDFs. National policies that exist outside the NBRP (building codes, financing funds, digital tools) are only credited when the NBRP references them. This materially affects Denmark in particular — see the reading note below.
- **Structure.** Each stream section is built around four elements: (i) Observation (cross-country synthesis with scores and quanti), (ii) What works (country-anchored examples tested for genuine specificity), (iii) Structural gaps (precise, not vague), (iv) Transversal priority improvements (each tested cross-country; only those that apply to ≥ 4 of 6 plans are retained as transversal).
- **Cross-country rule.** A country-specific callout may be given only if a measure is genuinely specific to that country across the 6 plans. Universal gaps and universal strengths are stated as transversal. Advocacy priorities that apply to ≥ 4 of 6 plans are stated once here and not repeated in country fiches.

⚠ Reading note on Denmark and Portugal

The Danish NBRP is deliberately concise and cross-references pre-existing legislation (Building Code BR18, Landsbyggefonden, Sparenergi.dk) rather than re-detailing it. Where the score of a stream or topic appears low for Denmark, this often reflects what the NBRP document itself contains rather than the maturity of Danish policy. Climate resilience (T5.6 = 0) is the sole topic genuinely absent from the Danish plan.

The Portuguese NBRP is a draft-stage document; the plan itself repeatedly uses language such as "Por iniciar", "Por orçamentar", "A determinar". Low Portuguese scores reflect the declared draft-stage nature of the document rather than a country assessment.

1. Headline picture: five transversal messages

The five messages below summarise the patterns that emerge from scoring all 6 plans across 19 topics and 8 dimensions. Each message is anchored in the v3_audited scores. They are the backbone of the transversal analysis developed in Section 2.

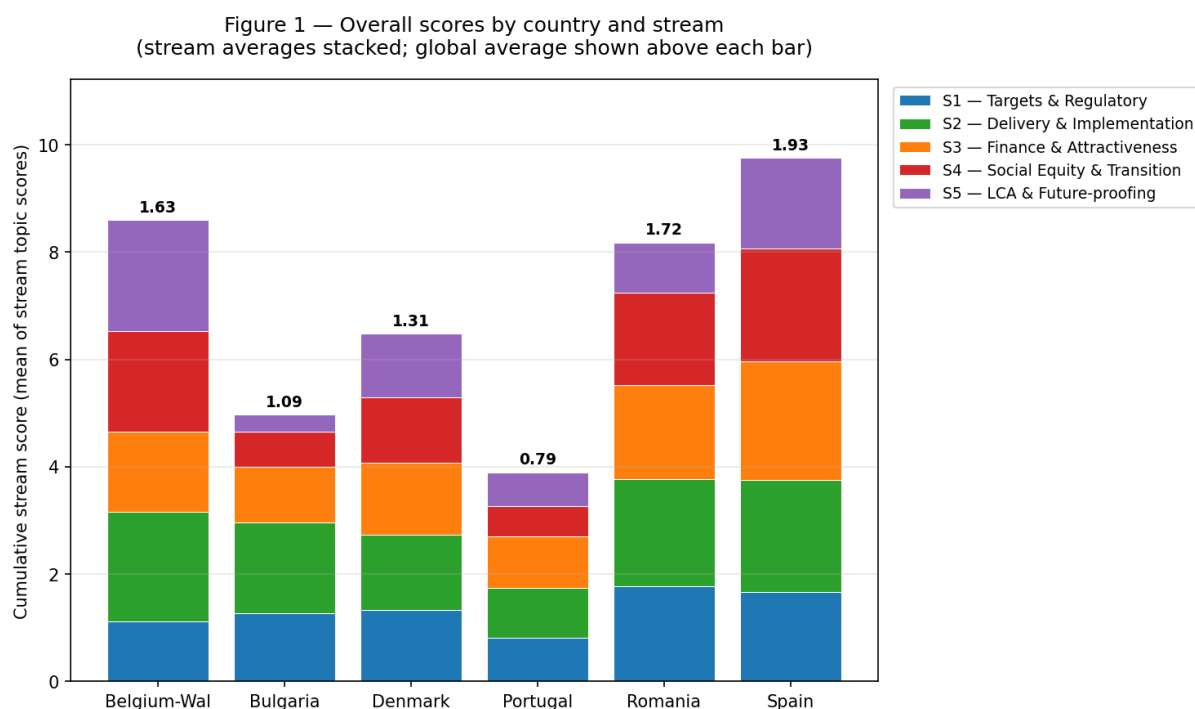


Figure 1 — Overall scores by country and stream (stream averages stacked; global average shown above each bar). Source: NBRP_final_v3_audited.xlsx.

Message 1 — None of the 6 plans is delivery-ready; differences lie in the depth of operationalisation

- Global scores range from 0.79 (Portugal) to 1.93 (Spain), below the 2.0 pilot/operational threshold on average.
- Only Spain (almost) exceeds the 2.0 threshold; Romania (1.72) and Belgium-Wallonia (1.63) approach it; Denmark (1.31), Bulgaria (1.09) and Portugal (0.79) sit materially below.
- The leading plans differ in profile: Spain is strongest on Delivery (S2 = 2.09), Finance (S3 = 2.21) and Social (S4 = 2.09); Romania is strongest on Targets (S1 = 1.77) and Finance (S3 = 1.75); Belgium-Wallonia is strongest on Delivery (S2 = 2.03) and LCA/future-proofing (S5 = 2.06).

Message 2 — The bottleneck is not ambition but implementation capacity

- Stream 1 (Targets & regulatory backbone) averages 1.34 across the 6 countries and Stream 5 (long-term quality) averages 1.14 — both below S2 Delivery (1.69) and S3 Finance (1.47).
- Ambition statements are widespread (endpoints, 2050 decarbonisation, vulnerable-household reduction targets). Operational translation into annual renovation rates, threshold values, unit costs, staffing levels and sequenced timelines is where the plans are thinnest.
- Only Spain and Romania publish fully quantified residential trajectories (T1.1 ≥ 2.5); 4 of 6 plans do not translate endpoints into annual rates and depth splits.

Message 3 — Four transversal blind spots are near-universal

- Glazed-area performance (T1.6): avg 0.46/3 across 6 plans; only Romania scores >1. Absent in BE-Wal and DK.

- TBS/BACS operationalisation (T1.5): avg 1.10; several plans reference smart or technical systems, but none translates them into a fully operational framework covering scope, thresholds, trigger points, minimum functionalities and verification routes..
- Multiple-benefits quantification as a funding-allocation criterion (T3.3): avg 1.08; Spain is the only outlier with MICATool ex-ante.
- Binding rental-market split-incentive instruments (T4.2): avg 1.04; 5 of 6 plans identify the issue but do not commit binding instruments.

Message 4 — Best practices exist but are fragmented across countries

- Spain: most quantified trajectory and widest financing toolbox (PACE-style, on-bill, efficient mortgages, CAE, SIF, HEVA, co-investment, guarantees).
- Denmark: binding LCA framework (BR18 since 2023 — whole-life-cycle GWP methodology, differentiated values, A4+A5 modules, tightening to 2029).
- Romania: most granular first-draft regulatory package (numeric MEPS T16 = 422 / T26 = 340 kWh/m²-y; ZEB thresholds per typology × 5 climate zones).
- Belgium-Wallonia: most developed climate-resilience integration (100% of audits integrate adaptation from 2030) and condominium architecture (10,000 renovated condominiums by 2035, "renovation trains" pilots).
- Bulgaria: typology-differentiated MEPS (9+ use-type categories) and the most structured workforce consortium (BUILD UP Skills Bulgaria 2030).
- No single plan combines more than 2–3 of these — the inspiration material is scattered.

