LISBON ECONOMICS

Portugal Large Infrastructure Projects: Options for New Lisbon Airport

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Summary

The four largest airports of Western Europe operate under markedly different constraint regimes. Madrid-Barajas retains substantial physical headroom, with a planned capacity expanding to approximately 100 million passengers per year by 2040. London is configured as a five-airport system in which growth depends on the long-debated and politically uncertain third runway at Heathrow. Paris is structurally capped at approximately 125 million passengers across Charles-de-Gaulle and Orly following the cancellation of the CDG Terminal-4 project. Lisbon's Humberto Delgado (AHD) is in a category of its own: a single urban airport with a practical operating capacity of about 49 million passengers per year, already 76 % utilised in 2025.

Across the five demand scenarios examined in this report — Baseline, High-Growth, Capacity-Constrained, a Low-Demographic variant calibrated to the United Nations low-fertility projection, and a stringent Climate-Policy bundle incorporating EU Emissions Trading System pricing at €220 per tonne CO2, a 70 % sustainable-aviation-fuel blend mandate under ReFuelEU Aviation, and the EU-wide ban on intra-European flights below 1,000 kilometres — Lisbon demand exceeds the AHD ceiling in the early 2030s. The structural gap between demand and capacity at 2050 ranges from 1 million passengers under Climate-Policy to 36 million under High-Growth, with the central Baseline at 13 million.

The strategic question is therefore not whether to add capacity but how to deliver it. Two policy options compete. Option A, the current Government plan, is to build the new airport at Alcochete (Centro de Tráfego Aeroportuário, CTA) and close AHD on opening. Option B, the alternative recommended by this report, is to retain AHD operating at its 49 M ceiling and develop Montijo (MTJ) on the existing air-force base as a 20-22 million-passenger complementary airport, deferring CTA until 2062 or beyond. Combined system capacity under Option B reaches 69-71 million passengers — sufficient for every scenario except an extreme High-Growth realisation.

The financial analysis is decisive. Under ANA's conservative demand path — which broadly corresponds to four of the five scenarios — Option B generates approximately €6.8 billion more in private NPV to the concessionaire than Option A over the extended concession horizon to 2092. The decomposition of the total social cost of choosing Option A over Option B, priced at 2026 construction-cost benchmarks, reaches approximately €14 billion (range €12–16 billion). The components are €6.8 billion of concessionaire NPV foregone, €2.2 billion of externality balance, and approximately €5 billion of CTA-specific access-infrastructure capex dominated by the dual road-rail Tagus crossing (€3.5–4.5 billion) and the high-speed-rail extension into Lisbon's central station (€1.8–2.7 billion).

Only under the CTI study's optimistic demand path does CTA generate positive value, and even under that path the AHD + Montijo dual-airport system would saturate by approximately 2040, at which point CTA becomes necessary regardless. The recommended default is therefore Option B with a 2034 review clause that triggers CTA only if observed 2033 traffic exceeds 75 million passengers per year on a five-year moving average. The cost of preserving this option through pre-design at Alcochete is small relative to the fiscal value of avoiding premature commitment.

Under standard cost-benefit framing consistent with the European Commission's DG REGIO guidance, the conclusion is robust to alternative weightings of producer surplus, the foreign-ownership shadow price applied to Vinci shareholder returns, and the demand-projection band. Under all three CBA framings considered — standard, foreign-ownership-shadow-priced, and Portuguese-fiscal-only —

Option B remains dominant. The qualitative case for Option B is therefore not dependent on a single methodological choice.

Sumário (português)

Os quatro maiores aeroportos da Europa Ocidental operam sob regimes de capacidade marcadamente diferentes. Madrid-Barajas mantém uma considerável folga física, com capacidade prevista de cerca de 100 milhões de passageiros por ano até 2040. Londres está configurada como sistema de cinco aeroportos, no qual o crescimento depende da longamente debatida e politicamente incerta terceira pista de Heathrow. Paris está estruturalmente limitada a aproximadamente 125 milhões de passageiros entre Charles-de-Gaulle e Orly após o cancelamento do projeto do Terminal-4 do CDG. Lisboa, com o Aeroporto Humberto Delgado (AHD), encontra-se numa categoria à parte: um único aeroporto urbano com capacidade operacional prática de cerca de 49 milhões de passageiros por ano, já com 76 % de utilização em 2025.

Nos cinco cenários de procura analisados no presente relatório — Base, Crescimento Elevado, Limitado por Capacidade, variante de Baixa Demografia (calibrada pela projeção de baixa fertilidade da ONU), e um cenário rigoroso de Política Climática que incorpora o preço do CDLE-aviação a €220 por tonelada CO2, mandato ReFuelEU Aviation de 70 % de mistura SAF, e proibição comunitária dos voos intra-europeus inferiores a 1 000 km — a procura de Lisboa excede o tecto do AHD no início da década de 2030. O défice estrutural entre procura e capacidade em 2050 varia entre 1 milhão de passageiros (Política Climática) e 36 milhões (Crescimento Elevado), situando-se em 13 milhões no cenário central Base.

A questão estratégica não é, pois, se acrescentar capacidade mas como entregá-la. Duas opções de política competem entre si. A Opção A, plano atual do Governo, consiste em construir o novo aeroporto em Alcochete (Centro de Tráfego Aeroportuário, CTA) e encerrar o AHD na data de abertura. A Opção B, alternativa recomendada neste relatório, consiste em manter o AHD em operação no seu tecto de 49 M e desenvolver o Montijo (MTJ) na base aérea existente como aeroporto complementar de 20-22 milhões de passageiros, diferindo o CTA para 2062 ou data posterior. A capacidade combinada do sistema sob Opção B atinge 69-71 milhões de passageiros — suficiente para todos os cenários exceto uma realização extrema de Crescimento Elevado.

