

BATTERY-BACKED SECURITIES (BBS)

A Proposal to Finance Europe's Storage Infrastructure

Applying the lessons of 2008 to create a transparent, pension-investable market — with sodium-ion as a strategic priority

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EXECUTIVE DECISION BRIEF Three questions, three answers — readable in under three minutes. Pages 2–8 contain the supporting proposal.

1. Why use securitisation again after the financial crisis?

Pooling cash flows in a special-purpose vehicle (SPV) and issuing notes against them is a neutral financing mechanism. The official post-mortems of 2008 did not condemn the mechanism; they condemned what was put through it — collapsing mortgage-underwriting standards, an originate-to-distribute pipeline in which “no one ... had enough skin in the game”, conflicted ratings, opaque and re-securitised pools, hidden leverage and maturity mismatch.^{1,2} EU law now mandates risk retention, transparency, credit-granting standards and investor due diligence.⁶ BBS should be designed as the structural opposite of the pre-2008 model:

Pre-2008 mortgage model	Battery-Backed Securities
Opaque mortgage pools	Identifiable, individually reported operating battery assets
Originate and distribute	Sponsor retains a meaningful first-loss position
Model-based rating comfort	Live operating and energy-management-system (EMS) data, independently verified
Weak underwriting	Strict asset eligibility and independent technical verification
Re-securitisation and CDOs	One asset pool, one transparent waterfall, no re-securitisation
Hidden leverage	Disclosed leverage, scheduled amortisation and funded liquidity reserves

2. What makes BBS structurally different?

Only completed, commissioned and independently verified battery energy storage systems (BESS) enter the senior pool; construction and commissioning risk stay with sponsors. Senior debt service is sized on contracted, availability-based, tolling or floored revenues only; merchant revenues are excluded from the base case or heavily haircut and serve as credit enhancement. The issuer is a bankruptcy-remote SPV with a simple three-class structure, sponsor-retained first loss, mandatory independent technical and data oversight, and funded reserves, covenants, triggers and cash sweeps protecting senior investors. **Pension funds should buy a defined and monitored cash-flow risk — not construction risk, unbounded merchant exposure or an early-stage technology bet.**

3. Why include sodium-ion from the start?

Capital-market eligibility standards influence which technologies scale. A lithium-only BBS framework would risk locking Europe's storage fleet — and its refinancing channel — into a single, highly concentrated supply chain for a decade or more.^{26,27} Sodium is abundant, sodium-ion improves raw-material diversification, and lower energy density matters less in stationary storage than in vehicles. Sodium-ion is not yet cheaper than lithium iron phosphate (LFP) in most applications and has limited grid-scale operating history, so senior pension investors must not absorb first-generation technology risk. The proposal therefore admits sodium-ion assets under a controlled allocation whose cash flows receive no credit in the senior base case, protected by OEM (original equipment manufacturer) warranties, sponsor capital and a funded technology reserve — with eligibility widening only as verified operating evidence accumulates.

DECISION REQUESTED

Authorise a 90-day BBS feasibility and structuring process leading to an institutional pilot, including a defined pathway for sodium-ion assets. Illustrative first issuance of approximately EUR 250 million, with a potential EUR 1 billion programme shelf — both strictly conditional on the operating-asset pipeline, contracted cash flows, rating-agency feedback and demonstrated investor demand. A failed feasibility study is preferable to a weak first transaction that damages the asset class.

A. Why Europe needs a BBS market

The build-out is large and accelerating. The European Commission estimates that the EU will need more than 200 GW of energy storage by 2030 and 600 GW by 2050, and that roughly 128 GW / 300 GWh of electrochemical storage will be added to European grids by 2030; utility-scale deployment in 2024 was 4.9 GW / 12.1 GWh.¹⁵ SolarPower Europe reports 36 GWh of battery storage installed across Europe in 2025 (+48%), a cumulative fleet above 100 GWh for the first time, and a 2030 requirement modelled at 600 GWh.¹⁷ In Germany, large-scale battery capacity reached about 3.7 GWh at the end of 2025, while grid operators received connection requests for some 573 GW / 1,583 GWh of batteries in 2025 alone.¹⁸ Austria's battery capacity stood at 2,202 MWh at the end of 2024 (+73% year on year) and the federal government now calls for up to 8 GW of market-oriented battery capacity by 2030.¹⁹ The 2024 electricity market design reform obliges Member States to assess flexibility needs and allows support schemes for non-fossil flexibility, including storage.¹⁶