Message 5 — There is a strong case for EU-level coordination

- The patterns above suggest 5 structural areas where EU-level learning would outperform 27 parallel MS attempts: (a) translating trajectories into annual rates, (b) sequencing financing instruments, (c) LCA methodology and GWP-limit convergence, (d) dedicated climate-resilience chapters with risk mapping, and (e) multiple-benefits monetization.
- In each of these areas, one or two countries have already developed an operable approach (Spain, Denmark, BE-Wal, Romania depending on topic) and 3–4 are materially behind.

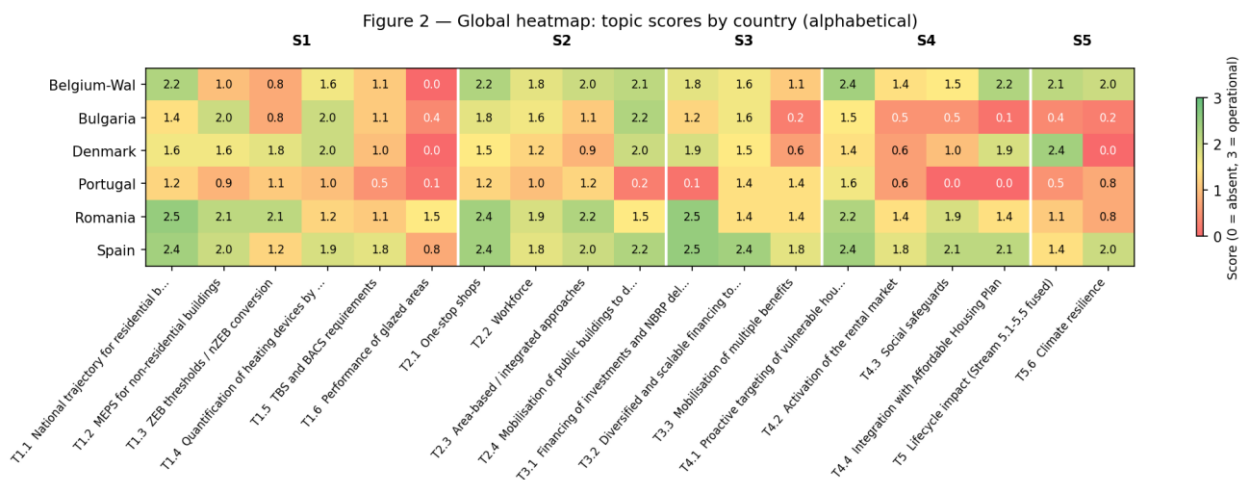


Figure 2 — Global heatmap: topic scores by country. Green ≥ 2.0 = operational/pilot-stage; Yellow 1.0–1.99 = intentional/partial; Red < 1.0 = absent or aspirational. Source: NBRP_final_v3_audited.xlsx.

Figure 3 — Maturity share by stream and country
(share of dimensions where the plan shows pilot-stage or operational evidence)

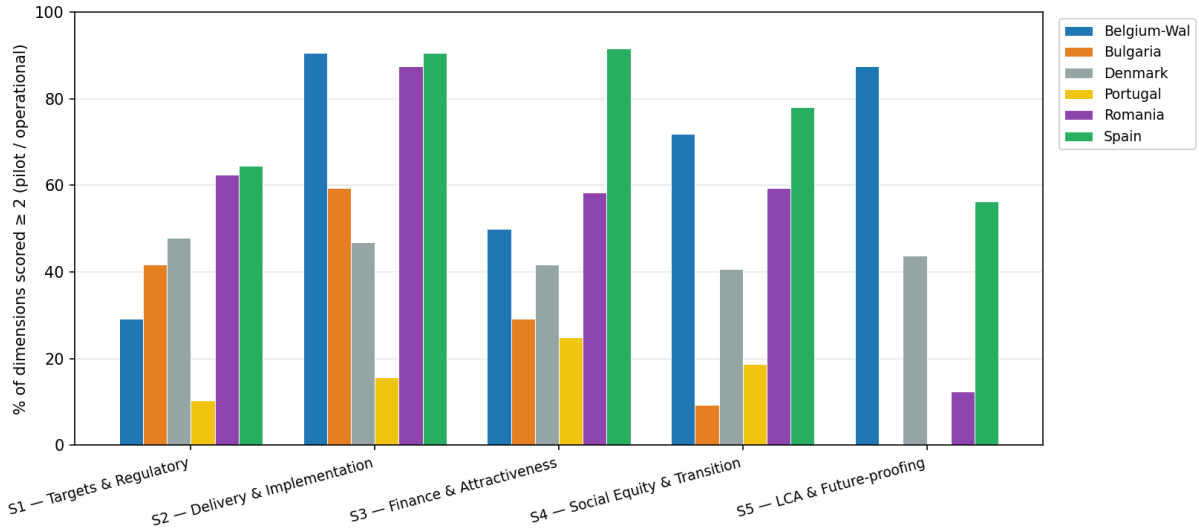


Figure 3 — Maturity share by stream and country (share of dimensions where the plan shows pilot-stage or operational evidence, i.e. scored ≥ 2). Spain passes 80% in S2/S3/S4; BE-Wal passes 85% in S2 and S5; Portugal is structurally below 25% in 4 of 5 streams; Bulgaria at 0% in S5.

2. Themes by stream

2.1 Stream 1 — Targets, standards & regulatory backbone

Stream averages — Belgium-Wal 1.13 · Bulgaria 1.27 · Denmark 1.33 · Portugal 0.81 · Romania 1.77 · Spain 1.67.