A análise financeira é decisiva. Sob a trajetória conservadora da ANA — que corresponde, em larga medida, a quatro dos cinco cenários — a Opção B gera aproximadamente €6,8 mil milhões mais de VAL privado para a concessionária do que a Opção A, no horizonte alargado da concessão até 2092. A decomposição do custo social total da escolha da Opção A sobre a Opção B, calculado aos benchmarks de construção de 2026, atinge aproximadamente €14 mil milhões (intervalo €12–16 mil milhões). As componentes são: €6,8 mil milhões de VAL concessionário sacrificado, €2,2 mil milhões de saldo de externalidades, e cerca de €5 mil milhões de investimento em infraestruturas de acesso específicas do CTA dominado pela Terceira Travessia do Tejo rodo-ferroviária (€3,5–4,5 mil milhões) e a extensão ferroviária de alta velocidade ao centro de Lisboa (€1,8–2,7 mil milhões).

Apenas sob a trajetória otimista do estudo CTI gera o CTA valor positivo, e mesmo nessa trajetória o sistema dual AHD + Montijo ficaria saturado por volta de 2040, altura em que o CTA se tornaria necessário independentemente. A recomendação padrão é, portanto, a Opção B com uma cláusula de revisão em 2034 que aciona o CTA apenas se o tráfego observado em 2033 exceder 75 milhões de passageiros por ano numa média móvel de cinco anos. O custo de preservar esta opcionalidade através de pré-conceção em Alcochete é reduzido face ao valor fiscal de evitar o compromisso prematuro.

Sob o enquadramento padrão de análise custo-benefício, consistente com a orientação da DG REGIO da Comissão Europeia, a conclusão é robusta a ponderações alternativas do excedente do produtor, ao preço-sombra de propriedade estrangeira aplicado aos ganhos de acionistas da Vinci, e à banda de projeção da procura. Sob os três enquadramentos de ACB considerados — padrão, com preço-sombra de propriedade estrangeira, e perspetiva fiscal portuguesa apenas — a Opção B permanece dominante. O argumento qualitativo a favor da Opção B não depende, portanto, de uma única escolha metodológica.

Executive summary

Context

The four largest airports of Western Europe operate under markedly different constraint regimes. Madrid-Barajas retains substantial physical headroom (planned capacity expanding to ≈ 100 M passengers/yr by 2040). London is a five-airport system in which growth depends on the long-debated third Heathrow runway. Paris is structurally capped at ≈ 125 M passengers across CDG and Orly after the cancellation of the CDG Terminal-4 project. Lisbon's Humberto Delgado (AHD) is in a category of its own: a single urban airport with a practical operating capacity of approximately 49 M passengers per year, already 76 % utilised in 2025.

Lisbon demand under five scenarios

Scenario	2050 traffic (M)	Driving assumption
Baseline	62	GDP +1.5-2 %/yr Europe; tourism +2-3 %/yr
High-Growth	85	CTI-optimistic path; tourism boom
Capacity-Constrained	55	Infrastructure delays; slot caps
Low-Demographic	55	EU-27 working-age population −15-20 % by 2050
Climate-Policy	50	EU ETS €220/t CO2; SAF 70 %; <1,000 km rail rule

Every scenario except the most stringent Climate-Policy exceeds AHD's 49 M ceiling by the early-to-mid 2030s. Additional capacity is therefore required from approximately 2035 onwards.

Two policy options compete

Option A — current Government plan. Build CTA at Alcochete (Phase 1 capacity 55-60 M; Phase 2 85-100 M; airport capex €8.5-9.9 bn) and close AHD on opening. Stated access infrastructure: new dual road-rail Tagus crossing on the Chelas-Barreiro alignment (15 km, road + 4 rail tracks, €3.5-4.5 bn at 2026 prices), HSR extension into Lisbon centre (€1.8-2.7 bn), and motorways (€0.4-0.6 bn). Total access capex €5.7-7.8 bn at 2026 prices.

Option B — AHD + Montijo dual airport. Retain AHD operating at its 49 M ceiling and develop Montijo (MTJ) on the existing air-force base as a 20-22 M-pax complementary airport; defer CTA until 2062 or beyond. Combined system capacity reaches 69-71 M passengers. Capex €0.8-1.2 bn for MTJ at 2026 prices. No new Tagus crossing is required (the existing Vasco da Gama and 25 de Abril bridges plus junction upgrades suffice for the four conservative scenarios). Total access capex €0.3-2.5 bn.

Financial NPV (concessionaire perspective, Mateus 2025)

Option	ANA demand to 2062	ANA demand to 2092	CTI demand to 2062	CTI demand to 2092
A — CTA only, close AHD	−€858 M	+€1,228 M	+€1,847 M	+€5,919 M

B — AHD + Montijo	+€5,985 M	+€8,070 M	(saturates ~2040)	(saturates ~2040)
Δ (B − A)	+€6,843 M	+€6,842 M	—	—

Total social cost of choosing A over B (2026 prices, ANA demand)

Component	Value (€ bn)	Comment
Concessionaire NPV foregone (ANA, to 2092)	+6.8	Privado-AHD+MTJ €8,070 M − Privado-ANA €1,228 M
Externality balance (saldo of access + airport externalities)	+2.2	Access differential €3,200 M; airport noise/emission offset €1,000 M
CTA-specific access-infrastructure capex (2026 prices)	+~5.0	Tagus dual bridge + HSR Lisbon-centre + motorways
Total social cost of Option A vs Option B	≈ +14	Range €12-16 bn under ANA-conservative demand

The access component alone — dominated by the dual road-rail Tagus crossing and the HSR urban tunnel to Lisbon centre — exceeds the entire concessionaire NPV gap. Under the foreign-ownership shadow-priced framing the total falls to ≈ €11.5 bn; under the Portuguese-fiscal-only framing it falls to ≈ €9 bn. All three framings keep Option B dominant; the qualitative conclusion is robust to the producer-surplus weighting choice.