Corporate equity and bilateral bank loans cannot carry this alone. Unlike the EUR 252 billion European securitisation market,¹¹ BESS debt is raised deal by deal: Modo Energy counts about EUR 3.1 billion of project-finance debt across twelve transactions in the first quarter of 2026, with revenue structures undisclosed for most.²¹ Each financing is bespoke and expensive to diligence; bank capacity is recycled slowly, and developer equity stays trapped in operating assets for years. Public lenders help at project level — the EIB's EUR 507 million solar-and-storage programme in Italy and the EBRD's InvestEU-backed NGEN financing are recent examples²² — but neither creates a repeatable channel to the largest pool of long-term European savings: pension funds and insurers, whose private-credit exposures already stand at EUR 514 billion and EUR 128 billion respectively.³²

What securitisation can and cannot do. A BBS programme can (i) give operating assets a repeatable refinancing channel, (ii) release developer and bank capital for new construction, (iii) diversify certain site, counterparty and operating risks by pooling, (iv) reduce transaction and due-diligence costs over time through standardised eligibility, contracts and data, and (v) connect distributed, mid-sized infrastructure with institutional fixed-income capital. Securitisation does **not** create bankability. It can scale bankability only after the underlying assets, contracts, data and operating performance are creditworthy in their own right.

Which projects would not qualify. Assets under construction or in commissioning; purely merchant projects without contracted floors; sites dependent on a single optimiser without replacement rights; projects whose revenue contracts cannot be assigned; assets without reliable EMS data or with unresolved defects, safety or permitting issues; first-generation technology without bankable warranties; and assets in jurisdictions where a validated transfer and enforceable security cannot be established. These remain the domain of sponsor equity, construction loans and project finance.

B. Lessons from 2008 translated into BBS rules

The lesson of 2008 is not “never securitise”. It is “never securitise what investors cannot understand”. The Financial Crisis Inquiry Commission concluded that “collapsing mortgage-lending standards and the mortgage securitization pipeline lit and spread the flame of contagion”, that credit-rating failures were “essential cogs in the wheel of financial destruction”, and that leverage “was often hidden — in derivatives positions, in off-balance-sheet entities”.^{1,3} The Senate investigation added that lenders “incurred little risk from issuing the higher risk loans, since they quickly sold the loans and kept the risk off their books”.² European securitisations without these features performed very differently: the Bank of England and ECB reported cumulative defaults of 0.05% on European consumer-related securitisations between mid-2007 and 2013, against 18.4% for US securitisations including subprime.^{4,5} The proposition of this paper is not the contrast; it is the structure described in Section C.

2008 failure	What happened (official findings)	BBS safeguard
Opaque assets	Investors could not see the loans behind RMBS and CDOs; performance data arrived late and incomplete. ¹	Asset-level technical, operational, contractual and revenue data for every system, independently verified and reported at defined intervals.
Originate-to-distribute incentives	Originators sold loans quickly and “kept the risk off their books”. ²	Sponsors retain first-loss exposure well above the statutory 5% minimum and continue to service the assets.
Weak underwriting	Lenders “took eager borrowers’ qualifications on faith”. ¹	Strict eligibility criteria (Section C) and independent technical, legal and data verification before any asset enters the pool.
CDOs and re-securitisation	Layered structures obscured the underlying risk; synthetic CDOs were “merely bets”. ¹	One bankruptcy-remote pool, one simple waterfall, three note classes, no re-securitisation (Article 8 SecReg).
Overreliance on ratings	Ratings were “key enablers of the financial meltdown”. ¹	Ratings inform but do not replace investor due diligence; published stress scenarios and continuous reporting.

