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Carbon-washing sustainable mobility: the case of Metro Mondego in Coimbra, Portugal

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ABSTRACT

Cities and urban transportation in particular are increasingly viewed as key arenas for sustainability and climate action. However, 'sustainable' and 'carbon-neutral' measures often emphasize technological solutions, emissions reductions and economic growth, while often failing to confront the wider mobility crisis, and often exacerbating social injustices. In this article, we extend the emerging concept of "carbon-washing", applied to corporate advertisement, to the analysis of government strategies in urban climate and mobility planning. Through a case study of the electric Metro Mondego Bus Rapid Transit (BRT) system in Coimbra, Portugal, we show how the municipal government and the public BRT corporation used sustainable mobility, urban greening and carbon emissions reduction discourses to conceal the project's significant environmental impacts on urban greenspaces, secure funding, and add new layers of legitimacy beyond the worn-out sustainability narrative. Our study thus suggests how sustainable mobility megaprojects can simultaneously advance climate narratives while reproducing car-centric urbanism, undemocratic planning, and socioecological harm. Furthermore, it documents how critical social movement voices can confront these projects and their impacts, generating alternative planning knowledge that exposes and contests carbon-washing practices and offer alternative strategies for more democratic, just and sustainable mobility interventions.

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1. Introduction

Cities are increasingly seen as crucial hubs for advancing sustainability and climate action (Pfadt-Trilling and Fortier 2021; Wachsmuth and Angelo 2023). As transportation is one of the most significant contributors to greenhouse gas emissions, expanding and electrifying public transit has emerged as a central policy focus. At the European level there is wide consensus that to reach the commitment of climate neutrality by 2050,

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reducing car dependency and developing sustainable transport networks is imperative (European Environment Agency 2023, 2024). However, while sustainable mobility policies can in principle address the socioenvironmental injustices of current transport systems, emerging research raises concerns that such policies could actually reinforce these injustices (Wågsæther et al. 2022). Critical scholarship highlights that ‘sustainable transportation’ measures often emphasize technological solutions, individual choices, emissions reductions, and economic growth while often failing to confront the mobility crisis, leaving untouched the privileged interests of car-based transport and marginalizing citizen participation and equity concerns (Verlinghieri 2020; Vitrano and Lindkvist 2022). Recent research shows how these ‘green’ branded interventions –such as new urban parks and other green amenities, transport and other infrastructure investments, and new land use regulations for climate adaptation– frequently exacerbate social injustices. They are often planned without community participation, privileging elites and experts; and target already privileged areas or foster gentrification of marginalized areas, leading to displacement of low-income residents (Anguelovski et al. 2022). In this emerging research, the specific inequities of sustainable transport policies have received less attention than those of other green interventions (Axsen and Sovacool 2019; Wågsæther et al. 2022). Moreover, this research has not paid sufficient attention to governments’ use of green/carbon-washing strategies to legitimize these ‘green’ or ‘climate-friendly’ infrastructure projects.

In this paper, we contribute to these debates through a case study of the conflict over the Metro Mondego electric Bus Rapid Transit (BRT) system in Coimbra, Portugal. By examining the gap between the project’s sustainable mobility and climate-friendly discourse and its implementation – marked by major impacts on greenspace and trees, prioritization of car infrastructure, and minimal citizen participation – we expose its weaknesses, incoherence, and carbon-washing tactics. The paper makes three contributions. First, it extends debates on greenwashing by conceptualizing carbon-washing as a governmental strategy within urban planning, rather than just a corporate communication practice. Second, it demonstrates how sustainable mobility megaprojects can simultaneously advance climate narratives while reproducing car-centric urbanism, undemocratic planning, and socioecological harm. Third, drawing on our scholar-activist research, it shows how urban social movements generate grassroots planning knowledge that exposes and contests carbon-washing practices and offer alternative visions and plans.

2. From greenwashing to carbon-washing in urban climate planning

As urban sustainability becomes a global discourse in policy and planning, local governments increasingly adopt sustainability and climate action plans (Pfadt-Trilling and Fortier 2021; Wachsmuth and Angelo 2023). However, emerging literature highlights that such plans for ‘urban greening’ often exacerbate social inequalities by promoting gentrification, displacing vulnerable populations, and prioritizing superficial interventions over more urgent needs, such as food, housing, and other social services (Anguelovski et al. 2022). While this trend of ‘green’ or ‘climate gentrification’ is frequently linked to greenspaces, it also extends to other projects, such as public transportation infrastructures labelled as ‘sustainable mobility’ which have been less studied (Axsen and Sovacool 2019; Wågsæther et al. 2022).

To better understand these contradictions, we build on the concepts of greenwashing and carbon-washing, focusing on how urban climate action – particularly in ‘sustainable mobility’ – is framed. Greenwashing refers to ‘the dissemination of false or deceptive information regarding an organization’s environmental strategies, goals, motivations, and actions’ (Nemes et al. 2022, 5). It typically involves claims or marketing ‘spins’ that do not align with an organization’s real environmental impact, resulting in ‘symbolic’ rather than genuine social responsibility (Steiner et al. 2018).

Greenwashing has attracted growing attention among researchers, civil society, and policymakers, largely focusing on corporate practices and prompting complaints, investigations, and regulation (Aronczyk, McCurdy, and Russill 2024). In the context of the climate crisis, related concepts such as ‘SDGwashing’ describe companies’ selective alignment with some environmental goals while obscuring social equity harms (Ferrón Vélchez et al. 2022; Heras-Saizarbitoria, Urbieto, and Boiral 2022). Practices ranging from misleading ecolabels to poorly designed green investments create confusion about environmental impacts (Shreedhar, Moran, and Mills 2024). Yet, greenwashing’s main purpose may not be public persuasion but attracting investors (De Simone and Pezoa 2021), especially in the rapidly-growing sector of climate finance (In and Schumacher 2021).

In and Schumacher (2021) coined the term carbonwashing to describe how corporations exploit weaknesses in Environmental Social and Governance (ESG) metrics and carbon reporting to project environmental responsibility through limited reductions and unsubstantiated ‘Net Zero’ claims. Empirical studies document tactics such as selective emissions disclosure, exaggerated reduction commitments, blame-shifting to consumers, and opaque accounting practices (Aronczyk, McCurdy, and Russill 2024).

Greenwashing research has largely focused on corporate and consumer contexts, while governmental greenwashing – particularly in urban planning – remains understudied. Although urban sustainability scholarship documents persistent gaps between discourse and practice, it rarely conceptualizes these dynamics as greenwashing or carbon-washing. For instance, a search in the database of this journal with the keyword ‘greenwashing’ produced only 4 articles, and none had the word in their title, abstract or keywords, engaging with the concept ‘in passing’. This limits understanding of how urban climate action is mobilized to legitimize contested projects. This article bridges these debates by examining carbon-washing and its hidden socioenvironmental impacts in urban mobility planning.

Studies show that dominant urban renewal strategies often rely on technocratic approaches that prioritize large-scale megaprojects, while mobilizing superficial sustainability claims. In Seoul, urban plans promoted densification and cosmetic greening which obscured deeper urban challenges (Schuetze and Chelleri 2016), while in Santiago de Chile, retail corporations advertised a ‘greener’ city without concrete environmental action, enhancing investor legitimacy while avoiding accountability (De Simone and Pezoa 2021). The convergence of greenwashing and financial capital reflects broader dynamics of neoliberal urbanization. For Schuetze and Chelleri (2016), meaningful solutions demand participatory, integrated, and long-term approaches to urban regeneration attentive to social equity and quality of life.

Urban climate and transportation planning exhibit similar misalignments. Tozer (2018) similarly finds that Canadian municipal sustainability plans frequently rebrand high-emission activities as sustainable under market-driven logics. Pfadt-Trilling and

Fortier (2021) demonstrate that US Climate Action Plans often rely on greenwashing practices, including incomplete emissions accounting and dependence on offsets and speculative technologies rather than substantive mitigation.

