

Mainstreaming governance, co-investment and technology solutions for Positive Energy Districts in monument protected areas (MonuPED)

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D2.2 Collaboration Concept - collaboration models and process improvements for PED approvals in monument-protected areas

Work Package 2: Concepts for enabling PEDs in MPAs/MPBs



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MANAGEMENT SUMMARY

D2.2, the MonuPED Collaboration Concept, examines how monument-protection approvals for PED-relevant measures are reached in practice, why collaboration between owners, investors and heritage authorities breaks down, and how the process can be made predictable. The diagnosis - built on a comparison of the Czech, German (Saxon), Romanian and Slovenian monument-protection frameworks (Section 2), on the approval pathways of the three Living Labs and the Koper case study (Section 3), and on a structured synthesis of barriers across six dimensions (Section 4) - is that the binding constraint is rarely the absence of a heritage-compatible technical solution. It is the process by which a solution is agreed - its predictability, transparency and coordination - and the decisive moment lies in the informal pre-application stage.

The deliverable's constructive core (Section 5) is a layered set of four collaboration models: Structured Pre-Application Dialogue (Model A), PED Working Groups (Model B), Tiered Approval Frameworks (Model C) and Digital Process Support (Model D). Dialogue is the low-threshold entry point; working groups institutionalise it; tiered, published criteria codify what it produces; and the WP4 digital toolkit makes all of it evidence-based. The city-specific application of the models is deliberately deferred to D5.2, where it will be developed and validated together with the WP5 Living Labs. Section 6 addresses policy audiences - recommending above all a differentiated heritage pathway in place of blanket exclusion from the EU's acceleration instruments - and Section 7 summarises limitations and next steps.

Figure 4 (how the six barriers interact) and Figure 8 (how the four models layer and combine) encapsulate the diagnosis and the response; together with the comparative matrices of Tables 2.1 and 2.2, they are suitable for standalone use in project communications, including the project website.



Contents

1.	INTRODUCTION	7
1.1	Purpose of this deliverable	7
1.2	Position within the MonuPED work programme	7
1.3	Geographic and thematic scope	8
1.4	Key terminology	9
1.5	How this document is structured	9
2.	COMPARATIVE ANALYSIS OF MONUMENT-PROTECTION REGULATORY FRAMEWORKS... ..	11
2.1	Czech Republic	11
2.2	Germany (Saxony / Leipzig)	12
2.3	Romania (Alba Iulia)	13
2.4	Slovenia (Koper)	13
2.5	Cross-country comparison	14
3.	HOW MONUMENT-PROTECTION APPROVALS ARE MADE IN PRACTICE	17
3.1	Approach and evidence base	17
3.2	The common approval pathway	17
3.3	Signals from the Living Lab	19
3.4	Prague 6	20
3.5	Leipzig	20
3.6	Alba Iulia	21
3.7	Koper	22
3.8	Cross-city synthesis: bottlenecks and informal enablers	22
4.	BARRIERS TO COLLABORATION AND EFFECTIVE PED APPROVAL - A STRUCTURED SYNTHESIS	24
4.1	Approach	24
4.2	The six barrier dimensions	24
4.3	Cross-referencing: barriers against cities and stakeholders	26
4.4	How the barriers interact, and the binding constraint per city	28
4.5	Signals from the Living Lab	29
5.	COLLABORATION MODELS AND PROCESS IMPROVEMENTS	31
5.1	From diagnosis to design	31
5.2	Model A - Structured Pre-Application Dialogue	32
5.3	Model B - PED Working Groups	33
5.4	Model C - Tiered Approval Frameworks	35
5.5	Model D - Digital Process Support	37
5.6	How the models combine	38
6.	POLICY RECOMMENDATIONS	40
6.1	Scope and alignment	40
6.2	EU-level coherence	40
6.3	National reform	41
6.4	Cross-cutting enablers	41
6.5	From recommendations to uptake	42
7.	SUMMARY AND NEXT STEPS	43
7.1	Summary	43
7.2	Limitations and what remains to be validated	43
7.3	Next steps	44
7.4	Closing	44
	REFERENCES	45

List of Tables

Table 2.1 - Comparative overview of the four monument-protection regimes (process/governance features)	12
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Table 2.2 - Friction points and reform levers for PED approvals, by jurisdiction (principal output of Section 2)	13
Table 3.1 - The approval pathway mapped to the four cities (decision points, actors, time discipline)	14
Table 3.2 - Where RES/PED applications most commonly stall (bottlenecks), by stage	17
Table 3.3 - Informal enablers observed or inferred, by type	17
Table 4.1 - Barrier dimensions against partner cities (H/M/L = relative severity; readings for the three ULL cities draw on the D3.1 barometer, Koper is a structural inference)	21
Table 4.2 - Barrier dimensions against stakeholder groups (● primary incidence · ○ secondary incidence)	21
Table 5.1 - Overview of the four collaboration models	24
Table 5.2 - Collaboration models against the six barrier dimensions (● primary lever · ○ supporting · → addressed mainly elsewhere)	28
Table 6.1 - Policy recommendations by level	35
Table 7.1 - Next steps by work package	37



1. INTRODUCTION

Europe's historic cities are being asked to do two things at once: reach climate neutrality and safeguard the cultural fabric that gives them their identity. Within the MonuPED project, the first work-package deliverable - D2.1, the *Catalogue of PED solutions for MPAs/MPBs* - established what is technically and legally feasible, surveying how renewable-energy and efficiency measures can be integrated into protected buildings and areas across the EU-27 and documenting good-practice cases (MonuPED D2.1, 2025). Alongside it, D3.1 maps the regulatory and cost limits to PED-related investment in MPAs (MonuPED D3.1, 2026; see §1.2). The present deliverable, D2.2, turns from feasibility to *process*. A solution that is technically sound and legally permissible in principle still has to be agreed by a chain of actors - owners, investors, monument-protection (MP) authorities, municipalities, grid operators and residents - before it can be built. D2.2 is the project's **Collaboration Concept**: it analyses how that agreement is reached today, where it breaks down, and how it can be made more predictable.

1.1 Purpose of this deliverable

This deliverable sits within Work Package 2 ("Concepts for enabling PEDs in MPAs/MPBs") and pursues three linked aims. First, it analyses how MP approval and collaboration processes operate in the four MonuPED partner countries and their pilot settings - both as they are structured in law and as they function in administrative practice. Second, it identifies the barriers to collaboration and to effective PED approval, distinguishing where friction is a matter of formal rules and where it stems from informal dynamics, capacity, or information gaps. Third, on that evidence base it proposes concrete, transferable **collaboration models and process improvements** designed to reduce rejection risk and increase predictability for owners and authorities alike.

In doing so the deliverable operationalises one of MonuPED's guiding ambitions: to move monument protection from a posture defined by what *cannot* be done toward one that articulates actionable "dos" - that is, from opaque, single-track, case-by-case refusal toward transparent, criteria-based cooperation. Consistent with that aim, D2.2 deliberately confines itself to the governance and process dimension. The feasibility of particular technologies is the subject of D2.1; the cost, financing and investment-regulatory dimension is the subject of Work Package 3 (see §1.2). Financial and technical considerations appear here only insofar as they shape how the relevant actors collaborate.

1.2 Position within the MonuPED work programme

MonuPED - *Mainstreaming governance, co-investment and technology solutions for Positive Energy Districts in monument protected areas* - is funded under the Driving Urban Transitions (DUT) Partnership and addresses the friction between PED objectives and the legal, technical and economic constraints of monument-protection regimes in its partner countries and pilot settings (MonuPED D2.1, 2025; MonuPED D3.1, 2026). The project is organised around concepts (WP2), investment, financing and regulatory conditions (WP3), a digital toolkit (WP4), Living Labs (WP5), and dissemination and exploitation (WP6).

D2.2 is best read in relation to three neighbouring strands of work:

- **To D2.1 (WP2).** D2.1 answers the question *what can be done* - a catalogue of heritage-compatible solutions and the regulatory context surrounding them. D2.2 answers the question *how it gets approved and delivered together*. It takes D2.1's menu of feasible interventions as its premise and asks which collaboration arrangements and approval pathways allow those interventions actually to be consented and built.
- **To D3.1 (WP3).** D3.1 maps the most common regulatory limits to PED-related investment in MPAs and their effect on installation costs, drawing on a structured "PED boundary barometer" exercise with the pilot cities (MonuPED D3.1, 2026). D2.2 draws on the same boundary analysis, but for its *process and governance* implications rather than its financing implications: where D3.1 quantifies cost premiums and assesses market viability, D2.2 examines how those



same constraints translate into delay, discouragement or rejection in the approval process, and how collaboration can mitigate them.

- **To WP4 and WP5.** WP4 supplies the digital MonuPED toolkit that the "digital process support" model in §5 integrates into the approval workflow; because the tools are referred to throughout this deliverable, the toolkit is introduced immediately below. WP5's Living Labs are both an input to and the testing ground for this deliverable: the Living Lab designs of D5.1 - including their stakeholder, target-group and multiplier definitions and their documented collaboration challenges - and the Living Lab activities to date feed the analysis of §§3-4, while the four collaboration models of §5 will in turn be validated with the Living Labs and the city-specific application will be co-developed and reported in D5.2 (see §7.3).

The MonuPED toolkit (WP4) at a glance. Because the WP4 tools recur throughout this deliverable, their overall concept is summarised here. The toolkit is a family of digital decision-support instruments that make heritage constraints, energy potential and building evidence shareable among owners, authorities and planners, so that approval discussions start from a common evidence base rather than contested opinion. It comprises the PV-Potential Map with monument-constraint layers and the Roofs & Facades visibility study for Prague 6, which turn the visibility judgment into a simulated, documentable assessment; the Leipzig Energy Map with its Digital Energy Twin, and the Thermal Precision Profiling tool, supporting city-scale energy planning and minimally invasive in-building diagnostics in Leipzig; the Energy & Solar Mapping tool for Alba Iulia; the cross-city RoofMatch application, which matches suitable roofs and their owners with investors; and the digital-twin and agent-based decision tools developed for the Slovenian (Koper) and Austrian (Pinkafeld) case studies. The tools recur in Sections 3 to 5, above all as the substance of Model D; the toolkit's overall concept and architecture are documented in D4.1.

1.3 Geographic and thematic scope

Where D2.1 surveyed the EU-27, D2.2 narrows its focus to the project's pilot settings: the Living Labs **Prague 6** (CZ), **Leipzig** (DE) and **Alba Iulia** (RO), and the case study **Koper** (SI) - "case study" being the term D5.1 uses for Koper and for the Austrian setting Pinkafeld - the Koper core administered by the national Institute for the Protection of Cultural Heritage of Slovenia (ZVKDS) through its regional units (MonuPED D2.1, 2025). The in-depth regulatory comparison that follows covers the four jurisdictions of these settings - Czechia, Germany, Romania and Slovenia. Austria, also represented in the project through the Pinkafeld case study (D5.1), is deliberately not given a separate treatment here: its federal monument-protection framework - the Denkmalschutzgesetz, administered by the Bundesdenkmalamt - enters the analysis through the case-study work and is referenced where relevant. These four jurisdictions were not chosen at random: they represent markedly different regulatory and administrative traditions and, as D3.1 shows, markedly different "enabling environments" - from Germany's comparatively dense and MPA-inclusive support landscape, through Romania's partial enabling framework constrained by an ownership-scale ceiling, to Czechia's near-blanket exclusion of MPAs from component-level support (MonuPED D3.1, 2026). This contrast is what makes the cross-country comparison in §2 analytically useful.

Thematically, the deliverable concerns the **governance and process of monument-protection approval** for PED-relevant interventions, and the **collaboration** between the actors whose alignment determines outcomes: owners - including major institutional owners such as the Czech Bishops' Conference (CBC) - investors, MP authorities at national, regional and municipal levels, municipalities, distribution system operators, energy-service providers and residents. Three adjacent topics are deliberately out of scope and treated elsewhere: detailed technology selection (D2.1); cost, financing and business models (D3.1 and D3.2); and the design and evaluation of the Living Labs themselves (WP5).



1.4 Key terminology

Monument-protected building (MPB). An individually designated or listed structure whose alteration requires prior consent from the competent heritage authority. Protection commonly extends to the building's fabric and external appearance, and in many regimes to protected interiors and fixtures as well (MonuPED D2.1, 2025).

Monument-protected area (MPA). A spatially delimited zone - a conservation area, protected ensemble, historic urban area, or the buffer zone around a monument - within which interventions to buildings, façades, roofscapes, streetscapes and the public realm are regulated even where an individual building is not itself listed. A practically important consequence is that an *unlisted* building standing inside an MPA can still be subject to substantial constraints on what its owner may do (MonuPED D2.1, 2025). The distinction matters for PED planning because district-scale measures necessarily touch the public realm and multiple plots, not only individual listed structures.

Positive Energy District (PED). Following the reference framework developed by JPI Urban Europe with SET-Plan Action 3.2, a PED is an energy-efficient and energy-flexible urban area, or group of connected buildings, that achieves net-zero greenhouse-gas emissions and actively manages an annual local or regional surplus of renewable energy, integrating buildings, their users and the regional energy, mobility and ICT systems within social, economic and environmental sustainability (Gollner, 2020; Bossi et al., 2020). The concept underpins the SET Plan's target, set in 2018, of supporting the design, deployment and replication of 100 PEDs across Europe by 2025; the DUT Partnership has since issued a more operational revision, the "PED Definition Framework 3.0" (PED-EU-NET, 2025). One caveat governs usage throughout: none of the partner countries' legislation yet recognises a PED as a legal category or approval object (§2.5), so references to "PED approval" in this deliverable are shorthand for the approval of the individual renewable-energy and efficiency measures from which a PED is assembled.

Virtual PED. PED configurations are usually distinguished into three archetypes: an *autonomous* (geographically bounded) PED, in which the positive balance is achieved with generation inside the district; a *dynamic* PED, which trades with the wider grid but still generates more than it consumes on site; and a **virtual** PED, in which the renewable production matched to the district's demand need not be located within its boundary at all, but is sited elsewhere and linked contractually or through energy-sharing arrangements (Frontiers in Sustainable Cities editorial, 2022). This archetype is decisive for MonuPED: where on-site generation within an MPA is heavily restricted, coupling protected-zone consumption with off-site renewable production - via renewable-energy-community or energy-sharing legislation transposing RED III - is frequently the only viable route to PED status. It is the second leg of the project's "dual pathway" of geographically bounded *and* virtual PED solutions (MonuPED D3.1, 2026).

Collaboration concept. As used in this deliverable, a collaboration concept is the structured set of governance arrangements, dialogue mechanisms and process improvements designed to align the interests, information and actions of the multiple stakeholders whose consent and cooperation are required to approve and deliver PED solutions in protected contexts. Because such projects typically span at least three regulatory domains that are ordinarily siloed across departments and tiers of government - heritage, energy, and planning/building - the concept is as much about coordination across institutions as it is about the owner–authority relationship (MonuPED D3.1, 2026). The four models proposed in §5 are concrete instantiations of this concept. This working definition, and the governance arrangements built on it, will be validated with the Living Labs as WP5's collaboration structures are put into practice (see §7.3).

1.5 How this document is structured

The remainder of the deliverable proceeds from analysis to recommendation. **Section 2** compares the monument-protection regulatory frameworks of the four partner countries through a process and governance lens, concluding with a comparative matrix that highlights where each national system



creates friction for the approval of PED-relevant measures - renewable-energy and efficiency interventions - and where flexibility or reform levers exist. **Section 3** moves from law on the books to administration in practice, mapping the decision points, actors, timelines and informal dynamics of approval in Prague 6, Leipzig, Alba Iulia and Koper, and identifying both the recurring bottlenecks and the informal enablers that make approval easier in some cases. **Section 4** distils this material into a structured synthesis of barriers to collaboration across six dimensions, cross-referenced to the partner cities and stakeholder groups. **Section 5** is the deliverable's core constructive contribution: four collaboration models - structured pre-application dialogue (Model A), PED working groups (Model B), tiered approval frameworks (Model C) and digital process support (Model D) - each specified in terms of the actors involved, the process steps, the preconditions for applicability and the evidence base from comparator projects (notably SPARCS, POCITYF and +CityxChange). The translation of these general models into city-specific programmes for Prague 6, Leipzig and Alba Iulia is deliberately deferred to D5.2, so that it can be developed and validated together with the Living Labs rather than ahead of them. **Section 6** addresses national and EU-level policy audiences, identifying reform opportunities and proposing language for advocacy. **Section 7** summarises and sets out next steps.