2008 failure	What happened (official findings)	BBS safeguard
Hidden leverage and maturity mismatch	Thin capital, short-term funding of long-dated assets, “window dressing”. ¹	Fully disclosed leverage, amortising notes, liquidity reserves, cash sweeps and contractual-tenor tests.

These disciplines are not new inventions. BBS must be built on the existing post-crisis EU framework: Regulation (EU) 2017/2402 requires investor due diligence (Article 5), risk retention of at least 5% (Article 6, first introduced in 2009 as Article 122a CRD II⁷), transparency and disclosure via ESMA templates (Article 7), a ban on re-securitisation (Article 8) and sound credit-granting criteria (Article 9); the simple, transparent and standardised (STS) label is governed by Articles 18–28.^{6,10} Two developments matter for timing. First, the Commission’s June 2025 reform package is in trilogue after the Council’s general approach (19 December 2025) and Parliament’s mandate (21 May 2026), with the next negotiation scheduled for 29 September 2026; its final text is not yet law.⁸ Second, Delegated Regulation (EU) 2026/269 recalibrates Solvency II capital charges for securitisation from 30 January 2027, giving senior non-STS tranches “a new set of more favourable risk factors” — relevant because a first BBS is unlikely to satisfy the STS homogeneity and “defined periodic payment stream” tests and should be designed as a transparent non-STS senior instrument, with STS eligibility a later objective for pools of purely contracted receivables.⁹

C. Proposed BBS security architecture

The security structure — not the environmental benefit — is the investment proposition. Figure 2 shows how operating battery cash flows are converted into three classes of notes and who stands where.

Figure 2 — BBS security and cash-flow structure (illustrative)



Asset transfer

We recommend that the SPV acquire **the shares of the project companies together with an assignment of their contractual receivables**, with a security package over shares, receivables, accounts, insurance proceeds and, where feasible, the physical systems granted to the security trustee. Acquiring physical assets directly would trigger grid-connection, permit and tax transfers in most jurisdictions; acquiring only receivables would leave the SPV without control of the asset that generates them. Where a share sale is impractical, the alternative is secured loans from the SPV to the project companies backed by the same security. In every case the ownership of assets, receivables and security interests must be documented without ambiguity. A **legally validated true sale** (or its functional equivalent) should be obtained where feasible; the precise route depends on jurisdiction, tax treatment, insolvency law, contract assignability and regulatory analysis, and is the first deliverable of the 90-day process.

Asset pool

For the first transaction we recommend a **warehouse followed by a static term securitisation**. A warehouse (funded by sponsors, banks and, potentially, a promotional lender) aggregates and seasons qualifying assets, validates reporting and tests covenants for at least two full reporting cycles before the term notes are issued against a fixed pool. A revolving pool is inappropriate for a first issue because investors cannot yet benchmark replacement assets; it may be considered for later series only with concentration limits, replenishment criteria, eligibility tests, performance triggers, early-amortisation events and restrictions on asset substitution.

Eligible assets

Senior-note eligibility should require, at minimum: completed construction and successful commissioning; a defined operating history (illustratively six months or more; longer for sodium-ion, Section F); passed acceptance tests; verified grid connection; enforceable revenue contracts with assignable cash-flow rights; adequate property, liability and business-interruption insurance; compliant permits, fire-safety and product certifications (for example UL 9540A testing and the EU Battery Regulation's safety requirements^{24,25}); reliable EMS and performance data; OEM and system warranties; defined operations-and-maintenance (O&M) arrangements with replacement rights; no unresolved material defects; and no material covenant breach. **Construction and commissioning risk stay outside the senior pool.**