Transportation is a key area of urban climate planning, as estimates suggest it is the second highest-emitting sector, after building electricity and heating (Jaramillo et al. 2022). Yet Holden, Gilpin, and Banister (2019) argue that ‘sustainable mobility’ has lost much of its transformative ambition due to fragmented approaches and continued growth in air and car travel. The agenda remains dominated by technocratic and modernization logics emphasizing emissions metrics, individual choice of transport mode, technological fixes (e.g. new roads, transport electrification), quickness and cost-effectiveness, and economic growth over socioenvironmental concerns (Verlinghieri 2020). Such approaches fail to challenge car dependency, meaningful participation, and social equity (ibid), and may even exacerbate inequalities, including gentrification (Wågsæther et al. 2022). They often overlook life-cycle impacts and social injustices of technologies such as electric vehicles – from lithium mining to water and land use (Axsen and Sovacool 2019), face resistance from entrenched car-oriented interests which shape their design (Berger et al. 2014; Hrelja, Isaksson, and Richardson 2013; Wågsæther et al. 2022), and tend to privilege urban areas while neglecting rural mobility needs (Flipo, Ortar, and Sallustio 2023).

Scanu, Cloutier, and Trudelle (2021), analysing Quebec’s sustainable transport plan, show how an ‘ecological modernization’ discourse prioritizes technical and environmental goals while marginalizing social equity, framing accessibility mainly in terms of efficiency and proximity rather than structural socioeconomic and cultural barriers which limit travel. Rumé (2022) similarly finds that a non-polluting tram project in Cuenca, Ecuador, became unsustainable due to planning failures that disrupted everyday practices of dwelling, mobility, and commerce, compromising ‘the relationships between inhabitants and their affective spaces.’ (217) Vitrano and Lindkvist (2022) observe that regional transport planning in Sweden remains dominated by economic concerns and a ‘growth imperative’, while Isaksson (2023) shows how framing sustainable mobility as ‘progress’ ties it to inherently unsustainable and conflictive growth logics. In Bergen, Norway, Wågsæther et al. (2022) demonstrate that light rail investments concentrate investments in already-privileged areas, raising property values and displacing lower-income residents into less-serviced peripheries.

We argue that the Metro Mondego (MM) project in Coimbra exemplifies these dynamics of green/carbon-washing. Like other urban ‘sustainable’ mobility megaprojects, MM was promoted as heralding a ‘new’, ‘modern’, ‘transformative’ and ‘green’ mobility and city, while being driven by ‘urban growth’ and densification, and ignoring car dependence and accessibility of marginalized peripheries. The project’s advertisements emphasized statistics of magnitude (number of cars and passengers, CO2 emissions reduced), efficiency and fastness (travel time), key elements of the modernization paradigm.¹ Furthermore, the project prioritized electoral interests, quick execution, and new investments and construction, while relying on unsubstantiated claims of emission reductions and promises of tree planting to downplay and justify its environmental impacts. These dynamics were compounded by poor democratic processes and a lack of attention to social equity, leading to unsustainable outcomes.

3. Methods

We use multiple qualitative methods to document the contradictions within Metro Mondego's claims of 'sustainable' mobility and urbanism and the government's green- and carbon-washing strategies. Our approach follows a scholar-activist or engaged research tradition, drawing on our dual role as researchers and participants in movements defending urban trees, sustainability, and livability. Such approaches, well established in urban planning and environmental studies, treat knowledge as politically situated and oriented toward action, spatial justice, and social transformation (Mottee et al. 2019; Sager 2016; Temper and Del Bene 2016). Rather than compromising rigour, engagement with grass-roots actors provides situated knowledge, alternative imaginaries, and critical insights into power relations, conflicts, and institutional dynamics. Scholar-activist research thus bridges analysis and action, contributing to more democratic and socioecologically transformative planning processes (Albrechts 2015; Verlinghieri 2020).

Scholar-activist research can take different forms depending on researchers' positionality and objectives (Mottee et al. 2019). In our case, the study emerged from participation in the movement rather than from a predefined research design. This position provided direct access to internal debates, information, and alternative proposals developed by activists, including the route alternatives discussed below. The analysis therefore builds on knowledge generated within the movement while situating the conflict within broader political-economic dynamics of neoliberal urbanism, sustainable mobility planning, and green/carbon-washing.

First, we draw on participatory observation, involving informal interactions with government officials and activists in various settings, such as protests, public events (guided tours of MM project sites, roundtable conversations), group meetings and chats, social media platforms, and individual discussions.

Second, we analyse the public narrative and official justification for the project, we analysed many secondary sources, including official documents such as court of auditor's reports, MM and European Commission reports (see European Commission 2011, 2023; Metro Mondego 2011; Tribunal de Contas 2012) and Environmental Impact Statements (EIS),² municipal and MM press releases, newspaper articles (having consulted all local and national journals for news on MM), and published interviews. From these, we sought to identify the history of the project, the discourse used to justify it, as well as information on its socioeconomic and environmental impacts.

Third, we employed the 'walking the city' method (Pierce and Lawhon 2015), complemented by counter-mapping approaches (Temper and Del Bene 2016), to document Metro Mondego's spatial transformations and socioecological impacts. Walking-based observations and interviews capture residents' lived experiences of contested spaces; the method's embodied dimension can 'enable a creative and critical relationship with nature, place, politics and space.' (Mason et al. 2023, 2). Counter-mapping visualizes community knowledge and alternative visions, supporting epistemic justice in socioenvironmental struggles.

We walked through key MM impact sites as part of the movement's protests, and as part of our everyday pedestrian mobility, to document impacts on such mobility and quality of life. Because impacts occurred along both stops and circulation lanes, we examined the full network and selected a representative sample of locations with major works

and tree loss. These sites – conceptualized as ‘sites of carbon-washing’ – were initially identified through movement activities. This purposive sampling focuses on locations where contradictions between sustainability discourse and on-site impacts were most visible, while acknowledging that additional affected sites could not be included due to space limitations.

Finally, we used visual materials, including maps of tree-cutting sites and alternative Metrobus routes designed by architects involved in the Save the Trees movement (including Authors 2 and 3). Visual tools support sustainable planning processes (Nasr-Azadani, Wardrop, and Brooks 2022) and help identify greening alternatives (Johnson and Castle-den 2011). In this case, they illustrate the MM project’s impacts and that, contrary to government claims, the movement presented feasible mitigation proposals.

Our analysis integrates these multiple sources of knowledge into a coherent narrative –the historical contextualization of Coimbra and its history of urban and mobility governance and conflicts, the analysis of document and the movement’s critiques, and finally the site-by-site analysis– to provide a more systematic assessment of the impacts and contradictions of Metro Mondego. The insertion of the project within longer-term and multi-sited urban conflicts allows a cumulative perspective on environmental change. Inspired by Huang and London (2016), we treat impacts as contextual and contested, integrating formal analysis with community and lived-experience knowledge.

4. The Metro Mondego as carbon-washing mobility

Coimbra, an intermediate city of 143,818 inhabitants (418,136 in the district) covering 319 km², is known for its UNESCO-listed university and historic centre. Located between Lisbon and Porto, it has experienced significant housing and infrastructure expansion in recent decades. Like much of Portugal, one of the EU countries with the highest rate of car use, Coimbra remains highly car-dependent (Lopes 2024), prompting proposals such as Metro Mondego, and various conflicts over green spaces. As we will show, Coimbra should be understood not as an exceptional case but as illustrative of broader transformations in European urban climate governance under conditions of austerity, EU funding regimes, and electoral pressures.

