LISBON ECONOMICS

Portugal Large Infrastructure Projects: High Speed Network and Europe Links

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Summary

Portugal's high-speed-rail programme — anchored on the 290-kilometre Lisbon-Porto line, with extensions to Madrid (Évora-Caia), Aveiro-Salamanca, Porto-Vigo and Sines, plus the Third Tagus Crossing and the conventional Linha do Norte modernisation — constitutes the largest single infrastructure commitment of the century in the national rail sector. Phase 1 first sub-section (Porto-Campanhã to Oiã, 71 kilometres) reached financial close in July 2025 under a 30-year Design-Build-Maintain concession with the LusoLAV / Avan Norte consortium led by Mota-Engil. The financing package for that sub-section amounts to €2.40 billion: a €875 million tranche from the European Investment Bank (the first of a €3 billion approved envelope), €480 million in Connecting Europe Facility grants, €900 million in commercial debt, and €150 million in Infraestruturas de Portugal co-financing.

The publicly-stated cost of the full 290-km line, as compiled from Infraestruturas de Portugal phase tender announcements and the project specification published by Rail Journal in October 2025, is approximately €9.7 billion at 2024-2025 prices. The decomposition by phase is €3.7 billion for Phase 1 (Porto-Soure, 143 km, of which Porto-Oiã 71 km at €1.9 billion and Oiã-Soure 72 km at €1.8 billion), €1.5 billion for Phase 2 (Soure-Carregado, approximately 75 km), and €4.5 billion for Phase 3 (Carregado-Lisbon, approximately 72 km, which includes the new Lisbon-end works comprising a Tagus crossing and central-station integration)[1]. The implied weighted-average cost is approximately €33 per route-kilometre — close to the European HSR mean of €25 per kilometre, with Phase 3's €62 per kilometre reflecting the urban-tunnel and bridge components at the Lisbon end. The escalation from the 2005 MOPT estimate (€4.7 billion, €17 per kilometre) is approximately 2.1-fold in nominal terms, broadly within plausible construction inflation over the 19-year interval. The intermediate-segment costs have been incrementally disclosed through PPP tender announcements; the cumulative programme commitment of approximately €13-16 billion (Lisbon-Porto plus the remaining six rail projects) has never been presented to Parliament as a single consolidated figure.

[1] *The reported total of approximately €9.7 bn is the sum of the publicly-stated phase costs as compiled by Rail Journal (October 2025, LusoLAV concession-award report) and Railway Technology (Porto-Lisbon high-speed line profile): Phase 1 Porto-Soure 143 km at €3.7 bn (of which Porto-Oiã 71 km at €1.9 bn construction estimate, contracted in July 2025 at €2.40 bn total financing comprising BEI €875 M, CEF grants €480 M, commercial lenders €900 M and Infraestruturas de Portugal €150 M — European Commission Representation in Portugal press release of 29 July 2025; and Oiã-Soure 72 km at €1.8 bn, relaunched as PPP2 in February 2026 with the alignment optimised to 60 km and a total 30-year availability-payment NPV of €4.765 bn distributed 2026-2056 — InfraPPP World, 2026). Phase 2 (Soure-Carregado, approximately 75 km): €1.5 bn. Phase 3 (Carregado-Lisbon, approximately 72 km, including the new Tagus crossing and the Lisbon central-station integration): €4.5 bn. The MOPT 2005 reference figure (€4.7 bn at 2005 prices, €17 M per km, recorded in the author's TGV.xlsx working file (Mateus 2025), Sheet1, row 5, label "MOPT em 2005") implies a 2.1-fold nominal escalation over the 19-year interval, broadly within plausible construction inflation. The author's NPV computation in this report uses a working capex of €10 bn (TGV.xlsx, Sheet1, row 17 column 11), consistent with extrapolating the Porto-Oiã unit contracted financing of €34 M per km across the 290-km line (€34 × 290 ≈ €9.9 bn) and broadly equivalent to the published three-phase construction sum of €9.7 bn.*

The most consequential design choice in the current plan is the use of Iberian gauge (1,668 mm) with CONVEL signalling — a choice that violates the operational specifications of Regulation (EU) 2024/1679 governing the Trans-European Transport Network. Spain has built its entire high-speed-rail network in European standard gauge (1,435 mm) since 1992, including the cross-border connections to France. The Iberian-gauge specification of the Portuguese plan therefore precludes direct interoperability with the European network beyond the Spanish-side gauge-changers, limits foreign-operator entry, suppresses freight modal-shift to rail beyond the Pyrenees (a flow currently worth

€26.6 billion per year by road), and creates a fiscal exposure of approximately €6-12 billion in lost or clawed-back EU funding and future re-gauging costs over the 25-30 year programme.

The exposure is concentrated on the cross-border TEN-T links rather than on the internal Lisbon-Porto line. The Commission has accepted Iberian-gauge financing for the Porto-Oiã section despite Regulation 1679 non-compliance, and may continue to do so for the internal segments at reduced grant rates. The cross-border projects — Évora-Caia for the Madrid corridor (binding 2034 TEN-T deadline), Aveiro-Salamanca for freight beyond the Pyrenees, Porto-Vigo for the Atlantic-corridor north, and Sines-Évora for the Atlantic-corridor south — are unfundable in Iberian gauge because the very purpose of those lines is interoperability with the European network. Spain has already approved the Madrid-Talavera section of the Madrid-Lisbon HSR in European gauge, and the Iberian-gauge segment Oropesa-Badajoz exists only at the insistence of successive Portuguese governments.

The author's NPV model (TGV.xlsx) shows that the Lisbon-Porto line in isolation, computed on 40-year present value at 4 % real discount, has a financial NPV of approximately −€8.06 billion without EU funding and −€3.37 billion with full EU co-financing. The annual operating subsidy required to sustain the service is approximately €450 million per year without EU funding and €200 million with it — the latter broadly in line with Spanish AVE per-kilometre operating-subsidy norms. The full TEN-T core network analysis by Lopes et al. (2022), presented at the 10th Congress of the CRP, shows a marginally positive social NPV of +€486 million with IRR 2.23 % and B/C ratio 1.11 once freight modal-shift, full EU co-financing and external-cost savings are included — but only under a compliant European-gauge specification with ERTMS.

The recommendation of this report is unambiguous: honour the contracted Porto-Oiã phase and course-correct the remaining 80 % of the programme. Specifically: switch to European gauge with ERTMS from Oiã south; re-prioritise the Lisbon-Madrid (Évora-Caia) link to meet the binding 2034 TEN-T core-network deadline; develop the Aveiro-Salamanca freight corridor in European gauge under the Connecting Europe Facility Atlantic-corridor envelope; conduct an independent multi-criteria review of the Third Tagus Crossing alignment (current Chelas-Barreiro versus the 10-15 kilometre shorter Beato-Montijo or Foz do Trancão-Alcochete N alternatives); split IP into conventional-rail and TEN-T / HSR divisions on the Spanish ADIF / ADIF-AV model; anchor financing in CEF grants and EIB defense-mobility soft loans; and require the consolidated programme envelope and 40-year financial-sustainability model to be published annually to Parliament under Tribunal de Contas oversight.

Sumário (português)

O programa português de alta velocidade ferroviária — ancorado na linha Lisboa-Porto de 290 quilómetros, com extensões a Madrid (Évora-Caia), Aveiro-Salamanca, Porto-Vigo e Sines, além da Terceira Travessia do Tejo e da modernização da Linha do Norte convencional — constitui o maior compromisso isolado de infraestruturas do século no setor ferroviário nacional. A primeira sub-secção da Fase 1 (Porto-Campanhã a Oiã, 71 quilómetros) atingiu o fecho financeiro em julho de 2025, sob uma concessão de Conceção-Construção-Manutenção de 30 anos com o consórcio LusoLAV / Avan Norte liderado pela Mota-Engil. O pacote financeiro dessa sub-secção totaliza €2,40 mil milhões: tranche de €875 milhões do Banco Europeu de Investimento (primeira de um envelope aprovado de €3 mil milhões), €480 milhões em subvenções do Mecanismo Interligar a Europa (CEF), €900 milhões em dívida comercial e €150 milhões de cofinanciamento da Infraestruturas de Portugal.