Risk profile by option

Twelve of fifteen asymmetric risks are materially worse under Option A. Two are Option-B-only (ATC airspace complexity in the Lisbon TMA, AHD long-life modernisation if growth materialises) and one is symmetric (military-relocation negotiation, present under either CTA's Campo de Tiro transfer or Montijo's air-base conversion). Option A's principal asymmetric risks include:

- Single point of failure — weather, strike or ATC event disrupts all Lisbon traffic (A only).
- Dual road-rail Tagus crossing delivery delay — CTA isolated if delayed (A: P:H · I:H).
- HSR extension to Lisbon centre delays — CTA without HSR access (A: P:H · I:H).
- Hub-share loss to Madrid during 7-10 year build (A: P:H · I:H; B: P:L · I:L).
- Stranded capex if demand undershoots — A: M × H (€5-8 bn); B: L × L.
- Financing / state-aid risk under EU competition rules — A: M × H; B: L × L (self-financing).
- Tourist-saturation political backlash against expansion — A: M × H; B: M × M.

Recommendations

R1. Deliver additional Lisbon capacity by 2035. Configuration is Montijo first under Option B; CTA reserved as a 2034-review contingency.

R2. Adopt Option B (AHD + Montijo dual airport) as the planning default. Build a 2034 review clause into both concessions: trigger CTA only if observed 2033 traffic exceeds 75 M passengers/year on a five-year moving average.

R3. Pre-design CTA in parallel with Montijo construction so the 2034 decision can be acted on quickly if the CTI demand path materialises. Land, environmental permitting and runway alignment held; no EPC or land-transfer contracts signed before the review.

R4. Couple Montijo (and any later CTA) with HSR Lisbon-Madrid and Lisbon-Porto. The same HSR alignment serves both options at marginal cost.

R5. Build tourist-saturation governance in parallel: Mais Habitação short-term-rental freeze, €4/night tourist tax from 2026, visitor-pressure rules by 2030.

R6. Verify the 49 M AHD cap independently (Eurocontrol or ICAO review). Movement-rate or noise-curfew constraints may bind closer to 45-47 M.

R7. Climate-adapted operations from day one at both Montijo (Option B) and any future CTA: SAF storage and distribution, all-electric ground support, geothermal/solar terminal energy.

Main report

Part 1 — Current situation

1.1 The European aviation context

Western European aviation has now fully recovered from the pandemic-induced contraction of 2020-2022, and 2024-2025 registered record traffic volumes across the major hubs of the region. The aggregate annual passenger throughput of the four metropolitan airport systems analysed in this report reached approximately 391 million in 2025, distributed as follows: Lisbon 37 million, Madrid 68 million, Paris (Charles-de-Gaulle and Orly combined) 107 million, and the London five-airport system 180 million. Beneath this headline of synchronised recovery, however, the four systems are entering very different long-run regimes, driven by the interplay of physical-capacity constraints, planned expansion programmes, and demographic-and-climate trajectories that will shape demand through 2050.

Madrid retains the clearest expansion path. The Aena master plan for Barajas adds a fourth runway and an enlarged satellite terminal, raising practical capacity from the current 80 million to approximately 100 million passengers per year by 2040. London, by contrast, is configured as a distributed five-airport system in which the single most consequential decision is the long-debated and politically uncertain third runway at Heathrow; without it, the system ceiling is in the 215-225 million range, while approval would lift it to approximately 285 million. Paris faces a different binding constraint: the cancellation of the CDG Terminal-4 project in 2021 fixed combined CDG-Orly capacity at approximately 125 million passengers, against a 2025 throughput already at 107 million. Demand is therefore expected to outstrip Paris capacity by approximately 2035 under any non-recessionary scenario, with the consequent loss of hub share to Madrid, Istanbul, and London.

Lisbon belongs to a category of its own. Humberto Delgado airport is a single-runway urban facility with a constrained taxiway geometry, a saturated apron, and active night-curfew restrictions imposed by the surrounding residential areas. The concession holder, ANA Aeroportos de Portugal (owned by the French infrastructure group Vinci under a fifty-year concession running from 2012 to 2062 with extension options to 2087 or 2092), reports that 2024 traffic reached 35.0 million passengers — equivalent to approximately 72 % of the practical operating cap — and the 2025 trend points to 37 million (76 % of cap). The annual passenger growth of 1.4 million reported by ANA for 2024 over 2023 implies, if maintained, that the available headroom will be exhausted within four to six years.

1.2 The four-airport comparison and the special case of Lisbon

Table 1 — Anchor passenger traffic (2015-2025) and capacity ceilings

Airport system	2015	2024	2025	2030 cap	2040 cap	2050 cap
Lisbon (LIS)	20.1	35.0	37.0	49	49 (+ NAL Ph1: 55-60)	49 (+ NAL Ph2: 85-100)
Madrid (MAD)	46.8	66.2	68.2	80	95	100

Paris (CDG + ORY)	95.4	103.4	107.0	115	122	125
London (5-airport)	154.3	176.7	179.8	190	215 / 250*	225 / 285*

** with Heathrow R3. All figures in millions of passengers per year.*

The data in Table 1 reveal what makes the Lisbon case distinctive. Lisbon is the only system in the comparison that is approaching its practical cap at the single-airport level, while none of the other three systems is currently constrained in the same binding sense. Madrid has approximately one third of additional capacity to absorb growth in the planned 2030 expansion; the London system has structural redundancy across five airports, even under the no-Heathrow-R3 scenario; and although Paris is already approaching its ceiling, it is approaching a structurally-capped ceiling rather than a single-airport physical constraint that can be addressed by adding a complementary facility nearby. Lisbon is the only system where the political and engineering response to projected demand must be a major new facility, and the decision concerning the configuration of that facility is the central question of this report.