This section traces the evolution of Metro Mondego from light rail to BRT amid governance instability, austerity, and sustainability discourse (4.1); situates recent mobility-related environmental conflicts in Coimbra’s governance context (4.2); and examines carbon-washing narratives, community critiques, and sites where discourse–practice contradictions are most visible (4.3–4.4).

4.1. A short history of the Metro Mondego project: between governance instability, financial austerity and the sustainability discourse

Conceived under Decree-Law 70/1994, Metro Mondego was initially planned as a light rail system linking Coimbra, Miranda do Corvo, and Lousã, replacing the ramal da Lousã railway (Lusa 2024a). After the creation of Metro Mondego, SA in 1996 – originally owned by local municipalities – the Portuguese State assumed majority control in 2001 to secure financial viability. Project costs rose from €122.8 million (1997 feasibility study) to €512 million by 2011, reflecting escalating consultancy expenses,

governance instability, failed public–private partnership attempts, and prolonged uncertainty over technological solutions. Implementation was further disrupted by institutional restructuring, suspension of rail services in 2009, and competing infrastructure investments such as the A13 highway. Repeated delays and unmet governmental promises prompted growing citizen mobilization, particularly in Lousã and Miranda do Corvo.

In 2011, the project was suspended despite roughly €150 million already invested in studies, contracts, and operations (Lusa Agency 2024a). The suspension resulted from fiscal austerity policies and unresolved concerns over operational deficits (€4.5–4.8 million annually). Following the global financial crisis, Portugal entered the EU-IMF-ECB financial assistance programme (‘Troika,’ 2011–2014), which required postponing major public works and prioritizing EU-co-financed projects with immediate competitiveness impacts (European Commission 2011; Ministério das Finanças 2011). Metro Mondego was consequently frozen alongside other transport investments.

Although the Troika programme formally ended in 2015, austerity effects persisted and Portugal continues servicing restructuring loans. Citizen movements continued advocating for the light rail (‘tram-train’) option, arguing that prior investments should not be wasted (Lusa Agency 2013). In 2017, however, the government replaced light rail with a cheaper Bus Rapid Transit (BRT/Metrobus) system, awarding contracts in 2020. Cost considerations were decisive: the BRT was estimated at €130 million – later rising to €200 million – less than half the projected light-rail cost, with 84% financed by EU funds. Despite this shift, the project retained the ‘Metro Mondego’ name, discursively presenting BRT as equivalent to light rail.

Initially presented as a transport project, after 2019 Metro Mondego was reframed as a sustainable mobility initiative aligned with national climate and social equity goals. Official discourse emphasized environmental responsibility, accessibility, and social acceptability (Metro Mondego 2023), reinforced by the slogan ‘More city, more sustainability, more future’ and imagery of electric buses integrated with urban greenery (Figure 1). The 42-km system, with 42 stations and electric vehicles serving 17 municipalities, is promoted as modern, efficient, and low-carbon, projecting 13 million passengers annually and CO₂ reductions of 18,900 tons per year. Originally scheduled for completion in 2024, delivery has been postponed to 2025–2026.

Two factors drove this renewed sustainability framing. First, the rise of youth climate activism in Portugal increased political pressure for low-carbon transport solutions; during Coimbra’s 2019 climate strike, protesters demanded rail investment, chanting ‘We want the train’, while the mayor promoted the Metro Mondego BRT. Second, EU policy priorities – particularly the Green Deal and the post-Covid Recovery and Resilience Plan – strongly incentivized electric public transport expansion through funding and regulatory support (European Commission 2023). EU officials explicitly endorsed the project as a clean, efficient mobility solution (European Commission 2021). Indeed, the EU actively encouraged Coimbra’s Metro Mondego BRT project. As the Commissioner for Cohesion and Reforms, Elisa Ferreira, stated when the first EU financing of the project was approved: ‘This project will provide citizens from Coimbra and the Coimbra region with much deserved clean, safe and efficient transport services. It will offer a more attractive public transport that will reduce travel times and pollution, and improve comfort and the quality of air.’ (European Commission 2021)



Figure 1. Left: One of many posters of Metro Mondego across the city promoting the project's motto, 'More city, more sustainability, more future', alongside a modern bus, and, ironically, lots of trees. Source: Author 1/ Right: Another promotional poster of MM, in the company's Facebook page, stating 'We are a Green Mobility', touting the electric vehicles and the reduction of air pollutants and CO2 emissions. The accompanying post states: 'At Metro Mondego, our commitment is daily: we always choose the greenest route. By travelling with us, you are contributing to a more sustainable, responsible, and conscious future. We want to make our region cleaner, healthier, and more vibrant.' (Authors transl.) Source: Metro Mondego (2026).

4.2. Environmental conflicts in Coimbra: confronting institutional path-dependence of car-based

The Metro Mondego is part of a broader history of environmental conflicts over transportation in Coimbra. One prominent case was the successful movement to prevent highway construction over the Choupal National Forest which borders the city (Monteiro and Montez 2015). Another was the resistance to a proposal for an underground parking lot in the central city's plaza, Praça da República, which threatened cutting its century-old London plane trees (*Platanus x acerifolia*, locally called plátanos).

The Metro Mondego conflict was preceded by a 2021 dispute over the EU-funded 'Caminhos Pedonais' ('Walking Paths') project in the Solum neighbourhood. Although presented as a pedestrian initiative for 'environmental protection', the project included construction of a new road that destroyed a green space and threatened dozens of mature trees, including several protected cork oaks. Residents organized a petition with over 800 signatures, raised the issue in the Municipal Assembly, and demanded consultation and redesign. The Municipality ultimately modified the project to preserve the cork oaks and several poplar trees while expanding mitigation planting.

This struggle began a broader engagement with local environmental activists, many of whom had previously been involved the struggle to protect the Choupal National Forest, and had just formed the organization ClimAção Centro (ClimateAction – Center Region) in 2019, to pressure the Municipality for climate planning and action. Trees

became a central issue in the city's political discourse, including during the municipal elections, when the winning candidate, José Manuel Silva, from the Juntos Somos Coimbra ('Together we are Coimbra') coalition, made it a campaign focus with promises to protect trees.

These conflicts reflect Coimbra's distinctive urban governance culture, characterized by institutional path dependency and resistance to systemic change. Previous research shows how planning instruments, housing strategies, and land-use policies reproduce long-standing governance logics that hinder innovation and integration of environmental services into planning (Ferreira 2020; Ferreira et al. 2024; Pinto et al. 2019). Under Mayor Manuel Machado, this translated into a preference for car-oriented mobility and highly visible, rapid interventions over systemic reform. Despite expectations that the current administration would introduce change, continuities in institutional practices and electoral logics help explain the controversial decisions surrounding Metro Mondego.

The Metro Mondego conflict formed part of a broader wave of mobilizations across Portugal opposing tree removal linked to large-scale transport projects. Similar struggles emerged in Lisbon, where activists sought to protect Jardim da Parada from metro construction (Samhan 2024), and in Porto, where protests challenged tree loss and bike-lane removal associated with a BRT project. As in Coimbra, environmental impact assessments underestimated tree loss (Soldado 2024). Unlike Coimbra, however, Porto's municipality halted the project and requested route modifications following strong political and public pressure. These conflicts culminated in the first National Gathering in Defense of Trees in February 2024, bringing together citizens and scientists to discuss coordinated action and the promotion of national tree-protection legislation (Fonseca 2024).

4.3. *The Metro Mondego as carbon-washing mobility*

In summer 2022, Coimbra's newly elected municipal government relaunched the long-delayed Metro Mondego project. A brief newspaper notice revealed plans to remove 663 trees – officially to be replaced one-for-one – although experts estimated more than 1000 would be felled. The announcement triggered the 'Save the Trees' movement, whose slogan 'The metro can pass, the trees must stay' challenged the project's environmental impacts. The movement brought together public school teachers, doctors, university professors and researchers, architects, biologists, journalists, environmental activists, students, and retired residents (Figure 2).