O custo publicamente declarado para a totalidade da linha de 290 km, conforme compilado a partir dos anúncios de concursos por fase da Infraestruturas de Portugal e do dossiê do projeto publicado pelo Rail Journal em outubro de 2025, é de aproximadamente €9,7 mil milhões a preços de 2024-2025. A decomposição por fases é de €3,7 mil milhões para a Fase 1 (Porto-Soure, 143 km, dos quais Porto-Oiã 71 km a €1,9 mil milhões e Oiã-Soure 72 km a €1,8 mil milhões), €1,5 mil milhões para a Fase 2 (Soure-Carregado, aproximadamente 75 km), e €4,5 mil milhões para a Fase 3 (Carregado-Lisboa, aproximadamente 72 km, incluindo a nova travessia do Tejo e a integração da estação central de Lisboa)[1]. O custo médio ponderado implícito é de aproximadamente €33 por quilómetro de via — próximo da média europeia de €25 por quilómetro em alta velocidade ferroviária, com os €62 por quilómetro da Fase 3 a refletir o componente urbano-túnel e a nova ponte no terminal de Lisboa. O agravamento face à estimativa MOPT de 2005 (€4,7 mil milhões, €17 por quilómetro) é de aproximadamente 2,1 vezes em termos nominais — dentro da inflação plausível da construção no intervalo de 19 anos. Os custos dos segmentos intermédios foram divulgados de forma incremental através de anúncios de concursos PPP; o compromisso programático cumulativo de aproximadamente €13-16 mil milhões (Lisboa-Porto mais os outros seis projetos ferroviários) nunca foi apresentado ao Parlamento como número consolidado único.

[1] *O total reportado de aproximadamente €9,7 mil milhões resulta da soma dos custos por fase publicamente declarados, conforme compilados pelo Rail Journal (outubro de 2025, reportagem sobre a adjudicação ao consórcio LusoLAV) e pelo Railway Technology (perfil do projeto Porto-Lisboa): Fase 1 Porto-Soure 143 km a €3,7 mil milhões (dos quais Porto-Oiã 71 km a €1,9 mil milhões em custo de construção estimado, contratado em julho de 2025 por €2,40 mil milhões de financiamento total, com tranche do BEI de €875 M, subvenções CEF de €480 M, financiadores comerciais €900 M, e Infraestruturas de Portugal €150 M — Representação da Comissão Europeia em Portugal, comunicado de 29 de julho de 2025; e Oiã-Soure 72 km a €1,8 mil milhões, relançada como PPP2 em fevereiro de 2026 com o traçado otimizado para 60 km e um VAL total de pagamentos de disponibilidade a 30 anos de €4,765 mil milhões distribuído entre 2026 e 2056 — InfraPPP World, 2026). Fase 2 (Soure-Carregado, aproximadamente 75 km): €1,5 mil milhões. Fase 3 (Carregado-Lisboa, aproximadamente 72 km, incluindo a nova travessia do Tejo e a integração da estação central de Lisboa): €4,5 mil milhões. A referência MOPT de 2005 (€4,7 mil milhões a preços de 2005, €17 M/km, registada no ficheiro TGV.xlsx do autor (Mateus 2025), Sheet1, linha 5, com a designação «MOPT em 2005») implica um agravamento nominal de 2,1 vezes ao longo do intervalo de 19 anos, dentro da inflação plausível da construção. O cálculo de VAL deste relatório usa um valor de investimento de trabalho de €10 mil milhões (TGV.xlsx, Sheet1, linha 17 coluna 11), em linha com a extrapolação do preço contratado de Porto-Oiã de €34 M/km × 290 km ≈ €9,9 mil milhões e essencialmente equivalente à soma das três fases publicada de €9,7 mil milhões.*

A escolha de conceção mais consequente do plano atual é o uso da bitola ibérica (1 668 mm) com sinalização CONVEL — escolha que viola as especificações operacionais do Regulamento (UE) 2024/1679 que rege as Redes Transeuropeias de Transporte. A Espanha construiu toda a sua rede de alta velocidade em bitola europeia padrão (1 435 mm) desde 1992, incluindo as ligações

transfronteiriças a França. A especificação de bitola ibérica do plano português impede assim a interoperabilidade direta com a rede europeia para além dos cambiadores de bitola do lado espanhol, limita a entrada de operadores estrangeiros, suprime a transferência modal de mercadorias para ferrovia para além dos Pireneus (fluxo atualmente avaliado em €26,6 mil milhões por ano por estrada) e cria uma exposição fiscal de aproximadamente €6-12 mil milhões em financiamento comunitário perdido ou recuperado e em custos futuros de re-bitolagem ao longo do programa.

A exposição concentra-se nas ligações transfronteiriças da RTE-T, e não na linha interna Lisboa-Porto. A Comissão aceitou o financiamento em bitola ibérica para a secção Porto-Oiã apesar da não-conformidade com o Regulamento 1679, e poderá continuar a fazê-lo para os segmentos internos a taxas de subvenção reduzidas. Os projetos transfronteiriços — Évora-Caia para o corredor de Madrid (prazo vinculativo de 2034 da rede TEN-T core), Aveiro-Salamanca para mercadorias além-Pirineus, Porto-Vigo para o corredor atlântico norte, e Sines-Évora para o corredor atlântico sul — são incompatíveis com financiamento em bitola ibérica, porque o próprio propósito dessas linhas é a interoperabilidade com a rede europeia. A Espanha já aprovou a secção Madrid-Talavera da AV Madrid-Lisboa em bitola europeia, sendo o troço Oropesa-Badajoz em bitola ibérica resultado da insistência dos sucessivos governos portugueses.

O modelo de VAL do autor (TGV.xlsx) mostra que a linha Lisboa-Porto, isolada, em valor atual líquido a 40 anos com taxa de desconto real de 4 %, apresenta um VAL financeiro de aproximadamente −€8,06 mil milhões sem financiamento da UE e −€3,37 mil milhões com cofinanciamento integral. O subsídio anual de exploração necessário para sustentar o serviço é de aproximadamente €450 milhões por ano sem financiamento europeu e €200 milhões com — este último em linha com as normas de subsídio por quilómetro da rede AVE espanhola. A análise do conjunto da rede TEN-T core por Lopes et al. (2022), apresentada no 10º Congresso do CRP, indica um VAL social marginalmente positivo de +€486 milhões com TIR 2,23 % e rácio benefício/custo 1,11 — mas apenas sob uma especificação compatível com a bitola europeia e ERTMS.

A recomendação do relatório é inequívoca: honrar o contrato da fase Porto-Oiã e corrigir o rumo dos restantes 80 % do programa. Especificamente: mudar para bitola europeia com ERTMS a partir de Oiã para sul; reprioritizar a ligação Lisboa-Madrid (Évora-Caia) para cumprir o prazo vinculativo de 2034 da rede TEN-T core; desenvolver o corredor de mercadorias Aveiro-Salamanca em bitola europeia sob o envelope CEF do corredor atlântico; conduzir uma revisão multicritério independente do alinhamento da Terceira Travessia do Tejo (atual Chelas-Barreiro versus as alternativas Beato-Montijo ou Foz do Trancão-Alcochete N, 10-15 km mais curtas); separar a IP em divisões de ferrovia convencional e TEN-T / HSR seguindo o modelo espanhol ADIF / ADIF-AV; ancorar o financiamento em subvenções CEF e empréstimos soft do BEI sob o instrumento de mobilidade militar; e exigir que o envelope programático consolidado e o modelo de sustentabilidade financeira a 40 anos sejam publicados anualmente ao Parlamento sob a supervisão do Tribunal de Contas.

Executive summary

Context

Portugal's HSR programme — anchored on the 290 km Lisbon-Porto line, with extensions to Madrid (Évora-Caia), Aveiro-Salamanca, Porto-Vigo, the Third Tagus Crossing and the Linha do Norte modernisation — is the largest public-infrastructure commitment of the century. Phase 1 first sub-section (Porto-Campanhã to Oiã, 71 km) reached financial close in July 2025 under a 30-year DBM concession with the Mota-Engil-led LusoLAV consortium. Financing: BEI €875 M + CEF grants €480 M + national lenders €900 M + IP €150 M = €2.4 bn for 71 km (€34 M/km). The publicly-stated three-phase total for the full 290-km line is approximately €9.7 bn (sum of Porto-Oiã €1.9 bn + Oiã-Soure €1.8 bn + Soure-Carregado €1.5 bn + Carregado-Lisbon €4.5 bn), implying a weighted-average construction cost of approximately €33 M per route-km.

Three independent problems with the current plan

- Cost: the publicly-stated three-phase total for the full 290 km line is approximately €9.7 bn (Porto-Oiã €1.9 bn + Oiã-Soure €1.8 bn + Soure-Carregado €1.5 bn + Carregado-Lisbon €4.5 bn). Weighted average ≈ €33 M/km — close to the European HSR mean of €25 M/km. The Carregado-Lisbon Phase 3 at €62 M/km drives most of the average above the benchmark (urban tunnel, Tagus crossing, central-station works).
- Compliance: The line is being built in Iberian gauge (1,668 mm) with CONVEL signalling. Regulation (EU) 2024/1679 mandates European gauge + ERTMS on TEN-T core lines (2030 deadline; 2034 for Lisbon-Madrid). Spain has operated all HSR in European gauge since 1992.
- Segmentation: IP communicates the project as separate segments, never publishing a cumulative total. Bottom-up reconstruction: €11-17 bn for LIS-OPO alone, €17-24 bn for the full TEN-T programme. Citizens compare each segment to MOPT 2005, not to the cumulative envelope.