1.3 The AHD constraint at 49 million passengers

The 49 million-passenger practical operating capacity attributed to Humberto Delgado is not a theoretical maximum derived solely from runway capacity. It is an operational figure that accounts for the joint constraints of approximately 610,000 annual aircraft movements at the current average aircraft size of 80 passengers per movement, the binding night curfew imposed by the urban residential ring around the airport, the constrained apron and taxiway geometry, and the single-runway-with-dependent-secondary-runway configuration that limits simultaneous parallel operations. The figure has been validated independently by ANA, by the concession auditor, and by the cost-benefit studies prepared by both the CTI (Comissão Técnica Independente) and the author's own analysis (Mateus 2025, NPV new Lisbon Airport workbook).

AHD therefore differs from the other three systems examined in a basic respect. It is not merely the largest share of a regional market that is approaching its ceiling; it is a single facility whose physical expansion is precluded by its urban context. The runway cannot be extended; the apron cannot be expanded without affecting the surrounding road network; the night-curfew restriction cannot be lifted without political consequences for the resident population of the surrounding districts. The political and engineering response is the new airport at Alcochete, with a planned Phase 1 capacity of 55-60 million passengers and a Phase 2 of 85-100 million. The strategic question is no longer whether to build it, but on what timeline and in what configuration relative to AHD's continued operation.

Part 2 — Demand projections by scenario

2.1 Methodological framework — five-scenario approach

Long-run aviation forecasting is notoriously prone to upward bias because the underlying models tend to anchor on past growth and underweight several powerful moderating forces: demographic decline, tourist saturation, climate policy, and rail substitution. The literature on aviation demand forecasting documents this tendency systematically (see, among others, Doganis 2019; Forsyth et al. 2020; International Transport Forum 2023; and the cost-benefit-analysis methodology of Flyvbjerg 2014 on optimism bias in megaproject demand forecasts). To make these trade-offs transparent, the present analysis works with five independent scenarios, each calibrated to a coherent set of demographic, economic and policy assumptions, and each carrying its own probability weight in the final recommendation.

- Baseline (B). GDP growth of 1.5-2.0 % per year in Europe and 2.5 % globally; tourism growth of 2-3 % per year; airline fleets modernise (A321XLR, A350, B787); moderate environmental regulation.
- High-Growth (H). GDP growth of 2.5-3.5 % per year; tourism boom from Asia and the Americas; ultra-long-haul and narrowbody long-haul expand; expansions delivered on time.
- Capacity-Constrained (C). Infrastructure ceilings bind across the European network (Paris T4 cancelled, LHR R3 not built, Alcochete delayed); slot caps, night curfews and environmental restrictions tightened.
- Low-Demographic (L). UN World Population Prospects 2024 low variant combined with reduced net migration; EU-27 working-age population declines by 15-20 % by 2050 (versus -10 % in the medium variant).
- Climate-Policy (CP). EU Emissions Trading System aviation pricing reaches €220 per tonne CO2 by 2050 (approximately €66 per passenger surcharge on intra-EU flights); ReFuelEU Aviation 70 % SAF mandate by 2050 (approximately €80 per passenger fuel premium); EU-wide ban on intra-European flights below 1,000 kilometres when a rail alternative of four hours or less exists, phased 10/50/80 % effective by 2030/2040/2050.

2.2 Comparative projections at 2050

Table 2 summarises the five-scenario outcomes at 2050 for each of the four airport systems, applying the demographic and saturation corrections discussed in section 2.3 and the climate-policy bundle of section 2.4. The figures are computed in the companion workbook (aviation_projections.xlsx) using formula-linked tables that propagate any change in the underlying assumptions.

Table 2 — 2050 passenger projections by scenario (millions)

Airport	Baseline	High-Growth	Capacity-Constr.	Low-Demo	Climate-Policy
Lisbon	62	85	55	55	50
Madrid	95	110	90	88	63
Paris	140	150	122	125	82
London	215	245	210	200	150

2.3 Demographic decline and tourist saturation

Europe's demographic trajectory differs sharply between host countries and origin markets, and the asymmetry matters for aviation demand. Portugal's population is projected by Eurostat EUROPOP 2023 to fall from 10.4 million in 2025 to 9.3 million by 2050 — a contraction of 10.6 %. Italy is projected to lose 11.4 % of its population over the same horizon; Germany 6.3 %; Spain holds approximately flat. Outside Europe, the United States grows 8.7 %, India 14.1 %, and parts of Latin America (Mexico, Argentina, Colombia) grow 7-11 %. The origin-market mix of each airport therefore exposes it differently to demographic stagnation: Lisbon and Paris are heavily exposed to declining German and Italian source markets, while Madrid is partially cushioned by its strong Latin-American connectivity, and London is supported by U.S. and Indian growth.

On top of demographic dynamics, tourist saturation is already a binding constraint in Lisbon and an emerging one in Paris. Lisbon registered approximately 19 million tourist overnights against a city population of 0.545 million in 2024 — a ratio of 35 overnights per resident, comparable to Venice and well beyond the social-tolerance threshold documented in the urban-tourism literature (UN WTO 2024; Postma & Schmuecker 2017). Paris (approximately 21 overnights per resident) and London (approximately 10) are high-pressure but less acute; Madrid (approximately 8) is moderate. The Mais Habitação law (Lei n.º 56/2023) froze new short-term-rental licences in pressured zones, the €4 per night tourist tax is scheduled to come into effect in 2026, and comparable measures are in force in Paris and Westminster. These instruments will trim leisure-demand growth from the demand side independently of capacity constraints, and the trim is concentrated in the leisure-heavy southern-European destinations of which Lisbon is the most exposed.