A note on method and sources. All work reported here is desktop research. It draws on the consortium's own analyses - the public deliverable D2.1 and the draft D3.1 are cited where their findings are used - together with primary legislation, heritage-authority guidance and the published outputs of comparator projects. Primary interview and workshop material generated under Tasks 2.1 and 2.2 is incorporated where it is available and is flagged where it would materially deepen the analysis, particularly in Sections 3 and 4; claims are not asserted beyond what the available evidence supports. All sources are gathered in a single consolidated reference list, which is not counted towards the page total.

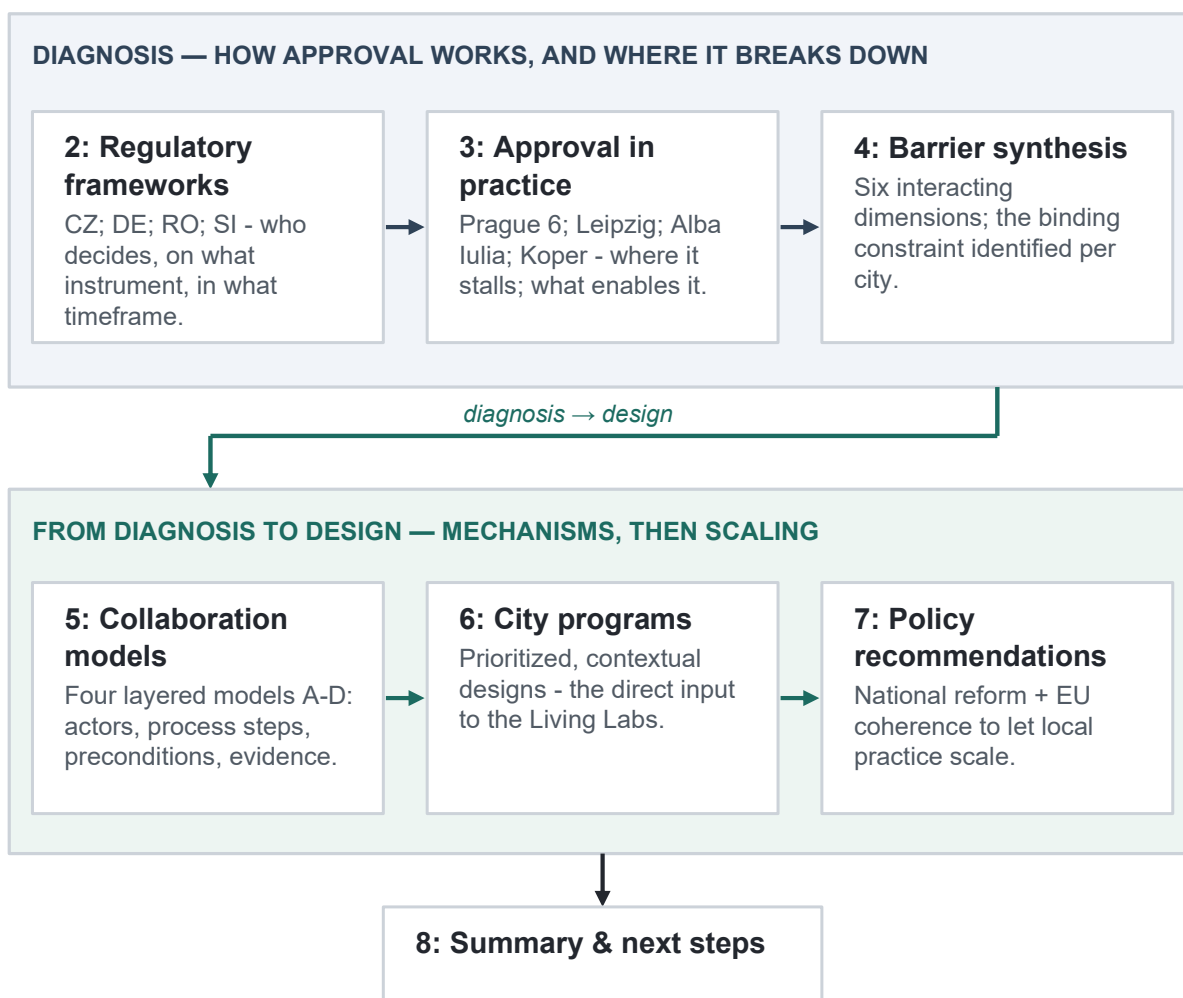


Figure 1. How this deliverable is built: from diagnosis to design



2. COMPARATIVE ANALYSIS OF MONUMENT-PROTECTION REGULATORY FRAMEWORKS

D2.1 established the EU-wide picture of how heritage law and renewable-energy integration interact (MonuPED D2.1, 2025). This section narrows the focus to the four MonuPED partner countries and examines their monument-protection (MP) frameworks specifically through the lens of *process and governance*: who decides, on what legal instrument, within what procedure and timeframe, and with what predictability. The emphasis is deliberate. It is frequently the architecture of the decision - not the substantive conservation rule alone - that determines whether a PED-relevant intervention is approved, delayed, watered down or abandoned. The cost and investment dimension is treated in D3.1 and the substantive catalogue of permissible technologies in D2.1; both are drawn on here only where they illuminate process.

At the level of substance the four systems converge on a shared European canon - authenticity, reversibility and minimal visual impact, framed by the UNESCO and ICOMOS instruments, the heritage exemption in the Energy Performance of Buildings Directive, and the permitting-acceleration architecture of the recast Renewable Energy Directive (RED III) (MonuPED D2.1, 2025; European Parliament and Council, 2023). At the level of governance, however, they diverge sharply: a federal, sixteen-Länder model in Germany; a two-tier advisory/executive split in Czechia; a centralised ministry-and-commission model in Romania; and an institute-issued, building-permit-integrated consent in Slovenia. The subsections below describe each in turn; the section closes with a comparative overview (Table 2.1) and a friction-and-levers matrix (Table 2.2), the latter being the section's principal output.

2.1 Czech Republic

The governing statute is Act No. 20/1987 Coll. on State Monument Care, in force since 1 January 1988, with implementing Decree No. 66/1988 Coll. It is a pre-1989 instrument, widely regarded as dated, and several attempts to replace it with a modern heritage act have failed (Národní památkový ústav [NPÚ], n.d.). Decision-making proceeds in two tiers. The National Heritage Institute (Národní památkový ústav, NPÚ) issues a written **expert opinion** as the technical basis but holds no decision power (§ 14(6)); the **executive** state-administration bodies - the Ministry of Culture, regional authorities, statutory-city magistrates and the municipalities with extended powers (*obce s rozšířenou působností*) - assess that opinion and issue the operative decision, the **binding opinion** (*závazné stanovisko*), wielding what Czech practice calls the "round stamp" (NPÚ, n.d.).

The procedure is owner-initiated: for a cultural monument only the owner may apply, while for non-monument properties inside a reservation, zone or buffer zone the owner, manager or user may apply (§ 14). The authority states whether the works are admissible from the standpoint of state monument care and on what conditions. A statutory deadline applies - 30 days, or 60 in especially complex cases (§ 149(4) of the Administrative Procedure Code, Act No. 500/2004 Coll.) - during which the NPÚ opinion is obtained. Territorial protection operates through monument reservations (*památková rezervace*), monument zones (*památková zóna*, declared by the Ministry of Culture by decree under § 6) and buffer zones (*ochranné pásmo*, declared by municipalities with extended powers under § 17). Prague's historic core is a monument reservation overlapping the UNESCO World Heritage property, and Prague 6 includes a designated urban monument zone (Dejvice–Bubeneč–upper Holešovice), the setting of the project's Archiepiscopal Seminary case (MonuPED D2.1, 2025). Under the new Building Act (Act No. 283/2021 Coll.) the heritage authority acts as a "concerned authority" feeding a binding opinion into the building procedure, with provision for a *coordinated* binding opinion; where public interests conflict, the coordinated opinion cannot issue until reconciliation has been attempted - simplification for the applicant, but added coordination demands on the authorities.

On renewables, NPÚ and the Ministry of Culture published a methodology for photovoltaic systems in monument care in 2022, conditionally accepting PV on non-visible or flat roofs within conservation zones and prioritising invisibility from the street and reversibility (MonuPED D2.1, 2025). Two features



generate process friction. First, the methodology is not legally binding and NPÚ's role in concrete rooftop-PV permitting is only advisory (§ 14(6)); authorities tend to follow it in practice, but its status is interpretive rather than normative, and legal commentators note that blanket restrictions on PV at monuments raise proportionality concerns and are corrected only *ex post* by the administrative courts (Doucha Šíkola advokáti, 2022). Second, the advisory/decision split can yield divergence between NPÚ's expert view and the authority's decision, and there are no PED-specific criteria for district-scale measures. The principal reform levers are correspondingly clear: harden and extend the 2022 PV methodology toward PED scale and greater determinacy; use the coordinated binding opinion as a genuine cross-domain coordination hook; and exploit the 2024 energy-sharing and energy-community framework as the legal vehicle for virtual-PED configurations that sidestep on-site restrictions (MonuPED D3.1, 2026).

2.2 Germany (Saxony / Leipzig)

In Germany heritage protection is a competence of the Länder; there is no single federal monument law but sixteen *Landesdenkmalschutzgesetze*, producing real variation in procedure and terminology (MonuPED D2.1, 2025). Leipzig is governed by the Saxon Monument Protection Act (*Sächsisches Denkmalschutzgesetz*, SächsDSchG, 1993). Alterations to a cultural monument require a monument permit (*denkmalschutzrechtliche Genehmigung*). The **lower monument authorities** (*untere Denkmalschutzbehörden*) decide - in Leipzig, a *Kreisfreie Stadt*, this sits with a department of the city administration itself, the Office for Building Regulation and Preservation of Monuments (*Amt für Bauordnung und Denkmalpflege*) - exercising these as delegated tasks subject to instruction (*Weisungsaufgaben*); the **State Office for the Preservation of Monuments** (*Landesamt für Denkmalpflege*), together with the State Office for Archaeology, is the expert authority (*Fachbehörde*) providing specialist input, and a *Denkmalrat* advises at the top tier (SächsDSchG, 1993). The monument permit may be obtained separately or, where a building permit is required, addressed within it, depending on the measure.

Saxony has moved deliberately to enable solar energy on monuments. A decree of the Saxon State Ministry for Regional Development of 12 January 2023 instructs the authorities to exhaust their assessment discretion in favour of approval and to advise owners on minimising impairment so that approval becomes possible; the Landesamt für Denkmalpflege and the Saxon Energy Agency (SAENA) jointly issued a practical guide, *Denkmalschutz und Solarenergie in Sachsen* (2023), including an application checklist. Practice reportedly approves most solar installations on monuments where the relevant principles are observed - the near-invisible rooftop PV on Leipzig's Nikolaikirche being one cited example (Landesamt für Denkmalpflege Sachsen & SAENA, 2023). Above the Länder laws sits a powerful federal lever: § 2 of the Renewable Energy Sources Act (EEG 2023) declares the construction and operation of renewable-energy installations to be in the "overriding public interest" (*überragendes öffentliches Interesse*) and to serve public safety, and requires that - until electricity generation is nearly greenhouse-gas-neutral - renewables be entered as a *priority concern* into all statutory weighing decisions, expressly including Länder heritage law. The Higher Administrative Court of Greifswald held that this produces a "regular overweight" of renewables in the heritage-law balancing test, surmountable only in atypical, specifically justified exceptional cases (OVG Mecklenburg-Vorpommern, 2023; Sailer & Miltz, 2023). Two qualifications matter for PEDs: a case-by-case weighing is still required, and § 2 EEG does not apply where the governing provision leaves no weighing discretion; moreover the leading case law concerned wind energy, so its force for rooftop PV on a highly graded monument is real but not automatic (Sailer & Miltz, 2023).

Even in this comparatively enabling setting, friction persists at the process level. D3.1 characterises Leipzig's challenge not as exclusion but as one of coordination and scaling within an otherwise favourable framework, with the absence of comprehensive planning tools hindering streamlined approvals - most acutely for small-scale installations such as balcony PV (MonuPED D3.1, 2026). The reform levers are, on balance, the strongest of the four: a statutory pre-weighting that penetrates heritage law (§ 2 EEG), an explicit pro-approval administrative decree, and published guidance with a



checklist. The open question is consistency of application across authorities and across monument grades.

2.3 Romania (Alba Iulia)

Romania is governed by Law No. 422/2001 on the protection of historical monuments (republished). Monuments are classified into *grupa A* (national and universal value) and *grupa B* (representative of local heritage) (Art. 8). Consent is centralised: interventions on historical monuments are made only on the basis of and in compliance with the **endorsement** (*aviz*) issued by the Ministry of Culture or, as the case may be, its deconcentrated public services - the county culture directorates (*Direcțiile Județene pentru Cultură*) (Art. 23). Interventions on **non-monument** buildings located within a monument's protection zone or in a protected built area likewise require the *aviz*, alongside the other statutory endorsements (Art. 24). The *aviz* is a precondition for the building permit (*autorizație de construi*). Expert endorsement feeding the *aviz* comes from the National Commission of Historical Monuments (*Comisia Națională a Monumentelor Istorice*, CNMI - 21 members) and its regional/zonal commissions (nine members each, chaired by CNMI members), which endorse urban-planning documentation for *grupa B* and execution projects in *grupa A* zones under CNMI-approved regulations (Law No. 422/2001, Arts. 21–24). The statute's own exceptions are revealing: force-majeure and urgent interventions are admitted only if reversible, and archaeological discharge (*descărcarea de sarcină arheologică*), on the National Archaeology Commission's endorsement, is required for ground works at archaeological sites.

The process friction is structural. The substantive decision is concentrated in the Ministry/CNMI chain, processing is committee-paced and can be slow, and there are no PED-specific guidelines or published evaluation methodology for renewables in protected fortress contexts (MonuPED D3.1, 2026). For Alba Iulia the difficulty is compounded by the object itself: the Alba Carolina (Vauban) citadel - the largest bastion fortress of its kind in Romania and on the UNESCO tentative list - is a protected ensemble of national importance comprising many separately owned and administered buildings, so procedural centralisation meets ownership fragmentation (MonuPED D3.1, 2026). The reform levers, however, are also identifiable in the law: Law No. 422/2001 empowers CNMI to endorse methodologies and technical norms, which offers a direct route to adopting a PED/RES-in-MPA methodology where none exists; the regional-commission tier could be used to build local interpretive consistency; and Romania's energy-community framework - Government Ordinances 143/2021 and 163/2022, and GO 59/2025 transposing RED III - supplies the legal vehicle for virtual PEDs, which D3.1 identifies as essential given the private-DSO context in Alba Iulia (MonuPED D3.1, 2026).

2.4 Slovenia (Koper)

Slovenia is governed by the Cultural Heritage Protection Act (*Zakon o varstvu kulturne dediščine*, ZVKD-1, Official Gazette 16/2008, as amended), implemented by the Institute for the Protection of Cultural Heritage of Slovenia (ZVKDS) through its regional units - for Koper, the Piran unit (MonuPED D2.1, 2025; ZVKD-1). The consent mechanism is two-step and procedurally integrated. An applicant must first obtain **cultural-heritage conditions** (*kulturnovarstveni pogoji*, Art. 29) from ZVKDS and then the **cultural-heritage consent** (*kulturnovarstveno soglasje*, Arts. 28 and 30). For interventions that require a building permit, the consent is issued as a **project consent** (*projektno soglasje*) within the building-permit framework, folding heritage approval into the construction-permit process rather than running it as a wholly separate track (ZVKD-1, Arts. 28–30).