Construction costs — European benchmarks vs Portuguese estimates

Reference line / estimate	Country / context	€ M / km (2026 prices)
Madrid-Barcelona AVE (2008)	Spain	≈ 22
Madrid-Sevilha AVE (1992)	Spain (inflation-adj)	≈ 30
LGV Sud-Est Paris-Lyon (1981)	France	≈ 20
European HSR mean	EU consolidated	25
Porto-Oiã contracted price (Jul 2025)	Portugal	34 (justifiable)
Lisbon-Porto three-phase published sum	Portugal	≈ 33 (weighted avg over 290 km)
of which Phase 3 (Carregado-Lisbon, urban + bridge)	Portugal	≈ 62 (€4.5 bn / 72 km)

The full programme — seven projects, €17-24 bn total

Project	Length	Cost (€ bn)	TEN-T deadline	Priority
HSR Lisbon-Madrid (Évora-Caia)	~100 km	3-4	Core 2034	1 — binding
Aveiro-Salamanca freight corridor	~240 km	2-3	Ext. core 2040	2 — highest export value
Sines-Évora freight (accelerate)	~100 km	1.5-2.5	Comp. 2050	3 — defense-mobility
HSR Lisbon-Porto (Phase 1.a contracted)	71 km	2.40	Core 2030	4 — contracted
Porto-Vigo north cross-border	~150 km	1.5-2.5	Ext. core 2040	5
HSR Lisbon-Porto (Phases 1.b + 2)	~206 km	9-14.5	Core 2030	6
TTT rail component	~15 km	1.5-3	Linked to LIS-Madrid	alignment review
Linha do Norte modernisation (conv.)	~340 km	1.5-2.5	n.a.	7 — continuous
Total programme envelope	—	≈ 17-24	—	Never officially published

EU funding exposure — internal vs cross-border

- Case A — internal Lisbon-Porto: the Commission has accepted Iberian gauge for Porto-Oiã despite Regulation 1679 non-compliance. Subsequent sections at moderate exposure of €1-4 bn at risk (reduced CEF rates, infringement-procedure risk, future re-gauging).
- Case B — cross-border TEN-T links (Évora-Caia, Aveiro-Salamanca, Porto-Vigo, Sines-Évora): funding effectively denied under Iberian gauge because Spain's side is European gauge to Oropesa. Exposure: €2.8-6.1 bn essentially unrecoverable.
- Plus BEI soft-loan implicit subsidy (€1-3 bn) and future re-gauging costs (€1-3 bn) → total fiscal exposure of the Iberian-gauge choice ≈ €6-12 bn over the 25-30 year programme.

NPV and operating subsidy — with vs without EU funding

Item (LIS-OPO, central demand 6 M trips/yr, 40-yr horizon)	Without EU money	With EU money
Initial capex outlay (net of CEF grants in EU case)	−€10.0 bn	−€6.5 bn
PV operating result (40 yr × €98 M/yr × 19.79)	+€1.94 bn	+€1.94 bn
PV BEI interest-rate saving (vs 3 % commercial on €4	n.a.	+€1.19 bn

bn)		
Financial NPV (40 yr, 4 % real)	≈ −€8.06 bn	≈ −€3.37 bn
Annual budget subsidy required	≈ €450 M / yr	≈ €200 M / yr

EU funding closes about 60 % of the financing gap (NPV improvement €4.7 bn) but does not turn the project economically positive in financial terms. The Lopes et al. (2022) social CBA for the full TEN-T network, including freight transfer + externalities + EU co-financing, produces +€486 M NPV (B/C 1.11). Lisbon-Porto in isolation is uneconomical even with EU money; the full compliant TEN-T network is marginally socially viable.

Recommendations

R1. Honour the Porto-Oiã contract (signed July 2025); course-correct the remaining 80 % of the programme.

R2. Switch to European gauge + ERTMS from Oiã south. Incremental cost ≈ €0.5-1.0 bn against preserved EU funding ≈ €5-12 bn (5×-10× return on the gauge premium).

R3. Re-prioritise Lisbon-Madrid (Évora-Caia) to meet the binding 2034 TEN-T deadline. Renegotiate the 2009 Poceirão-Caia project on a partial-application basis to avoid the exit indemnity; specify the Portuguese side in European gauge throughout.

R4. Develop the Aveiro-Salamanca freight corridor in European gauge under the CEF Atlantic-corridor envelope plus EIB defense-mobility instrument. The corridor serves 55 % of land-export value originating in Norte and Centro Portugal.

R5. Independent multi-criteria review of the Third Tagus Crossing alignment (Chelas-Barreiro vs Beato-Montijo vs Foz do Trancão-Alcochete N). The shorter alignments save 10-15 km and approximately €0.5-1.0 bn while improving CTA-airport access.

R6. Split IP into a conventional-rail division and a TEN-T / HSR division on the Spanish ADIF / ADIF-AV model. Form an AEIE with ADIF-AV and SNCF for Iberian-peninsular HSR coordination.

R7. Anchor financing in EIB defense-mobility loans (outside deficit rules) plus CEF grants (30-40 % co-financing, compliance-conditional).

R8. Use DG-MOVE technical support to lead an international tender for the master-plan revision (RCM 77/2025), ensuring Regulation 1679 compliance is built in from the outset.

R9. Transparency: require IP and the Ministério das Infraestruturas to publish a consolidated programme envelope and a 40-year financial-sustainability model (with and without EU funding) alongside each segment tender. The Tribunal de Contas has the authority to require this.

Main report

Part 1 — State of play

1.1 What is committed and what is pending

The HSR Lisbon-Porto programme is being delivered in phases. As of mid-2025 the legal and financial commitments stand as follows. The Porto-Campanhã to Oiã section (Phase 1.a, 71 kilometres) was contracted in July 2025 under a thirty-year Design-Build-Maintain concession to the LusoLAV / Avan Norte consortium, led by Mota-Engil and composed exclusively of Portuguese construction firms. The concession was financed through an €875 million European Investment Bank tranche (the first part of a €3 billion approved envelope), €480 million in Connecting Europe Facility grants, €900 million from a syndicate of national and international lenders, and €150 million in Infraestruturas de Portugal co-financing. The combined €2.40 billion for 71 kilometres implies €34 million per kilometre, a figure within the European range for tunnel-heavy urban sections.

The remaining components of the rail programme are at various stages of preparation. The Phase 1.b section (Oiã to Soure, 72 kilometres) is in pre-tender with an estimated capex of €2.5-3.5 billion. The Phase 2 section (Soure to Lisbon, approximately 134 kilometres) remains in the master-plan stage with cost estimates of €5-8 billion. The Lisbon-end works, including the rail share of the Third Tagus Crossing and the central Lisbon station, are in even earlier stages of planning, with cost estimates of €1.5-3 billion depending on the alignment choice. The Lisbon-Madrid (Évora-Caia, Portuguese-side) link is on hold pending renegotiation of the 2009 project. The Aveiro-Salamanca freight corridor and the Porto-Vigo north cross-border link are at the planning stage. The Linha do Norte modernisation is in continuous-upgrade execution.

1.2 Cost build-up — 2005 to 2025

The publicly-stated cost of the Portuguese HSR Lisbon-Porto programme has evolved through three reference figures. The 2005 MOPT estimate of €4.7 billion (€17 per kilometre on the original 277-km alignment) reflected the original Portuguese plan. The three-phase published total, as compiled from the LusoLAV concession-award announcement (October 2025) and Railway Technology's project profile, is approximately €9.7 billion for the now-290-km line (Porto-Soure €3.7 bn — Porto-Oiã €1.9 bn plus Oiã-Soure €1.8 bn — Soure-Carregado €1.5 bn, Carregado-Lisbon €4.5 bn). The 2025 Porto-Oiã contracted price — the only market-tested figure in the programme — is €34 per kilometre for the all-in financing envelope. The nominal escalation from 2005 to 2024-2025 is therefore approximately 2.1-fold (€9.7 bn ÷ €4.7 bn), broadly within plausible construction inflation over the 19-year interval.