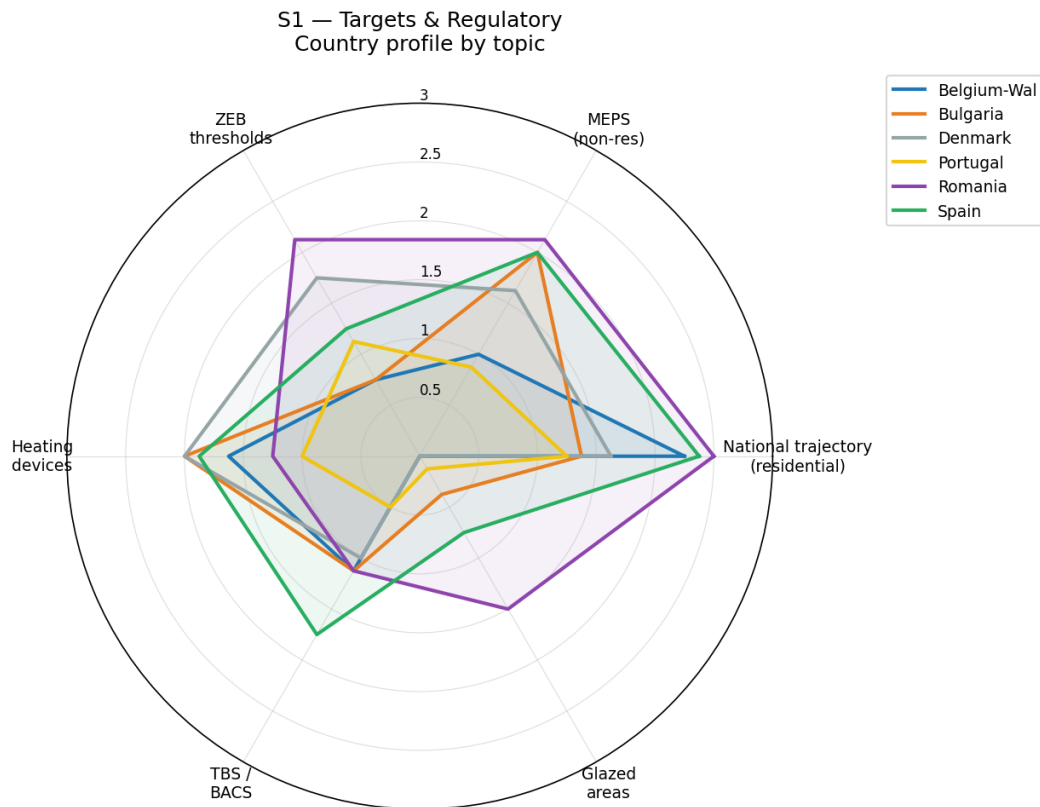


Figure 4a — Stream 1 country profile by topic.

Observation

- Most plans define a long-term endpoint but few translate it into annual renovation rates, floor area and depth assumptions, which weakens the market signal for medium/deep renovation and the associated envelope improvements needed to deliver durable savings. Only Romania (T1.1 = 2.5) and Spain (T1.1 = 2.38) publish a fully operationalised residential trajectory; Belgium-Wal (2.25) anchors in label-class endpoints (2036/2041/2050) but without annual rates; Denmark (1.63), Bulgaria (1.38) and Portugal (1.25) remain at trajectory-outline stage.
- Numeric MEPS thresholds for non-residential exist in 3 of 6 plans: Bulgaria (typology-differentiated, 9+ categories: Administrative 488, Schools 188, Hotels 550, Commercial 813 kWh/m²·y), Romania (T16 = 422, T26 = 340 kWh/m²·y) and Spain (per use category × 4 climate zones). Belgium-Wallonia has a MEPS structure without kWh/m² thresholds (T1.2 = 1.0); Portugal remains conceptual (T1.2 = 0.88).
- ZEB thresholds: Denmark already binding in Building Code BR18 Table 31 (<27 kWh/m²·y residential, <33 non-residential; mandatory 2028 public / 2030 all — T1.3 = 1.75). Spain tentative pending EU harmonised methodology (T1.3 = 1.25). Romania (T1.3 = 2.13) publishes thresholds per typology × 5 climate zones with explicit NZEB-10% conversion method. Belgium-Wallonia (0.75), Bulgaria (0.75) and Portugal (1.13) are unformed.
- Heating-device inventories are strongest in Bulgaria (district heating prevalent in multi-family, quantified) and Denmark (heat-pump rollout quantified) — both at T1.4 = 2.0. Romania (1.25) and Portugal (1.0) acknowledge data gaps explicitly; Belgium-Wal (1.63) quantifies fuel mix but not replacement trajectory.
- Measures supporting market innovation remain limited across all plans. For glazed areas (T1.6), Romania (1.5) is the only outlier with dedicated provisions. For smart and technical systems (T1.5), references are somewhat more common, but mostly remain weakly operationalised; Spain is the only relative outlier with 1.75.

What works

- Bulgaria — most detailed typology-differentiated MEPS thresholds (9+ use-type categories: Administrative 488, Schools 188, Hotels 550, Commercial 813 kWh/m²·y). Specific: no other plan provides this level of use-type differentiation.
- Denmark — binding ZEB thresholds already in the Building Code (BR18 Table 31, <27/<33 kWh/m²·y; mandatory 2028/2030). Specific: the only plan in the 6 with a legally binding ZEB framework.
- Romania — numeric MEPS (T16 = 422, T26 = 340 kWh/m²·y) and ZEB thresholds per typology × 5 climate zones (Table 5.2.3), including for renovated buildings with explicit NZEB-10% conversion method. Specific: most granular first-draft regulatory package among the 6.
- Spain — backcast trajectory with 17.8M dwellings cumulative by 2050; 1.57M equivalent deep renovations 2020–2030 (above NECP's 1.38M). Specific: most quantified long-term trajectory.

Structural gaps

- Translation of endpoints into annual renovation rates and depth splits: absent or partial in 4 of 6 plans (BE-Wal, BG, DK, PT).
- Little to no measures regarding the development and support of market uptake of innovations in renovation, including building envelope solutions and technical systems; where such elements appear, they are rarely connected to a clear delivery or market-development logic.
- Heating-device stock inventories with replacement trajectories incomplete in 3 of 6 (BE-Wal, PT, RO); data gaps explicitly flagged by RO and PT.
- ZEB threshold status ambiguous in 4 of 6 (tentative in ES; aspirational in BE-Wal, BG, PT).

- Where smart-readiness tools are referenced, they are rarely linked to compliance, funding, permitting or prioritisation logic.

Transversal priority improvements

- **PI-1.1** In order to make the ambitions more operational, the trajectory endpoints should be translated into annual renovation rates, floor area and depth assumptions by segment — applies to BE-Wal, BG, DK, PT (4 of 6).
- **PI-1.2** Move ZEB thresholds from tentative or aspirational to binding with an explicit timetable — applies to BE-Wal, BG, PT, ES (4 of 6).
- **PI-1.3** Provide a dedicated plan that acts also as a market-development signal for renovation solutions, including medium/deep building envelope renovation and relevant technical systems, by linking innovation support more clearly to regulatory trajectories, procurement, support schemes and delivery programmes. (all plans).
- **PI-1.4** Complete heating-device inventories (stock by fuel/technology by building segment) and quantified replacement trajectories — applies to BE-Wal, PT, RO (3 of 6 — borderline transversal, but a material gap where it applies).

2.2 Stream 2 — Delivery architecture & implementation capacity

Stream averages — Belgium-Wal 2.03 · Bulgaria 1.69 · Denmark 1.41 · Portugal 0.94 · Romania 2.00 · Spain 2.09.