2.4 Climate policy and the 1,000 km rail rule

France enacted the ban on domestic flights with a rail alternative of two hours and thirty minutes or less in May 2024 under the Loi Climat et Résilience of 2021. Spain has proposed an analogous rule for flights below 500 kilometres. The Climate-Policy scenario in this report extends the principle to all EU flights below 1,000 kilometres whenever a rail alternative of four hours or less exists, phased in over 2030-2050. Combined with EU ETS aviation pricing rising to €220 per tonne CO2 and the ReFuelEU Aviation SAF mandate at 70 % blend by 2050, the bundle implies a fuel-and-carbon surcharge of approximately €140-150 per intra-European passenger by 2050.

The intra-European short-haul share of operations is the principal moderating variable across the four systems. Paris is by far the most exposed (approximately 45 % of operations below the 1,000 km threshold and served by a dense TGV network), followed by Madrid (35 % share, expanding AVE network) and London (30 %, Channel barrier and weaker rail alternatives to mainland Europe). Lisbon is the least exposed (15 % share), because its geographic position outside the European core means that a substantial proportion of its traffic is long-haul to Brazil, the United States and Africa rather than short-haul to mainland European destinations. This geographic peripherality is the one dimension on which Lisbon enjoys a structural advantage relative to Madrid, Paris and London.

Part 3 — Options for the new Lisbon airport: A and B

3.1 The strategic choice

Lisbon requires additional airport capacity from approximately 2035 onwards under every demand scenario considered, with the binding date earlier in High-Growth and later in the most stringent Climate-Policy scenario. The strategic question is how to deliver that capacity. The Government's current plan, designated Option A in this analysis, is to build a new airport at Alcochete on the south Tagus bank (the Centro de Tráfego Aeroportuário, CTA, also referred to as the Novo Aeroporto de Lisboa, NAL) and to close AHD on opening. The alternative, Option B, is to develop Montijo on the existing air-force base as a 20-22 million-passenger complementary airport to AHD, retaining both facilities in operation, and to defer CTA until 2062 or beyond. Under Option B the combined system capacity reaches 69-71 million passengers per year — sufficient for every scenario except an extreme High-Growth realisation. A third hybrid option (CTA built while AHD remains open in parallel) is dominated by both A and B on private and social grounds and is excluded from the analysis.

3.2 Capacity match by scenario

Table 3 — Lisbon demand vs AHD capacity by scenario, millions

Year	AHD cap	Baseline	High-Growth	Cap-Constr.	Low-Demo	Climate-Policy
2025	49	37	37	37	37	37
2030	49	40	44	37	38	38
2040	49	50	65	48	46	44
2050	49	62	85	55	55	50

The capacity gap relative to the 49 million AHD ceiling at 2050, in the counterfactual where Alcochete does not open, is 13 million passengers under Baseline, 36 million under High-Growth, 6 million under Capacity-Constrained, 6 million under Low-Demographic, and 1 million under Climate-Policy. Translated into direct ticket revenue at an average fare of €150, this is between €1.95 billion and €5.4 billion per year of revenue foregone in the no-expansion counterfactual. Tourism, business and hub multipliers raise the wider GDP loss to a range of €5-8 billion per year under Baseline (see Doganis 2019, Chapter 3, on airport-economy multipliers).

3.3 The financial NPV comparison

The financial NPV of Options A and B, computed under the two principal demand trajectories (the conservative ANA path and the optimistic CTI study path) and discounted at 4 % real over the 40-year asset life, is presented in Table 4. The figures are derived from the author's NPV new Lisbon Airport workbook (Mateus 2025).

Table 4 — Concessionaire NPV (€ million) by option × demand projection

Option	ANA demand, to 2062	ANA demand, to 2092	CTI demand, to 2062	CTI demand, to 2092

A — CTA only, close AHD	−858	+1,228	+1,847	+5,919
B — AHD + Montijo	+5,985	+8,070	n.a.*	n.a.*
Δ (B − A)	+6,843	+6,842	—	—

** Under CTI optimistic demand, the combined AHD + MTJ system (69-71 million) would saturate around 2040, at which point Option A becomes necessary regardless. Source: Mateus (2025), companion NPV workbook.*

Under ANA's conservative demand path, Option B dominates Option A by approximately €6.8 billion in private NPV — and this margin is essentially unchanged whether the horizon is the original 2062 concession end or its 30-year extension to 2092. The concessionaire generates substantially more value by retaining AHD and developing Montijo than by building CTA. The Portuguese State, on these numbers, does not need to contribute capital — even for the Montijo investment — because the AHD revenue base alone covers the financing. Only under the CTI study's optimistic demand path does Option A's CTA programme generate positive value (+€1.8 billion to 2062, +€5.9 billion to 2092 with the proposed tariff escalation), and under that path the dual-airport configuration would absorb early-year traffic without requiring CTA before approximately 2040.

3.4 Access-infrastructure cost stack — the dominant social-cost component

Building CTA at Alcochete imposes access-infrastructure obligations that are not required, or are required at a much smaller scale, under Option B. Two items dominate the cost stack: the new dual road-rail bridge across the Tagus, and the High-Speed Rail connection linking CTA to the Lisbon centre. The legacy NPV workbook uses a €450 million figure for the Tagus crossing and €1,650 million for total access; both are based on 2019-2020 prices and understate the 2026 envelope by a factor of 3-5×.

The Government's stated solution for CTA access is a new dual-mode crossing of the Tagus on the Chelas-Barreiro alignment, comprising six road lanes with hard shoulders, four rail tracks (two high-speed plus two conventional / freight), approximately 15 kilometres of structure including viaducts on both banks, and seismic / wind-design foundations for the estuary span. Comparable European long-multi-span road-rail estuary crossings (Øresund, Great Belt, Messina pre-construction estimates) cost in the range of €230-300 million per kilometre in 2026 prices once foundations, rail deck, seismic / wind compliance and bank-side interfaces are included. Applied to the 15-kilometre Chelas-Barreiro alignment, the capex envelope at 2026 prices is approximately €3.5-4.5 billion (civil works plus rail systems, excluding rolling stock). Under Option B, no new Tagus crossing is required: the existing Vasco da Gama and 25 de Abril bridges, with junction upgrades, can absorb the traffic generated by AHD + Montijo at the demand levels of the four conservative scenarios.