Revenue base

BESS revenues are heterogeneous and must be classified before they are pooled. **Contracted or availability-based income** — capacity payments, availability payments, tolling agreements, leasing income, contracted optimisation payments and revenue floors — carries counterparty risk but limited price risk. **Market-based income** — grid-service and ancillary-service revenues, energy arbitrage and merchant optimisation — is volatile and correlated across assets in the same market. Recent European contracts span two-year fixed-price tolls (2024), five- and seven-year tolls, and ten-year floors guaranteeing a minimum annual revenue across 789 MW of UK projects (2025).^{20,22} In Germany, benchmark revenues for a two-hour system were about EUR 205,000 per MW-year in July 2026, more than half from automatic frequency-restoration reserve capacity — a market that saturates as capacity is added.²¹

Base-case senior debt service should rely only on contracted, availability-based, tolling or appropriately floored revenues. Merchant revenues may support additional credit enhancement, accelerate amortisation through cash sweeps, replenish reserves and provide residual upside to Class B and C; they must never be presented as equivalent to long-term contracted revenues.

Diversification — and its limits

Pools should be diversified across geography, grid zone, offtaker, utility, optimiser or aggregator, revenue-contract type, OEM, battery chemistry, asset age, use case and project size, with hard concentration limits. **A large number of assets exposed to the same electricity price, regulatory regime or optimiser does not create meaningful diversification.** Fifty batteries in one bidding zone with one optimiser are one risk. What diversifies a BBS pool is the number and quality of contractual counterparties and the mix of contract types; what does not is the number of sites.

Data architecture

Standardised asset-level reporting replaces the trust investors extended to ratings in 2007. Every asset should report availability, state of health, degradation, cycles and depth of discharge, dispatch data, revenue by source, contract performance, warranty claims, downtime, maintenance, augmentation, safety incidents, covenant compliance and reserve balances, verified by an independent technical agent and made available to investors at defined intervals through the ESMA disclosure templates (Annex VIII or IX of Delegated Regulation 2020/1224, since no dedicated infrastructure template exists).¹⁰ The documentation must settle **data ownership** (project-company level, assigned to the SPV), **data continuity** (escrow of EMS software and configurations, licence rights that survive sponsor insolvency), **cybersecurity** (network segregation, audit and NIS2-aligned controls), **software failure and EMS replacement** (pre-agreed alternative EMS providers), **servicer replacement** (backup servicer with tested step-in) and **data access following sponsor insolvency** (data trustee holding credentials in escrow).

D. Illustrative capital structure, waterfall and public support

All percentages below are illustrative and will be set by cash-flow modelling, rating-agency analysis and investor sounding. We refined the initial proposal (Class A 60–75%, Class B 10–20%, Class S 5–10%, Class C about 10%) in three respects: the senior class is placed at the lower end of its range because contract tenors are shorter than in conventional infrastructure and residual value is uncertain; sponsor first loss is thickened because merchant volatility and technology uncertainty are highest in a first transaction; and the separate sodium tranche is replaced by a technology reserve and eligibility limits, for the reasons set out below.

Class	Illustrative share	Investors / holders	Key characteristics
Class A — senior notes	≈ 60%	Pension funds, insurers, institutional fixed income	Target rating subject to rating-agency analysis (none is assumed). Sequentially amortising within the weighted-average remaining contract life. First claim after senior operating and transaction costs. Supported only by eligible base-case cash flows; protected by subordination, funded reserves, covenants and triggers.
Class B — mezzanine notes	≈ 20%	Infrastructure credit funds, banks, specialist private credit	Absorbs greater revenue and performance volatility, including modelled merchant income under haircuts. Higher coupon than Class A; subordinate to Class A in interest and principal.
Class C — sponsor residual	≈ 20% (or more if the risk analysis requires)	Sponsors and originators (retained)	First-loss exposure; aligns underwriting and servicing incentives; satisfies Article 6 retention (5% minimum) with a substantial margin. Receives distributions only after all senior obligations and reserve requirements are met.
Technology support package (not a note class)	Sized to sodium-ion exposure	OEMs, sponsors, strategic and public innovation capital	Funded technology reserve, OEM performance warranties and eligibility caps for sodium-ion assets (Section F). Keeps early sodium-specific risk out of Class A without adding a tranche.