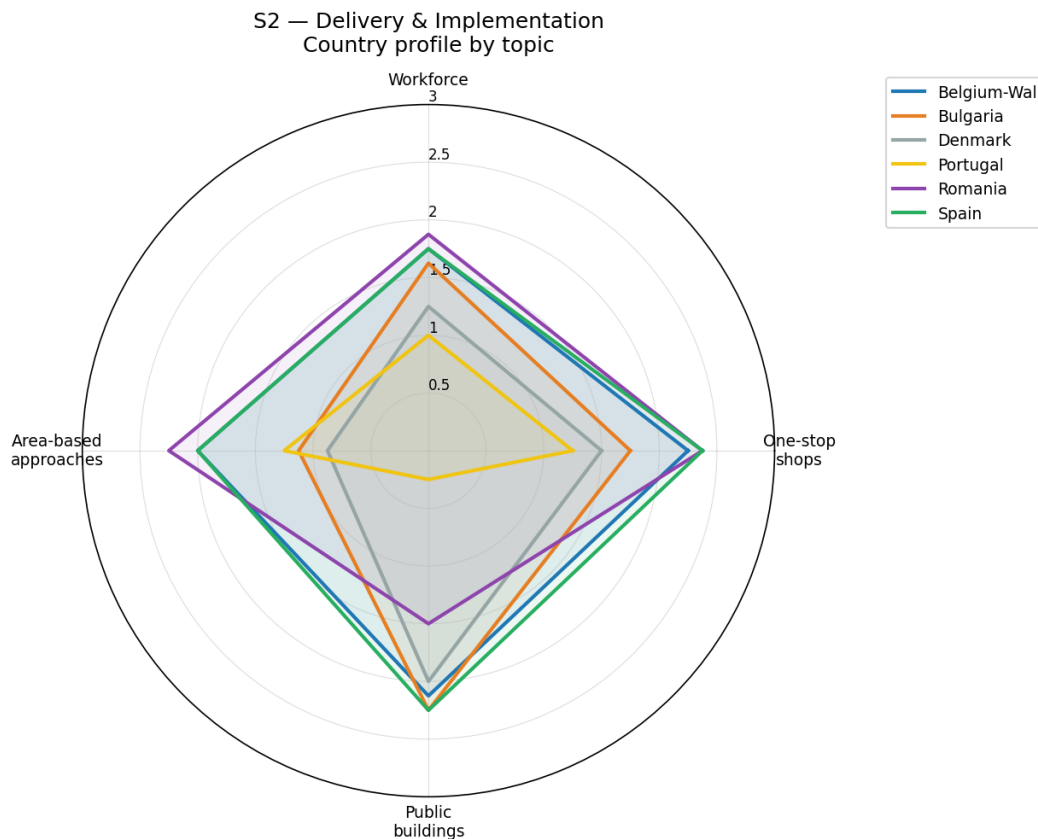


Figure 4b — Stream 2 country profile by topic.

Observation

- Delivery is the relative strength across plans (stream avg 1.69, highest of the 5 streams). Three plans pass the 2.0 operational bar: Spain (2.09), Belgium-Wal (2.03), Romania (2.00).
- OSS architectures are quantified in Spain (≥ 1 OSS per 80,000 inhabitants + per region + in areas with older stock + in neighbourhood renewal areas + < 90 min travel), Romania (42 existing county OSS + Bucharest, legal anchor GEO 92/2024, transparent unit cost €250k, expansion target 100 offices by 2035) and Belgium-Wallonia (3-tier service model; 80k-inhabitant / 90-min territorial coverage target; ~614 OSS indicative by 2030 in ES). Denmark operates digital-first (Sparenergi.dk + Energi- og Bygningsanalysen). Bulgaria has no OSS network referenced in the plan — the structural outlier of the 6 (T2.1 = 1.75 reflects non-OSS delivery measures; the OSS topic itself is absent).
- Workforce gaps are quantified in 5 of 6 plans: Belgium-Wal 64,000 jobs required + 71,000 additional jobs in supply chain; Bulgaria ~52,000 via BUILD UP Skills (198,200 \rightarrow 249,500 workers, +25%); Portugal 80,000; Romania $> 160,000$ workers to upskill including 79,963 unskilled; Spain ~700,000. None of the 6 plans translates these headcount figures into annual training output targets by profile, region and role. Denmark does not quantify.
- Area-based / neighbourhood approaches are emerging as a shared pattern: Belgium-Wallonia deploys "renovation trains" (industrialised on-site works on similar dwellings in a neighbourhood); Romania publishes district-level annual indicators 2026–2030 (renovated floor area, average depth, share of area in worst-performing segment); Spain has a State Aid within AGE for renovation actions

at neighbourhood or district level (60% MIVAU / 40% CCAA financing split). Denmark, Bulgaria and Portugal are at generic-reference stage.

- Public-building strategy is articulated as a market-shaping lever in 5 of 6 plans: Belgium-Wal (T2.4 = 2.13), Bulgaria (2.25 — comprehensive inventory by 2025, 1.9%/y energy reduction, 3%/y renovation of buildings >250 m²), Denmark (2.0 — 3.9M m² + 3%/year + EED Art.6 agreement, EPC class B target by 2040), Romania (1.5) and Spain (2.25). Portugal (0.25) is a country-specific outlier: no binding annual renovation rate, no market-shaping role articulated.

What works

- Belgium-Wallonia — 3-tier OSS architecture with territorial density target (80k-inhabitant / 90-min coverage) and a condominium renovation pillar (100% EPC by 2030, 10,000 renovated condominiums by 2035, "renovation trains" pilots). Specific: only plan combining 3-tier OSS logic with a formal condominium focus.
- Denmark — Sparenergi.dk mature national digital OSS (segmented digital mail to home-owners, 5-region public meetings by DEA, Energi- og Bygningsanalysen tool free to all municipalities). Specific: only plan with an operational national digital-first OSS model.
- Romania — operational 42-office OSS network (1 per county + Bucharest) with legal backing (GEO 92/2024), transparent unit cost €250k, expansion plan to 100 offices by 2035. Specific: only plan with an operational OSS network that covers the full territory and offers more than information-type of support.
- Spain — OSS territorial-density formula combining ≥ 1 per 80k inhabitants + per region + older stock + neighbourhood renewal areas + <90 min travel. Specific: widest combined coverage criteria among the 6.
- Bulgaria — BUILD UP Skills Bulgaria 2030 consortium (Enext, CMB, AUER, NAVET, BAIS): quantified 25% employment growth target (198k→250k), 5 priority areas, VET modernisation project, inter-ministerial coordination. Specific: most structured multi-actor workforce consortium.
- Romania — district-level annual indicators 2026–2030 (floor area, depth, worst-performing share). Specific: only plan with quantified district-programme indicators for the first NBRP period.

Structural gaps

- Translation of quantified workforce gap into annual training output by profile / region / role: universal gap (6 of 6). Even Spain (700,000 CNC workforce gap) does not translate into per-year training throughput.
- OSS staffing, budget and service blueprint: incomplete in Portugal, Bulgaria, Denmark (digital focus, limited tailor-made recommendations) even where concept is present.
- Public-building renovation rates and specifications (LCA, TBS): specified in DK and ES, partially in BG/RO/BE-Wal, absent in PT.
- Area-based programmes rarely scaled beyond pilots: only Romania publishes binding district-level annual targets for 2026–2030.

Transversal priority improvements

- **PI-2.1** Provide a clear roadmap for OSS evolution that embeds clear targets and role definitions for relevant actors, by translating OSS concepts into staffed, budgeted and time-bound deployment (unit cost, target volumes, geographical coverage formula, service blueprint) — applies to BE-Wal, BG, DK, PT (4 of 6).