The High-Speed Rail extension into Lisbon's central station is the second large access-cost component. To make CTA a high-speed-rail-accessible airport comparable to Madrid-Barajas T4 or Paris-CDG T2-TGV, three rail-engineering items are required: an HSR spur of approximately 20-25 kilometres from the Barreiro end of the third crossing to the CTA terminal (€0.6-0.9 billion at 2026 prices); an HSR station at CTA with 400-metre platforms (€0.2-0.3 billion); and an urban-tunnel section of 5-8 kilometres between Chelas and the central HSR terminus, constructed by tunnel-boring machine through dense urban substrate (€1.0-1.5 billion). The combined HSR access stack for CTA is therefore €1.8-2.7 billion. Under Option B, the existing Estação do Oriente next to AHD already integrates with conventional rail and metro; Montijo is reachable from existing rail via the Barreiro-Pinhal Novo line with upgrades costing €0.2-0.4 billion.

3.5 Total social cost — decomposition

Table 5 — Total social cost of Option A vs Option B, decomposition (PV, € billion)

Component	Value	Comment
Concessionaire NPV foregone (ANA demand, to 2092)	+6.8	Privado-AHD+MTJ €8,070 M − Privado-ANA €1,228 M.
Externality balance (the −€2,191 M saldo from the Comparação note)	+2.2	Access externalities differ by €3,200 M (TGV branch, Tagus crossing, motorway commuter time); airport noise / emission balance offsets €1,000 M.
CTA-specific access-infrastructure capex (2026 prices)	+~5.0	Tagus dual bridge + HSR spur + HSR urban tunnel + motorways.
Total additional social cost of Option A vs Option B	≈ +14	Range €12-16 bn under ANA-conservative demand.

All three components point in the same direction: choosing Option A under ANA-conservative demand destroys approximately €14 billion of social value relative to Option B, with a range of €12-16 billion across plausible assumption variations. Under the standard EU Cohesion / EIB cost-benefit framing (DG REGIO 2014), producer surplus is given a weight of 1.0; under a more conservative variant that applies a foreign-ownership shadow price of 0.5-0.7 to the share of producer surplus retained by Vinci shareholders (and 1.0 to the Portuguese-fiscal share captured by concession fees and corporate-tax-on-profits), the total social cost falls to approximately €11.5 billion. Under the strictest framing — excluding the private share of producer surplus and counting only externalities, access infrastructure, and Portuguese-fiscal flow-back — the figure falls to approximately €9 billion. All three framings keep Option B dominant; the qualitative conclusion is therefore robust to the producer-surplus weighting choice.

Part 4 — Risk assessment

The Alcochete decision is large in capital intensity (approximately €8-10 billion for the airport plus €5-7 billion of access infrastructure at 2026 prices) and long in horizon, and it sits at the intersection of three other policy debates: climate, housing, and aviation hub strategy. The most important risks, with their assessed probability and impact, and the principal mitigation actions, are presented below. The analysis follows the asymmetric-risk framework standard in infrastructure project appraisal (Flyvbjerg, Garbuio & Lovallo 2009; Flyvbjerg 2014).

4.1 Per-option risk profile

Table 6 — Asymmetric risk profile: Option A vs Option B

Risk	Option A (CTA)	Option B (AHD + MTJ)	Asymmetric ?
Demand undershoots planned capacity (€5-8 bn stranded capex)	P:M · I:H	P:L · I:L	A much worse
Construction delay or cost overrun on the core airport	P:H · I:H (€8-10 bn project)	P:M · I:M (€1 bn project)	A much worse
Tagus dual road-rail bridge delivery delay (CTA isolated)	P:H · I:H (essential)	n.a. — not required	A only
HSR extension to Lisbon centre delays (CTA without HSR)	P:H · I:H (€1.8-2.7 bn item)	P:L · I:L (small spur only)	A much worse
Single point of failure — weather / strike / ATC event	P:L · I:VH (all Lisbon traffic)	n.a. — two airports	A only
Hub-share loss to Madrid during multi-year build	P:H · I:H (7-10 yr exposure)	P:L · I:L (gradual scaling)	A much worse
AHD-to-CTA transition disruption (slots, labour, cargo)	P:H · I:M	P:L · I:L (no transition)	A only
Tourist-saturation political backlash against expansion	P:M · I:H (CTA = leisure surge)	P:M · I:M (smaller surge)	A worse
Climate-Policy regime trims revenue	P:M · I:H (€8-10 bn at risk)	P:M · I:M (€1 bn at risk)	A worse
Environmental / Natura 2000 challenge (Tagus estuary)	P:M · I:H	P:M · I:M	A worse
Financing / state-aid risk under EU competition rules	P:M · I:H (large state guarantee)	P:L · I:L (self-financing)	A worse
Military relocation negotiation (Campo de Tiro)	P:M · I:M	P:M · I:M (Montijo air base)	Symmetric

ATC / airspace complexity in Lisbon TMA	P:L · I:L (single airport)	P:M · I:M (two airports)	B only
AHD long-life modernisation if growth materialises	n.a. — AHD closes	P:M · I:L (€500 M – 1 bn)	B only
HSR Lisbon-Madrid / Lisbon-Porto misalignment with airport plan	P:H · I:H (CTA depends on HSR)	P:M · I:L (rail-independent)	A worse

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

Twelve of the fifteen asymmetric risks are materially worse under Option A. Two are Option-B-only (ATC complexity and AHD modernisation), and both are well-understood and low magnitude. One is symmetric (military-relocation negotiation, present under either CTA's Campo de Tiro transfer or Montijo's air-base conversion). The aggregate risk-weighted expected cost is approximately €15-25 billion for Option A versus €2-4 billion for Option B — approximately a seven-fold ratio in expected downside. The risk-profile result is therefore consistent with the financial-NPV result of section 3.3 and reinforces it.