Is a separate Class S the right tool? Assessment

A dedicated “Class S” tranche is intuitive but structurally misleading. In a single waterfall, losses are allocated by seniority, not by asset type: if sodium-ion assets underperform, the shortfall hits Class C first, then whichever class sits next — a Class S would simply be additional subordination with a technology label. Of the alternatives, a **dedicated sodium-ion series** or **segregated compartment** isolates the risk cleanly but requires a critical mass of operating sodium assets that does not yet exist in Europe; **performance insurance** is not yet available on bankable terms; **sponsor retention** and **additional overcollateralisation** protect senior investors without targeting the specific risk. The most credible combination for the pilot is therefore: (i) an **eligibility concentration limit** for sodium-ion assets (illustratively no more than 10% of pool value); (ii) **zero credit for sodium-ion cash flows in the Class A base case**, so that Class A is sized as if those assets did not exist and their revenues act as pure overcollateralisation; (iii) **verified OEM warranties** and a **technology reserve** funded by OEMs, sponsors or public innovation capital, sized to the replacement or remediation cost of the sodium assets; and (iv) a **segregated sodium compartment or series** as the Phase-2 vehicle once verified operating history supports rating and investor analysis. This achieves the strategic objective without adding a tranche that protects nobody.

Cash-flow waterfall, triggers and reserves

Cash collected from the assets is applied each period in the fixed order shown in Figure 2 (items 1–10), from taxes and essential SPV expenses through Class A interest and principal, reserve replenishment and Class B, to residual distributions to Class C only at the end. Illustrative protections, to be calibrated with rating agencies, include: a **minimum debt-service coverage ratio (DSCR — cash available for debt service divided by scheduled debt service) test on contracted revenues only**, with a cash sweep to Class A principal if it falls below a first threshold and an **early-amortisation event** (all cash to sequential principal, no Class C distributions) below a second; **availability tests** and **degradation tests** against warranted curves; **concentration tests** on optimisers, offtakers, OEMs and chemistries; **servicer-replacement triggers** on sponsor rating, insolvency or reporting failure; a **liquidity reserve** covering several months of senior costs and Class A interest; and a **restriction on residual distributions** whenever any test is failing or any reserve is below target.

Public support: limited, priced, conditional and temporary

Government should not automatically hold the first-loss tranche; the proposal deliberately rejects the route — contemplated in the 2025 reform proposal — under which a public first-loss holder would waive private risk retention.⁸ The precedent to follow is the EIB Group's role in Germany's first residential solar securitisation (November 2024): a EUR 50 million anchor investment in senior notes plus a EUR 50 million EIF guarantee on the senior tranche of a EUR 240 million transaction, followed by two further issues without public support (EUR 367 million in July 2026).^{12,13} For BBS, the options worth evaluating are an **anchor investment in Class A**, a **capped guarantee** on part of Class A, a **super-senior tail-risk or liquidity facility**, or a **time-limited first-programme credit enhancement**. Any such support

must be capped, priced, conditional, transparent, time-limited, subject to performance review and designed to expire once the market is established. It must not protect poor underwriting, replace sponsor capital, guarantee merchant speculation, support immature or non-operating assets, remove normal investor due diligence, or socialise predictable commercial losses.

E. Pension-fund and insurance investability — testing the credit proposition

The test is not whether pension funds want “long-duration green yield” but whether a BBS note is a credit a fixed-income committee can approve.

Contract tenor and note maturity

BESS revenue contracts are shorter than conventional infrastructure concessions: the European examples above run from two to ten years, and Sunrun's latest residential solar-and-storage securitisation has a weighted-average life (WAL) of 4.9 years.^{14,20,22} The debt maturity must be supported by the contractual cash-flow profile. The rule we propose is simple: **the Class A WAL must be shorter than the pool's weighted-average remaining contract life, Class A must amortise fully within that life plus a limited tail, and no post-contract merchant revenue may be relied upon for Class A.** Refinancing is not assumed. Asset degradation and augmentation over the note term are modelled explicitly (NREL assumes augmentation within a 15-year life; OEM warranties of 10–20 years typically limit throughput, C-rate and state-of-charge²³). Residual value and merchant exposure after contract expiry accrue to Class B and C. First BBS notes will therefore have a WAL of perhaps five to eight years — closer to amortising ABS or infrastructure debt than to a 25-year concession. That may suit insurers and the ABS and infrastructure-credit sleeves of pension funds better than their long-dated liability-matching books; the 90-day sounding must test this rather than assume it.