Comparing the Portuguese figures with European benchmarks places the programme within the European norm with one important exception. The Madrid-Barcelona high-speed line (621 kilometres, opened 2008) was built at approximately €22 per kilometre in 2026 prices. The first Spanish high-speed line, Madrid-Sevilha (1992), translates to approximately €30 per kilometre once inflation-adjusted. The French Paris-Lyon LGV Sud-Est (1981) cost approximately €20 per kilometre in 2026 prices. The German Cologne-Frankfurt line (2002), in mountainous terrain, cost approximately €33 per kilometre. The British HS2 project, currently under construction, sits at the extreme upper end at £108-150 million per kilometre — an outlier widely attributed to cost-overrun factors. The European HSR mean is €25 million per kilometre. The Portuguese Porto-Oiã contracted price of €34 million per

kilometre and the implied weighted-average of approximately €33 million per kilometre across the full 290-km line sit within the upper European range. The exception is the Phase 3 Carregado-Lisbon section at €62 million per kilometre (€4.5 billion for 72 km), reflecting the urban tunnel, new Tagus crossing, and central-station integration that the Lisbon-end works require. The cost critique of the programme is therefore concentrated on the Phase 3 specification rather than on the line as a whole — and on the segmentation of the announcement schedule, which has prevented the public from seeing the approximately €9.7 billion full-line total as a single figure (section 1.3).

Construction-cost inflation over the build period materially raises the nominal outturn cost above the €9.7 billion constant-2024-price figure. The Lisbon-Porto programme is delivered in four construction windows: Porto-Oiã 2025-2028, Oiã-Soure 2026-2030, Soure-Carregado 2026-2030, and Carregado-Lisbon post-2030 (target completion mid-2030s). Applying European rail-construction-cost inflation of approximately 4 per cent per year to each phase's mid-construction year yields the following outturn-price estimates: Porto-Oiã ≈ €2.1 billion (already contracted at €2.40 billion all-in financing, of which the construction component is close to this figure); Oiã-Soure ≈ €2.1 billion; Soure-Carregado ≈ €1.75 billion; Carregado-Lisbon ≈ €6.3 billion. Total nominal outturn for the Lisbon-Porto programme: approximately €12.0-13.0 billion, against the €9.7 billion sum at 2024 constant prices. The differential — €2-3 billion of construction-cost inflation — accrues to Infraestruturas de Portugal and to the concession partners through the indexation clauses of each PPP contract.

The construction-cost inflation effect is even larger for the other rail TEN-T projects, which are scheduled for later construction windows. The Lisbon-Madrid Évora-Caia section (€3-4 billion at 2024 prices, construction 2028-2034) reaches approximately €3.7-5.0 billion at outturn prices. Aveiro-Salamanca (€2-3 billion at 2024 prices, construction 2030-2038) reaches approximately €2.9-4.4 billion. Sines-Évora (€1.5-2.5 billion at 2024 prices, construction 2030-2037) reaches approximately €2.2-3.7 billion. Porto-Vigo (€1.5-2.5 billion at 2024 prices, construction 2030-2040) reaches approximately €2.3-3.9 billion. Linha do Norte modernisation (€1.5-2.5 billion at 2024 prices, continuous through 2030) reaches approximately €1.7-3.0 billion. The other-rail programme outturn total is therefore €12.8-20.0 billion at construction-period prices, against €9.5-14.5 billion at 2024 constant prices. Combined with the Lisbon-Porto outturn, the full rail-investment programme outturn cost is approximately €25-33 billion at construction-period prices — against €19-25 billion at 2024 constant prices. The approximately €6-8 billion construction-cost-inflation overhead is a fiscal exposure that the current published estimates do not display explicitly.

1.3 Demand assumptions and the segmentation problem

IP's 2024 demand projection for the Lisbon-Porto HSR is 10.5 million passengers per year, corresponding to approximately 3,000 million passenger-kilometres. The European Commission press release of July 2025 cites the more conservative figure of close to 10 million. The author's working assumption is 6 million trips per year as a mid-2029-to-2049 average, sitting between IP's upper bound and the air-substitution-only floor of 3-4 million. Three reference points anchor the discussion: the current Alfa Pendular peak of 3.3 million passengers per year, the present Lisbon-Porto air-traffic volume of approximately 2 million annually, and the MOPT 2005 projection of 12 million subsequently downgraded.

The IP figure of 10.5 million assumes near-complete air-corridor substitution, substantial induced demand of 30-50 per cent over the existing rail base, and 100 per cent retention of existing Alfa

Pendular passengers — an upper-bound case appropriate for sizing infrastructure capacity but not for financial appraisal. A more defensible central case for NPV computation is 5-7 million trips per year, consistent with the corridor's population base (approximately 8.5 million in Greater Lisbon plus Porto plus Coimbra), Portugal's projected demographic decline of 10.6 per cent by 2050, and the rail-substitution evidence from comparable European corridors such as Paris-Lyon and Madrid-Sevilha.

Beyond the demand uncertainty, a transparency problem afflicts the entire programme. The Government and IP communicate each project segment with its own price announcement and with no consolidated total ever presented to Parliament. The Porto-Oiã price of €2.40 billion is publicised, the Oiã-Soure and Soure-Lisbon segments have only internal estimates, the Lisbon-end works depend on the Third Tagus Crossing alignment decision, and the Évora-Caia segment lives off a stale 2009 figure. A bottom-up reconstruction of the full Lisbon-Porto programme yields €11-17 billion. Including the full cross-border TEN-T programme (Évora-Caia, Aveiro-Salamanca, Porto-Vigo, Sines-Évora, plus the Third Tagus Crossing and the Linha do Norte modernisation) brings the total to €17-24 billion — a figure citizens are not being shown. The segmentation dilutes political accountability, fragments public debate, and suppresses comparison with alternative uses of the same fiscal envelope.

1.4 Contractual arrangement — PPP DBFM with availability payments

The Portuguese Government has chosen to deliver the HSR Lisbon-Porto programme through a series of phase-by-phase Public-Private Partnerships under the Design-Build-Finance-Maintain (DBFM) model, with availability-based payments over a 30-year concession term. Each phase — Porto-Oiã (PPP1, contracted July 2025), Oiã-Soure (PPP2, relaunched February 2026), Soure-Carregado (PPP3, planned), and Carregado-Lisbon (PPP4, planned) — is awarded as a separate 30-year concession. The concessionaire designs the line, builds it, raises the project finance (a mix of European Investment Bank soft loans, commercial debt, and concessionaire equity), and maintains the infrastructure for the 30-year concession period. The State pays availability fees against contracted service-level agreements; these fees are demand-independent and continue regardless of the number of trains run.

Three risk-allocation features distinguish this model from the alternatives. First, the concessionaire bears the design, construction-cost-overrun and construction-delay risks, mediated through fixed-price engineering-procurement-construction sub-contracts with liquidated-damages clauses. Second, the concessionaire bears the 30-year availability and maintenance risk, with availability-payment penalties for downtime against the contracted service-level agreements. Third, the State retains the traffic and demand risk: if Lisbon-Porto passenger volumes fall short of forecast, the State still owes the contracted availability payment to the concessionaire. The €4.765 billion 30-year net present value reported for the Oiã-Soure PPP2 (InfraPPP World, February 2026) is therefore the present value of the State's cumulative availability-payment obligation over 2026-2056, not the upfront capital expenditure.

Operations — the running of trains, ticketing, and on-board service — sit outside the PPP envelope. They will be performed by CP (Comboios de Portugal) under regulated tariffs, and potentially by competing operators (Renfe-AVE, SNCF, Romania's ROHM Rail) if the open-access regime is extended. Rolling-stock procurement (the 20 HSR train sets announced in the Council of Ministers' January 2026 decision) is also separate, procured directly by CP or by IP for subsequent leasing to the operator. This separation of infrastructure delivery (PPP DBFM) from rolling-stock procurement and operating service is a material departure from the integrated-procurement models used in some other European jurisdictions.

Box 1 — Spain (ADIF / ADIF-AV) vs Portugal (DBFM PPP): contractual models

Spanish direct administration and the Portuguese DBFM PPP differ on every dimension of the procurement and risk-allocation chain.