Several procedural features favour the applicant. If, on the conditions application, ZVKDS finds the intervention acceptable and conditions unnecessary, that application is treated as a consent application and consent issues directly; conversely, a plainly inadmissible intervention is refused at that stage (Art. 29(11)). A **deemed-consent** rule applies: consent is taken to have been granted where the conditions were obtained and ZVKDS has not decided otherwise within 15 days of the consent application (Art. 30(2)). For major interventions a conservation plan (*konservatorski načrt*) is required, and ZVKDS may prescribe the method of execution and of expert supervision in the consent itself (ZVKD-1, Art. 30). In Koper the historic core is protected as a cultural monument of local importance (Mestna občina Koper,



n.d.) and lies on the archaeological "red list," so subsurface and ground-source options are effectively foreclosed and reversible, non-visible roof-integrated PV - or off-site generation on the adjacent port-area roofs - become the realistic routes (Mestna občina Koper, n.d.; MonuPED D2.1, 2025).

The residual friction is the substantive discretion ZVKDS retains through the conditions and consent it sets, the conservation-plan burden for larger works, and - as everywhere - the absence of PED-specific criteria. On balance, though, the integration of heritage consent into the building-permit project-consent system, together with the deemed-consent deadline, makes Slovenia the most procedurally streamlined and time-bounded of the four on paper. The levers build on these strengths: the conditions-first model and the 15-day deadline already give applicants early certainty and a documentation roadmap, while Slovenia's RED III transposition (energy communities and self-consumption) supplies the virtual-PED vehicle that Koper's port-area generation potential makes concrete (MonuPED D2.1, 2025; European Parliament and Council, 2023).

2.5 Cross-country comparison

Read side by side, the four regimes share an identical substantive test but distribute the decision very differently in institutional space and time. Table 2.1 summarises the structural and procedural features; Table 2.2 then translates these into the friction points and reform levers most relevant to PED approvals.

Table 2.1 - Comparative overview of the four monument-protection regimes (process/governance features)

Feature	Czechia	Germany (Saxony)	Romania	Slovenia
Primary heritage law	Act 20/1987 Coll. (+ Decree 66/1988)	SächsDSchG 1993 (one of 16 Länder laws)	Law 422/2001	ZVKD-1 (OG 16/2008, amended)
Protection competence	National (tiered state administration)	Länder (federal states)	National (Ministry of Culture)	National (state, via ZVKDS)
Body that decides the consent	Executive organs: Ministry of Culture / regional authorities / extended-powers municipalities	Lower monument authority - (for Leipzig, the Office for Building Regulation and Preservation of Monuments within Leipzig municipality)	Ministry of Culture or county culture directorate (DJC)	ZVKDS (regional unit)
Expert / advisory body	NPÚ - no decision power	Landesamt für Denkmalpflege (Fachbehörde)	CNMI + regional commissions	ZVKDS (advice and decision integrated)
Core consent instrument	Binding opinion (<i>závazné stanovisko</i>)	Monument permit (<i>denkmalschutzrechtliche Genehmigung</i>)	Endorsement (<i>aviz</i>)	Conditions + consent (<i>pogoji + soglasje</i>)
Statutory time-limit	30 days (60 if complex)	None specific (case-by-case)	None specific (commission-paced)	15 days → deemed consent
Link to building permit	Concerned-authority input; coordinated binding opinion (Act 283/2021)	Within or alongside building permit, per measure	<i>Aviz</i> is a precondition for the permit	Issued as project consent inside the permit process
Area / zone protection	Reservations, zones, buffer zones	Monuments + ensembles (<i>Ensembleschutz</i>)	Protection zones + protected built areas	Heritage areas + monument zones
Statutory pro-renewables weighting	None (non-binding 2022 PV methodology)	§ 2 EEG 2023 - "overriding public interest"	None	None
Published RES / solar guidance	NPÚ/MoC PV methodology (2022)	Saxon decree (2023) + LfD/SAENA guide	None PED/RES-specific	None PED/RES-specific
Virtual-PED legal vehicle	Energy-sharing / community framework (2024)	Energy sharing / <i>Mieterstrom</i> ; EEG	Energy communities (GO 143/2021, 163/2022, 59/2025)	Energy communities / self-consumption (RED III)



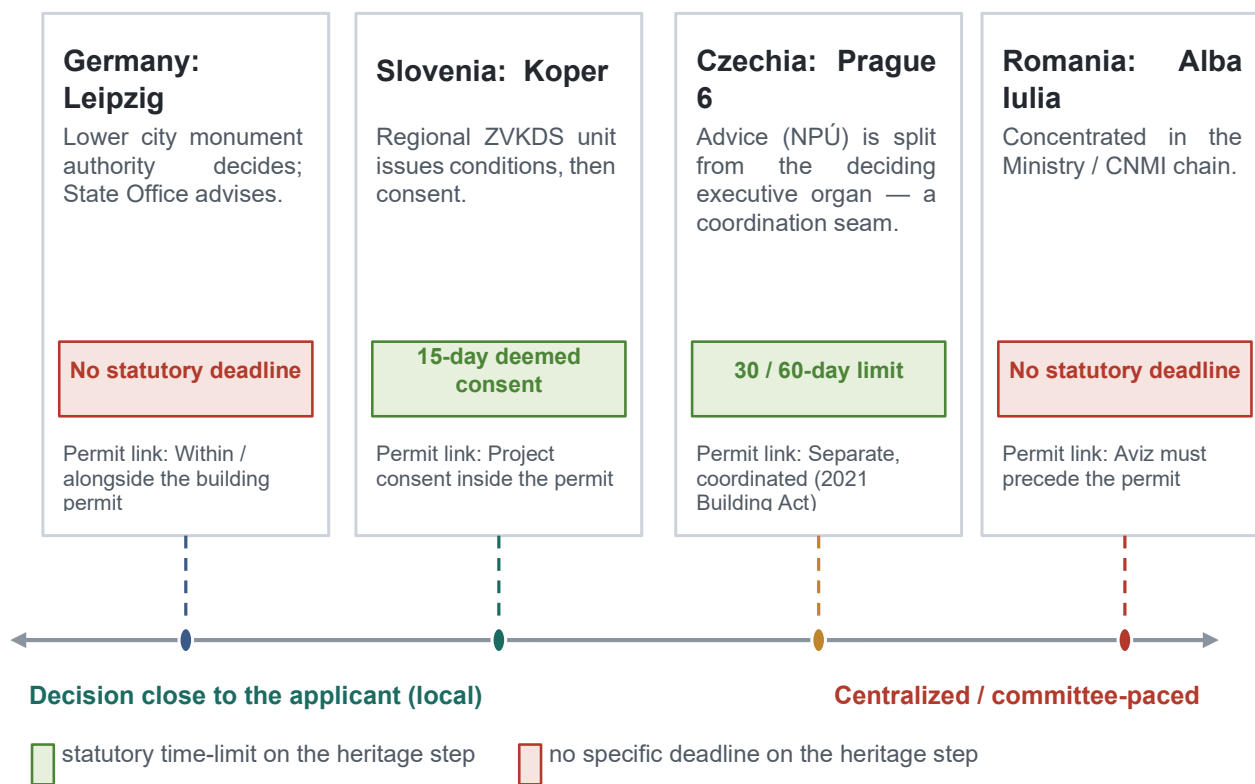
Four contrasts stand out. **Decision locus:** the decision sits closest to the applicant in Germany (the lower city authority) and Slovenia (the regional institute unit); Czechia separates advice (NPÚ) from decision (the executive organ), creating a coordination seam; Romania concentrates it in the Ministry/CNMI chain, the most centralised arrangement and the most exposed to backlog. **Time discipline:** only Slovenia (15-day deemed consent) and Czechia (30/60-day statutory limit) attach explicit deadlines to the heritage decision; Germany and Romania are, in practice, less time-bound. **Integration with the building permit:** Slovenia is the most integrated (project consent), Czechia now coordinated under the 2021 Building Act, Germany integrated or parallel by measure, and Romania sequential (the *aviz* must precede the permit). **Pro-renewables weighting:** Germany alone has a statutory pre-weighting (§ 2 EEG) that reaches into heritage law; the others rely on case-by-case discretion, supplemented in Czechia by a non-binding methodology. The common gap is equally important: none of the four has PED-specific or district-scale approval criteria - unsurprising, given that the PED concept itself has no footing yet in any of the four countries' legislation (see the note in §1.4) - and all apply the same substantive triad - reversibility, invisibility and minimal impact - case by case (MonuPED D2.1, 2025).

Table 2.2 - Friction points and reform levers for PED approvals, by jurisdiction (principal output of Section 2)

Jurisdiction	Principal process / governance friction for PED approvals	Flexibility / reform levers
Czechia	Advisory NPÚ and deciding executive can diverge; outdated 1987 statute; PV methodology only advisory; no PED-scale criteria; proportionality enforced only <i>ex post</i> by courts	Harden and extend the 2022 PV methodology to PED scale; use the coordinated binding opinion (Act 283/2021) as a coordination hook; 2024 energy-sharing framework for virtual PEDs
Germany (Saxony)	Case-by-case handling with limited written guidance; difficulty identifying the right contact/channel; lengthy applications; no PED-scale tooling; uneven application across authorities and monument grades	§ 2 EEG statutory pre-weighting penetrating heritage law; pro-approval Saxon decree (2023) + LfD/SAENA guide; mature energy-sharing / <i>Mieterstrom</i> routes
Romania	Centralised Ministry/CNMI decision chain → bottleneck and delay; committee-paced; <i>aviz</i> required even in protection zones; no PED/RES methodology; fortress ownership fragmentation	CNMI power to endorse methodologies → adopt a PED/RES-in-MPA method; use regional commissions for local consistency; energy-community law (incl. GO 59/2025) for virtual PEDs
Slovenia	ZVKDS retains substantive discretion via conditions/consent; conservation-plan burden for major works; archaeological "red list" forecloses subsurface options; no PED criteria	Deemed-consent deadline (15 days) + conditions-first certainty; consent integrated as project consent; RED III energy communities + port-area off-site PV (Koper)
Cross-cutting (EU)	RED III acceleration may bypass historic cores (heritage areas are commonly excluded from acceleration areas); the overriding-public-interest presumption may be limited for heritage; EPBD solar duties exempt protected buildings - so MPAs risk being left outside the "fast lane"	Member-State discretion to extend single contact points, digital permitting and statutory deadlines to MPAs; targeted heritage-PED guidance; energy-community routes as the common enabler of virtual PEDs

In short, each national system offers at least one structural strength that a collaboration concept can build on - Germany's statutory pre-weighting and guidance, Czechia's deadline and published methodology, Slovenia's integration and deemed-consent rule, and Romania's commission-endorsed methodology route - while all four share the same core deficits: no PED-scale criteria, a substantive test applied case by case, and an energy/heritage/planning interface that is coordinated only weakly. How these formal frameworks actually behave when an owner approaches them - where applications stall, and what makes some succeed - is the subject of Section 3.





Common gap: none of the four regimes defines PED-scale, district-level approval criteria.

Figure 2. Where the heritage decision sits across the four regimes



3. HOW MONUMENT-PROTECTION APPROVALS ARE MADE IN PRACTICE

3.1 Approach and evidence base

Section 2 set out how the four systems are structured in law. This section examines how they behave in practice in the three Living Labs and case study Koper, because for renewable-energy (RES) and PED-relevant interventions the outcome turns less on the text of the consent rule than on three things the statute does not fully determine: how administrative discretion is exercised against a case-by-case judgment of heritage significance; how early and how well the applicant engages the heritage authority before formally applying; and how the heritage decision is coordinated with the building permit and with the energy and planning domains around it. These are features of *every* discretionary heritage regime. Authoritative guidance is explicit that taking heritage-skilled advice from the outset improves the quality of proposals and makes applications simpler and quicker for authorities to handle (Historic England, 2021); the corollary is that where such advice is unavailable, under-resourced or applied inconsistently from one officer or authority to the next, unpredictability becomes the dominant experience for applicants.

A note on the evidence base is owed here. In the absence of the consortium's Task 2.1 and Task 2.2 interview and workshop record, this section reconstructs the process from four sources: the formal structure (Section 2); the documented findings of the MonuPED "PED boundary barometer" for the Living Labs Prague 6, Leipzig and Alba Iulia (MonuPED D3.1, 2026); documented local precedents - SPARCS in Leipzig, and +CityxChange and EMERGE in Alba Iulia (MonuPED D3.1, 2026; SPARCS, n.d.); and the general literature on discretionary heritage decision-making. Named-case timelines, officer-level practices and applicant testimony are deliberately not invented; the workshop record should be used to add them, and the points at which it would do so are flagged. Koper is treated as a case study - the term used in D5.1 for Koper and Pinkafeld - and more structurally than the three Living Labs, because it was not part of the barometer exercise and the confidential Living Lab material is not relied on here.

3.2 The common approval pathway

Beneath the procedural differences, all four cities route a PED-relevant intervention through the same sequence - a preparatory feasibility stage and four formal stages:

- **Stage 0 - feasibility and options assessment.** Before the heritage pathway is engaged at all, the owner or investor establishes which PED measures are technically and economically feasible for the specific building - drawing on the D2.1 catalogue, energy advisers and the WP4 tools. Most owners do not yet know what a PED is or which solutions their building could carry; without this preparatory step, the pathway below is never entered.
- **Stage 1 - pre-application (informal).** The owner or investor explores feasibility, ideally consults the heritage authority or its expert body, and prepares a significance/heritage rationale. Most of the substantive shaping happens here, and it is largely informal. In practice the stage takes different forms: on- and off-site consultation with authority officers or experienced architects - typically reserved, given the resources it demands, for special or unique ensembles such as the Baumwollspinnerei - or guidance through analogue and digital materials for standard building types.
- **Stage 2 - heritage consent (formal).** The applicant seeks the binding instrument (binding opinion, monument permit, *aviz*, or consent), expert input is obtained, and a decision issues, usually with conditions.
- **Stage 3 - building permit.** The heritage consent feeds - sequentially or integrated - into the construction permit.



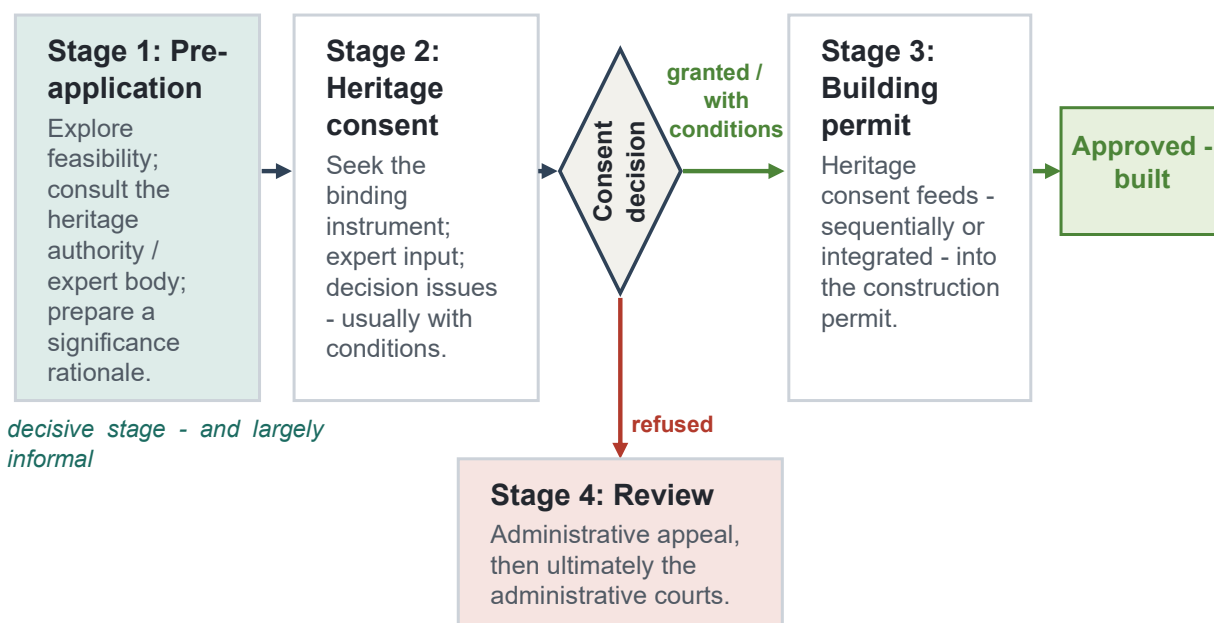
- **Stage 4 - review.** If refused, an administrative appeal and, ultimately, the administrative courts are available. Table 3.1 maps these stages to each city, providing the decision points, actors, instruments and time discipline in compact form; the stakeholder groups engaged at each stage follow the definitions of D5.1 (Living Lab Design).