Activists urged the municipality to review project routes and infrastructure, calling for solutions that avoided net loss of green spaces and increased tree canopy in line with European restoration goals, to make Coimbra truly green and sustainable (ClimAção Centro 2022a). They identified multiple high-impact sites (ClimAção Centro 2022b; Gonçalves 2022) and pressed officials to honour electoral commitments to protect the city's trees. Architects and biologists within the movement worked together to propose feasible route modifications capable of preserving hundreds of trees (Gonçalves 2022; Martins 2022).

Activists also questioned why a new EU-funded water and sewage system was built alongside, rather than beneath, the Metrobus corridor (Martins 2022). Locating pipelines under the 7-meter canal would have reduced construction impacts, but their parallel

installation required excavation widths of 15–30 m, increasing the project's overlap with mature trees. Municipal authorities framed tree loss as unavoidable for mobility improvements, yet during a public debate in Coimbra's City Hall on September 21, 2022, officials acknowledged that this alternative was rejected because it would slow implementation. The decision illustrates how execution speed – aligned with electoral timelines – was prioritized over ecological protection and integrated planning.

The Municipality and MM argued that activists were misinformed and politically motivated, lacking perspective and focused on 'negative politics' (Silva and Bastos 2022), and framed environmental impacts as unavoidable 'transformations' necessary for urban progress. They further argued that activists' objections came too late, claiming prior public participation had already occurred, and dismissed the proposed route changes as unfeasible, arguing this would supposedly jeopardize funding and trigger financial penalties, even threatening the project's cancellation (Diário de Coimbra 2022), a position reiterated in response to a legal action filed by activists. The action challenged the absence of a mandatory Environmental Impact Study (EIS) for the final project version, noting that the 2017 EIS was outdated and did not assess expanded routes or tree impacts. After a brief injunction, the court ruled in favour of the Municipality, citing public interest and potential financial penalties from further delays.

Central to the project's defense was the framing of the project as environmentally beneficial: officials emphasized a 1:3 tree mitigation ratio, projected removal of 200,000 cars annually, and estimated reductions of nearly 20,000 tons of CO₂ emissions – claimed to be higher than the cut trees' carbon capture – giving the project a 'positive environmental

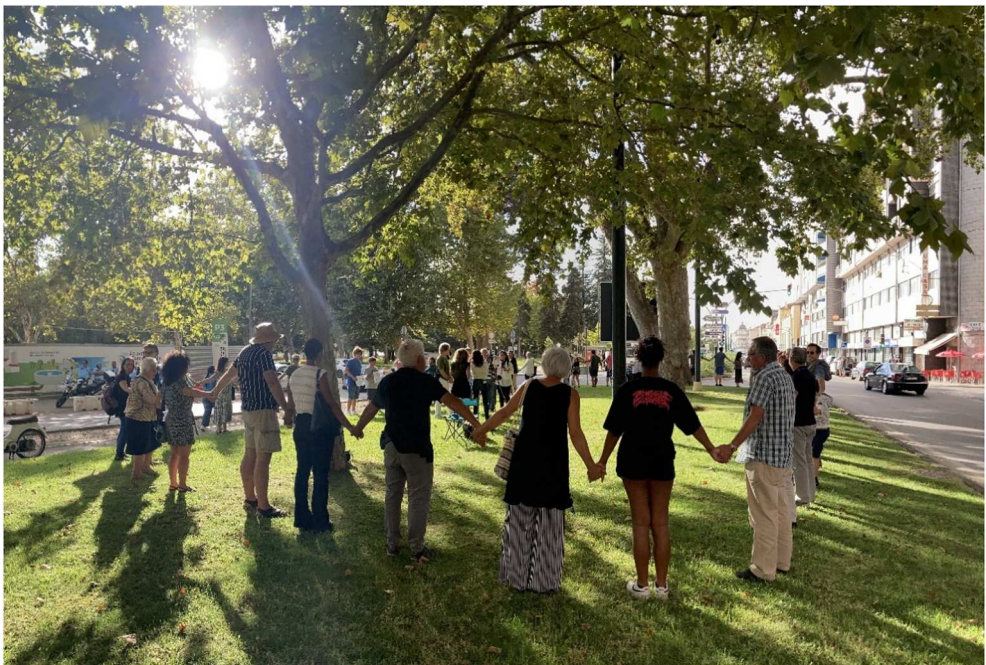


Figure 2. Protest circling the centenary plane trees on Emidio Navarro Avenue. Source: Catarina Parente (2022).

balance'. They added that delaying the Metrobus would worsen environmental harm by prolonging the use of 'thousands' of cars. As the mayor and the transportation counsellor said in an opinion piece: 'Any good environmentalist cannot tolerate any further delays to the MetroBus.' (Silva and Bastos 2022). This reasoning became the core of the project's carbon-washing narrative.

These claims were later contradicted by project developments (García López 2022). The alleged urgency proved unfounded as repeated delays occurred for reasons unrelated to tree protection, while project modifications proceeded without penalties (Alves 2022; Coimbra Municipal Chamber 2023a). Investigative reporting revealed weak public oversight of costs and deadlines for contracts, citing missing information, contractual inconsistencies, and absence of clarifications from the infrastructure agency, IP (Nunes 2023). By early 2024, Metro Mondego had executed only 38% of planned investments for 2023, and under half of those scheduled for 2021–2022 (Lusa Agency 2024b), with delays poorly justified by MM, which blamed other agencies. Reports suggested completion would be postponed beyond 2025 (Transportes & Negócios 2024). Despite not being completed, the project was officially 'inaugurated' by the municipality and MM in August 2025, two months before the municipal elections, with free rides in a short 5 km route. This reinforced activists' view that implementation speed reflected electoral rather than environmental priorities. Indeed, a business magazine's report highlighted that BRT systems were gaining popularity across Portugal –with Coimbra as the leading example – 'precisely because of the speed with which it can be implemented, in just one [electoral] term.' (Jornal de Negócios 2024).

The participatory process was markedly insufficient, especially given the project's scale. Government discourse conveyed the project as predetermined, with municipal leaders stressing urgency and discouraging further studies and debate. In May 2019, the then-municipal president of Coimbra stated in dramatic terms: 'There is no more time to waste ... it is the time to do [the project] or to die' (Coimbra Municipal Chamber 2019). Public participation was limited to brief online consultations on the Participa portal, each lasting only 20 days for each of two Metrobus routes. The first consultation (for the Coimbra-B – São João route), received 11 submissions, while the second (for the routes within Coimbra), recorded none. By that stage, the project had already been approved by the Council of Ministers, rendering participation largely procedural.

Between national approval and project financing in 2020, public engagement was minimal. Apart from a single contracting announcement and a municipal assembly vote – formally open but rarely accessible to citizens, as they are barely announced in the local press and require a request to participate one month in advance – no public hearings were held. From 2020 until construction began in 2022, the project was not publicly presented. Even after works and tree felling started, information remained absent from municipal and MM websites, appearing only after the first protests. Requests from citizens, including the authors, for detailed plans were largely unanswered.

In an interview, one of the leaders of ClimAção Centro, schoolteacher Miguel Dias, highlighted the shortcomings in information, noting that while it may be available, '[this] does not mean that it is accessible', and the lack of visual representations that would allow the average citizen to fully understand the project. Another ClimAção activist, professor in community development Mário Montez, added: 'There was much public discussion, I participated in the platform [Participa], but then you do not get

any feedback on how the population's ideas influenced the political decision.' (in Furtado 2022). Both expressed feelings of powerlessness and discouragement, as the project was presented as 'inevitable', and they felt their participation served merely as a token exercise to 'make the news' rather than genuinely address their concerns (Furtado 2022).