Dimension	Spain — ADIF / ADIF-AV (direct administration)	Portugal — DBFM PPP per phase
Infrastructure ownership	State, vested in ADIF (conventional) and ADIF-AV (high-speed)	State (Infraestruturas de Portugal) at end of concession; concessionaire-controlled during 30-year term
Construction financing	State-funded debt issued by ADIF / ADIF-AV against the sovereign balance sheet	Project finance raised by the concessionaire SPV: BEI tranches + commercial debt + concessionaire equity
Construction risk	Borne by ADIF / State; cost overruns covered by additional state debt or budget	Borne by concessionaire under fixed-price EPC sub-contracts with liquidated damages
Maintenance over the asset life	Operated in-house by ADIF / ADIF-AV through state-employed engineering staff	Concessionaire 30-year contractual obligation, with availability-payment penalties for SLA breach
Traffic / demand risk	Borne by ADIF: recovered through track-access charges levied on operators (Renfe, Iryo, Ouigo)	Borne by the State: availability payments to the concessionaire are demand-independent
Weighted financing cost	Sovereign-rate debt (≈ 3 % for Spain), low cost of capital	Blended: BEI ≈ 1.5-2 %, commercial debt 4-5 %, concessionaire equity 7-8 % return target
Maastricht-debt treatment	On general-government balance sheet (full ADIF and ADIF-AV consolidation)	Off-balance-sheet, conditional on Eurostat MGDD Chapter VI test (concessionaire bearing construction + availability risk)
Cost over the asset life	Lower in nominal terms (sovereign rate + no equity premium)	Higher (private-capital premium) but spread over 30 years; State commitment is the availability-payment stream
Reference per-km cost (HSR)	Madrid-Barcelona 621 km opened 2008 at ≈ €14 M/km (2008 prices)	Lisbon-Porto 290 km published average ≈ €33 M/km (2024 prices); Phase 3 Lisbon-end at €62 M/km
Procurement	ADIF-AV in-house plus framework contracts; little PPP exposure on HSR core network	Competitive PPP DBFM tender per phase; LusoLAV / Avan Norte awarded PPP1 in July 2025
Train operator (separately)	Renfe (state) plus open-access entrants Iryo, Ouigo, Avlo since 2020	CP (state) initially; open access conditional on rolling-stock and

		infrastructure compatibility
Vertical integration of infrastructure + operations	Partially preserved (ADIF-AV + Renfe historically integrated; now separated for competition)	Strictly separated: infrastructure under PPP, operations with CP

The strategic implication of the Portuguese choice is that the State has chosen cost-of-capital and risk-transfer trade-offs that differ from Spain's. Portugal's DBFM PPP places construction and maintenance risk on private capital, in exchange for a higher blended financing cost and a 30-year commitment of availability payments. Spain's direct-administration model exposes the State balance sheet to construction risk but accesses cheaper sovereign-rate financing. Over the 40-year horizon used in this report's NPV computations, the Portuguese model's higher financing cost adds approximately €1.5-2.5 billion in lifetime servicing cost relative to a hypothetical Spanish-style direct-administration alternative — offset to the extent that the off-balance-sheet treatment of the PPP relieves the State's Maastricht-debt path during the construction window (Part 3 of this report). Box 2 below adds the second critical dimension of the trade-off: under availability-payment PPPs, demand risk remains on the State balance sheet — a structural feature whose Portuguese precedent is the motorway-PPP programme of the 2000s, with a costly history.

Box 2 — Cautionary precedent: the Portuguese motorway-PPP experience and the Troika intervention

Portugal's motorway-PPP programme of 2000-2010 is the most directly relevant precedent for the HSR Lisbon-Porto DBFM concessions, and its fiscal history is uniformly poor. Under the SCUT (Sem Custo para o Utilizador) and shadow-toll concession models in force at the time, the State entered availability-payment contracts with private concessionaires for the construction and maintenance of approximately 1,800 kilometres of motorways. The State paid the concessionaires based on availability of the road and on shadow tolls calibrated to forecast traffic volume — but retained full demand risk, because the actual users paid no toll (the State did, on their behalf, via the shadow-toll mechanism).

The fiscal outcome was severe. By 2011, actual traffic volumes on most SCUT motorways were 30-50 per cent below the forecasts used to size the availability-payment streams, but the State's contractual obligations to the concessionaires were unchanged. The annual State payment to motorway concessionaires reached approximately €1.0-1.2 billion in 2011-2012 — equivalent to 0.6-0.7 per cent of GDP. The Troika (International Monetary Fund, European Commission, and European Central Bank) under the 2011-2014 Economic Adjustment Programme identified the motorway-PPP availability-payment streams as one of the largest fiscal risks on the Portuguese balance sheet, with a forecast-exceeding net present value estimated at approximately €7-10 billion.

The Troika required the renegotiation of the motorway-PPP contracts. Real tolls were introduced on SCUT motorways during 2010-2012 to shift demand risk back to users. Some concessionaire equity returns were clawed back through availability-payment recalibration. Certain shadow-toll contracts were converted to fixed-price availability arrangements with shared traffic-risk clauses. The net annual saving to the State from these renegotiations was approximately €200-400 million per year from 2014 onward — substantial in absolute terms but well short of the Troika's headline estimate of the forecast-exceeding NPV.

Box 2 — Lessons for HSR DBFM PPP design

Structural feature of motorway-PPP availability model	Direct read-across to HSR Lisbon-Porto DBFM PPP
Availability-payment PPPs concentrate demand risk on the State.	Identical structure. If HSR traffic falls short of forecasts, the State still owes the contracted availability-payment stream to LusoLAV / Avan Norte and to future-phase concessionaires.
Forecast over-optimism is endemic to transport-demand projections (Flyvbjerg et al. 2003 on the optimism-bias literature; Flyvbjerg 2014; European Court of Auditors Special Reports 19/2018 and 08/2023).	IP's 10.5 M-passenger-per-year demand projection for HSR Lisbon-Porto is at the upper bound of plausible cases. The 5-scenario analysis of this report places the central case at 6 M trips/year (the Baseline) and the Climate-Policy scenario at 4 M trips/year — both materially below the concession-financing assumption.
The Troika's recommended remedy was partial demand-risk transfer to users via direct tariffs (SCUT toll introduction 2010-2012).	Structurally available for HSR: passengers do pay fares. But the fare-revenue share of total cost recovery depends on (i) ticket price level versus competition (rail / air / road), and (ii) the operator's commercial freedom to set fares. CP under regulated tariffs may be unable to recover the availability-payment stream from passengers alone.
Contract renegotiation under fiscal stress is politically and economically costly; the State's bargaining position is weakest at the moment of necessity.	Build flexibility into the original PPP terms: traffic-risk-sharing thresholds, step-down availability-payment clauses triggered by demand undershoot, and termination options. The current PPP1 and PPP2 templates are reported to be conventional availability-only contracts (InfraPPP World, February 2026), with no traffic-risk-sharing built in.
The Maastricht-debt off-balance-sheet treatment is a benefit during the construction window but does not protect the State from the ultimate demand-risk liability.	The current Maastricht-debt relief estimated at 5-8 percentage points of GDP (€15-25 bn avoided issuance) is real, but the contingent liability for availability payments throughout 2030-2056 sits on the State's contingent-liability schedule and is recognised under ESA 2010 ESS / IPSAS 32 disclosure requirements.

The implication is clear. The Portuguese State should not assume that PPP DBFM for HSR is structurally superior to direct administration; the motorway-PPP experience demonstrates that availability-payment PPPs are essentially financial-leasing arrangements that transfer construction risk to the private sector but retain demand risk on the State balance sheet, often at unfavourable financing terms. Two specific design changes would improve the HSR PPP contracts at the still-tenderable phases (PPP3 Soure-Carregado, PPP4 Carregado-Lisbon). First, embed traffic-risk-sharing thresholds (step-down availability-payment clauses below a defined-demand floor, and step-up clauses above a defined ceiling), so that risk is partially shared with the concessionaire. Second, consider a hybrid model in which a portion of the availability payment is replaced by a track-access charge paid by the operator

from fare revenue, shifting some demand risk onto the operator and through to users. Both adjustments require contract redesign before each future phase's tender close.

Part 2 — The gauge problem and EU funding exposure

2.1 Spain's position on European gauge

Spain has built its entire high-speed-rail network in European standard gauge (1,435 millimetres) since the first line in 1992, encompassing Madrid-Sevilha (1992), Madrid-Barcelona (2008) extended to Figueres-Perpignan and Paris (2013), Madrid-Valência, Madrid-Galiza and Madrid-Astúrias. The cross-border connection to France is European gauge throughout, enabling direct interoperability of AVE and TGV rolling stock. For the Madrid-Lisbon HSR specifically, the Spanish side has approved Madrid-Talavera in European gauge for passenger service, Talavera-Oropesa in European gauge for mixed-use passenger and freight, and only Oropesa-Badajoz remains in Iberian gauge. The retention of Iberian gauge on the Oropesa-Badajoz segment was at the explicit insistence of successive Portuguese governments and not Spain's preference; the gauge-changer at Oropesa is Spain's accommodation to Portugal rather than the other way round.

Spain's strategy of variable-axle gauge-changing trains, exemplified by Talgo and CAF systems, is a transitional tool rather than a strategic destination. The Spanish commissioner for the Mediterranean corridor emphasised at the December 2024 Valencia Forum that European gauge is essential for exports beyond the Pyrenees, citing the battery-manufacturing developments at Sagunto and Zaragoza. Spain invested approximately €1.3 billion in the Mediterranean corridor in 2024 alone. The Atlantic-corridor commissioner has secured third-rail (mixed-gauge) installation between the French border and the Vitoria logistics platform.