Two boundary notes apply to the pathway. First, heritage consent and the building permit are not the whole of it: implementation ordinarily also requires consents outside this model's scope - above all the grid-connection process with the distribution system operator for generation assets - and this wider sequence is the basic process every owner or investor has to go through; the pathway isolates its heritage-specific steps. Second, where ground works are involved, archaeological screening belongs to Stages 0-1 and formal clearance or discharge to Stage 2, as the Romanian and Slovenian regimes make explicit (Section 2).



Table 3.1 - The approval pathway mapped to the four cities (decision points, actors, time discipline)

Stage	Czechia - Prague 6	Germany - Leipzig	Romania - Alba Iulia	Slovenia - Koper
Pre-application: who is engaged	NPÚ regional office (expert) + Prague City Hall heritage dept. (MHMP OPP)	City lower monument authority + Landesamt für Denkmalpflege	County culture directorate (DJC Alba); CNMI/zonal commission for fortress	ZVKDS regional unit Piran (conditions stage)
Formal instrument · decision-maker	Binding opinion (<i>závazné stanovisko</i>) · executive organ (MHMP/regional)	Monument permit (<i>denkmalrechtliche Genehmigung</i>) · city lower authority	Endorsement (<i>aviz</i>) · Ministry of Culture / DJC + CNMI	Consent (<i>soglasje</i>) · ZVKDS
Time discipline on the heritage step	30 days (60 if complex), statutory	None specific (case-by-case)	None specific (commission cadence)	15 days → deemed consent
Link to building permit	Separate; coordinated binding opinion under 2021 Building Act	Within or alongside the building permit	Aviz must precede the building permit	Project consent inside the building permit
Key supporting document	Visibility/heritage rationale (Roofs & Facades simulation, D4.3)	Heritage rationale + LfD/SAENA checklist	Expert study and documentation for the commission	Conservation plan (for major works)
Review / appeal	Appeal to superior body, then administrative courts	Administrative objection (where applicable), then administrative court	Administrative-contentious court	Appeal to the Ministry, then Administrative Court



Time discipline (heritage step): CZ 30 / 60 d; SI 15 d (deemed consent); DE & RO none specific

Heritage instrument: binding opinion (CZ); monument permit (DE); aviz (RO); consent (SI)

Figure 3. The common approval pathway - the four formal stages (preceded by the Stage 0 feasibility assessment)

3.3 Signals from the Living Labs (WP 5)

Early Living Lab engagement in the three cities during 2025 and 2026 - still preliminary, and weighted toward the process of collaboration rather than a systematic record of decisions - anticipates and corroborates the central claim of this section - and, since WP5 is designed to feed WP2, is presented



here up front, before the city accounts that build on it: that the difficulty lies in the approval process rather than in the existence of a compatible solution. In LL Prague 6 a process-focused workshop brought the municipality, the Bishops' Conference and the monastery's technical manager together expressly to share experience of monument-protected renovations and the approval pathway, and to identify its bottlenecks. A recurring observation was that owners and users have too little awareness of how monument-protection approval actually works. The partners' response - a citizen-facing guide to the process, taken to publication - is itself an instance of the early, documented steer that Model A formalises. In Leipzig Baumwollspinnerei, practitioners describe the binding difficulty as coordination across municipal departments - identifying the right contact, aligning schedules and reconciling comments over several rounds - and report that an in-person round table is markedly more productive than a sequential written exchange with legal advisers; their exchanges with the monument authority frame the explicit aim as standardising and simplifying approval, against the high administrative effort that individual permits currently demand. In Alba Iulia, a workshop convening the fortress's institutional owners - academic, religious, cultural and administrative - surfaced the national framework as limiting many solutions and, more pointedly, the absence of any legal basis for energy-sharing between owners as the main brake on interest; subsequent work tested candidate solutions for compliance with heritage law and ran into the practical task of assembling building data across many separate owners. These signals are consistent with the bottlenecks and enablers set out above; they are emerging rather than conclusive, and several planned activities remain in progress.

3.4 Living Lab Prague 6 (Czechia)

In Prague the binding-opinion track is held by the City Hall heritage department for the territory, with the National Heritage Institute's regional office supplying the expert opinion; Břevnov Monastery, as a national cultural monument, engages the regional-authority competence, while the Archiepiscopal Seminary sits within a designated monument zone (Section 2). Informal pre-application consultation with the heritage institute is the norm and is where a proposal is shaped to pass the invisibility-and-reversibility test; the building permit then runs on a separate track under the post-2024 building-permit system.

The bottlenecks are well defined. First and most decisive is the **visibility assessment from protected viewpoints** - the criterion on which rooftop PV most often turns, with no transparent metric, which is precisely why the project's Roofs & Facades study (D4.3) builds a visibility simulation from significant viewpoints (MonuPED D3.1, 2026). Second is the **unpredictability of the binding opinion**: with the 2022 PV methodology only advisory and substantial discretion in play, the barometer records that the absence of an official methodology produces unpredictable, sometimes rejected applications that deter investors (MonuPED D3.1, 2026). Third is the **advisory/decision seam** - the expert opinion of the institute and the decision of the City Hall can diverge. Fourth is the **discouragement effect** of the wider "double exclusion": a PED has no legal status and component-level RES support does not apply in MPAs, so many owners are dissuaded before they engage at all (MonuPED D3.1, 2026).

The informal enablers are equally identifiable. Pre-application dialogue with the heritage institute remains the main route to a workable scheme. The **CVUT/CBC working group launched in late 2023** - bringing Czech Technical University, the Czech Bishops' Conference and monument-protection authorities into a standing channel - is a nascent institutional enabler that converts ad hoc contact into ongoing dialogue (MonuPED D3.1, 2026). The Bishops' Conference itself, as a portfolio-scale institutional owner with repeated interactions, has the standing and capacity of a repeat player. And the visibility-simulation/3D-model approach is an emerging interpretive practice that turns a subjective aesthetic judgment into a sharable evidence base. (Actual elapsed times and officer-level practice in Prague 6 should be drawn from the T2.1/T2.2 record.)

3.5 Living Lab Leipzig Baumwollspinnerei (Germany)

In Leipzig the city's Office for Building Regulation and Preservation of Monuments (lower monument authority) decides the monument permit with the Saxon State Office advising. The distinctive feature is



that the Saxon decree of January 2023 effectively *formalises constructive pre-application dialogue*: it instructs authorities to exhaust their assessment discretion in favour of approval and to advise owners how to minimise impairment so that approval becomes possible (Landesamt für Denkmalpflege Sachsen & SAENA, 2023). Above this sits the § 2 EEG pre-weighting, which shifts the default of the heritage balancing test toward renewables (Section 2). The Living Lab Baumwollspinnerei operates within this setting on the back of a stakeholder network built during SPARCS - the Horizon 2020 smart-city lighthouse project (2019–2024) in which Leipzig, with the Baumwollspinnerei among its demonstration areas, piloted positive-energy solutions and built the co-creation network drawn on throughout this deliverable (SPARCS, n.d.; sparcs.info; sparcs-leipzig.info).

The bottlenecks are characteristic of an otherwise enabling system. The barometer locates the friction at **small-scale installations** - balcony and rooftop PV - for which comprehensive planning tools and clear thresholds are lacking, exactly where application volume is highest (MonuPED D3.1, 2026). **Identifying the right contact and communication channel**, and the case-by-case handling with limited written guidance, are recurrent process frustrations (MonuPED D3.1, 2026). At the Baumwollspinnerei the estate is under single ownership - the Leipziger Baumwollspinnerei Verwaltungsgesellschaft, an MIB subsidiary - so the difficulty is not assembling owner consents but the **multi-tenant structure**: many tenants with limited investment stakes complicate engagement; **neighbourhood-scale coordination** beyond the estate boundary, for energy sharing and shared heat, does require multiple owners and actors to align (MonuPED D3.1, 2026).

The informal enablers are the strongest of the four cities. The **SPARCS legacy** is a durable, trust-based cooperation channel among the city, the grid operator, the energy-service provider and owners - an existing ecosystem rather than one built from scratch (MonuPED D3.1, 2026; SPARCS, n.d.). Documented **precedents** such as the near-invisible rooftop PV on Leipzig's Nikolaikirche function as worked examples of an "acceptable" solution in the Saxon guidance (Landesamt für Denkmalpflege Sachsen & SAENA, 2023). The **Saxon decree and LfD/SAENA checklist** operate as a quasi-formal interpretive practice tilting decisions toward approval, reinforced by the § 2 EEG weighting in the background. The intensity of engagement also tracks the site: for an ensemble of the Baumwollspinnerei's uniqueness and significance to Leipzig's industrial heritage, frequent on- and off-site consultation is warranted; for standard building types such as the Gründerzeit dwellings of roughly 1850–1918 that dominate the protected stock, far less effort is - or realistically can be - invested, which is exactly where standardised guidance and desk-based tools must substitute (Models C and D). (The small-scale-PV bottleneck and the Baumwollspinnerei engagement dynamics would be sharpened by the workshop record.)

3.6 Living Lab Alba Iulia (Romania)

In Alba Iulia the *aviz* runs through the county culture directorate and, for *grupa A* works in the fortress, the Ministry and the National Commission with its zonal commission; the *aviz* must precede the building permit issued by the municipality, and ground works trigger archaeological discharge given the Roman Apulum layers beneath the citadel (the Principia museum sits over the legionary headquarters). Because the municipality is frequently both owner and applicant for fortress buildings, it can coordinate a good deal internally before approaching the heritage chain.

The bottlenecks are structural. **Centralisation and committee cadence** concentrate the substantive decision in the Ministry/CNMI chain and pace throughput by the commission cycle, against a backdrop in which there are no clear PED guidelines for fortress areas and no evaluation methodology (MonuPED D3.1, 2026). **Ownership fragmentation** across the many separately administered buildings of the Vauban citadel makes assembling a district-scale proposal a coordination problem in its own right, before any *aviz* is sought. **Archaeological constraints** foreclose subsurface options and add discharge steps. And the **EU-funding dependency** with a thin domestic commercial market discourages applications that are not grant-backed (MonuPED D3.1, 2026).



The informal enablers centre on capacity and precedent. The municipality's two-decade record of delivering EU-funded projects, with in-house project teams, gives it the administrative capacity of a strong repeat player (MonuPED D3.1, 2026). Documented **precedents within the fortress** - the Positive Energy Block replication tested as a +CityxChange Follower City, and the best-practice and obstacle analysis from the EMERGE project - provide local interpretive reference points and an existing relationship base with stakeholders (MonuPED D3.1, 2026). Alignment with the municipal climate plan (PAASC) supplies political backing, and the energy-community route (GO 59/2025) is the legal enabler for the virtual-PED workaround that the private-DSO context requires. (The actual *aviz* timelines and the division of practice between the directorate and the National Commission for specific fortress buildings should come from the workshop record.)

3.7 Case study Koper (Slovenia)

In Koper, the Piran regional unit of the heritage institute issues conditions and then consent, integrated as a project consent into the building permit, subject to the 15-day deemed-consent rule, with a conservation plan required for major works (Section 2). The old town's status as a protected cultural monument and its location within a register of archaeological areas together shape what is even worth proposing: subsurface and ground-source options are effectively foreclosed, so reversible, non-visible roof-integrated PV - or off-site generation on the adjacent port-area roofs - are the realistic routes (Mestna občina Koper, n.d.; MonuPED D2.1, 2025). This account is structural and should be corroborated and extended with the heritage institute's own practice data for the Piran unit.

The bottlenecks follow from that picture: the **archaeological designation** forecloses subsurface and ground-source options and adds archaeological steps; **ZVKDS discretion** through the conditions and consent, and the **conservation-plan burden** for larger works, remain; the **Mediterranean roofscape** of visible, low-pitch clay-tiled roofs narrows the tolerance for visible roof PV; and there are **no PED-scale criteria**. The informal enablers, by contrast, are partly built into the procedure: the **conditions-first model functions as a structured pre-application dialogue** that gives an early, documented steer of a kind the other systems achieve only informally; the **deemed-consent deadline** disciplines time; the **port-area off-site option** is a concrete virtual-PED enabler; and reversible, non-visible roof PV is the recognised, approvable intervention type. (Practice data from the Piran unit and any Koper applicant experience are needed to move beyond this structural account.)

3.8 Cross-city synthesis: bottlenecks and informal enablers

Across the three Living Labs and the Koper case study, the decisive stage is Stage 1 - the **informal, pre-application** stage. Where a constructive dialogue exists - formalised in the Saxon decree, built into the Slovenian conditions stage, emerging through the Prague CVUT/CBC group, or carried by Alba Iulia's municipal project capacity - proposals are shaped to succeed and outcomes improve. Where it is absent or under-resourced, unpredictability and discouragement dominate, and the experience is the one the barometer records for Prague: rejected applications that deter the next applicant (MonuPED D3.1, 2026). The recurring choke points and enablers are summarised in Tables 3.2 and 3.3.

Table 3.2 - Where RES/PED applications most commonly stall (bottlenecks), by stage

Stage / locus	Typical bottleneck for RES/PED solutions	Most acute in
Stage 1 - pre-application	No transparent acceptability criteria; advice quality and availability vary; discouragement before applying	All; LL Prague (unpredictability + "double exclusion")
Stage 2 - heritage assessment	Visibility/aesthetic judgment without a metric; reversibility demands; case-by-case handling	All; LL Prague & Koper (roofscapes)
Stages 2-3 - advisory/decision or aviz/permit seam	Expert advice and decision can diverge; sequential <i>aviz</i> delays the permit	LL Prague (institute ↔ City Hall); LL Alba Iulia (commission cadence)



Stage / locus	Typical bottleneck for RES/PED solutions	Most acute in
Stages 0-2 - ground / subsurface works	Archaeological clearance and discharge	LL Alba Iulia (Apulum); Koper (archaeological register); LL Prague (reservation)
Cross-stage - district scale	Ownership fragmentation; multiple consents to assemble; no PED criteria	LL Alba Iulia (fortress); LL Leipzig (neighbourhood scale / tenants)
Cross-stage - small-scale volume	Balcony/rooftop PV lacking thresholds and tools	Leipzig

Table 3.3 - Informal enablers observed or inferred in the city accounts (§§3.4–3.7), by type

Type of enabler	Manifestation	Living Labs
Repeat-player capacity	Portfolio-scale institutional owners and capable municipalities	Prague (Bishops' Conference); Alba Iulia (municipality)
Standing dialogue channels	Working groups and cooperation networks	Prague (CVUT/CBC group); Leipzig (SPARCS network); Koper (conditions dialogue)
Documented precedents	Visible "acceptable" solutions that make the threshold legible	Leipzig (Nikolaikirche PV); Alba Iulia (+CityxChange PEB); Prague (PV methodology examples)
Interpretive steers	Guidance and statutory weighting that shift the default toward approval	Leipzig (Saxon decree; § 2 EEG); Koper (conditions-first)
Decision-support tooling	Visibility simulation, 3D models, solar/heritage mapping	Prague (Roofs & Facades); all
Time-discipline rules	Deadlines that reduce uncertainty	Koper (15-day deemed consent); Prague (30/60-day limit)

Two conclusions carry into the rest of the deliverable. The bottlenecks are not, in the main, about whether a heritage-compatible solution exists - Section 2 and D2.1 show that it usually does - but about the *process* through which it is judged: an aesthetic test applied case by case without a shared metric, a coordination seam between advice, decision and permit, archaeological steps for ground works, ownership fragmentation at district scale, and the absence of any PED-scale criteria. The enablers, conversely, are forms of structured relationship, legible precedent, interpretive steer, decision-support tooling and time discipline. These map directly onto the four collaboration models developed in Section 5 - pre-application dialogue (Model A), standing PED working groups (Model B), tiered, criteria-based approval (Model C), and digital process support (Model D) - to which the analysis now turns by way of the consolidated barrier synthesis in Section 4.