4.2 Cross-cutting mitigation principles

- Sequence governance ahead of capacity. The tourist-saturation governance framework (Mais Habitação short-term-rental rules, €4/night tax, visitor-pressure caps) must precede any leisure-traffic surge through Alcochete; otherwise the political case for the airport unravels in its opening years.
- Modular phasing. Each capacity phase should be deliverable in tranches so that an undershoot scenario does not strand capital. Phase 1 of CTA, in particular, should be deliverable in 35-million and 55-million tranches.
- Decision rules, not dates. The Phase-2 commitment should be conditional on observed 2035 traffic — not committed to a calendar year — so that the project survives both upside and downside realisations of demand.
- Parallel rail investment. The high-speed-rail corridors Lisbon-Madrid and Lisbon-Porto are complements to either airport option, and their delivery schedules should be aligned with the airport-decision horizon.
- Pre-commit to climate compliance. The new airport (whether CTA or Montijo) should be designed for the Climate-Policy world from the outset: sustainable-aviation-fuel storage and distribution, all-electric ground support, geothermal or solar terminal energy.

Part 5 — Recommendations

R1. Deliver additional Lisbon capacity by 2035.

The configuration to be Montijo first under Option B (the preferred default — see R2), with CTA reserved as a contingency triggered by the 2034 review. Every scenario, including the most demand-pessimistic, exceeds AHD's 49 million ceiling by the early-to-mid 2030s, and additional capacity is therefore required regardless of which option is ultimately chosen.

R2. Adopt Option B (AHD + Montijo dual airport) as the planning default, with a 2034 demand-review clause that converts to Option A only if observed 2033 traffic exceeds 75 M passengers per year on a five-year moving average.

The companion NPV model (Mateus 2025), updated with 2026 construction-cost benchmarks, shows that under ANA's conservative demand path the total additional social cost of choosing Option A over Option B is approximately €14 billion (range €12-16 billion), decomposed as €6.8 billion of concessionaire NPV foregone, €2.2 billion of externality balance, and approximately €5 billion of CTA-specific access-infrastructure capex at 2026 prices. The access component alone — dominated by the dual road-rail Tagus crossing and the HSR extension to Lisbon centre — exceeds the entire concessionaire NPV gap. Develop Montijo first; defer CTA. Build into both concessions an automatic review clause that triggers the CTA programme if observed 2033 traffic exceeds the threshold on a five-year moving average.

R2b. Develop Montijo on the existing air-force base as a complementary 20-22 million-passenger facility.

MTJ capex (€1.5-2 billion at 2026 prices) is an order of magnitude smaller than CTA; the project can be operational by 2032 with limited environmental disruption, reuses existing runways, and is not stranded under Option A either (it would then serve as overflow, cargo and general-aviation base). The Campo de Tiro military relocation envelope (€370 million compensation already costed) and access works overlap substantially with what CTA would need in any case.

R3. Trigger Phase 2 of CTA conditionally on demand verification 2035-2040.

Decision rule: commission Phase 2 if (a) 2035 traffic exceeds 55 million, or (b) the projected 2040 traffic exceeds 65 million on a five-year moving average. Avoid a fixed-date commitment that locks in capital before demand is revealed.

R4. Couple Alcochete (or its Montijo alternative) with HSR upgrades Lisbon-Madrid and Lisbon-Porto.

A 3-hour HSR Lisbon-Madrid captures intra-Iberian short-haul demand otherwise exposed to the Climate-Policy rail-substitution rules, while deepening the hub catchment. A Lisbon-Porto upgrade consolidates the national feeder.

R5. Build tourist-saturation governance in parallel.

The 2023 Mais Habitação STR freeze and the 2026 tourist tax are necessary but insufficient. A visitor-pressure cap regime, ring-fenced tourism revenue for local infrastructure, and neighbourhood-led licensing should be in place before any leisure-traffic surge materialises.

R6. Verify the 49 M AHD cap assumption independently.

The figure is at the upper end of public estimates; movement-rate or noise-curfew constraints may bind closer to 45-47 million. An ICAO or Eurocontrol review is recommended before financing decisions are taken.

R7. Hub strategy versus Madrid.

Capacity is a necessary but not sufficient condition for hub competitiveness against the Iberia-oneworld-Latin-America corridor through Madrid. Slot-pricing reform, carrier incentives, and TAP-Star Alliance corridor strengthening should be designed in parallel with the physical infrastructure.

R8. Climate-adapted operations from day one.

Alcochete (or Montijo) should open with SAF storage and distribution, all-electric ground support, geothermal / solar terminal energy, and SAF-blended fuel supply contracts. This reduces operating cost under the Climate-Policy scenario and supports the political case for the project.

Glossary

Acronyms, organisations and technical terms used in this report.

AHD Aeroporto Humberto Delgado — the current Lisbon airport, located within the city of Lisbon. Practical operating capacity approximately 49 million passengers per year, movement- and curfew-limited.

ANA ANA Aeroportos de Portugal — the Portuguese airport-system concessionaire, owned by Vinci (the French infrastructure group) under a fifty-year concession running from 2012 to 2062, with options to extend to 2087 or 2092.

Atlantic corridor One of the European Union's nine TEN-T core network corridors, running from southern Iberia through Spain and France to Strasbourg and beyond. Primary funding corridor for Portuguese cross-border rail TEN-T projects.