The movement also exposed the contradictory logic of tree planting within the project's carbon-washing strategy. Large-scale tree removal could have been avoided through minor route design adjustments, yet planners prioritized electoral timelines, linear and large-scale designs, and traffic continuity over impact minimization. The project thus violated basic mitigation principles by preserving road capacity rather than urban tree cover. Indeed, the MM's CEO acknowledged that routes were chosen to minimize disruption to car traffic (Soldado 2022). In practice, only a few traffic lanes were removed, new roads and parking areas were added, while pedestrian space and planned tree planting were reduced in some locations. This reflected an anti-environmental mindset which contradicted stated goals of sustainability, greening and reducing car use. During a widely-attended public debate in October 2022, biologist and ClimAção activist Anabela Azul asked the municipal president, 'Why maintain roads but cut down trees?', a question that went unanswered (Farias 2022).

Activists further argued that mitigation measures did not produce a positive environmental balance (García López 2022). Tree removal increases emissions while reducing filtering of air pollutants, shade provision, and protection against extreme urban heat. Newly planted trees, if they survive changing climatic conditions, would take decades to replicate the ecological functions of mature ones –a gap during the crucial years when immediate climate mitigation and adaptation strategies are required. Moreover, trees constitute urban ecosystems and cultural heritage, carrying social and affective value beyond quantitative mitigation metrics.

In response to these criticisms, in October 2022 MM and the Municipality announced a 'tree-by-tree' review to reduce removals. Officials cited new urban tree legislation and climate concerns as justification (Coimbra Municipal Chamber 2023b), which implicitly validated the movement's claims. Yet five months later, only 83 additional trees were preserved out of 683 scheduled for cutting, disappointing activists. Meanwhile, mitigation commitments weakened, and faced delays and misinformation: the promised 1:3 planting ratio appeared reduced to 1:2 in the official agreement between the Municipality and MM, with 1,208 trees to be planted (Coimbra Municipality 2024a), while the separate Municipal Reforestation Plan also failed to meet its targets in 2022–2023.

The movement also questioned the reliability of MM's projected CO₂ reductions. Activists argued that emissions savings would occur only if the Metrobus substantially replaced car use (Farias 2022), a doubtful assumption given the project's car-oriented design, and the fact that Coimbra's population size (170.000) is lower than the MM's estimated number of cars that would be taken out of the road (200.000). They further noted emissions generated by tree removal and construction activities, particularly the carbon intensity of cement and heavy machinery. A comprehensive full life-cycle assessment would be required to evaluate net impacts (Pfadt-Trilling and Fortier 2021), yet MM did not provide its emissions calculation study upon request by the authors.

Finally, regarding the so-called inevitability of the impacts, investigative journalist Farias (2022) put it best: '... this sounded like a new, twenty-first-century version of the speeches of the last millennium when polluting the air and seas to install factories

and large foreign tourist complexes, displacing vulnerable populations to build roads and cutting down forests for the expansion of agribusiness were some of the prices that had to be paid in the name of supposed economic progress. Collateral damage ...’

4.4. *Metro Mondego’s sites of carbon-washing*

Building on analysis of key portions of the MetroBus routes, this section employs a narrative and visual exploration of specific sites where the above-mentioned contradictions became clearest.

4.4.1. *Emídio Navarro avenue*

In August 2022, activists learned that five plane trees – two over a century old – on Emídio Navarro Avenue were scheduled for removal (Soldado 2022). A protest drawing hundreds of participants followed, alongside an online petition titled ‘Metro Mondego can pass, the Plátanos must stay’, that gathered nearly 2,000 signatures in one week (ClimAção Centro 2022a). After meeting with Metro Mondego (MM), architect A. Nuno Martins and biologist Maria João Feio proposed an alternative route (Figure 4) and a guide for redesigning other project routes, preserving its trajectory while saving hundreds of trees. MM did not respond, and a few days later removed the trees without prior notice, preventing further mobilization and declining subsequent requests for clarification. MM never met again with movement activists to explain their plans or why alternative designs were not feasible.

The Municipality dismissed the significance of the tree removals, arguing they provided little shade and would be replaced with 43 new plantings (Silva and Bastos 2022). However, the five trees represented the last remnants of a once tree-lined avenue gradually cleared over two decades (Figure 3). MM rejected the movement’s alternative route, claiming – falsely – that it would require additional tree removal, and that it would reduce demand due to a slightly longer distance from the sidewalk to the metrobus stop (Soldado 2022). One year later, the site remained unfinished and occupied by construction offices. Activists marked the anniversary with a silent protest organized by ClimAção Centro (2022b).

4.4.2. *Estação Nova (Coimbra-A train station)*

In June 2023, additional mature trees – the last remnants of Emídio Navarro Avenue’s historic canopy – were removed near Coimbra-A (‘New Station’), despite activists proposing an alternative route that would have preserved them (Figure 5). The intervention also led to the closure of Coimbra-A station, replacing the direct rail connection to Coimbra-B with a Metro Mondego bus service. The Civic Movement to Save the New Station warned that this change would negatively impact mobility, particularly older and lower-income residents from surrounding villages, who are more reliant on public transport (Coimbra Municipal Chamber 2024b) and now faced inconvenient transfers to get from their homes to Coimbra’s centre. Research shows that additional transfers reduce public transport attractiveness, potentially increasing car use and worsening mobility inequalities (Coimbra Municipal Chamber 2024b; Movimento Cívico pela Estação Nova 2022).

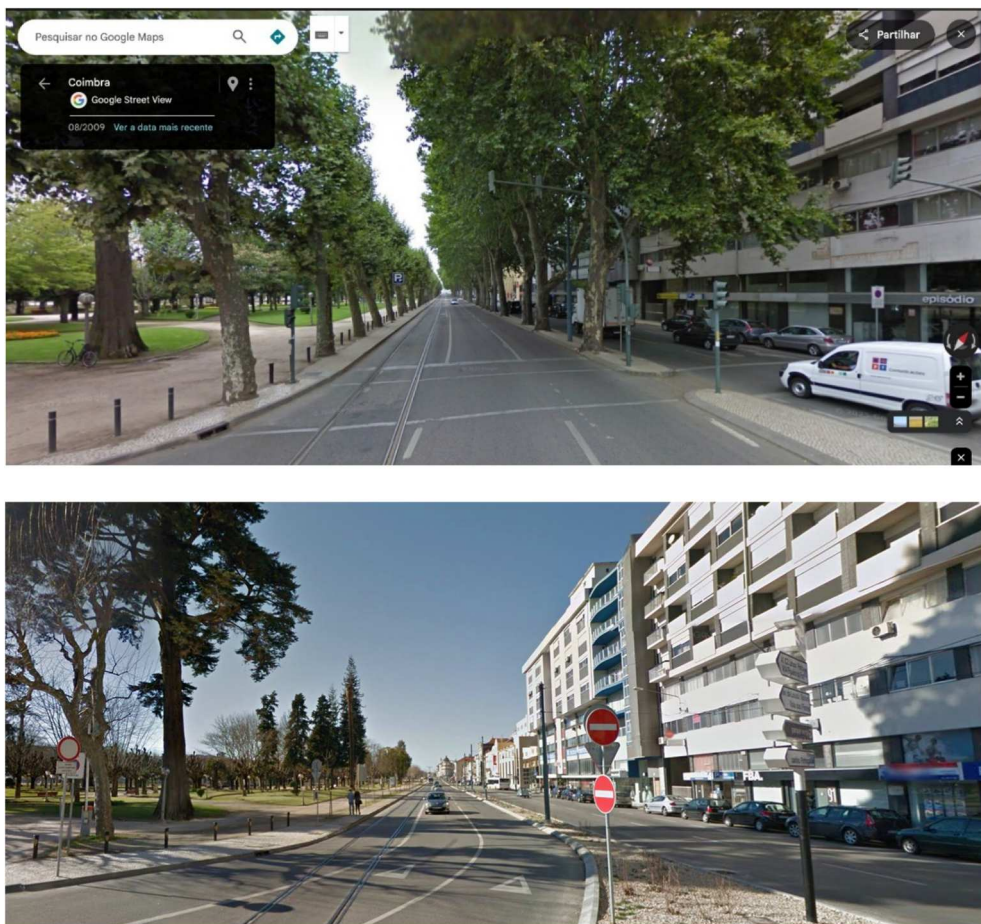


Figure 3. Emidio Navarro Avenue in 2008 (top) and 2018 (bottom), showing the cumulative impact of tree cuttings before the MM project. Source: Gonçalves (2024).