4. BARRIERS TO COLLABORATION AND EFFECTIVE PED APPROVAL - A STRUCTURED SYNTHESIS

4.1 Approach

This section consolidates the barriers surfaced in Sections 2 and 3, and in the project's Task 2.1 challenges mapping, into a single structured account. It is organised around the six dimensions used by the project - **regulatory, process, collaboration, owner structure, financial and technical** - and cross-references each to the four Living Labs and case study and to the stakeholder groups it most affects. The aim is not to re-narrate the earlier material but to show how the barriers *distribute* and *interact*, so that the models in Section 5 can be targeted at the right points. The six dimensions align with, and sharpen for the heritage context, the multi-dimensional barrier taxonomies in the PED literature, where regulatory, financial, social/governance and technical factors recur and are strongly interdependent (Sassenou et al., 2024). Two of the six - financial and technical - are examined here only for their process and collaboration implications; their substantive depth belongs to WP3 (cost and financing, D3.1; co-investment, D3.2) and to WP4 and D2.1 (technology), as the brief directs. The city-level severity readings draw on the documented "PED boundary barometer" for the Living Labs Prague 6, Leipzig and Alba Iulia (MonuPED D3.1, 2026); the Koper case study, which was not part of that exercise, rests on structural inference pending the workshop record.

4.2 The six barrier dimensions

(1) Regulatory - divergent MP approval frameworks across CZ/DE/RO/SI. As Section 2 showed, the four countries deploy four different administrative architectures, consent instruments, deadlines and weightings, and none has PED-scale approval criteria; all apply the same substantive triad - reversibility, invisibility, minimal impact - case by case. The divergence is itself a barrier: it raises the cost of replication across the consortium and prevents a single procedural playbook, while the absence of a PED-specific mandate means authorities have no basis on which to assess district-scale proposals as such. Fragmented and "disjointed" regulation is repeatedly identified as a headline barrier to PED deployment (Sassenou et al., 2024). The dimension binds owners and investors (replication uncertainty), MP authorities (no mandate to apply PED criteria) and municipalities; relief sits with national - in Germany, state (Land) - legislators and heritage authorities (PED/RES methodologies) and with EU coherence instruments (RED III).

(2) Process - opaque, unpredictable evaluation criteria for RES applications. This is the dimension on which Section 3 turned. Outcomes hinge on case-by-case discretion against a significance-and-visibility judgment for which there is no transparent metric; pre-application advice is variable in quality and availability; the advisory/decision or *aviz*/permit seam introduces a second locus of uncertainty; and archaeological steps add unpredictability for ground works. The result is rejection risk that deters the next applicant - the dynamic the barometer records most starkly for Living Lab Prague, where the absence of an official methodology produces unpredictable, sometimes rejected applications (MonuPED D3.1, 2026). It is mitigated where guidance and precedent exist (the Saxon decree; the Czech 2022 PV methodology) or where statutory deadlines apply (Slovenia's 15-day deemed consent; the Czech 30/60-day limit). The corrective is well attested: early, heritage-skilled advice improves proposals and speeds applications (Historic England, 2021). The dimension binds applicants - owners and investors - most directly; the relief lever is held by MP authorities (transparent criteria and structured pre-application dialogue) and by intermediaries supplying decision-support tooling.

(3) Collaboration - lack of structured dialogue between owners and MP authorities. Interactions are typically ad hoc, default to an adversarial posture, and span three ordinarily siloed domains - heritage, energy and planning - with no standing channel in which to build trust or shared expectations; owners, MP authorities, investors and residents remain, in the barometer's terms, disconnected (MonuPED D3.1, 2026). Nor is the dialogue at issue bilateral only: it must draw in the technical experts - specialised architects and energy advisers - and the utilities and grid operators whose cooperation



implementation requires. WP5 is the project's direct answer: the Living Lab activities are dedicated precisely to building this collaboration, and D5.1 defines the collaboration challenges, stakeholder groups, target groups and multipliers for each Living Lab; this dimension should be read together with that design. This is the cross-cutting dimension: it binds every stakeholder group, and it is the one on which the others most depend, since a regulatory or process obstacle that could be resolved through dialogue instead hardens into refusal when no dialogue exists. The evidence is that strong local networks and inclusive governance are among the decisive *drivers* of PED success, the mirror image of this barrier (Sassenou et al., 2024). Emerging channels are visible in the Living Labs Prague (the CVUT/CBC working group), Leipzig Baumwollspinnerei (the SPARCS network) and, by procedural design, the Koper case study (the conditions-first stage functions as a built-in dialogue), while Alba Iulia relies on municipal coordination. The relief lever is institutionalised dialogue - pre-application processes and standing working groups (Models A and B).

(4) Owner structure - complex multi-ownership including church portfolios. District-scale PEDs require consent to be assembled across many owners with divergent interests, capacities and decision rules, and the heritage setting concentrates three well-documented collective-action problems. First, the **landlord-tenant split incentive**: where the owner bears the investment but the tenant captures the energy benefit, neither party is fully incentivised - acute in commercial, multi-tenant heritage (Economidou et al., 2015). Its configuration varies by estate: at the Leipzig Baumwollspinnerei the owner is itself the energy provider and sets tenant energy prices, so the benefits of energy savings do not automatically reach the tenants - a different cut of the same misalignment. Second, the **multi-owner / condominium collective-decision problem**: required voting majorities and loan-access hurdles can stall investment in shared building elements (Economidou et al., 2015). This is the live problem for the typical Gründerzeit dwellings (roughly 1850–1918) in Leipzig and elsewhere, where decisions on shared elements require high consent thresholds among many individual owners. Third, **institutional and church portfolios** - exemplified by the Czech Bishops' Conference - combine internal governance layers with mixed religious, cultural, residential and commercial use (as at Břevnov Monastery), complicating both authorisation and benefit-sharing (MonuPED D2.1, 2025; MonuPED D3.1, 2026). The dimension manifests as church portfolios in Prague, commercial multi-tenancy in Leipzig, a multi-administrator fortress in Alba Iulia and a fine grain of small owners in Koper's old town. Its relief depends on aggregation vehicles (energy communities), benefit-sharing arrangements (green leases, tenant-electricity models) and a coordinating intermediary; portfolio-scale institutional owners can themselves act as anchors and aggregators.

(5) Financial - increased capital costs for MP-compatible RES solutions (depth in WP3 - D3.1/D3.2; here, process and collaboration implications only). D3.1 documents cost premiums of roughly two to five times standard solutions for heritage-adapted installations - premiums that not all PED measures carry: minimally invasive in-building measures such as energy and load management can be deployed at broadly standard cost - and, in the Czech case, the exclusion of MPAs from component-level support (MonuPED D3.1, 2026). For the present deliverable the relevant point is how these economics reshape *collaboration*. Higher stakes per project raise risk-aversion and rejection-aversion on both sides of the table; predictability therefore acquires economic value, because a faster, surer approval directly lowers the risk cost of capital; and constrained on-site economics push projects toward aggregated and virtual configurations and toward blended heritage-plus-energy funding - both of which require *more* coordination among *more* actors. In short, the financial barrier amplifies the collaboration barrier. Its city incidence follows D3.1: most severe in Prague (double exclusion), least in Leipzig (support applies in MPAs), intermediate in Alba Iulia (ownership-scale ceiling and EU-funding dependency). The financing instruments themselves are the subject of D3.2; the *process* relief - predictability - is within D2.2's remit.

(6) Technical - limited compatible PED-solution options on site (depth in WP4 and D2.1; here, process and collaboration implications only). D2.1 establishes that a heritage-compatible menu exists but is narrow - chiefly non-visible or building-integrated PV, ground-source systems where archaeology



permits, screened heat pumps, and off-site generation - alongside largely fabric-neutral non-generation measures such as storage and energy and load management, which heritage rules constrain far less (MonuPED D2.1, 2025). Two collaboration implications follow. Because the same limited set of solutions recurs, that set can in principle be pre-assessed and codified into criteria and precedents - turning a technical constraint into an opportunity to reduce process opacity (a direct input to Model C). Conversely, where the on-site menu is foreclosed - by Koper's archaeological register or Prague's subsurface archaeology - the technical limit forces the collaboration outward into virtual and off-site configurations, again raising coordination needs. Technical limits also create a capacity gap on the authority side, since MP officers are trained in conservation rather than energy systems and must assess unfamiliar technology; and they drive the need for shared decision-support tooling that assesses technical feasibility and heritage acceptability together (Model D). On-site headroom is greatest on industrial heritage with large roofs and halls (Leipzig Baumwollspinnerei) and tightest in dense or archaeologically sensitive cores (Koper, parts of Prague and the Alba fortress). Data availability is part of the same dimension: planning and operating PED solutions presupposes building and energy data that are frequently missing or non-standardised in heritage contexts, which is why data assembly recurs below as a precondition for the digital tools (Model D).

4.3 Cross-referencing: barriers against Living Labs and stakeholders

Tables 4.1 and 4.2 map the six dimensions against the three Living Labs and the Koper case study, as well as against the stakeholder groups; the groups follow the stakeholder definitions of the Living Lab design (D5.1). Severity in Table 4.1 is rendered as high (H), medium (M) or low (L).

Table 4.1 - Barrier dimensions against Living Labs (H/M/L = relative severity; readings for the three LL cities draw on the D3.1 barometer; the Koper case study is read by structural inference)

Dimension	Prague 6	Leipzig Baumwollspinnerei	Alba Iulia	Koper
Regulatory	M - two-tier advisory/executive split; old statute; reservation + zone overlay	L-M - enabling (§ 2 EEG + Saxon decree) but Land-specific	H - centralised Ministry/CNMI chain; aviz even in zones	M - integrated but discretionary; local-importance status
Process	H - no official methodology; visibility judgment unpredictable	M - guidance + precedent help; small-scale tooling gap	H - no PED guidelines/methodology; commission cadence	M - conditions-first + deadline help; no PED criteria
Collaboration	M (improving) - CVUT/CBC working group nascent	L-M - strong established network (SPARCS project); scaling gap	M - municipal coordination; stakeholder fragmentation	M - conditions dialogue built-in (structural)
Owner structure	H - church portfolio (CBC); mixed-use monastery	H - single owner (MIB) but many tenants (Baumwollspinnerei); multi-owner Gründerzeit stock city-wide	H - multi-administrator fortress (scores of buildings)	M-H - many small owners in the old town
Financial (→ D3.1/D3.2)	H - double exclusion (no MPA support)	L-M - support applies in MPAs	M - ownership-scale ceiling; EU-dependency	M (structural)
Technical (→ D2.1/WP4)	M-H - dense core; subsurface archaeology	L-M - industrial halls/roofs give headroom; minimally invasive in-building measures largely unconstrained	M-H - Roman (Apulum) layers; fortress visibility	H - archaeological register; Mediterranean roofscape

A comprehensive stakeholder approach underpins Table 4.2. MonuPED identifies and works with: municipalities; individual homeowners - citizens and small owners, owner associations (such as



churches), tenants, and the commercial real-estate sector; monument-protection authorities - public authorities at state and city level, municipalities, and local communities and associations; and, as a third, supporting group, financing institutions (banks), insurance companies and utilities.

Table 4.2 - Barrier dimensions against stakeholder groups (● primary incidence · ○ secondary incidence)

Dimension	Owners (incl. church)	Residents / tenants	MP authorities	Municipality	Investors / financiers	DSO / ESCO & intermediari es	Principal relief lever
Regulatory	●	○	●	●	●	○	National (or state) reform - incl. a legislative footing for the PED concept - + heritage- authority RES methodology; EU coherence
Process	●	○	●	○	●	○	Transparent criteria + pre- application dialogue + visibility tooling (Models A/C/D)
Collaboration	●	●	●	●	●	●	Standing working groups + structured pre- application dialogue (Models A/B)
Owner structure	●	●	○	○	●	○	Aggregation (energy communities) + benefit- sharing (green leases / tenant electricity) + coordinating intermediary
Financial	●	○	○	○	●	○	Fund- matching + co- investment (D3.2); predictability (D2.2) → WP3
Technical	●	○	●	○	○	●	WP4 decision- support tools + MP- authority capacity-



Dimension	Owners (incl. church)	Residents / tenants	MP authorities	Municipality	Investors / financiers	DSO / ESCO & intermediaries	Principal relief lever
							building → WP4/D2.1

Two conclusions follow from the tables. First, collaboration is the only dimension that binds every stakeholder group, and owners carry primary incidence across all six - which is why the models of Section 5 are built around the owner-authority relationship while deliberately widening the room. Second, the relief levers are not hypothetical: MonuPED is already building several of them - the WP4 toolkit supplies the decision-support tooling for the technical and process dimensions, WP3 (D3.2) develops the co-investment instruments for the financial dimension, the WP5 Living Labs are constructing the collaboration structures on the ground, and the models of Section 5 are the project's direct response on the process, collaboration and owner-structure dimensions.

4.4 How the barriers interact, and the binding constraint per city

The six dimensions are not independent, and treating them in isolation understates the problem. A short causal sketch runs as follows. Regulatory divergence and process opacity together generate a high transaction cost and a real risk of rejection; in the absence of a collaboration channel, that risk is not negotiated down but instead becomes discouragement, deterring applicants before they engage. Owner-structure fragmentation multiplies the number of consents that must be assembled and overlays the split-incentive problem on top. The financial premium raises the stakes of each decision, amplifying risk-aversion and pushing projects toward aggregated and virtual configurations that demand still more coordination. And the technical constraint narrows the menu - forcing off-site solutions where the on-site option is foreclosed, while simultaneously offering, in its finiteness, the raw material for codified criteria. The interdependence is exactly what the PED-barrier literature reports: these factors reinforce one another, so that piecemeal fixes tend to disappoint (Sassenou et al., 2024).

The practical value of the synthesis is that the *binding constraint* differs by the Living Lab cities, and so should the intervention. In **Prague 6** the binding constraints are process opacity (the unpredictable visibility judgment) compounded by the discouragement effect of financial double-exclusion; the regulatory and technical menus are workable. In **Leipzig** the regulatory and process dimensions are comparatively resolved, and the binding constraints are collaboration-at-scale and the tooling gap for high-volume small installations. In **Alba Iulia** the binding constraints are owner-structure fragmentation across the fortress and regulatory centralisation. In **Koper** - on the structural reading - the binding constraints are technical on-site foreclosure and the absence of PED-scale criteria, partly offset by an already-streamlined procedure. This diagnosis sets the targeting for Section 5: process opacity calls for tiered, criteria-based approval (Model C) and decision-support tooling (Model D); the collaboration gap calls for structured pre-application dialogue and standing working groups that bring in not only owners and MP authorities but also technical experts, utilities and grid operators (Models A and B); owner-structure fragmentation calls for those same dialogue mechanisms plus aggregation; and the financial and technical dimensions are addressed primarily through WP3 and WP4, with Model D providing process support.