2.2 The Portuguese choice and its compliance status

Portugal's 2022 National Rail Plan (PFN) acknowledges the "undeniable advantages" of European-gauge migration but explicitly excluded migration from its scope. The current IP plan for Lisbon-Porto, including the Porto-Oiã section contracted in July 2025, is being constructed in Iberian gauge with CONVEL signalling. CONVEL is classified as ERTMS Class B; Regulation (EU) 2024/1679 mandates the deactivation of all Class-B signalling systems by 2040. The gauge issue was the subject of European Parliament written question E-004119/2022 by Gusmão and Matias in December 2022, which asked the Commission directly whether EU funding would be provided for projects in Portugal's National Rail Plan not incorporating migration to standard gauge.

The Commission has not committed to deny funding outright. Indeed, the BEI €3 billion approval, the CEF €813 million commitment, and the Porto-Oiã financial close all proceeded despite the gauge non-compliance — a pattern consistent with European Court of Auditors Special Report 19/2018 and Special Report 08/2023, both of which criticised the Commission for enforcement laxity on TEN-T specifications. However, the political environment is shifting. The 2028-2034 Multi-annual Financial Framework will tighten compliance conditionality, the new Commissioner for Sustainable Transport committed at the July 2025 press event to a new HSR acceleration plan, and the Court of Auditors has reiterated its concerns. The Porto-Oiã section may be the last segment that benefits from the lenient enforcement regime.

2.3 Quantifying the EU funding exposure — internal vs cross-border

The EU funding pressure on the gauge choice is not uniform across the programme. Two distinct cases must be separated. The internal Lisbon-Porto line (Case A) does not cross any border; its only EU interface is the gauge-changer at the future Évora-Caia connection. The Commission has demonstrated tolerance for Iberian-gauge financing of internal lines, though at reduced grant rates and with infringement-procedure risk. Portugal could plausibly secure EU co-financing for the subsequent internal segments in Iberian gauge, at the cost of (i) reduced CEF grant rates from a potential 25-35 % to an actual 8-12 % of capex, (ii) future infringement-procedure risk if the Commission tightens enforcement, and (iii) eventual forced migration costs payable after the 2034/2040/2050 deadlines. Net EU funding exposure: moderate, in the range of €1-4 billion.

The cross-border TEN-T links to the European network (Case B) sit in an entirely different category. The whole purpose of Évora-Caia for the Lisbon-Madrid corridor, of Aveiro-Salamanca for freight beyond the Pyrenees, of Porto-Vigo for the Atlantic corridor north, and of Sines-Évora for the Atlantic corridor south is interoperability with the Spanish and beyond-Spanish European-gauge network. Spain's Madrid-Talavera section is already in European gauge; Oropesa-Badajoz is in Iberian gauge only at Portuguese insistence. Building any of these cross-border links in Iberian gauge defeats their reason for existing, and the Commission will deny CEF funding accordingly. Net EU funding exposure on Case B: very high, €2.8-6.1 billion essentially unrecoverable, plus an additional €1-3 billion in BEI soft-loan implicit subsidy at risk, plus €1-3 billion in future re-gauging costs if forced. Total Case B fiscal exposure of the Iberian-gauge choice: €5.8-12.1 billion over the 25-30 year programme.

Part 3 — Recommended alternative path

The Porto-Oiã contract (signed July 2025) is committed and should not be cancelled. The course-correction applies to the remaining 80 % of the programme and to the operational framework. Seven specific recommendations follow.

3.1 European gauge + ERTMS from Oiã south

The remaining sections of the HSR Lisbon-Porto programme — Oiã-Soure, Soure-Lisbon, and the Lisbon-end works including the Estação Central and the rail component of the Third Tagus Crossing — should be specified in European gauge with full ERTMS Class A signalling. This is technically achievable through a third-rail transition at Oiã to preserve interoperability with the Porto-Oiã Iberian-gauge section already under contract. The incremental construction cost of this specification change is in the range €0.5-1.0 billion. The corresponding preservation of EU funding leverage, across the internal LIS-OPO segments and the cross-border links, is in the range €5-12 billion. The return on the gauge-compliance premium is therefore between five and ten times.

3.2 Re-prioritise Lisbon-Madrid for the binding 2034 deadline

The Évora-Caia section, the Portuguese side of the Lisbon-Madrid corridor, must be delivered by 2034 under the implementing decision of 30 October 2025. Spain has committed to the Spanish side by 2030 (Spanish transport minister Óscar Puente at the Faro summit of October 2024). Portugal should renegotiate the 2009 Poceirão-Caia project on a partial-application basis — reusing approximately 70 per cent of the existing environmental, geological and engineering studies. This approach avoids the exit indemnity payable on outright cancellation, accelerates the delivery date to 2033-2034 ahead of the

binding deadline, and ensures the Portuguese-side specification is European gauge throughout. Once the Portuguese side is committed in European gauge, the parallel renegotiation of Oropesa-Badajoz on the Spanish side becomes politically viable, creating a fully-European-gauge Madrid-Lisbon corridor.

3.3 Develop the Aveiro-Salamanca freight corridor

Portuguese land exports to the European Union beyond the Pyrenees totalled €26.6 billion in 2024 (INE), exceeding exports to Spain (€17.2 billion). Approximately 99.5 per cent of this flow currently travels by road, with rail modal share at just 0.5 per cent — one of the lowest in Europe. The Aveiro-Salamanca freight corridor is the most direct rail link from the Portuguese industrial centre (Norte and Centro generate 55 per cent of land-export value) to the Spanish meseta and the Atlantic-corridor freight network beyond. The current PFN prioritises the Linha da Beira Alta upgrade instead, modernising the existing Iberian-gauge conventional line with steep gradients exceeding 1.25 per cent that limit freight-train tonnage and energy efficiency. A new Aveiro-Salamanca line in European gauge with ERTMS would deliver significantly lower energy consumption (26 watt-hours per ton-kilometre versus 38 on the Beira Alta line), accommodate longer trains, and connect directly to the European rail-freight network without transshipment. Estimated capex is €2-3 billion for approximately 240 kilometres of new mixed-use line; estimated EU co-financing is 40-50 per cent or €0.8-1.5 billion.

3.4 Third Tagus Crossing — independent alignment review

The Government's current alignment for the Third Tagus Crossing is Chelas to Barreiro, approximately 15 kilometres of dual road-and-rail structure carrying six road lanes plus four rail tracks, at a 2026 cost estimate of €3.5-4.5 billion. Two alternative alignments are technically feasible and economically attractive. The Beato-Montijo alignment is approximately 10 kilometres shorter than Chelas-Barreiro, with a corresponding civil-works saving estimated at €0.5-1.0 billion. The Foz do Trancão-Alcochete N alignment is approximately 15 kilometres shorter and would directly serve the future Alcochete airport in the event Option A (see the aviation report) is eventually triggered. An independent multi-criteria evaluation of the three alignments — comparing them on civil-works cost, HSR geometry compatibility, airport-access compatibility, suburban-rail integration and environmental impact (Tagus estuary, Natura 2000) — should precede any further commitment of capex. The decision should be taken in 2026 to avoid pre-committing approximately €4 billion of infrastructure capital before the best alignment is identified.

3.5 Governance — split IP into conventional + TEN-T / HSR divisions

Spain operates its conventional-rail network through ADIF and its high-speed network through ADIF-AV, with separate management, technical specifications, and procurement processes. The two networks have different operational logics: the conventional network operates in Iberian gauge with CONVEL-equivalent signalling and integrates with freight and regional services, while ADIF-AV operates in European gauge with ERTMS and focuses on long-distance passenger plus increasingly mixed freight services. Portugal should adopt the same model. A conventional-rail division of IP would retain current management responsibilities for the existing Iberian-gauge network. A new TEN-T / HSR division would carry responsibility for European-gauge ERTMS-equipped mixed-use new lines, operating within an AEIE (Agrupamento Europeu de Interesse Económico) jointly with ADIF-AV and SNCF for Iberian-peninsular network coordination. This separation makes the strategic trade-offs between the two

networks manageable rather than blurred, and it permits specialised procurement and project-delivery capacity to be recruited for the TEN-T division.

Part 4 — Risk assessment

Two paths are now open: continuation of the current IP plan, characterised by Iberian-gauge specification, CONVEL signalling, passenger-focused design and the Chelas-Barreiro alignment for the Third Tagus Crossing; and the course-corrected plan recommended in Part 3, characterised by European-gauge specification from Oiã south, ERTMS Class A signalling, mixed-use passenger-freight design, an independent alignment review for the Tagus crossing, a governance split between conventional and TEN-T / HSR divisions, and defense-mobility financing for the cross-border corridors. The principal asymmetric risks are summarised below.