- **PI-2.2** Provide a clear roadmap for workforce readiness to equip the sector players with the relevant signals for developments, by translating quantified workforce gaps into annual training output targets by profile, region and role — applies to all 6 plans.
- **PI-2.3** Structure area-based / neighbourhood programmes with binding district targets (floor area, average depth, share of area in worst-performing segment) applies to BG, DK, PT (3 of 6 — transferring from RO/ES/BE-Wal).
- **PI-2.4** Better frame the public-building strategy as an explicit market-shaping lever, to send signals to sector players, through a set of clear ambitions , binding annual renovation rates and procurement specifications, including for deep renovation, fabric performance, integrated technical systems, controls and performance-based operation — applies to PT (priority); partial reinforcement BG, RO.

2.3 Stream 3 — Finance & political attractiveness

Stream averages — Belgium-Wal 1.50 · Bulgaria 1.04 · Denmark 1.33 · Portugal 0.96 · Romania 1.75 · Spain 2.21.

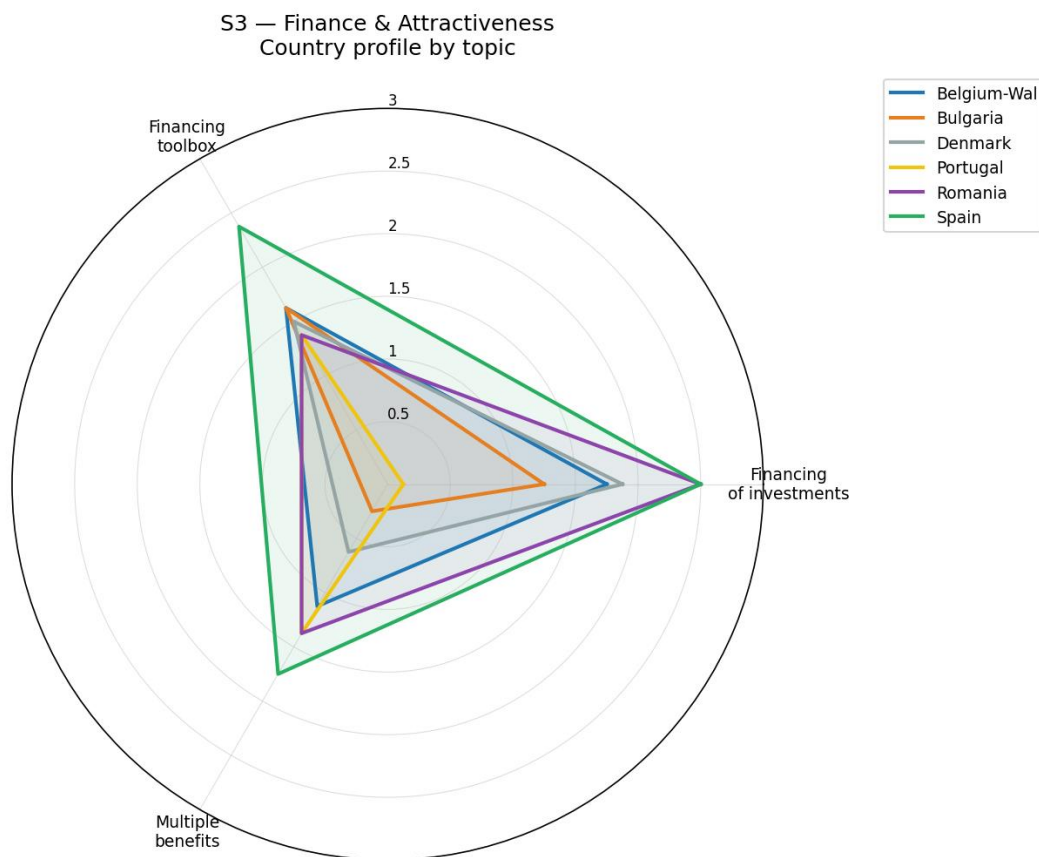


Figure 4c — Stream 3 country profile by topic.

Observation

- S3 shows the largest inequality among the 5 streams: Spain at 2.21 vs Portugal at 0.96 — a 2.3× gap. T3.1 (Financing of investments) ranges from 0.13 in Portugal (no envelope, no split, no period disaggregation) to 2.50 in Spain and Romania.
- Investment envelopes quantified in 4 of 6 plans: Spain (€39.35bn 2026–2030, with €11.31bn public / €28.04bn private split + 7-policy breakdown + ETS2/PSpC integration); Romania (€122–125bn total to 2050, €31bn by 2030, full period breakdown Table 4.2.4 + dedicated "Other Funding" stream for OSS, vulnerable HH, technical assistance); Denmark (€1,889M residential 2026–2030 + €964M private, but private funds not disaggregated); Belgium-Wallonia (€110bn to 2050, €33bn 2025–2030 slice). Bulgaria envelope partial; Portugal has no envelope.
- Financing toolbox: Spain dominates with 7+ instrument families (PACE-style, on-bill, efficient mortgages, CAE certificate market, SIF, HEVA census, co-investment, guarantees). Other plans describe 2–4 instruments without sequencing. Bulgaria has the National Decarbonisation Fund (NDF) as an anchor — pilot deep-renovation scheme blending ~49.9% grants + loans + guarantees. Denmark operates via grants, tax instruments and a revolving fund while green loans are available in the private market through commercial banks.
- Multiple benefits (T3.3): Spain is the outlier at 1.75 with MICATool ex-ante quantification (~2M beneficiaries, HEP, deaths avoided, GDP effects). Other plans acknowledge co-benefits without monetising them — Bulgaria 0.25 near-absent, Denmark 0.63, Belgium-Wal 1.13 (quantifies ~30% energy cost increase but does not use it as funding-allocation criterion), Romania 1.38 (references

but does not monetise), Portugal 1.38. Indoor environmental quality is a useful illustration: health, comfort, air quality and productivity are increasingly cited, and in Portugal are already linked to indicators and support programmes, but these benefits are still rarely embedded in funding-allocation logic or verification.

What works

- Romania — €122–125bn total envelope with period-by-period breakdown (Table 4.2.4) and a dedicated "Other Funding" stream specifically for OSS, vulnerable households and technical assistance. Specific: only plan with a dedicated delivery-cost funding line.
- Bulgaria — National Decarbonisation Fund (NDF) anchor financing vehicle with pilot deep-renovation scheme blending ~49.9% grants + loans + guarantees. Specific: only plan anchoring structural market shift on a dedicated national deep-renovation fund.
- Spain — widest financing toolbox (PACE-style, on-bill, efficient mortgages, CAE certificate market, SIF, HEVA census, co-investment, guarantees) with ETS2 / Social Climate Fund / PSpC integration. Specific: most diversified toolbox with explicit market-activation instruments.
- Spain — MICATool ex-ante multiple-benefits quantification (~2M beneficiaries, HEP, deaths avoided, GDP). Specific: the only plan using quantified co-benefits in its design argument.
- Denmark — Landsbyggefonden + Green Housing Agreement €3.6bn referenced in the NBRP as the anchor for non-profit housing renovation (integration of housing financing with renovation pathway). Specific among the 6: mature social-housing anchor fund explicitly linked to NBRP.