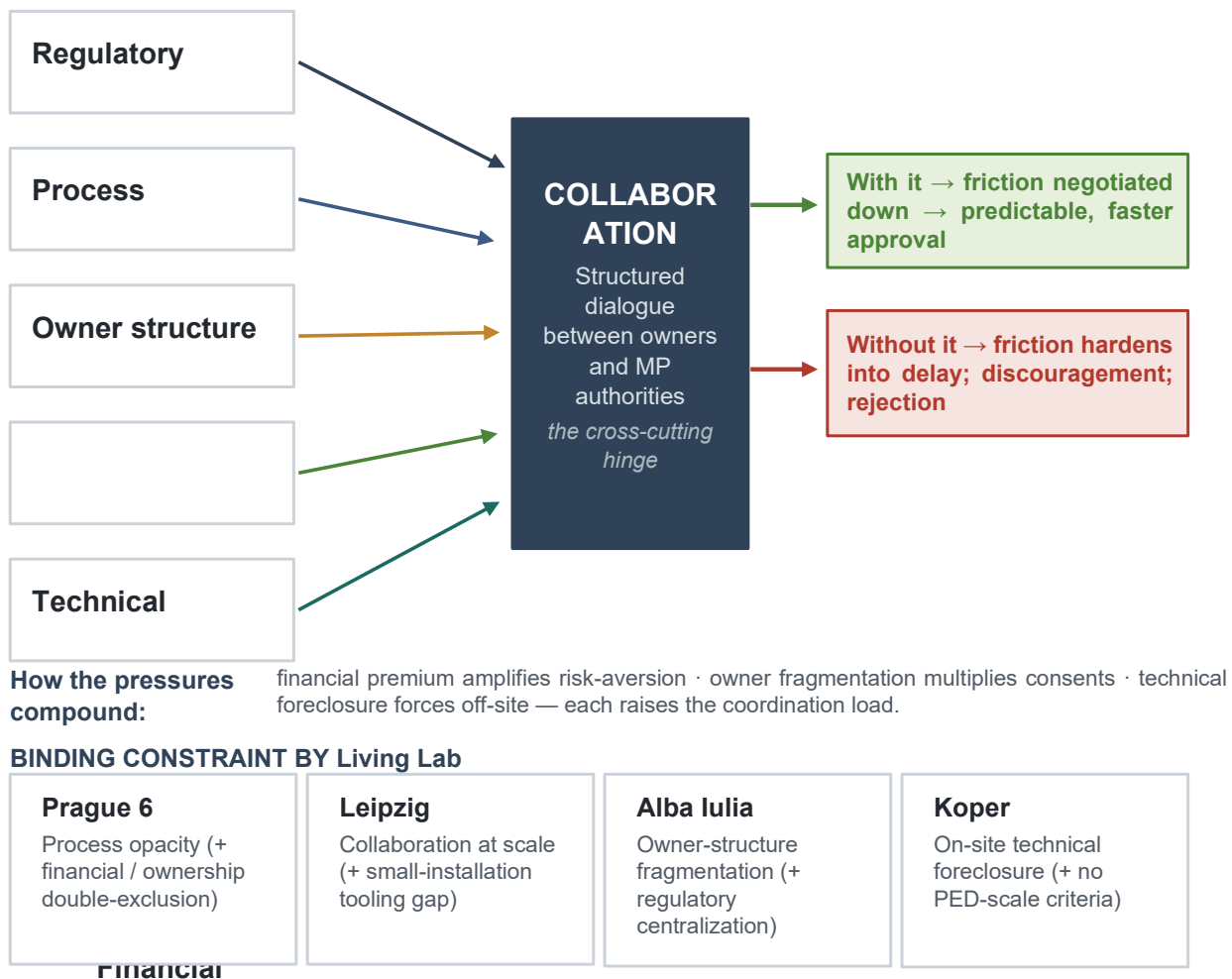


Figure 4. How the six barriers interact - collaboration is the hinge

4.5 Signals from the Living Labs (WP 5)

The Living Lab activities offer preliminary corroboration across the six dimensions and, in one respect, sharpens the diagnosis. Most striking, a Leipzig exchange with the monument-protection authority concluded that operational and ownership structures are frequently a greater obstacle than heritage-protection requirements themselves - a finding that elevates the owner-structure dimension and reinforces the city-specific reading in §4.4 rather than the generic assumption that heritage rules are the dominant barrier; the same exchange floated encoding area-specific PV-approval likelihood into the city's digital energy map - the published Energie-Atlas (leipzig.de/energie-atlas; City of Leipzig, n.d.) - anticipating Models C and D. On the regulatory dimension, Alba Iulia's owners identified the absence of any legal framework for energy-sharing between them as the principal brake on engagement - direct corroboration both of the regulatory–collaboration interaction described above and of the energy-community route this deliverable recommends for that city - while Leipzig framed its aim as standardising what are at present high-effort individual permits. On process, Prague partners named the unpredictability of the approval pathway and the low awareness of how it works; on collaboration, the Leipzig picture is differentiated: several municipal departments are necessarily involved, but standard procedures between them are established - the practical task is to scale and standardise these routines for high-volume PED-type applications, not to create coordination from scratch. The technical dimension surfaces chiefly as the data precondition noted in §4.2(6) - missing building data across Alba Iulia's fortress and Prague's case-study assets, and limited GIS capacity in smaller municipalities seeking to replicate the tools - and the financial dimension appears at the edge of the Living Lab work, in cross-regional exchange on financing deep renovation and energy poverty, consistent with its treatment under WP3. Taken together, these signals reinforce the differentiated



picture of §4.4 - process opacity and owner awareness in Prague 6, ownership and coordination and permit standardisation in Leipzig, owner fragmentation and the missing energy-sharing basis in Alba Iulia - and, being preliminary and partly engagement-focused, should be read as corroboration to be confirmed as the Living Labs mature. The models follow in Section 5.



5. COLLABORATION MODELS AND PROCESS IMPROVEMENTS

5.1 From diagnosis to design

Section 4 identified the binding constraints in each city and routed them to specific remedies. This section sets out those remedies as four collaboration models. They are not competing alternatives but a layered, mutually reinforcing set that can be adopted incrementally: each translates an informal enabler observed in Section 3, or a reform lever identified in Section 2, into a designed mechanism, drawing on the documented practice of SPARCS, POCITYF and +CityxChange. The premise throughout - established by D2.1 and Section 2 - is that a heritage-compatible technical solution usually exists; the work of these models is to make the *process* by which it is agreed predictable, collaborative and fast.

Two framing points govern what follows. First, which model - or combination - a city should adopt is not arbitrary: it follows from the city's binding constraint (§4.4) and from each model's preconditions, and one prerequisite is common to all four - a mapped stakeholder ecosystem (owners, authorities, utilities, residents, intermediaries), using the stakeholder, target-group and multiplier definitions of D5.1. Second, the models are at this stage reasoned proposals: their validation is a joint WP2-WP5 task, carried out with the Living Labs by testing each model's assumptions against Living Lab experience, and the validated, city-specific application will be reported in D5.2 (see §7.3).

Each model is specified below in the same terms: what it is, its **evidence base** - including its foothold in the Living Lab cities - the **actors** involved (with terminology aligned to the stakeholder, target-group and multiplier definitions of D5.1), the **process steps**, and the **preconditions** for applicability. They differ in implementation threshold, which matters for sequencing: Model A can be adopted now by a single authority; Model B requires convening and sustained resource; Model C requires criteria development and, for any statutory fast-track, legislative change; Model D tracks the maturity of the WP4 toolkit (introduced in §1.2) and is gated by the availability of machine-readable heritage data. Table 5.1 gives the overview; §5.6 sets out how the four combine.

Table 5.1 - Overview of the four collaboration models

Model	Purpose	Primary barriers addressed	Lead actor(s)	Implementation threshold
A - Structured Pre-Application Dialogue	An early, documented steer on acceptability and conditions before formal application; cuts rejection risk, raises predictability	Process; Collaboration	MP authority + expert body; a facilitator	Low–moderate - adoptable now by a single authority, though sustained advisory staff time must be resourced
B - PED Working Groups	A standing cross-stakeholder channel to build trust, resolve cross-domain issues and generate a shared vision and criteria	Collaboration; Owner structure	Convener (municipality or university/project partner)	Moderate - needs convening + sustained resource
C - Tiered Approval Frameworks	Differentiated, published, criteria-based pathways keyed to protection level × solution type	Process; Regulatory	MP authority + national (state) heritage body; legislators	Higher - needs criteria development; can start non-binding
D - Digital Process Support	A shared evidence base and tools (visibility, mapping, matching) that cut information asymmetry and accelerate assessment	Process; Technical (supports A/B/C)	Tool providers (in MonuPED, WP4) + MP authority + municipality	Tracks WP4 maturity; gated by data availability



5.2 Model A - Structured Pre-Application Dialogue

What it is. A formalised advisory process between a prospective owner or investor and the MP authority (with its expert body) *before* a formal application is submitted, producing an early, documented steer on whether a proposal is acceptable and on what conditions. It is the designed version of the informal pre-application consultation that Section 3 found to be the decisive stage, and it aligns directly with the EU's "one-stop-shop" and single-contact-point instruments for renovation and permitting (European Commission, 2026; European Parliament and Council, 2023, 2024).

Evidence base and Living Labs foothold. POCITYF's demonstration in Évora (Portugal) - a UNESCO-listed historic centre and one of the project's two lighthouse cities - is the clearest worked example: with all buildings protected, solutions were iteratively co-designed with the municipality and the Cultural Heritage Administration, and redesigned to their requirements, rather than submitted cold (POCITYF, n.d.). Historic England's guidance is explicit that early heritage-skilled advice improves proposals and makes applications simpler and quicker to determine (Historic England, 2021). Partial instances already operate in the Koper case study (the statutory conditions stage, with its deemed-consent deadline) and in Leipzig (the January-2023 Saxon decree), both described in Section 2 and §3.5. The EU instruments give the model policy footing: one-stop-shops are recognised in the recast EPBD and EED and elaborated in Commission Recommendation (EU) 2026/536, and RED III requires single contact points for permitting (European Commission, 2026; European Parliament and Council, 2023, 2024).

Actors. The owner or investor; the MP decision authority - the owner's entry point, in Leipzig the city's Office for Building Regulation and Preservation of Monuments - together with its expert body (the National Heritage Institute, the Saxon State Office, the county directorate/National Commission, or ZVKDS); a facilitator or single point of contact - typically a municipal energy office, a first-stop building-advice service such as Leipzig's *Bauberatung* (which also routes owners to the monument-protection department; City of Leipzig, n.d.), or a university/project partner; where grid connection is implicated, the utility or distribution system operator; and, ideally, a heritage-skilled adviser preparing the significance documentation - in practice most often a specialised architect or energy adviser.

Process steps.

1. Early enquiry, accompanied by a significance/heritage baseline (an assessment of what makes the asset and its setting significant).
2. A structured pre-application exchange - a meeting and site visit for complex or unique assets; a desk-based assessment supported by the Model D tools (visibility simulation, PV-potential and constraint maps) for high-volume standard cases - concluding in written feedback - the "steer" - that states the acceptability envelope and likely conditions.
3. Iterative redesign of the proposal to meet the steer.
4. An optional written record of the agreed envelope - in practice usually agreed minutes or an advisory note rather than a formal opinion or comfort letter, which authorities are understandably reluctant to issue ahead of the formal decision.
5. Submission of the formal application with materially reduced uncertainty.
6. A feedback loop that records the case as a precedent for reuse (feeding Models C and D).



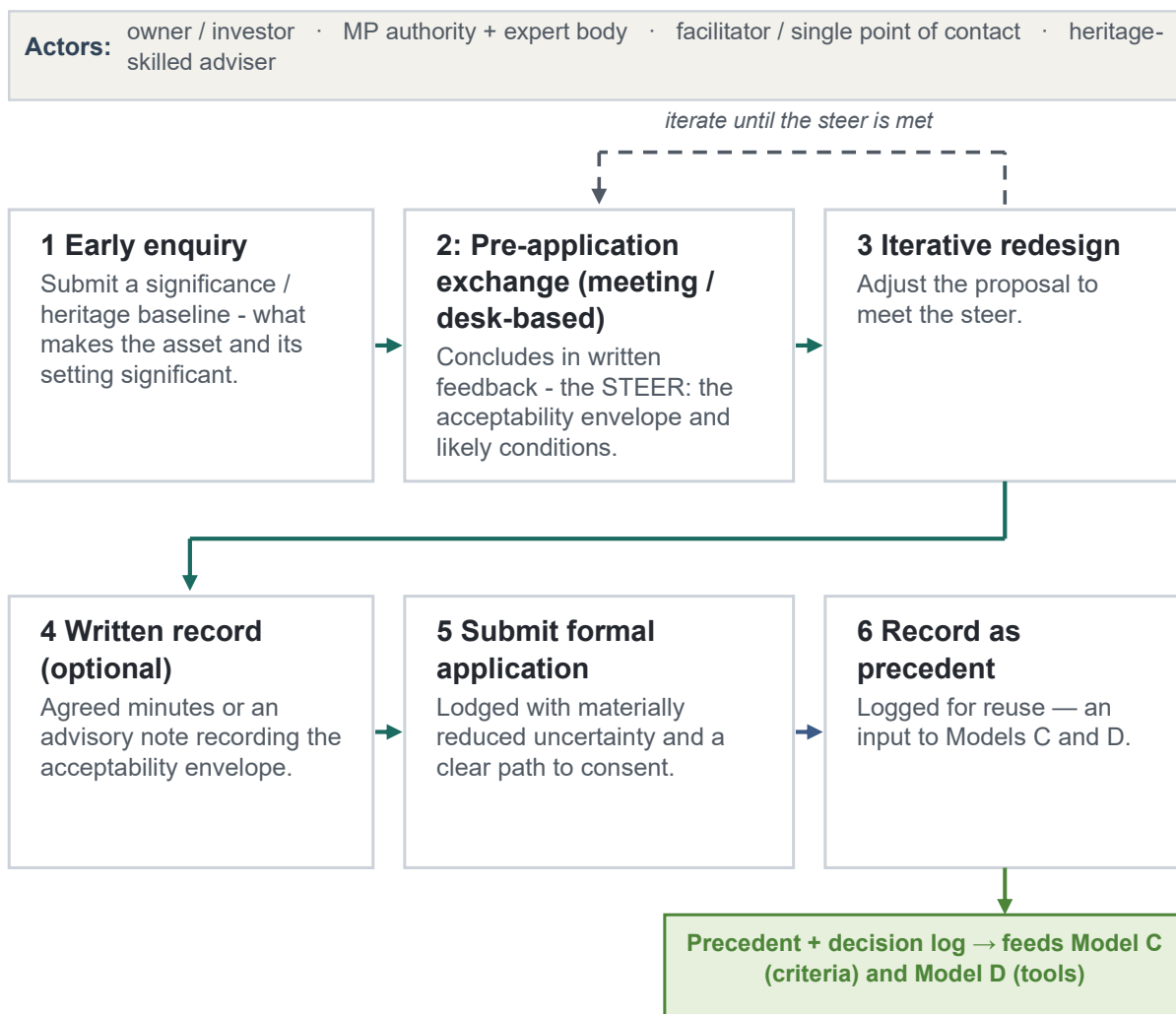


Figure 5. Model A - Structured Pre-Application Dialogue

Preconditions. An authority willing and resourced to give early advice - the model the Saxon decree institutionalises by instructing authorities to advise owners how to minimise impairment so that approval becomes possible (Landesamt für Denkmalpflege Sachsen & SAENA, 2023); a significance baseline document; a designated single point of contact; and, to counter the well-documented variability of pre-application advice between officers and authorities, a *published service specification* setting out what the dialogue offers and on what timeline (Historic England, 2021). The model is the lowest-threshold of the four and applicable in all four cities. Proportionality keeps the staffing burden manageable: the full dialogue - meeting and site visit - is reserved for complex or unique assets, while high-volume standard cases (rooftop or balcony PV on typical dwellings) are served by standardised materials and a desk-based assessment supported by the Model D tools.