The movement's critiques made visible broader mobility and equity concerns with the MM project: its routes in the city focus on already well-served central areas, and none of them reach the working-class neighbourhoods on Coimbra's periphery, where public transportation is already limited. Activists also cautioned that electric buses, which rely on lithium batteries, could be less sustainable than trains, which would pose another environmental contradiction.³ The Movement offered an alternative route for the Metrobus to avoid removing the tracks between Coimbra-B and Coimbra-A, but it was not considered by the government.

4.4.3. Coimbra B station

At Coimbra-B station, the Metro Mondego project significantly altered the landscape by cutting down nearly half of an existing wetland-forest and destroying a mountain, part of the drained Gorgulão riverbed, to make way for a new road and roundabout (Figure 6). This was not the original proposal approved for this site. The published Environmental Impact Assessment (EIA) report for this modification (Infraestruturas de Portugal 2019),

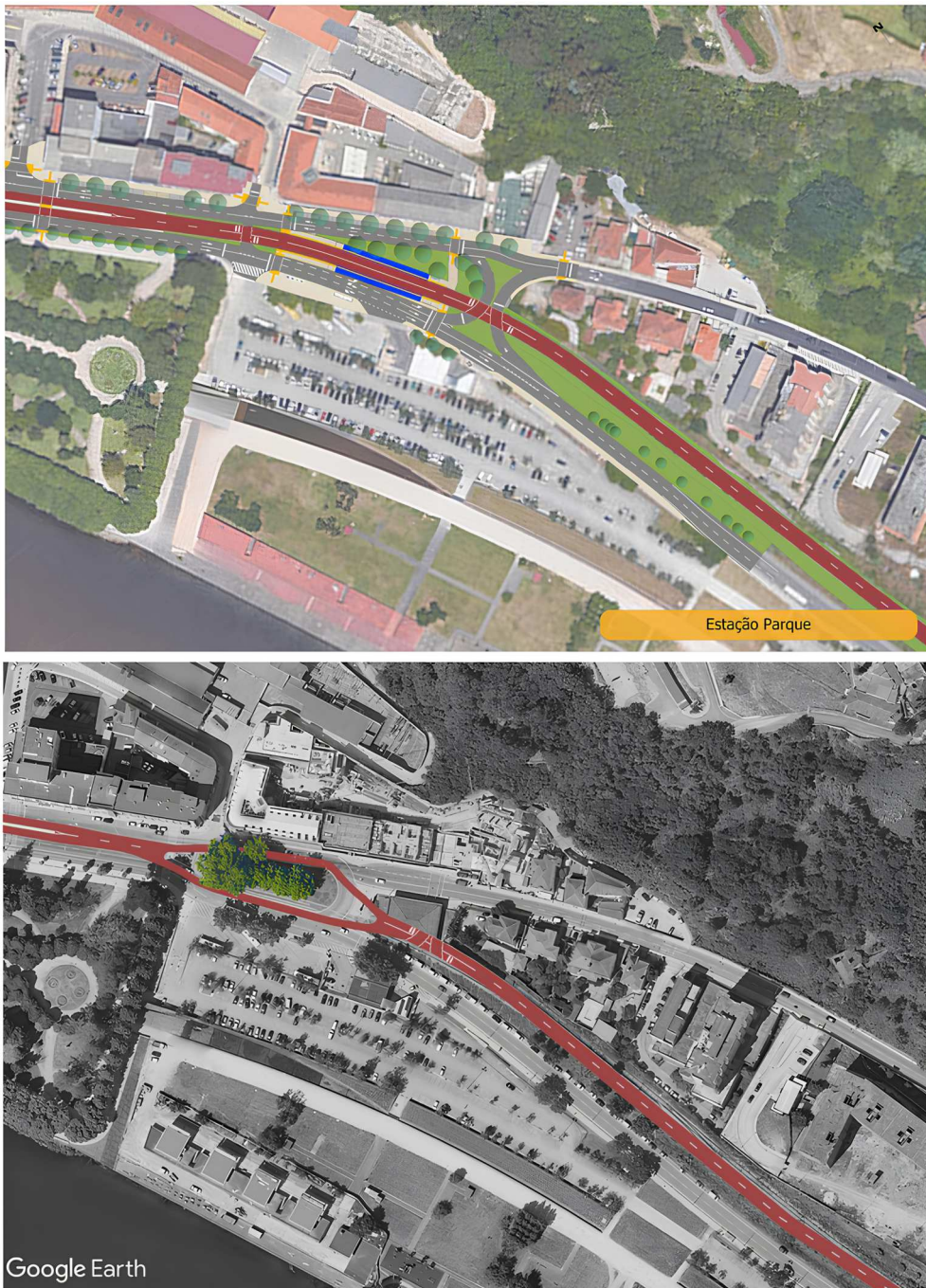


Figure 4. Top: Project plan for the Mondego Parque Metro station, involving the felling of all trees in a roundabout. // Bottom: Alternative layout proposed by the authors, preserving all existing trees. Sources: Author, based on Google Maps and project documentation; Gonçalves (2022).