Structural gaps

- Public / private split + period disaggregation: incomplete in Belgium-Wal (only 2025–30 slice), Bulgaria, Denmark (private funds not disaggregated), Portugal (no envelope).
- Sequencing the financing toolbox from description to pilot deployment (which instrument, which institution, which timeline): universal gap (5 of 6) — only Spain approaches sequencing.
- Multiple-benefits quantification as a funding-allocation criterion: universal gap except Spain.
- Ex-post tracking of co-benefits: gap in all 6 (even Spain's MICATool is ex-ante only).

Transversal priority improvements

- **PI-3.1** Quantify total investment envelope with public / private split and period disaggregation — applies to BE-Wal (partial), BG, DK, PT (4 of 6). Portugal-specific: quantify a total envelope at all.
- **PI-3.2** Sequence the financing toolbox from description to pilot deployment (which instrument, through which institution, on what timeline) — applies to BE-Wal, BG, DK, PT, RO (5 of 6).
- **PI-3.3** Embed multiple benefits into the full policy cycle (from funding allocation to post-renovation verification) by 1/ using them as an explicit criterion in funding allocation logic and 2/ build a structured ex-post measurement system into programme design, including for concrete dimensions such as health, comfort and indoor environmental quality where relevant — applies to all 6 plans

2.4 Stream 4 — Social robustness

Stream averages — Belgium-Wal 1.88 · Bulgaria 0.66 · Denmark 1.22 · Portugal 0.56 · Romania 1.72 · Spain 2.09.

⚠ Reading note on Denmark (Stream 4)

Denmark's S4 score (1.22) is partly driven by low visibility of rental-market instruments (T4.2 = 0.63) and social safeguards (T4.3 = 1.0) in the NBRP itself. The country's Landsbyggefonden and Green Housing Agreement €3.6bn are referenced in the NBRP and explain the substantial re-scoring of T4.4 (Affordable Housing Plan integration) upward from the Word assessment (0.13) to the PDF audit (1.88). Low rental/safeguards scores nonetheless reflect genuine absence in the NBRP document.

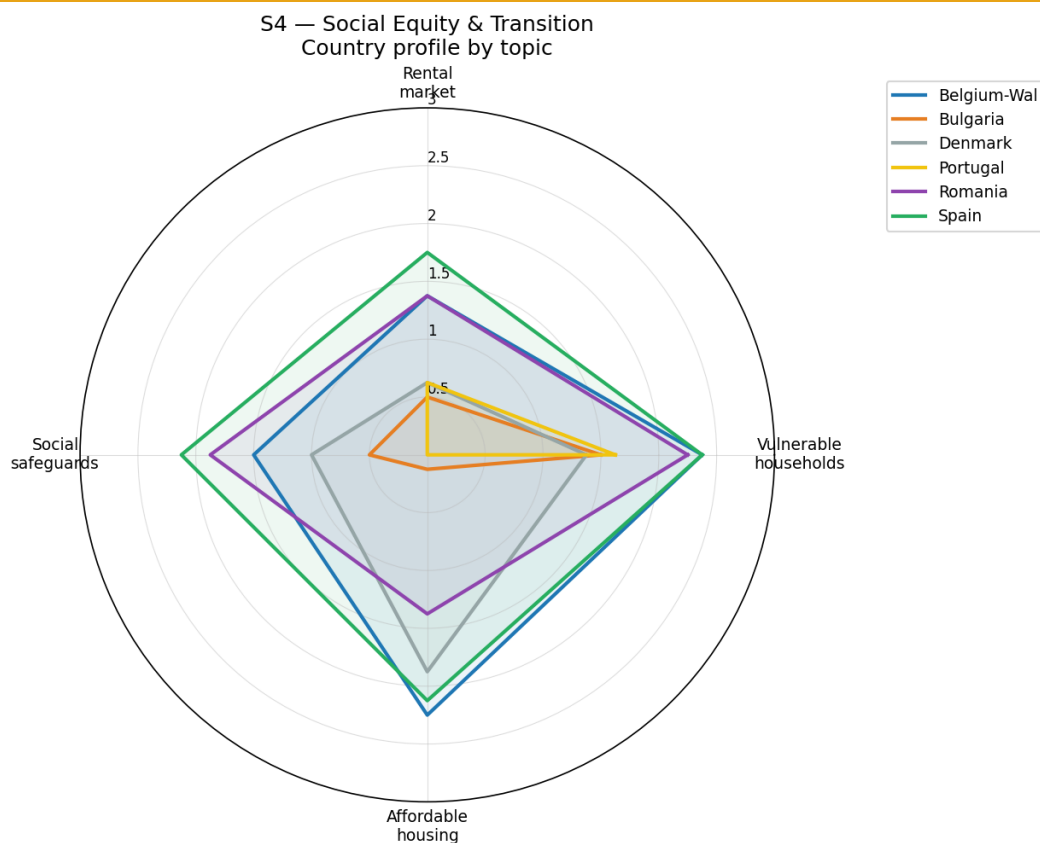


Figure 4d — Stream 4 country profile by topic.

Observation

- Most mature topic in S4: vulnerable-households targeting (T4.1). Five of 6 plans score ≥ 1.5 : Belgium-Wal 2.38, Spain 2.38, Romania 2.25 lead; Bulgaria 1.50, Denmark 1.38, Portugal 1.63. All 6 define vulnerability; 3 quantify the energy-poverty population (Bulgaria 1.83M people, Spain ≈ 2 M beneficiaries, Portugal 1.8–3M; Belgium-Wal partial).
- Weakest topic in S4: rental-market activation (T4.2). Max Spain 1.75; Bulgaria 0.5, Denmark 0.63, Portugal 0.63. Split-incentive is recognised by 5 of 6 but binding instruments (green-lease templates, rent caps conditional on renovation, cost-pass-through limits) are absent or embryonic in 5 of 6.
- Social safeguards (T4.3): binding in Spain (2.13) and Romania (1.88); partial Belgium-Wal (1.5); Denmark (1.0); absent in Portugal (0); near-absent in Bulgaria (0.5). Portugal is a country-specific gap: no anti-renoviction protection, no rent-retention mechanism, no affordability conditionality anywhere in the NBRP.

- Affordable Housing Plan integration (T4.4) is polarised: Belgium-Wal 2.25, Spain 2.13, Denmark 1.88 integrate (Denmark via Landsbyggefonden + Green Housing Agreement €3.6bn; BE-Wal via housing-policy coordination); Bulgaria 0.13 and Portugal 0 have no linkage at all.

What works

- Belgium-Wallonia — "trusted referent" model for vulnerable households + "loyer chaud" 100% safeguard (dual cap on rent + energy cost: 100% of rents above the rent limit where energy performance below target). Specific: dual cap approach not found in the other 5 plans.
- Spain — €3bn vulnerable-household envelope, 5 sub-actions, 21.88% reduction target, differentiated subsidy intensity by vulnerability level, and direct contractor payment (anti-Matthew logic). Specific: direct-payment anti-Matthew mechanism not present in other plans; €3bn is the largest dedicated envelope for vulnerable households in the 6 plans.
- Romania — I4/I7 voucher system + Social Climate Fund integration plan + Art.17(19) safeguards anchored in GEO 92/2024 energy-poverty definition. Specific: voucher-based direct targeting with EU SCF integration pathway.
- Bulgaria — Art.38e Energy Act legal definition of energy poverty (November 2023) + Council of Ministers Decree 24/2025 on household status determination + SEDA annual monitoring from 2024 (1.83M people, indicator 28.47%). Specific: most structured legal/monitoring architecture for energy poverty among the 6.
- Denmark — Landsbyggefonden (National Building Fund) + Green Housing Agreement €3.6bn referenced in the NBRP as the anchor for non-profit housing renovation. Specific: a mature social-housing financing vehicle explicitly linked to the NBRP (re-scored upward from Word 0.13 → PDF 1.88).