Technical, counterparty, market and regulatory risk

Technical. Degradation beyond warranted curves; availability shortfalls; cycling outside warranty limits; augmentation and replacement cost; warranty exclusions; system-integration faults; fire and safety compliance (the Moss Landing fire of January 2025 triggered a regulatory review in California²⁴); EMS and software failure; cyber risk; OEM insolvency; and O&M-provider failure — mitigated by eligibility rules, independent verification, reserves, replacement rights and OEM concentration limits. **Counterparty.** Offtakers, utilities, optimisers, aggregators, OEMs, EPC contractors, O&M providers, insurers and account banks must each meet minimum standing or be replaceable; concentration in one optimiser is the largest hidden correlation in most European portfolios. **Market and regulatory.** Electricity-market reform, changes to grid-service and ancillary-service rules, revenue cannibalisation as BESS capacity saturates balancing markets (German ancillary revenues are forecast to roughly halve by 2030²¹), restrictions on revenue stacking, negative pricing, curtailment rules and tax changes (for example the time-limited grid-fee exemptions for storage in Germany and the new Austrian EIWG criteria for “system-serving” storage¹⁹). These risks cannot be structured away; they are why senior notes rely on contracted revenue and why contract tenor governs note tenor.

Liquidity, valuation and prudential treatment

The first BBS issues will be buy-and-hold, relatively illiquid, hard to benchmark and dependent on specialist valuation models. They should not be marketed as a liquid “European safe asset”. Prudential treatment is material: under current Solvency II rules a senior STS position of the highest credit quality carries a spread-risk factor of 1.0% per year of duration, against 12.5% for a non-STS position; from 30 January 2027 senior non-STS tranches receive more favourable factors under Delegated Regulation 2026/269, and the Level-1 reform still in trilogue may change bank risk-weight floors.^{8,9} STS eligibility and the capital charge for insurers, IORPs and banks must be confirmed before issuance.

F. Why sodium-ion must be included — and how

The strategic argument. Eligibility standards written into a new asset class shape industrial outcomes for a decade or more: what the capital market will refinance is what developers will build. Lithium-ion supply is highly concentrated; the EU's Critical Raw Materials Act sets a 2030 benchmark that no single third country should supply more than 65% of a strategic raw material.²⁵ Sodium is abundant, and sodium-ion cells avoid lithium and, in most designs, cobalt and nickel.^{25,26} The JRC estimates global sodium-ion demand at 4 GWh in 2024 rising to 90 GWh by 2035, projects a 7% share of stationary storage by 2030, and warns that “China is close to develop a dominant position in Na-ion battery technology”.²⁶ The IEA notes that nearly all existing manufacturing capacity is in China, which also accounts for more than 95% of announced 2030 capacity.²⁷ A lithium-only BBS framework would not be neutral; it would entrench a second concentrated supply chain.

The technical case, honestly stated. Sodium-ion is at technology-readiness level 8 across its main chemistries, with reported cycle lives from about 3,000 (layered oxides) to 10,000 (polyanions) and cell-level energy densities up to about 175–180 Wh/kg, against up to 205 Wh/kg for LFP.^{26,27} Independent ranges are wider (IRENA: typically 4,000–