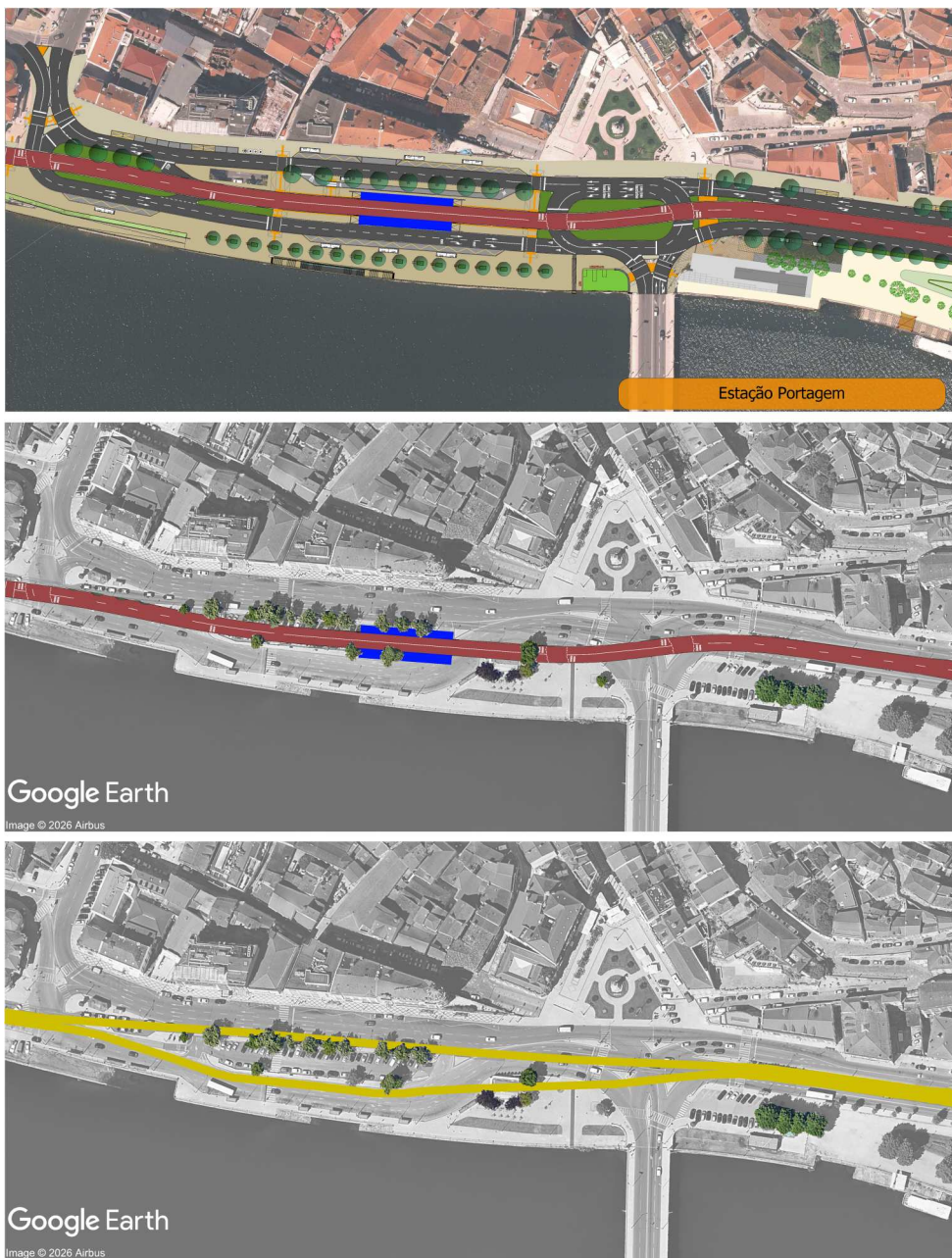


Figure 5. Top: Project plan for the Metro Mondego Portagem station, in front of Coimbra-A railway station. // Middle: Photomontage overlaying the planned Metrobus circulation lanes onto a satellite image, highlighting the trees scheduled for removal (and later felled). // Bottom: Alternative layout proposed by the authors, preserving all existing trees. Sources: Author, based on Google Maps and project documentation; Gonçalves (2022).

downplayed the severity of this situation, describing the impacts as ‘negative, of reduced magnitude, confined and reversible’. The claim of reversibility is incorrect, since once impermeabilized, the riverbed cannot return to its natural state, and there was no



Figure 6. Top: Satellite image of the Coimbra-B railway station and its surrounding area, prior to the Metro Mondego intervention. Source: Google Maps. // Bottom: Drawing produced by Metro Mondego illustrating the proposed layout of the Coimbra-B station for the Metrobus system. Source: Metro Mondego website (retrieved in 2022, but no longer available).

action to mitigate this impact on site. Moreover, destroying a forest riverbed to build a roundabout –especially when another roundabout is located nearby (see right-corner of [Figure 6](#))– seemed inconsistent with the ‘green’ and ‘sustainable’ branding of the project. The EIA report also failed to consider alternative solutions to avoid this environmental damage, contrary to standard practices in environmental impact assessments.

4.4.4. *Jardim de Solum*

Another glaring contradiction of the Metro Mondego project was the destruction of the Solum Garden. This small park had been created less than 20 years earlier as part of the environmental mitigation measures for the Coimbra Stadium, built for the 2004 European Football Championship. Despite the park’s importance, the initial Metro Mondego design called for the entire park to be turned into a parking lot – apparently at the request of an elite private school located next to it. Following protests from the tree-defense movement, the Municipality claimed it would ‘save the park’, stating that only a tiny, ‘temporary’ parking lot would be built for student drop-offs during the construction of Metro Mondego (Campeão das Províncias 2022). However, this promise proved misleading. Only half of the park was preserved, and the parking lot is not temporary as initially suggested.

This contradiction is clear: a project supposedly designed to reduce car use and promote urban greening destroyed part of an existing green space to build the antithesis of sustainable mobility. It is even starker when considering that the area already has significant parking facilities, both adjacent to the park and beneath the Stadium, as illustrated in [Figure 7](#).

4.4.5. *Praça 25 de Abril*

The Metro Mondego significantly altered the landscape of this plaza, once bordered by ample green areas with mature trees, by removing 16 trees and replacing the Garden and parking lot with a paved plaza and new street. Activists protested these changes during the 2022 European Week of Mobility, with the Municipality defending the design as ‘more paved area to walk through.’ After the protest, the Municipality pledged to add some greenery (Notícias de Coimbra 2023), yet the project still led to a net reduction in mature trees and green areas, as can be seen in [Figure 9](#). Additionally, the route now supports a planned housing project nearby built in an old olive farm, aligning the Metro Mondego with urban expansion goals and further reducing the city’s greenspace ([Figure 8](#)).

4.4.6. *Hospital da Universidade de Coimbra*

The Metro Mondego at the University Hospital (HUC) revealed yet another contradiction: the clearing of a forest with approximately 200 trees to pave the way for the Metro-Bus route and the construction of a large concrete wall. This decision sparked significant controversy, as movement activists offered a viable alternative route along an existing road on the east side of the site, which largely followed an established local bus path and would have preserved the forest (Gonçalves 2022; Martins 2022). Nevertheless, once again the municipality and Metro Mondego corporation dismissed this alternative ([Figure 10](#)).