5.3 Model B - PED Working Groups

What it is. Institutionalised, standing cross-stakeholder working groups that replace one-off contact with an ongoing dialogue channel - building trust and shared expectations, and providing a venue in which the cross-domain (heritage / energy / planning) issues that no single authority can resolve alone are worked through. The model is demonstrated by the CVUT/CBC initiative in Prague - a standing channel established in late 2023, before MonuPED's start, and since carried into the Prague 6 Living Lab (MonuPED D3.1, 2026). One reality check frames the model: "PED" is not yet a standing term - let alone a legal category - in the partner countries (§1.4, §2.5), so a working group's first task is typically to build a shared local understanding of what a PED is and how it serves the city's energy-transition strategy.



Evidence base and Living Labs foothold. SPARCS provides the methodological template: a transdisciplinary strategy of co-creation, co-development and co-implementation; the demonstration of participatory governance models for integrated city planning; a shared "City Vision 2050" process; and a documented body of stakeholder-engagement practice in Leipzig that SPARCS generalised into a reusable co-creation toolbox (SPARCS, n.d.). POCITYF ran an open-innovation ecosystem that engaged city administrators, planners, universities, entrepreneurs and citizens together with local and national authorities to "find the best solutions and overcome barriers" (POCITYF, n.d.). +CityxChange added the Innovation Playground and its "CommunityxChange" strand, mobilising citizen "energy champions" in a historic core (+CityxChange, 2019–2021). In the partner cities, Leipzig's SPARCS network and Prague's CVUT/CBC working group are existing footholds in the Living Labs, and Alba Iulia's municipal project teams provide a ready convening capacity (MonuPED D3.1, 2026).

Actors. A convener (a municipality, or a university or project partner); MP authorities (decision and expert); major owners - including church and institutional portfolios such as the Czech Bishops' Conference, commercial owners and owner associations; the public utilities, the DSO (grid operator) and energy-service providers; investors and financiers; resident and community representatives; and the relevant city departments (energy, planning, building). This is the quadruple helix of public authority, industry, academia and citizens, with the heritage authority deliberately inside the room.

Process steps.

1. Convene the stakeholder ecosystem mapped as a prerequisite (§5.1) - owners, authorities, utilities, residents, intermediaries.
2. Agree terms of reference, cadence and roles, distinguishing active partners from supporters and target groups. (For worked examples of group set-up, see the SPARCS co-creation toolbox and the Living Lab designs in D5.1.)
3. Hold recurring sessions that build a shared vision and work through a pipeline of real cases.
4. Co-create acceptability criteria and document precedents, of the kind the Czech PV methodology and the Saxon worked-example catalogue exemplify (Section 2) - an input to Model C.
5. Maintain a shared knowledge base and precedent log (an input to Model D).
6. Link the group to the Living Labs and to the city's climate-strategy governance (WP5).



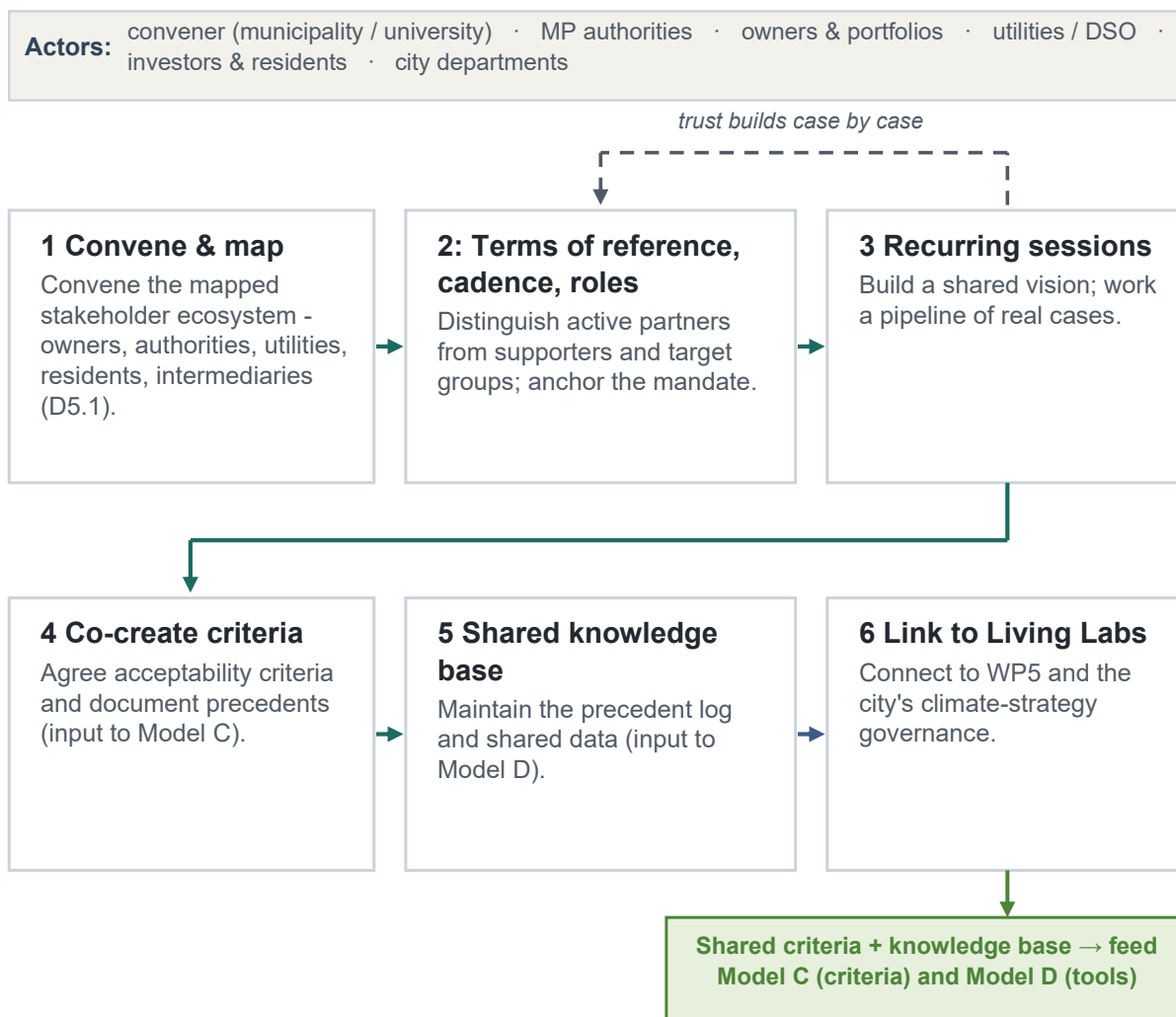


Figure 6. Model B - PED Working Groups

Preconditions. A willing convener with sustained resource - the principal cost - together with senior buy-in from the MP authority and continuity over time. A further precondition is a mutual baseline: a shared understanding of the PED concept, or at least an agreed municipal energy-transition strategy, without which a "PED" working group has no anchor. Feasibility is moderate, and the model is strongest where a relationship base already exists. Multi-level governance coordination of exactly this kind is repeatedly identified as a critical success factor for PEDs (MonuPED D3.1, 2026; Sassenou et al., 2024).

5.4 Model C - Tiered Approval Frameworks

What it is. Differentiated, criteria-based approval pathways that replace single-track, opaque, case-by-case decisions with a predictable, published system. Pathways are keyed to two axes: the **protection level** of the asset according to the state or national definition (for example, individually listed monument; national monument; non-listed building within a zone; building within a buffer zone) and the **solution type** (for example, reversible non-visible roof PV; visible roof PV; façade-integrated; subsurface; storage and in-building energy- and load-management measures; off-site). Each combination is assigned a proportionate procedure - from a light-touch notification for low-impact, reversible installations in lower-sensitivity settings, up to full assessment for high-impact interventions in the most sensitive. The model directly attacks process opacity. Criteria figure in all four models - Model A applies them case by case in the steer, Model B co-creates them - but Model C is where they are consolidated, formalised and published as the operative approval procedure.

Evidence base and Living Labs foothold. +CityxChange is the strongest precedent: it created regulatory sandboxes to live-test innovations - including compliance with building regulations - in



Limerick's historic Georgian core, engaged the energy regulator directly, and published a playbook of regulatory recommendations (+CityxChange, 2019–2021). POCITYF demonstrated that, because heritage rules are administered at municipal level, cities need not wait for national reform to adjust the de facto framework (POCITYF, n.d.). Two Living Lab footholds already point toward tiering: the Czech NPÚ/Ministry PV methodology is a nascent, if advisory, criteria set, and the Saxon guidance's catalogue of "acceptable" worked examples functions as de facto criteria (Section 2). The wider templates are significance-based assessment, long standard in conservation practice (Historic England, 2021), and the EU's own differentiated permitting - renewables acceleration areas and simplified rooftop-solar procedures under RED III - whose heritage carve-outs this model is precisely designed to manage rather than inherit (European Parliament and Council, 2023).

Actors. The MP authority and its expert body, which own the criteria; the national heritage authority or ministry, which endorses the methodology - a route the Romanian law expressly provides, since the National Commission may endorse methodologies and technical norms (Section 2); the municipality, for planning integration; and legislators, where a statutory fast-track is sought.

Process steps.

1. Define significance/sensitivity tiers and solution-type categories.
2. Pre-assess the finite menu of heritage-compatible solutions from D2.1 against the tiers, producing an acceptability matrix with standard conditions.
3. Assign a proportionate procedure to each cell (notification / streamlined / full assessment).
4. Publish the criteria, so that owners and investors can anticipate the outcome.
5. Pilot the framework in a bounded area under a regulatory-sandbox arrangement.
6. Review and iterate as precedents accumulate.

Preconditions. A significance-tiering basis - which all four systems already have in some form - and a characterised solution set (D2.1); endorsement by the authority and, usually, the ministry; and, for any statutory fast-track, legislative change, for which RED III's permitting provisions offer hooks. The threshold is higher than for Models A and B, but the framework can begin life as *non-binding published criteria*, as the Czech 2022 PV methodology effectively does, and harden over time.



	less sensitive	→		more sensitive
	Building in buffer zone	Non-listed in a zone	Individually listed monument	National monument
Reversible, non-visible roof PV	N	N	N	S
Visible roof PV	N	S	S	F
Façade-integrated	S	S	F	F
Subsurface / ground-source	S	F	F	F
Off-site generation	EC	EC	EC	EC

N Notification (light-touch)
 S Streamlined assessment
 F Full assessment
 EC Energy-community / virtual-PED route

Each cell is assigned a proportionate procedure; largely fabric-neutral measures - storage, energy- and load-

Figure 7. Model C - a tiered, criteria-based approval matrix

5.5 Model D - Digital Process Support

What it is. The integration of the WP4 digital tools into the approval workflow to reduce information asymmetry and accelerate assessment - turning contested judgments (above all, visibility) and scattered information (heritage constraints, solar potential, ownership) into shared, evidence-based inputs available to every party. Model D is the connective tissue that makes Models A and C evidence-based and supports Model B.

Evidence base and Living Labs foothold. The WP4 toolkit is itself the evidence base, and each tool is tied to a partner city: the PV-Potential Map with MP-constraint layers and the Roofs & Facades visibility study in Prague 6, the Leipzig Energy Map with digital-twin components and the Thermal Precision Profiling tool in Leipzig, the Energy & Solar Mapping tool in Alba Iulia, the RoofMatch application across cities, and a digital-twin/agent-based decision tool developed for the Slovenian case (MonuPED D3.1, 2026; MonuPED D2.1, 2025). POCITYF deployed analogous digital infrastructure - a City Information Platform and a peer-to-peer energy platform (POCITYF, n.d.). And the EU policy direction reinforces the model: RED III mandates the digitalisation of permitting and single contact points, and the one-stop-shop guidance envisages digital front doors for owners (European Parliament and Council, 2023; European Commission, 2026). Crucially, these tools target the very "no transparent criteria / no planning tools" barriers that the barometer recorded for Prague and Leipzig (MonuPED D3.1, 2026).

Actors. The providers and maintainers of the digital tools (in the MonuPED setting, the WP4 partners and universities); the MP authority and its expert body, as users and validators; owners and investors, as users; the municipality, as data host and integrator; and the DSO and energy-service providers, supplying energy data.

Process steps.



1. Assemble heritage-constraint layers, solar/energy-potential data and ownership into a shared GIS or 3D model (PV-potential maps with MP-constraint layers; energy maps; a 3D city model).
2. Run a visibility simulation from protected viewpoints for a given proposal - the function the Prague Roofs & Facades study performs precisely because visibility is the choke point (MonuPED D3.1, 2026).
3. Use matching tools - the RoofMatch application - to connect suitable roofs and owners with investors.
4. Feed the outputs into the pre-application steer (Model A) and the criteria assessment (Model C).
5. Maintain a precedent and decision log.
6. Optionally, provide a digital one-stop-shop or single-contact-point portal and digital permitting - the digital front door of the Model A dialogue, not a separate recommendation (European Commission, 2026; European Parliament and Council, 2023).

Preconditions. Machine-readable heritage data, which is frequently missing - D3.1 notes that MP-constraint layers are often unavailable or non-standardised; the maturity of the WP4 tools; authority capacity and willingness to use them; and sound data governance. Feasibility therefore tracks WP4 delivery, and the data-availability gap is the binding precondition.

5.6 How the models combine

The four models are layered rather than parallel. **Model A** is the entry point and the lowest threshold: a single authority can begin offering a structured pre-application steer immediately. **Model B** institutionalises and scales that dialogue, and - by working through real cases - generates the precedents and shared criteria that **Model C** then converts into a predictable, published procedure. **Model D** is the connective tissue throughout, supplying the visibility simulations, constraint maps and matching tools that make A and C evidence-based and faster, and the shared knowledge base that B curates. A sensible adoption sequence by feasibility is therefore: begin with Model A plus a light deployment of Model D (pre-application dialogue supported by visibility tooling); stand up Model B to institutionalise the relationships; co-develop Model C's criteria through the working group and pilot them in a sandbox; and mature Model D as the WP4 data and tools allow. Table 5.2 maps the models against the six barrier dimensions, closing the loop with Section 4.