Structural gaps

- Binding rental-market split-incentive instruments beyond problem recognition: gap in 5 of 6 (Spain partial).
- Binding social safeguards and anti-renoviction: gap in Portugal (0), Bulgaria (0.5), Denmark (1.0).
- Affordable Housing Plan integration: gap in Bulgaria (0.13) and Portugal (0); concerns coordination governance and shared instruments (vacancy mobilisation, public tendering priority, etc.).
- Energy-poverty ex-post outcome tracking (beyond count of beneficiaries): gap in all 6 plans.

Transversal priority improvements

- **PI-4.1** Introduce binding rental-market split-incentive instruments (green-lease templates, cost-pass-through caps, renovation-conditional rent mechanisms) — applies to BE-Wal, BG, DK, PT, RO (5 of 6).
- **PI-4.2** Introduce binding social safeguards and anti-renoviction protections — applies to BG, DK, PT (3 of 6 — Portugal priority as score = 0; Bulgaria priority as score = 0.5; Denmark partial).
- **PI-4.3** Articulate linkage between the NBRP and the Affordable Housing Plan (governance + shared instruments — vacancy mobilisation, tendering priority, etc.) — applies to BG, PT (priority); DK should state the articulation explicitly.
- **PI-4.4** Introduce ex-post outcome tracking of energy-poverty reduction (beyond population count) — applies to all 6 plans.

2.5 Stream 5 — Long-term quality & future-proofing

Stream averages — Belgium-Wal 2.06 · Bulgaria 0.31 · Denmark 1.19 · Portugal 0.63 · Romania 0.94 · Spain 1.69.

⚠ Reading note on Denmark (Stream 5)

Denmark has the strongest operational LCA framework of the 6 plans (T5 = 2.38; BR18 in force since 2023) but scores 0 on climate resilience (T5.6): the topic is genuinely absent from the NBRP — no risk mapping, no overheating/flooding criteria in renovation packages, no adaptation component. The low S5 average (1.19) therefore masks a split profile rather than an overall weakness.

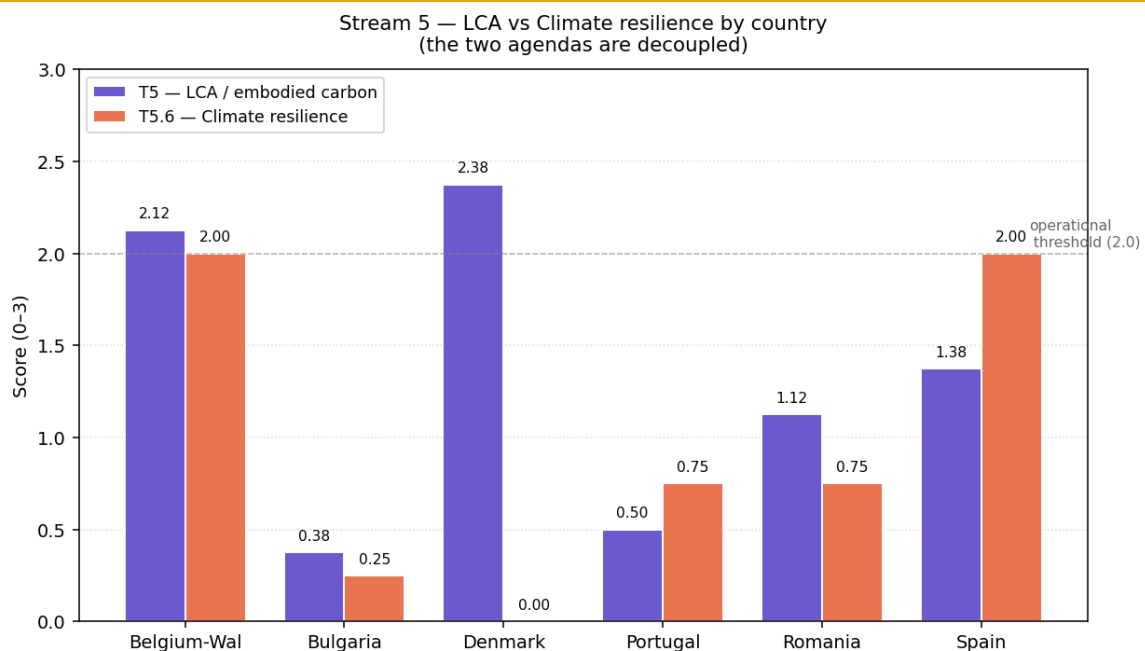


Figure 4e — Stream 5: LCA vs Climate resilience by country. The two agendas are decoupled: Denmark leads LCA and scores 0 on resilience; Belgium-Wal and Spain are the only plans strong on both.

Observation

- S5 hosts two separate agendas that do not correlate. Understanding the stream requires reading T5 (LCA) and T5.6 (resilience) separately.
- LCA / embodied carbon (T5): Denmark 2.38 (BR18 operational since 2023 — binding WLC GWP methodology, differentiated values, A4+A5 modules, tightening to 2029); Belgium-Wallonia 2.13 (TOTEM tool operational + Measure 24/Action 5 roadmap: regional observatory 2029, first report 2030); Spain 1.38 (EPBD Art.7 transposition route via Measure 6.3.x + PERTE industrialisation + circularity 6.2.x; GWP limit values pending National Roadmap); Romania 1.13 (Ch. 3.18 comprehensive on roadmap logic, but design-stage on metrics — no GWP limit values, data gaps explicit); Portugal 0.50 and Bulgaria 0.38 near-absent (EN 15804 alignment referenced but no timetable).
- Climate resilience (T5.6): Belgium-Wal 2.0 (100% of audits integrate adaptation from 2030 + PEB tool integration), Spain 2.0 (dedicated Section 8.1 + National Adaptation Plan integration + climate-shelter network); Denmark 0 — absent from the NBRP; Bulgaria 0.25, Romania 0.75 (handled piecemeal: overheating in envelope + seismic in PNRR C5 without coherent resilience track), Portugal 0.75 (nature-based solutions + urban heat recognised, but no dedicated chapter).
- The two agendas are not correlated: Denmark leads LCA and is last on resilience. Belgium-Wal and Spain are the only plans strong on both.

What works

- Denmark — BR18 binding LCA framework since 2023: whole-life-cycle GWP methodology, differentiated values, A4+A5 modules, tightening schedule to 2029. Specific: the only operational binding LCA framework in the 6 plans.
- Belgium-Wallonia — TOTEM LCA tool operational + regional GWP roadmap (Measure 24/Action 5): observatory in 2029, first report in 2030. Specific: only plan with a fully scheduled LCA roadmap governance structure.
- Belgium-Wallonia — climate-resilience integration in 100% of audits from 2030 + adaptation component in PEB tool. Specific: only plan with building-audit-level adaptation integration.
- Spain — dedicated Section 8.1 on climate resilience + National Adaptation Plan linkage + climate-shelter network. Specific: most structured dedicated resilience chapter in the 6 plans.