ATC Air Traffic Control. Used in this report to refer to airspace-management complexity (single versus dual airport configurations) and rail-signalling systems.

BEI / EIB Banco Europeu de Investimento / European Investment Bank — the European Union's long-term lending institution. Active in Portuguese infrastructure financing via the Connecting Europe Facility and the defense-mobility instrument.

CDG Charles de Gaulle airport, Paris's primary international airport, operated by Groupe ADP.

CEF Connecting Europe Facility — the European Union's principal grant-funding instrument for trans-European infrastructure under Regulation (EU) 2021/1153. Provides non-repayable contributions to TEN-T core projects at 20-50 % of capex for cohesion-region beneficiaries, conditional on technical-specifications compliance (European gauge, ERTMS, mixed-use design).

Chelas-Barreiro The Government's currently planned alignment for the Third Tagus Crossing, approximately 15 km of dual road-and-rail (6 road lanes plus 4 rail tracks) at 2026 capex of €3.5-4.5 billion. Two alternative alignments — Beato-Montijo and Foz do Trancão-Alcochete N — are 10-15 km shorter.

CTA / NAL Centro de Tráfego Aeroportuário / Novo Aeroporto de Lisboa — the planned new airport at Alcochete on the south Tagus bank, with Phase 1 capacity of 55-60 million passengers and Phase 2 of 85-100 million. Airport capex approximately €8.5-9.9 billion; access infrastructure €5.7-7.8 billion at 2026 prices.

DG-MOVE Directorate-General for Mobility and Transport of the European Commission. Manages the Connecting Europe Facility Transport envelope, oversees the Atlantic corridor coordinator, and is the proposed technical-assistance partner for the revision of Portugal's HSR master plan.

DG REGIO Directorate-General for Regional and Urban Policy of the European Commission. Owns the Cost-Benefit Analysis methodology applied to TEN-T projects under Regulation (EU) 2021/1153.

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

ERTMS European Rail Traffic Management System — the European Union's standard rail signalling and train-control system. Class A (ETCS + GSM-R) is the target; legacy Class-B systems (including the Portuguese CONVEL) must be deactivated by 2040 under Regulation (EU) 2024/1679.

ETS (aviation) Emissions Trading System for aviation — the EU's carbon-pricing mechanism extended to intra-EEA flights since 2012, with free-allowance phase-out 2024-2026 and a modelled trajectory to €220 per tonne CO2 by 2050.

ICAO International Civil Aviation Organization, a United Nations agency relevant to airport-capacity assessment and bird-strike protocols at Alcochete.

IATA International Air Transport Association, the industry body responsible for slot-allocation protocols and demand-forecast methodologies.

LCC Low-Cost Carrier — aviation segment likely to operate from Montijo under Option B.

LHR / LGW / STN / LTN / LCY London Heathrow, Gatwick, Stansted, Luton and City — the five airports of the London system.

Mais Habitação Portuguese 2023 housing law (Lei n.º 56/2023) that froze new short-term-rental licences in pressured zones. Relevant to this analysis as a tourist-saturation governance instrument.

Montijo / MTJ The existing Air Force base on the south Tagus bank proposed under Option B as a 20-22 million-passenger complementary airport to AHD. Capex €0.8-1.2 billion at 2026 prices.

MOPT Ministério das Obras Públicas e Transportes — the former Portuguese ministry that produced the 2005 €4.7 billion estimate for HSR Lisbon-Porto.

Mota-Engil Portuguese construction and infrastructure group; lead member of the LusoLAV / Avan Norte consortium that contracted the HSR Porto-Oiã Phase 1.a section in July 2025.

NAL Novo Aeroporto de Lisboa — synonym for CTA.

Natura 2000 European Union network of protected areas. Relevant to environmental-impact assessment for Alcochete (Tagus estuary) and Montijo (Tejo nature reserve).

NPV Net Present Value — discounted-cash-flow valuation. In Portuguese, Valor Actual Líquido (VAL).

Option A (aviation) The current Government plan: close AHD when CTA opens at Alcochete. Single-airport solution; capex €14-18 billion including access infrastructure.

Option B (aviation) The recommended alternative: retain AHD operating at its 49 million ceiling; develop Montijo as a complementary 20-22 million-passenger facility; defer CTA to 2062 or beyond. Capex €1-4 billion.

PFN Plano Ferroviário Nacional — Portugal's 2022 National Rail Plan.

PPP Public-Private Partnership — the contractual model under which the HSR Porto-Oiã concession (DBM, 30 years) and the ANA airport franchise are structured.

ReFuelEU Aviation Regulation (EU) 2023/2405. Mandates progressive blending of Sustainable Aviation Fuel: 2 % by 2025, 6 % by 2030, 32 % by 2040, 70 % by 2050.

SAF Sustainable Aviation Fuel — drop-in jet fuel from non-fossil feedstocks (used cooking oils, agricultural residues, captured CO2 plus green hydrogen). Mandated under ReFuelEU Aviation.

STR Short-Term Rental — Airbnb / Booking.com-style accommodation. A tourist-saturation regulatory lever; Lisbon froze new STR licences in 2023 under Mais Habitação.

TAP Transportes Aéreos Portugueses — the Portuguese flag carrier. Principal HSR-corridor competitor under the Climate-Policy rail-substitution rules.

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

Terceira Travessia do Tejo (TTT) The Third Tagus Crossing. Government plan: Chelas-Barreiro 15-km dual road-rail bridge at €3.5-4.5 billion at 2026 prices.

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

UN WPP United Nations World Population Prospects — the 2024 revision provides medium- and low-variant population projections used in this report's demographic analysis.

VAL Valor Actual Líquido — Portuguese for Net Present Value.

Vinci French infrastructure-and-construction group. Owns the ANA airport concession through ANA da Vinci.

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