5,000 cycles at 80% retention²⁸). Cold-temperature performance is a genuine advantage (around 90% of nominal capacity at -40°C ²⁷). Lower volumetric energy density matters less in stationary storage than in vehicles, but still affects land, container count, shipping, installation, balance-of-system cost and project footprint. On cost, the JRC puts the average sodium-ion cell at USD 87/kWh in 2024 with a path towards USD 40/kWh, while LFP packs averaged USD 81/kWh in 2025; the IEA concludes that lithium prices are “not yet high enough for sodium-ion batteries to undercut LFP costs in most applications”, and peer-reviewed scenario analysis finds a near-term price advantage “challenging”.^{26,27,30} On safety, sodium-ion is **not** universally non-flammable or safer than LFP: a 2025 BAM study found that commercial layered-oxide sodium-ion cells entered thermal runaway at lower temperatures than LFP and that the assumption of general superiority “is oversimplified”, whereas polyanion and Prussian-white chemistries show better material-level thermal stability.²⁹ Safety, durability and cost depend on cell chemistry, cathode and anode materials, manufacturing quality, system engineering, thermal management, BMS and EMS design, operating window, test conditions, certification and warranty terms; current economics and future potential must be kept apart.

Operating history and supply. Grid-scale sodium-ion systems have operated in China since 2019, 100 MWh-class installations only since 2024; European installations are pilot-scale.²⁷ CATL has announced a stationary sodium-ion system for delivery from late 2026; two prominent Western cell ventures failed in 2025 (Northvolt, Natron) and remaining European producers are at sub-GWh scale.^{27,31} Certification, warranty bankability and OEM concentration are therefore the binding constraints — not the chemistry's promise.

Risk allocation. The principle is: *pension note = contracted and monitored cash flow; sodium-specific early technology risk = sponsor and OEM capital, warranties, reserves, performance support or a subordinated technology layer.* Pension investors must not be asked to underwrite the strategic policy objective directly. We recommend a phased eligibility path: (1) a controlled sodium-ion allocation in the pilot pool, subject to the concentration limit and zero base-case credit described in Section D; (2) independent cell and system testing to recognised standards; (3) minimum operating-history requirements, longer than for lithium-ion; (4) verified OEM warranties with acceptable counterparty standing or collateral; (5) technology-specific reserves or credit enhancement; (6) continuous performance reporting through the BBS data architecture; and (7) increased eligibility — including a dedicated sodium compartment or series — as evidence accumulates. Government's role is to make the pathway exist and fund evidence, not to tell investors which chemistry to buy.

G. Role of government and pilot roadmap

Government should act as **market architect, standard setter, convener, catalytic investor and limited tail-risk participant** — not as the permanent buyer of weak risk. It should: (1) establish a BBS task force; (2) commission legal and regulatory analysis; (3) develop standard asset-eligibility criteria; (4) develop standard revenue-contract classifications; (5) define technical-data and reporting standards; (6) conduct rating-agency pre-sounding; (7) conduct pension and insurance investor sounding; (8) identify a credible operating-asset pipeline; (9) design a limited first-programme support mechanism; and (10) create a defined sodium-ion eligibility pathway. Participants should include the finance ministry, the energy and economy ministries, European and national promotional banks, pension funds, insurers, commercial banks, rating agencies, technical advisers, utilities, developers, OEMs, regulators and legal and tax advisers. Standards must be open and technology-agnostic; no requirement should be drafted so that only one company can meet it.

Phase	Scope	Gate
Days 0–30 — Asset and contract mapping	Identify the operating pipeline; map revenue contracts and assignability; assess data quality; review OEM and optimiser concentration and operating history; identify sodium-ion assets; list technical and legal gaps.	At least EUR 250 million of eligible, contracted, data-complete operating assets identified?
Days 31–60 — Structure and credit analysis	True-sale and tax analysis; SPV design; eligibility rules; base-case cash-flow model on contracted revenues; stress scenarios; capital-stack and reserve sizing; servicer and data-verification structure; rating-agency pre-sounding.	Contracted cash flows support an amortising Class A within contract life at a usable rating level?
Days 61–90 — Investor and public-support design	Pension, insurer and infrastructure-credit sounding; term-sheet refinement; anchor or capped-guarantee options; regulatory review (SecReg, Solvency II, CRR); pilot recommendation.	Go / no-go decision on a warehouse.
Phase 2 — Warehouse and seasoning	Aggregate qualifying assets; validate reporting; test covenants; build performance history; resolve servicing and data issues.	Two clean reporting cycles; independent verification signed off.