Structural gaps

- LCA metrics (GWP limit values, methodology finalisation, data infrastructure): gap in 5 of 6 — only Denmark has operational binding values. Belgium-Wal has roadmap timetable but metrics pending; Spain/Romania at design stage; Portugal/Bulgaria near-absent.
- Climate-resilience dedicated chapter with risk mapping: gap in 4 of 6 — Denmark absent (T5.6 = 0); Bulgaria near-absent (0.25); Romania piecemeal (0.75); Portugal partial (0.75).
- Circularity / embodied-carbon-in-renovation specifications: gap in 4 of 6 — only Denmark and Belgium-Wal treat circularity operationally.
- Integration of LCA into public-building procurement: partial in Spain (PERTE industrialisation) and Romania; gap in BG, PT, DK, BE-Wal beyond the general LCA framework.

Transversal priority improvements

- **PI-5.1** Define GWP limit values and publish an LCA roadmap with dated, binding milestones to send a market signal that allows sector players to position ahead of regulatory thresholds and support early movers in gaining structural advantage in the emerging EU low-embodied-carbon market. (all plans)
- **PI-5.2** Introduce a dedicated climate-resilience chapter with risk mapping (heatwaves, floods, extreme weather) + integration of resilience criteria into renovation packages — applies to DK (priority — score = 0), BG, PT, RO (4 of 6).

3. Quantitative cross-country snapshot

Quantification maturity in the NBRPs varies widely and is only weakly correlated with the overall scoring. Some lower-scored plans have strong quantification on their strengths (e.g. Bulgaria's workforce roadmap, Portugal's energy-poverty population); some higher-scored plans have quanti gaps on their weaknesses (e.g. Belgium-Wallonia's public/private investment split). The snapshot below gives the headline figures each NBRP makes available.

Figure 7 — Quantitative cross-country snapshot (selected NBRP indicators)

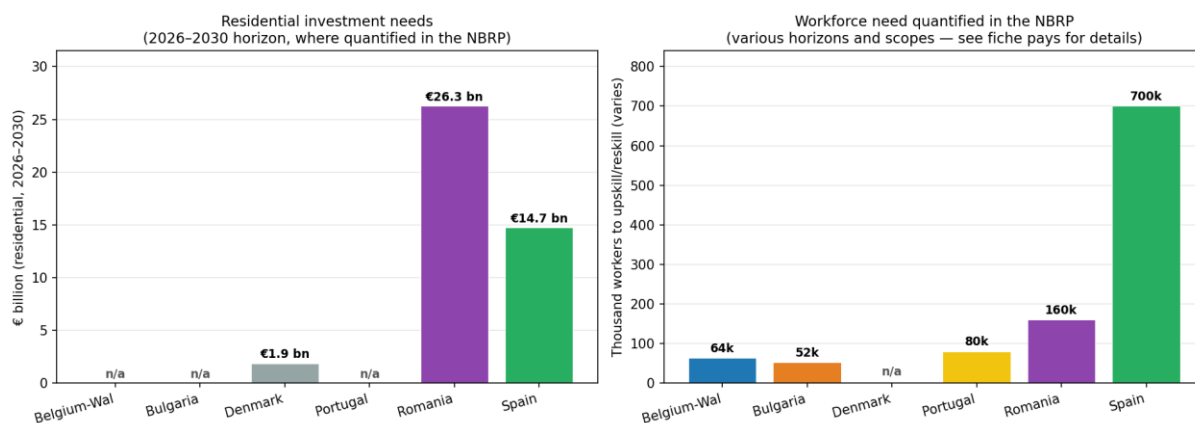


Figure 7 — Quantitative cross-country snapshot (selected NBRP indicators). Left: residential investment needs 2026–2030 where quantified. Right: workforce upskilling/reskilling need quantified in the NBRP (various horizons and scopes — see country fiches in Document 1 for details).

Snapshot table

Figures below are as published in each NBRP. "n/a" indicates the NBRP does not quantify this indicator; where multiple horizons are published, the most recent 5–10 year window is shown for comparability.

Indicator	BE-Wal	BG	DK	PT	RO	ES
Residential renovation rate (current)	3.0%/yr (2024–2030)	Light 0.01%, Medium 0.38% (2022)	n/a	4.1% (2023)	2.75% (18.06M m ² /yr)	445,500 dwellings/yr
Non-res renovation rate (current)	3.78%/yr (2024–2030)	n/a	n/a	2.7% (2023)	3.76% (2.33M m ² /yr)	0.69% (4.13M m ² /yr)
Residential investment needs 2026–2030	part of €33bn total (2025–2030)	partial	€1.89bn	n/a	€26.25bn	€14.74bn
Total investment envelope to 2050	€110bn	partial	€9.45bn (residential)	n/a	€122–125bn	not fully combined (€39.35bn 2026–30)
Public / private split	partial (€38–64bn private est.)	partial	€1,388M pub €966M priv (all bldgs 2026–30)	n/a	part of €17.75bn private	€11.31bn pub €28.04bn priv (2026–30)
OSS network target	network planned	none referenced	Sparenergi.dk digital OSS	≥1 per 80k inhab	42 → 100 OSS by 2035	~614 OSS by 2030

	(no count)			(no staffing)	(€250k/OSS)	(derived)
Workforce gap (upskill/reskill)	64,000 +71,000 supply chain	198k→249.5k (+25%) via BUSBG2030	n/a	80,000	160,000 (incl. 79,963 unskilled)	700,000 (CNC)
Energy-poverty population quantified	partial	1.83M (SEDA 2024, 28.47%)	n/a	1.8–3M by 2050	yes (SCF integr.)	≈2M beneficiaries

What the quanti picture tells us

- Wide disparity in quantification maturity. Spain and Romania quantify both sides (targets + means); Belgium-Wallonia quantifies the rates but not the public/private split of the €110bn envelope; Denmark quantifies finance at aggregate level but not renovation rates or depth mix; Bulgaria quantifies depth and energy poverty but leaves the envelope partial; Portugal remains explicitly "to be determined" on finance.
- The quanti picture can diverge from the overall score. Bulgaria (global score 1.09) has among the most structured workforce quantification (BUILD UP Skills 198k→249.5k, +25%) despite a low global score; Belgium-Wallonia (global 1.63) has strong rate quantification (3.00%/yr residential → 5.12% post-2031) but finance split gaps.
- OSS cost transparency is concentrated: only Romania publishes a unit cost (€250k per new OSS, €250k annual operation), only Spain publishes targeted OSS volumes by criterion (~614 OSS derivable by 2030); the other 4 plans are qualitative.
- Workforce quantification exists in 5 of 6 but none of the 6 plans translates a headcount gap into annual training output targets by profile / region / role (see PI-2.2).
- Energy-poverty population is quantified in 4 of 6 plans (BG, PT, RO, ES) but none of the 6 plans set ex-post outcome tracking beyond beneficiary count (see PI-4.4).