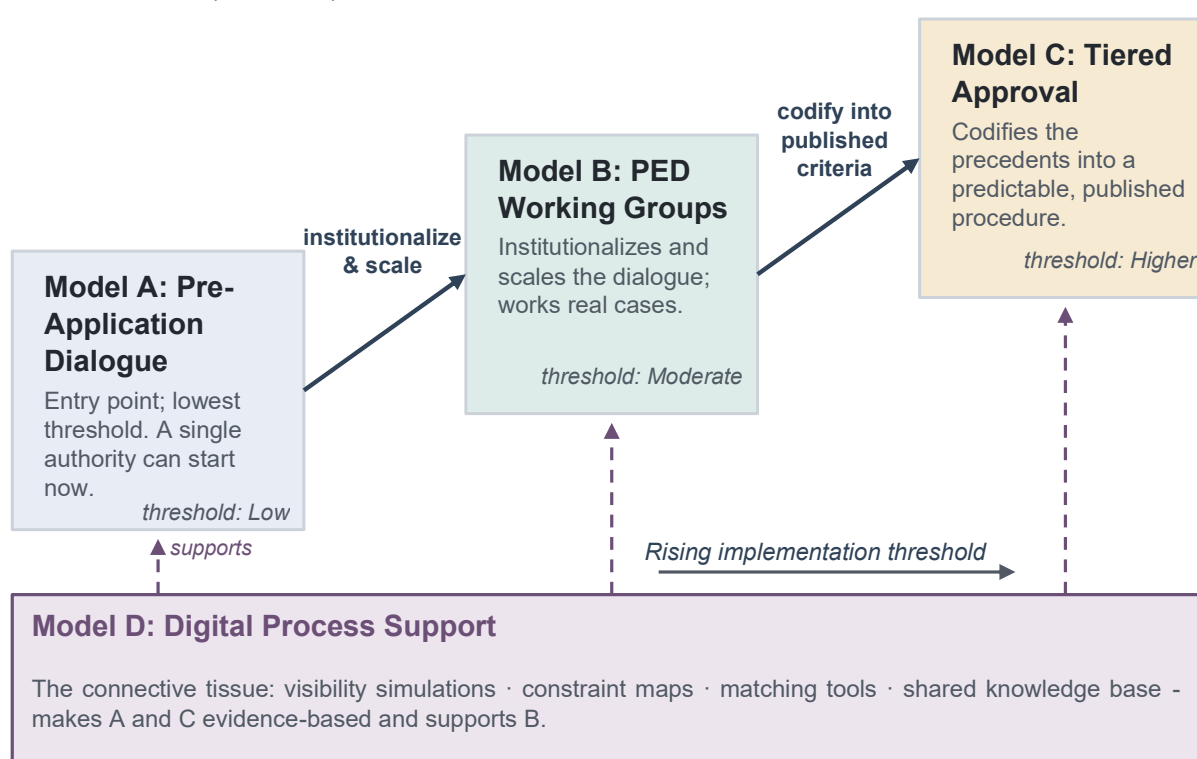
Table 5.2 - Collaboration models against the six barrier dimensions (● primary lever · ○ supporting → addressed mainly elsewhere)

Barrier dimension	Model A	Model B	Model C	Model D	Note
Regulatory	○	○	●	○	C codifies; A/B build local consistency; national reform in Section 6
Process	●	○	●	●	The core target of the model set
Collaboration	●	●	○	○	A and B are the direct levers
Owner structure	○	●	○	○	B convenes; D matches; aggregation/finance → WP3
Financial	○	○	○	○	→ WP3 (D3.1/D3.2); predictability lowers the risk cost of capital



Barrier dimension	Model A	Model B	Model C	Model D	Note
Technical	○	-	○	●	→ WP4/D2.1; D supplies tooling, C codifies the menu

Two points close the section. First, the financial and technical dimensions are addressed primarily through WP3 and WP4, as the brief directs; the contribution of the models is indirect but real - Model D supplies the tooling and Model B the coordination venue through which aggregation, co-investment and virtual-PED configurations become workable, while the predictability delivered by A and C lowers the risk cost of capital that the financial barrier imposes. Second, because the binding constraint differs by city (§4.4), so should the *priority* among the models. Translating this general set into prioritised, contextualised programmes for Prague 6, Leipzig and Alba Iulia is deliberately not attempted here: it is deferred to D5.2, so that it can be developed and validated together with the WP5 Living Labs - mapping the models onto each city's existing structures, strategies and stakeholders - rather than specified ahead of them (see §7.3).



Adoption A + light D → B → C (piloted in a regulatory sandbox) → mature D as WP4 data allow.

Figure 8. How the four models layer and combine



6. POLICY RECOMMENDATIONS

6.1 Scope and alignment

The collaboration models of Section 5 are mechanisms that cities and heritage authorities can adopt within the law as it stands. This section addresses what they cannot achieve alone: the national (regional) and EU-level changes that would let good local practice scale and that would remove the structural disadvantages MPAs face under the current decarbonisation framework. The recommendations respond to the project's objective of formulating policy recommendations at national and European levels. They are deliberately confined to the process, governance and collaboration domain that is D2.2's remit; financing-specific measures - capital-cost premiums, support-scheme design, blended finance - are developed under WP3 (MonuPED D3.1, 2026; and the forthcoming D3.2). The recommendations are organised at two levels - EU coherence and national reform - followed by a set of cross-cutting enablers, and are summarised in Table 6.1.

6.2 EU-level coherence

The European decarbonisation *acquis* - the European Green Deal, the Fit for 55 package, REPowerEU, the recast Renewable Energy Directive (RED III), and the recast EPBD and EED - has greatly accelerated the deployment of renewables (European Commission, 2019, 2022b; European Parliament and Council, 2023, 2023b, 2024). But it accelerates them largely through instruments that *exempt* heritage, which produces a structural gap precisely where MPAs sit. RED III requires Member States to designate renewables acceleration areas with fast-tracked permitting and introduces a simplified procedure for rooftop solar and a presumption of overriding public interest, yet it expressly permits Member States to exclude protected sites - and the protection of cultural and historical heritage is among the grounds - so historic cores are routinely left outside the very regimes designed to speed deployment (European Parliament and Council, 2023). The first EU-level recommendation follows directly.

First, a **differentiated heritage pathway rather than a blanket exclusion**. Commission guidance and national transposition should ensure that, where a heritage area is excluded from a general acceleration regime, it is paired with a proportionate, simplified procedure for heritage-compatible renewables - the Model C principle elevated to the level of the *acquis* - rather than left to the slow, case-by-case default. Heritage status should route a proposal to a tailored procedure, not out of simplification altogether.

Second, **clarity on "do no significant harm" (DNSH)**. EU funding under the Recovery and Resilience Facility and cohesion instruments is conditioned on the DNSH principle (European Commission, 2021). It should be confirmed, in guidance, that reversible, heritage-compatible renewables in MPAs are DNSH-compliant and therefore fundable, so that heritage is not treated as a blanket obstacle to climate finance.

Third, **heritage-aware one-stop-shops and single contact points**. The recast EPBD and EED establish one-stop-shops as the integrated advisory instrument, RED III requires single contact points for permitting, and Commission Recommendation (EU) 2026/536 gives practical guidance (European Commission, 2026; European Parliament and Council, 2023, 2023b, 2024). These should explicitly incorporate heritage pre-application advice, so that an owner in an MPA meets a single, heritage-aware front door - the institutional home for Model A.

Fourth, **standardised, machine-readable heritage data and digital permitting**. RED III mandates the digitalisation of permitting procedures (European Parliament and Council, 2023). An EU push for interoperable, machine-readable heritage-constraint data layers - the precondition Model D repeatedly runs into - would let digital permitting and decision-support tools function in heritage contexts rather than stall on missing data.

Fifth, **energy-community and virtual-PED enablement**. The renewable-energy-community provisions of RED II and the citizen-energy-community provisions of the Electricity Market Directive give Member



States the tools to enable off-site, shared and virtual generation (European Parliament and Council, 2018, 2019). For MPAs, where on-site, visible generation is most constrained, the virtual PED is often the only route to a positive balance; EU monitoring of transposition should treat support for shared and off-site generation as essential rather than optional.

6.3 Regional and national reform

The friction points and reform levers identified country by country in Section 2 translate into four national agendas. These agendas are working proposals: consistent with the deferral of the city-specific programmes to D5.2, they will be refined together with the Living Lab partners as the collaboration models are validated.

Czechia. The new Building Act (Act 283/2021) introduces a coordinated binding opinion; its implementation should be used to integrate the heritage opinion into a single coordinated procedure with the statutory deadlines preserved (Section 2). In parallel, the 2022 NPÚ/Ministry of Culture photovoltaics methodology - at present advisory - should be developed into an authoritative, criteria-based framework of the Model C type, giving owners and authorities a predictable reference (Doucha Šikola advokáti, 2022; MonuPED D3.1, 2026).

Germany (Saxony). The §2 EEG presumption that renewables serve an overriding public interest now penetrates Länder heritage law, but its effect in practice still depends on case-by-case judgment (Sailer & Militz, 2023). Saxony's January-2023 decree and the LfD/SAENA solar guidance are the template: state heritage authorities should issue binding, standardised guidance with worked-example catalogues so the EEG presumption yields consistent outcomes, and the interface between municipal heat planning and monument law should be clarified - that is, guidance on how the heat-supply options selected in municipal heat plans (networks, large heat pumps, building-level systems) are weighed and permitted where they touch monuments and ensembles, so that heat planning and monument permitting do not send conflicting signals (Landesamt für Denkmalpflege Sachsen & SAENA, 2023; Sächsisches Staatsministerium für Regionalentwicklung, 2023).

Romania. The binding constraint is centralisation: an *aviz* is required from the Ministry of Culture or its county directorate together with the National Commission of Historical Monuments, even within protection zones (Section 2). The National Commission should use its statutory power to endorse methodologies and technical norms for recurring renewables-in-heritage solution types, converting repetitive case-by-case decisions into a predictable framework; low-impact, reversible installations could be delegated to county directorates or routed through a notification track; and these changes should be folded into the Cultural Heritage Code reform under way (*Legea nr. 422/2001*; MonuPED D3.1, 2026).

Slovenia. The two-stage system - conservation conditions followed by conservation consent, with deemed-consent deadlines - performs comparatively well (Section 2). The recommendation is to preserve and reinforce the deemed-consent timelines, to issue national ZVKDS guidance on renewables in heritage contexts, and to extend the conservation-plan approach to district-scale interventions (*Zakon o varstvu kulturne dediščine*, ZVKD-1).

6.4 Cross-cutting enablers

Four enablers recur across all four countries and both levels of government, and each mirrors one of the collaboration models. Authorities should **publish their assessment criteria**, so that predictability replaces opacity (Model C). They should **resource heritage authorities to give early, documented advice**, since the pre-application steer is the single highest-leverage, lowest-cost intervention (Model A). National energy law should **enable energy communities and virtual PEDs**, the lifeline for assets that cannot generate visibly on site. And heritage-constraint data should be **standardised and made machine-readable**, without which digital tools cannot support the workflow (Model D). None of these requires waiting for the others; each can be advanced independently, and each compounds the value of the rest.



6.5 From recommendations to uptake

These recommendations are not a wish-list addressed to a single decision-maker but a connected pathway. The Living Labs (WP5) generate the local evidence; the working groups (Model B) build the local consensus and the precedents; national methodologies (Model C) and EU guidance then scale what the evidence and consensus have established. The role of D2.2 is to make that pathway explicit and to ensure that the local mechanisms and the framework reforms point in the same direction. Section 7 summarises the deliverable and sets out the immediate next steps.

Table 6.1 - Policy recommendations by level

Level	Recommendation	Primary barrier addressed	Linked model / section
EU	Differentiated heritage permitting pathway, not blanket exclusion from acceleration regimes	Regulatory; Process	Model C; 2, 5.4
EU	Confirm heritage-compatible RES in MPAs is DNSH-compliant and fundable	Financial (→ WP3)	4 ; WP3
EU	Heritage-aware one-stop-shops / single contact points	Process; Collaboration	Model A; 5.2
EU	Standardised, machine-readable heritage data + digital permitting	Process; Technical	Model D ;
EU	Enable shared, off-site and virtual generation (energy communities)	Owner structure; Technical	Virtual PED; 6.2
CZ	Use the coordinated binding opinion; upgrade the PV methodology to authoritative criteria	Process; Regulatory	Model C; 2.1
DE/SN	Binding statewide heritage guidance with worked examples; clarify heat-planning interface	Process; Regulatory	Model C; 2.2
RO	National-Commission-endorsed methodology; delegate/notify low-impact works	Regulatory; Process	Model C; 2.3
SI	Reinforce deemed-consent deadlines; national guidance on RES in heritage	Process	Model A/Model C; 2.4
All	Publish criteria; resource early advice; enable virtual PEDs (energy-community and energy-sharing law); standardise heritage data (machine-readable constraint layers) - detail in §6.4	All (process-side)	Models A/C/D; 6.4



7. SUMMARY AND NEXT STEPS

7.1 Summary

This deliverable set out to map how monument-protection approvals work - in law and in practice - across the four national systems and four cities in scope, to diagnose why collaboration between owners, investors and heritage authorities so often breaks down, and to propose a structured set of collaboration models and process improvements for positive-energy-district development in monument-protected areas. Its central finding is that the binding constraint in these areas is rarely the absence of a heritage-compatible technical solution: D2.1 demonstrates that reversible, low-visibility and off-site options generally exist. The constraint is the *process* by which a solution is agreed - its predictability, transparency and coordination. The leverage for change is therefore procedural and collaborative far more than it is technical, and that is where this concept concentrates.

The diagnosis ran in three steps. Section 2 showed that the four heritage regimes converge on a shared European canon of authenticity, reversibility and minimal visual impact but diverge sharply in governance - federal in Germany, advisory-executive in Czechia, centralised in Romania, permit-integrated in Slovenia - and distilled this into a friction-and-levers matrix. Section 3 showed that, in practice, the law understates the role of discretion: the visibility of a roof intervention is the recurring choke point, and an early, informal pre-application contact is the single most decisive enabler of a positive outcome. Section 4 consolidated the picture into six interacting barrier dimensions - regulatory, process, collaboration, owner structure, financial and technical - and identified, for each city, the binding constraint that determines which barrier matters most.

The constructive response followed. Section 5 set out four collaboration models - Structured Pre-Application Dialogue (A), PED Working Groups (B), Tiered Approval Frameworks (C) and Digital Process Support (D) - each specified by its actors, process steps, preconditions and evidence base, and each grounded in the documented practice of SPARCS, POCITYF and +CityxChange. The models are layered and incrementally adoptable: dialogue is the low-threshold entry point, working groups institutionalise it, tiered criteria codify what it produces, and digital tools make the whole evidence-based. The translation of the models into prioritised city programmes is deferred to D5.2, to be developed and validated with the Living Labs; the differentiated diagnosis of §4.4 - process opacity in Prague 6, collaboration at scale in Leipzig, owner fragmentation and regulatory centralisation in Alba Iulia - already indicates that the same four models will carry very different priorities in the three cities. Section 6 lifted the analysis to the framework level, recommending that national systems publish criteria, resource early advice, enable energy communities and standardise heritage data, and that the EU stop carving heritage out of its decarbonisation instruments and instead give protected areas a differentiated, proportionate pathway.

7.2 Limitations and what remains to be validated

The analysis is a desktop study, and its limits should be stated plainly. Sections 3 and 4 in particular rest on the regulatory and economic evidence of D3.1, on the comparative legal analysis of Section 2, and on the published literature. The four models are reasoned proposals, not yet empirically tested. Their validation with the Living Labs - and the city-specific application deliberately deferred from this deliverable - are the subject of D5.2 (see §7.3). The validation of the Prague Roofs & Facades visibility tool against the National Heritage Institute's professional judgment is deferred to the Living Lab phase. And a small number of city-strategy figures - notably the Prague 6 Local Energy Concept's quantified targets - could not be independently verified from public sources and are reported qualitatively. These are not weaknesses to be concealed but the specific points at which the consortium's later work can confirm, correct and extend the concept.



7.3 Next steps

The immediate path forward is to put the concept to work in the Living Labs and to connect it to the parallel work packages. Who carries each action, with whom and on what timeline remains to be agreed with the consortium and the Living Lab partners; Table 7.1 records the current working allocation by work package.

Table 7.1 - Next steps by work package

Strand	Action	Delivers
WP5 (Living Labs)	Validate the four models with the Living Labs - mapping which elements are already in place in each city, where each model adds value and on what evidence - and co-develop the city-specific application on the anchor assets	The validated, city-specific application of the models, reported in D5.2; the missing primary evidence for Sections 3–4
WP5 → WP2	Feed the working-group precedents and acceptability decisions back into draft tiered criteria (Model C)	A first, evidence-based criteria set per city (WP2 lead, with the Living Lab city teams)
WP3 (D3.2)	Develop the financing-side recommendations that D2.2 deliberately deferred - support-scheme design, cost-premium mitigation, blended finance	The financial complement to this concept
WP4	Mature the toolkit (visibility simulation, PV/energy maps with heritage layers, RoofMatch) and resolve the machine-readable heritage-data gap that Model D depends on	The digital infrastructure Models A, C and D require

7.4 Closing

The contribution of this deliverable is to provide MonuPED - and comparable projects working at the intersection of heritage and decarbonisation - with a structured, evidence-based bridge from diagnosis to action: a clear account of why collaboration fails, a set of mechanisms to repair it, a city-by-city programme for testing them, and a policy agenda to let them scale. The technical means to put renewables on and around monuments largely exist. What has been missing is a predictable, collaborative process for agreeing their use, and a policy framework that treats protected areas as a place to do decarbonisation carefully rather than a place to exempt from it. This concept is the consortium's proposal for both. The test now is implementation, and that work begins in the Living Labs.



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Zákon č. 500/2004 Sb., správní řád (Administrative Procedure Code), § 149. Czech Republic.

Zakon o varstvu kulturne dediščine (ZVKD-1), Uradni list RS št. 16/2008, as amended (Cultural Heritage Protection Act), Arts. 28–30. Slovenia.