Risk	Current plan	Course-corrected	Asymmetric ?
EU funding clawback on subsequent sections (gauge non-compliance)	P:H · I:H (€5-13 bn at stake)	P:L · I:L	Current much worse
Forced re-gauging post-2034 / 2040 enforcement	P:H · I:H (€1-3 bn)	n.a. — already compliant	Current only
TEN-T 2034 deadline missed for Lisbon-Madrid (binding)	P:M · I:H	P:L · I:M (renegotiated 2009 project)	Current worse
Foreign operators excluded (no Renfe-AVE, no SNCF)	P:H · I:M (CP monopoly)	P:L · I:L (competitive market)	Current much worse
Freight corridor not deliverable (Articles 13.a / 44 of 1679)	P:H · I:H	P:L · I:L	Current much worse
TTT alignment locked at Chelas-Barreiro, no formal alternative review	P:H · I:M (€0.5-1 bn waste)	P:L · I:L (alignment reviewed)	Current worse
Future ECA / Commission infringement action on TEN-T compliance	P:M · I:H	P:L · I:L	Current worse
IP capacity constraints (single agency over both conventional and HSR)	P:H · I:M	P:L · I:M (ADIF-AV model split)	Current worse
Cost overruns on remaining sections (no PPP discipline)	P:H · I:H	P:M · I:M (PPP tender plus DG-MOVE oversight)	Current worse
2009 Poceirão-Caia exit indemnity payable	P:H · I:M (committed)	P:L · I:L (renegotiated)	Current worse
Demand undershoot vs IP 10.5 M	P:H · I:M (over-sized	P:M · I:L (right-sized)	Current

	infrastructure)		worse
Decision delay if course-correction approved	n.a.	P:M · I:M (1-2 yr programme reset)	Course-correct only
Implementation complexity (third-rail transition at Oiã)	n.a. — homogeneous Iberian gauge	P:M · I:M	Course-correct only
Coordination risk with Spain on gauge transitions	P:M · I:M	P:M · I:M	Symmetric
Political risk of changing course on a contracted programme	P:L · I:L	P:M · I:H	Course-correct only

P = probability; I = impact; L / M / H / VH = low / medium / high / very-high.

Eleven of fifteen asymmetric risks are materially worse under the current plan. Three are course-correction-only (decision delay, implementation complexity, political risk of changing course on a contracted programme). One is symmetric (coordination with Spain on gauge transitions). The course-correction therefore reduces aggregate risk exposure substantially, even after accounting for the new risks it introduces.

Part 5 — The other big rail projects in the programme

The Lisbon-Porto HSR is the most visible single project in the rail programme, but it is neither the most economically valuable nor the most time-critical. This Part places it in the wider Portuguese rail-investment context and provides a comparative matrix across the six other major projects in Regulation 2024/1679 and Resolução do Conselho de Ministros 77/2025.

Project	Length	Cost (€ bn)	TEN-T deadline	Gauge requirement	EU funding priority
HSR Lisbon-Porto	290 km	11-17	Core 2030	Should be European; built Iberian	Medium (internal)
HSR Lisbon-Madrid (Évora-Caia)	~100 km	3-4	Core 2034 (postponed)	Must be European	Very high (cross-border)
Aveiro-Salamanca freight corridor	~240 km	2-3	Extended core 2040	Must be European	Very high (Atlantic corridor)
Porto-Vigo (north cross-border)	~150 km	1.5-2.5	Extended core 2040	Must be European	High (Atlantic corridor)
Sines-Évora freight	~100 km	1.5-2.5	Comp. 2050	European	High (defense + port)
Third Tagus Crossing (rail share)	~15 km	1.5-3.0	Linked to LIS-Madrid 2034	European	Medium-high

Linha do Norte modernisation (conv.)	~340 km	1.5-2.5	n.a. (existing)	Iberian (existing)	Medium (conventional)

The analytically defensible ordering of the seven projects, combining TEN-T binding deadlines with EU funding leverage and strategic export value, is as follows. The first priority is the Lisbon-Madrid Évora-Caia link, given its binding 2034 deadline, Spain's commitment to deliver its side by 2030, and the renegotiable status of the 2009 project. The second priority is the Aveiro-Salamanca freight corridor, which carries the highest economic value (55 per cent of land-export base) and Atlantic-corridor financing priority. The third priority is the Sines-Évora freight corridor, accelerated from its current comprehensive-network 2050 deadline given the defense-mobility instrument's complementarity with Sines port logistics. The fourth priority is the Lisbon-Porto Phase 1.b (Oiã-Soure), which is in pre-tender and benefits from continuity with the already-contracted Phase 1.a. The fifth priority is Porto-Vigo, with the 2040 extended-core deadline. The Lisbon-Porto Phase 2 (Soure-Lisbon) is sixth in priority, and the Linha do Norte continuous modernisation is seventh. The current IP / RCM 77/2025 plan effectively reverses the top of this priority list: Lisbon-Porto is being pursued aggressively while Évora-Caia remains on hold and Aveiro-Salamanca is in early planning. The fiscal and strategic case for re-ordering is strong — the EU funding leverage on the top three projects is dramatically higher than on the Lisbon-Porto line in isolation.

Part 6 — Recommendations

R1. Honour the Porto-Oiã contract as committed; course-correct everything else.

The July 2025 concession is committed and should not be cancelled. The course-correction applies to Oiã-Soure, Soure-Lisbon, Évora-Caia, Aveiro-Salamanca, the Third Tagus Crossing, and the governance framework.

R2. Switch to European gauge + ERTMS from Oiã south.

Specify all remaining sections of the HSR Lisbon-Porto programme in European gauge with full ERTMS Class A signalling. Incremental cost approximately €0.5-1.0 billion against preserved EU funding of approximately €5-12 billion, yielding a five-to-ten-fold return on the gauge premium.

R3. Re-prioritise the Lisbon-Madrid (Évora-Caia) section to meet the 2034 TEN-T binding deadline.

Renegotiate the 2009 Poceirão-Caia project on a partial-application basis to avoid the exit indemnity and accelerate delivery. Specify the Portuguese side in European gauge throughout, consistent with Spain's already-approved Madrid-Talavera section.

R4. Develop the Aveiro-Salamanca freight corridor in European gauge.

Anchor the project in the CEF Atlantic-corridor envelope and structure the EIB component under the defense-mobility instrument. The corridor serves 55 per cent of Portuguese land-export value originating in Norte and Centro.

R5. Independent multi-criteria review of the Third Tagus Crossing alignment.

Compare Chelas-Barreiro, Beato-Montijo and Foz do Trancão-Alcochete N alignments on civil-works cost, HSR geometry, airport-access compatibility, suburban-rail integration and environmental impact. Decision in 2026 to avoid pre-committing infrastructure capex of approximately €4 billion.

R6. Split IP into conventional-rail and TEN-T / HSR divisions on the ADIF / ADIF-AV model.

Form an AEIE with ADIF-AV and SNCF for Iberian-peninsular HSR coordination. Recruit specialised procurement and project-delivery capacity (currently lacking under IP's resource constraints).

R7. Anchor financing in EIB defense-mobility loans plus CEF grants.

EIB loans under the defense-mobility instrument sit outside the deficit rules; CEF grants are available at 30-40 % co-financing for compliant TEN-T projects. The combination provides the fiscal envelope; the gauge / ERTMS compliance is the condition precedent.

R8. Use DG-MOVE technical-assistance support to lead an international tender for the master-plan revision.

President Juncker's proposal of European-Commission technical assistance for capacity-constrained Member States can take this form. An EU-technical-team-co-chaired tender ensures Regulation 1679 compliance is built into the plan rather than retro-fitted.

R9. Re-order the rail-investment programme on EU-funding-priority and binding-deadline grounds.

The defensible ordering (Évora-Caia first, Aveiro-Salamanca second, Sines-Évora third, then Lisbon-Porto Phase 1.b, Porto-Vigo, Lisbon-Porto Phase 2, Linha do Norte) preserves approximately €5 billion of fiscal envelope through higher EU co-financing on the top three cross-border projects.

R10. Transparency: consolidated programme envelope and 40-year financial-sustainability model, published annually to Parliament.

Require IP and the Ministério das Infraestruturas to publish a consolidated rail-investment programme envelope covering all seven projects, updated annually, plus a 40-year financial-sustainability model for each project showing operating subsidy with and without EU funding. Tribunal de Contas has the authority to require this.

Glossary

Acronyms, organisations and technical terms used in this rail report.

ADIF / ADIF-AV Administrador de Infraestructuras Ferroviarias. Spanish rail-infrastructure managers — ADIF for the conventional Iberian-gauge network, ADIF-AV for the high-speed European-gauge network. Recommended governance model for splitting IP into conventional + TEN-T divisions.

AEIE Agrupamento Europeu de Interesse Económico (European Economic Interest Grouping). Legal vehicle proposed for coordinating the new Portuguese TEN-T / HSR entity with ADIF-AV and SNCF for Iberian-peninsular coordination.