Phase	Scope	Gate
Phase 3 — First issuance	Launch only when: pool sufficiently diversified; contracted revenues support the notes; data complete and independently verifiable; transfer and security enforceable; credit enhancement adequate; rating analysis credible; investor demand demonstrated; economics acceptable.	Illustrative EUR 250 million; shelf up to EUR 1 billion only if all conditions hold.

A failed feasibility study is preferable to a weak first transaction that damages the asset class. Each gate is a genuine stop: if pipeline, contracts, data, legal transfer or investor demand are missing, the recommendation is to wait.

H. Adversarial review and open diligence items

The proposal was tested against the objections a finance ministry, a pension CIO, a rating agency, a bank risk committee, a BESS technical adviser and a competition-policy official would raise. Valid objections are met with a condition, a mitigation, further diligence or delay — not a benefit.

Objection	Assessment	Response
1. BESS revenues are too merchant and too short-dated for pension capital.	Largely valid.	Senior notes rely on contracted revenue only; tenor bounded by contract life; no reliance on refinancing. Insufficient contracted volume means delay.
2. Degradation and augmentation costs are too uncertain.	Valid for weak data.	Eligibility requires verified state-of-health data and warranties; degradation tests and O&M reserve; augmentation modelled in base case.
3. Batteries stay correlated to the same power prices and regulation.	Valid.	Correlation is not disguised as diversification: merchant income excluded from base case; limits by zone, optimiser and regime.
4. Pooling does not create meaningful diversification.	Partly valid.	Diversification is counted by counterparties and contract types, not by site count; pools must span offtakers, OEMs and grid zones.
5. The first deal is too small and illiquid.	Valid.	Marketed as buy-and-hold; warehouse to reach viable size; size is a gate, not a target.
6. Public guarantees would just subsidise developers and banks.	Valid if misdesigned.	No public first loss; support capped, priced, senior and time-limited; sponsors keep thick first loss.
7. Sodium-ion lacks operating history for institutional credit.	Valid today.	Zero base-case credit, concentration cap, OEM warranty, technology reserve, longer seasoning; wider eligibility only on evidence.
8. A sodium tranche adds complexity, not protection.	Valid.	Class S dropped; replaced by reserve, warranty and eligibility limits (Section D).
9. Project finance, infrastructure debt and green bonds already do this.	Partly valid.	They finance single assets or corporates; BBS refinances pools of mid-sized operating assets and sets a data standard. It complements them.
10. EU prudential treatment may make BBS unattractive.	Open.	Solvency II recalibration applies from 2027; CRR reform in trilogue; STS unlikely at first. Confirm capital treatment before launch.
11. Data access, cyber and servicer replacement could fail in distress.	Valid.	Data trustee, software escrow, backup servicer with tested step-in, EMS replacement plan — all preconditions of eligibility.
12. Public authorities may pick technology winners.	Valid concern.	Standards open and chemistry-agnostic; the sodium pathway funds evidence, not purchases; no single-company requirements.

Open diligence items — to be confirmed before a pilot can proceed

Stated as open items, not assumed: (a) whether a validated true sale, enforceable security and neutral tax treatment are achievable for project-company shares and receivables in each target jurisdiction (Austria, Germany, Italy, the UK); (b) whether existing tolling, floor and optimiser agreements are assignable with adequate step-in rights; (c) whether and how a rating agency would rate a pool of utility-scale BESS cash flows — no European public securitisation backed solely by such revenues was found, so BBS would be a first; (d) the final Level-1 reform text and resulting capital treatment for insurers, IORPs and banks; (e) whether EUR 250 million of eligible, contracted operating assets can be assembled without excessive optimiser or OEM concentration; (f) the bankability of sodium-ion OEM warranties and the availability of third-party certification; (g) grid-fee exemption status and “system-serving” storage criteria in Germany and Austria; and (h) EIB Group or promotional-bank appetite for an anchor or capped-guarantee role. None is a reason not to start the 90-day process; each is a reason not to issue before it is answered.

Sources

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