Alfa Pendular The fastest existing Portuguese intercity train service on the Lisbon-Porto conventional line — approximately 2 h 45 min journey time; 3.3 million passengers per year at the 2016 peak.

Atlantic corridor One of the European Union's nine TEN-T core network corridors, running from southern Iberia (Sines, Lisbon, Porto, Vigo) through Spain and France to Strasbourg and beyond.

AVE Alta Velocidad Española — the Spanish high-speed-rail network, operated entirely in European 1,435 mm gauge since the first line (Madrid-Sevilha) opened in 1992.

Aveiro-Salamanca Proposed new cross-border rail corridor (~240 km Portuguese side) in European gauge with mixed passenger plus freight design. Serves the 55 % of Portuguese land-export value originating in Norte and Centro regions. Atlantic-corridor priority.

BEI / EIB Banco Europeu de Investimento / European Investment Bank. Approved €3 bn for HSR Lisbon-Porto in 2024 (€875 M first tranche disbursed for Porto-Oiã in 2025); operates the defense-mobility instrument outside the deficit-rule scoring.

Bitola europeia / Iberian gauge Track-gauge terminology in Portuguese / English. Iberian gauge = 1,668 mm (Spanish and Portuguese conventional network); European standard gauge = 1,435 mm (all new TEN-T lines per Regulation 2024/1679; all Spanish HSR since 1992).

CEF Connecting Europe Facility — EU grant-funding instrument for TEN-T projects under Regulation (EU) 2021/1153. 20-50 % co-financing for compliant projects; reduced rates for non-compliant (Iberian-gauge) Portuguese projects.

Chelas-Barreiro The Government's current alignment for the Third Tagus Crossing — 15 km dual road + rail (6 lanes + 4 rail tracks), €3.5-4.5 bn at 2026 prices.

CONVEL Controlo de Velocidade — the legacy Portuguese rail-signalling system, classified as ERTMS Class B. Regulation 1679 mandates deactivation of all Class-B systems by 2040.

CP Comboios de Portugal — the Portuguese state-owned passenger rail operator.

CRP 10º (2022) and 11º (2025) Congresso da CRP rail-policy papers cited throughout this report.

ECA European Court of Auditors. Has issued Special Reports 19/2018 and 08/2023 criticising the Commission's TEN-T enforcement laxity.

ERTMS European Rail Traffic Management System — the EU standard signalling and train-control system. Class A (ETCS + GSM-R) is the target; Class B systems (including CONVEL) must be deactivated by 2040.

Évora-Caia The Portuguese-side segment of the Lisbon-Madrid HSR corridor (~100 km, Poceirão to Caia). Binding TEN-T core-network deadline 2034.

HSR High-Speed Rail (generally lines designed for 250+ km/h; 300 km/h on the Portuguese HSR Lisbon-Porto).

IP Infraestruturas de Portugal — the state company responsible for rail and road infrastructure management, planning and construction. The rail report recommends splitting into conventional and TEN-T / HSR divisions on the ADIF / ADIF-AV model.

Linha do Norte The 340-km conventional Lisbon-Coimbra-Porto rail line. Continuous-upgrade investment ≈ €1.5-2.5 bn through 2030 covering ERTMS deployment, electrification, station modernisation.

LusoLAV / Avan Norte The construction-and-maintenance consortium that signed the 30-year DBM concession for HSR Porto-Oiã in July 2025; led by Mota-Engil, 100 % Portuguese-construction-firm composition.

Mota-Engil Portuguese construction-and-infrastructure group; lead member of the LusoLAV / Avan Norte consortium.

PFN Plano Ferroviário Nacional — Portugal's 2022 National Rail Plan. Excluded European-gauge migration from its scope despite acknowledging the benefits.

Poceirão-Caia The 2009 HSR Lisbon-Madrid project (Portuguese side) on hold with an exit indemnity payable. Renegotiation for partial application recommended.

Porto-Vigo Cross-border HSR / TEN-T extended-core line. Approximately 150 km Portuguese side, 2040 deadline.

Availability payment Periodic payment by the State to a PPP concessionaire under a DBFM contract, calibrated to deliver contracted infrastructure service-level agreements (track availability, signalling uptime, station hours) and demand-independent of traffic volume. The €4.765 bn reported for the Oiã-Soure PPP2 (InfraPPP World 2026) is the 30-year availability-payment NPV, not the upfront capex.

DBFM Design-Build-Finance-Maintain. The PPP contractual model adopted for each phase of the HSR Lisbon-Porto programme. The concessionaire designs the line, builds it, raises the project finance (mix of BEI tranches, commercial debt and concessionaire equity), and maintains the infrastructure over a 30-year concession term; remuneration through availability payments (q.v.). Operations and rolling-stock procurement sit outside the PPP envelope.

Direct administration Procurement model under which the State (typically via an infrastructure-management body such as ADIF or ADIF-AV in Spain) directly designs, builds, finances, and maintains the infrastructure using state debt or budget. Contrasts with PPP DBFM (q.v.). Allows access to sovereign-rate financing but places construction-risk on the State balance sheet. Box 1 of this report compares the Spanish ADIF / ADIF-AV direct-administration model with the Portuguese DBFM PPP model.

EPC Engineering, Procurement and Construction. Sub-contract arrangement under which a PPP concessionaire transfers construction-cost-overrun risk to the EPC contractor in exchange for a fixed-price commitment. Liquidated-damages clauses penalise delays.

MGDD Eurostat Manual on Government Deficit and Debt. Chapter VI governs the on- versus off-balance-sheet treatment of PPPs under Eurostat ESA 2010. A PPP qualifies for off-balance-sheet treatment if the concessionaire bears at least one of: construction risk, availability risk, or demand risk. The HSR Porto-Oiã PPP1 satisfies the test by transferring construction + availability risk.

Open-access regime Regulatory framework permitting multiple operators to compete on the same rail infrastructure under non-discriminatory track-access terms. Spain operates open-access on HSR since 2020 (Renfe, Iryo, Ouigo, Avlo); Portuguese open-access on HSR is conditional on infrastructure compatibility (European gauge, ERTMS).

PPP Public-Private Partnership. The HSR Porto-Oiã concession is a DBFM PPP under a 30-year concession.

SCUT Sem Custo para o Utilizador (free at the point of use). The Portuguese motorway-PPP model in force during the 2000s under which the State paid the concessionaire shadow tolls calibrated to traffic, retaining full demand risk. Box 2 of this report documents the costly fiscal outcome and the Troika-mandated renegotiation.

Shadow toll Payment by the State to a PPP concessionaire calibrated to actual traffic volume, used in the Portuguese SCUT motorway model. Differs from a pure availability payment (which is demand-independent) but similarly transfers demand risk to the State balance sheet.

SPV Special-Purpose Vehicle. Legal entity established by a PPP concessionaire consortium to carry the concession contract, raise project finance, and contract sub-suppliers. The Porto-Oiã SPV is Avan Norte — Gestão da Ferrovia de Alta Velocidade, owned by the LusoLAV consortium.

Troika The tripartite oversight group of the International Monetary Fund, European Commission and European Central Bank that supervised Portugal's 2011-2014 Economic Adjustment Programme. Required the renegotiation of the motorway-PPP availability-payment contracts (Box 2).

Track-access charges Tariffs levied by the rail infrastructure manager (ADIF, ADIF-AV in Spain; IP in Portugal) on train operators using the network. Under direct administration these charges recover capex + maintenance cost over the asset life; under PPP DBFM the availability payment substitutes for the track-access-charge revenue.

RCM 77/2025 Resolução do Conselho de Ministros 77/2025 — the Council of Ministers resolution establishing the current Portuguese HSR programme. Subject of the proposed DG-MOVE-led international tender for master-plan revision.

Sines-Évora Proposed freight rail corridor connecting the deep-water Port of Sines to the Évora node on the Lisbon-Madrid line.

SNCF Société Nationale des Chemins de fer Français — French national rail operator; proposed AEIE partner for Iberian-peninsular HSR coordination.

TEN-T Trans-European Transport Network — the EU's strategic transport-infrastructure network under Regulation (EU) 2024/1679. Three tiers: core (2030 deadline), extended core (2040), comprehensive (2050).

TFUE Tratado sobre o Funcionamento da União Europeia (Treaty on the Functioning of the European Union). Articles 170, 171 and 288 establish the legal basis for TEN-T and the binding nature of EU regulations.

TGV Train à Grande Vitesse — French high-speed train and network.

Tribunal de Contas The Portuguese Court of Auditors. Has the legal authority to require consolidated-programme-envelope publication under its PPP-oversight mandate.

VAL Valor Actual Líquido — Portuguese for Net Present Value.

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