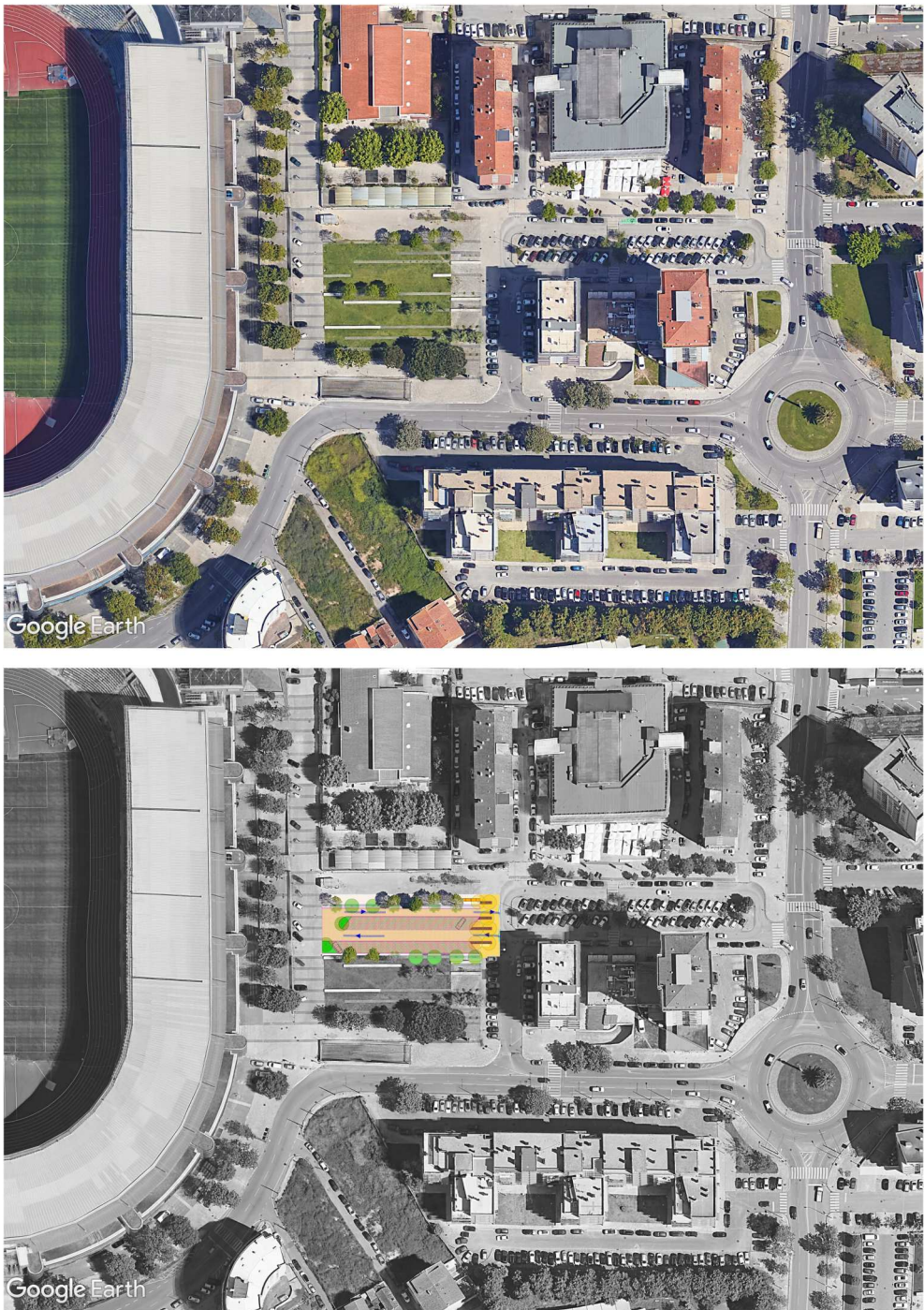


Figure 7. Top: Solum Park prior to the construction of the parking lot (Source: Google Earth). // Bottom: Photomontage created by overlaying the design of the proposed 'temporary' kiss & ride parking lot onto the same satellite image. Source: Author, based on Coimbra Municipal Chamber (2022).



Figure 8. Protest during the European Week of Mobility's tour of part of the MM route in Praça 25 de abril (September 19, 2022). The left sign refers to the number of trees cut. The middle sign directly confronts the MM campaign, stating: 'Metro Mondego: Less city, fewer trees, less sustainable, less future'. The right sign reads, 'I am a tree; cut me if you are (in)capable'. Source: Author 1.

4.4.7. Lourenço Almeida Azevedo avenue

This historic street, near Praça da República and Jardim da Sereia, is known for its mature jacaranda and tipuana trees, which form a prominent urban landscape. Under pressure from activists, the Municipality revised its 2017 plan to remove 43 trees, later announcing that only 11 would be cut due to phytosanitary concerns. However, this revision was never formalized in publicly available project documents. Although presented as a concession, the original proposal – within a project labelled sustainable – had envisaged removing nearly all trees on the street. Even the reduced figure represented roughly 15% of its tree cover.

In May 2025, the street became a focal point of renewed mobilization after the Municipality announced construction without clarifying which trees would be removed. Protesters gathered to demonstrate in the street, reading poetry, hugging the trees, and holding an impromptu assembly to decide on further actions. This moment marked the involvement of new actors, including youth climate activists, and the Academic Association of Coimbra (AAC), the main student body of the University of Coimbra, which published commentaries on social media in defense of the trees, and organized protest banner-making sessions. The movement launched an online petition challenging phytosanitary justifications for tree removal and criticizing the project for degrading urban tree shade and biodiversity, air quality, thermal comfort, pedestrian space, and the city's identity (ClimAção Centro 2025). The petition demanded suspension of tree cutting, publication of technical plans, and consideration of alternative design solutions.

Movement pressure brought the issue to the June municipal assembly meeting, where activist Margarida Lima emphasized the ecological, social, and cultural importance of urban trees, framing the debate as a broader 'defense of life' (Coimbra Municipal Chamber 2025). Making a reference to the Municipality's promotional slogan of 'Coimbra, The right place to be', she said this would come true if we value what we

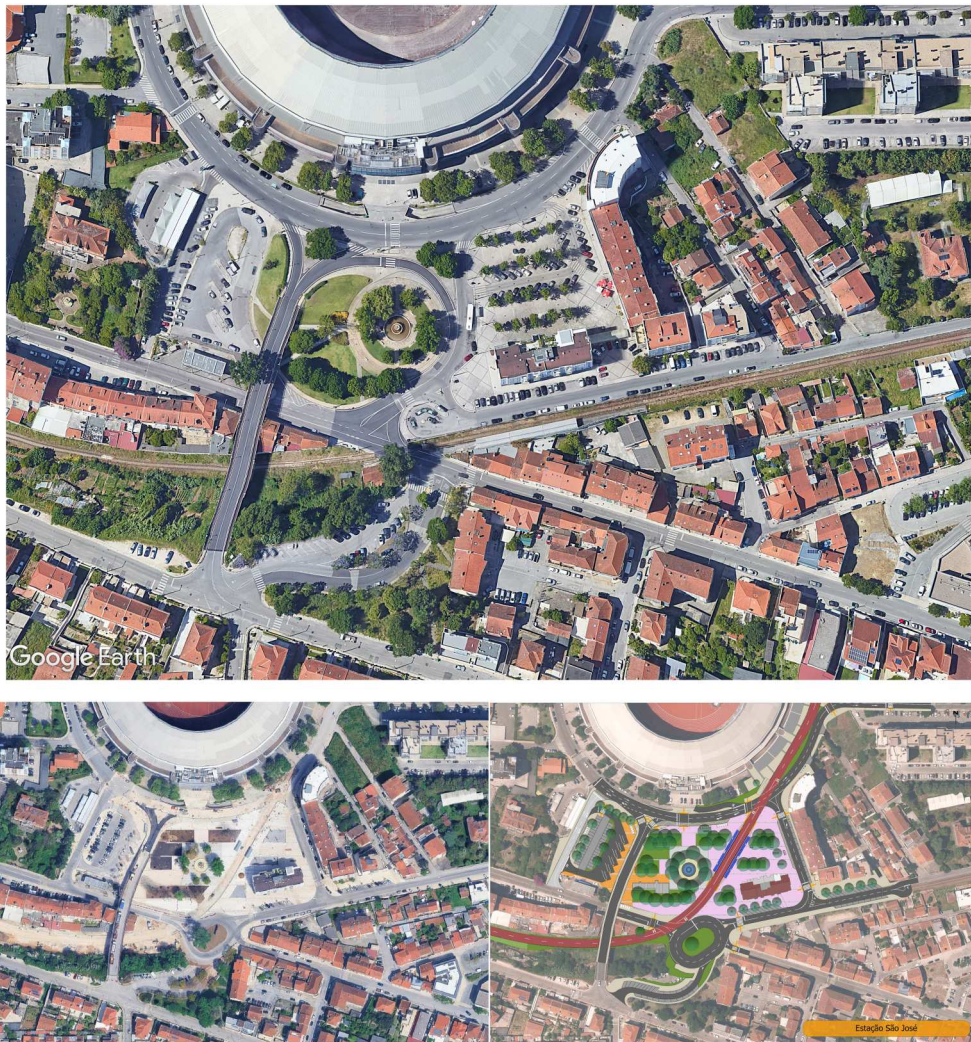


Figure 9. Top: Praça 25 de Abril garden before Metro Mondego interventions (satellite image). Bottom left: Satellite image from 2025 illustrating the extent of tree removal following project implementation. Bottom right: Project plan of São José Station and Metrobus circulation lanes on both sides of the square. Sources: Satellite images – Author, based on Google Maps; project drawing – Metro Mondego website (retrieved in 2022, but no longer available).

already have and respect green spaces and trees. In contrast, ruling-party representatives articulated a technocratic discourse linking the Metrobus –and construction projects more generally– to economic growth and social progress, and environmental responsibility, while criticizing protesters as obstructive and accusing them of doing spectacle politics’ and ‘a la carte environmentalism’ (Coimbra Municipal Chamber 2025, authors’ transl.) The controversy prompted intervention by the Municipal Ombuds-woman, who convened a meeting between officials and activists, resulting in municipal commitments to protect tree roots during construction and reassess planned removals (Figure 11).

(a)



(b)

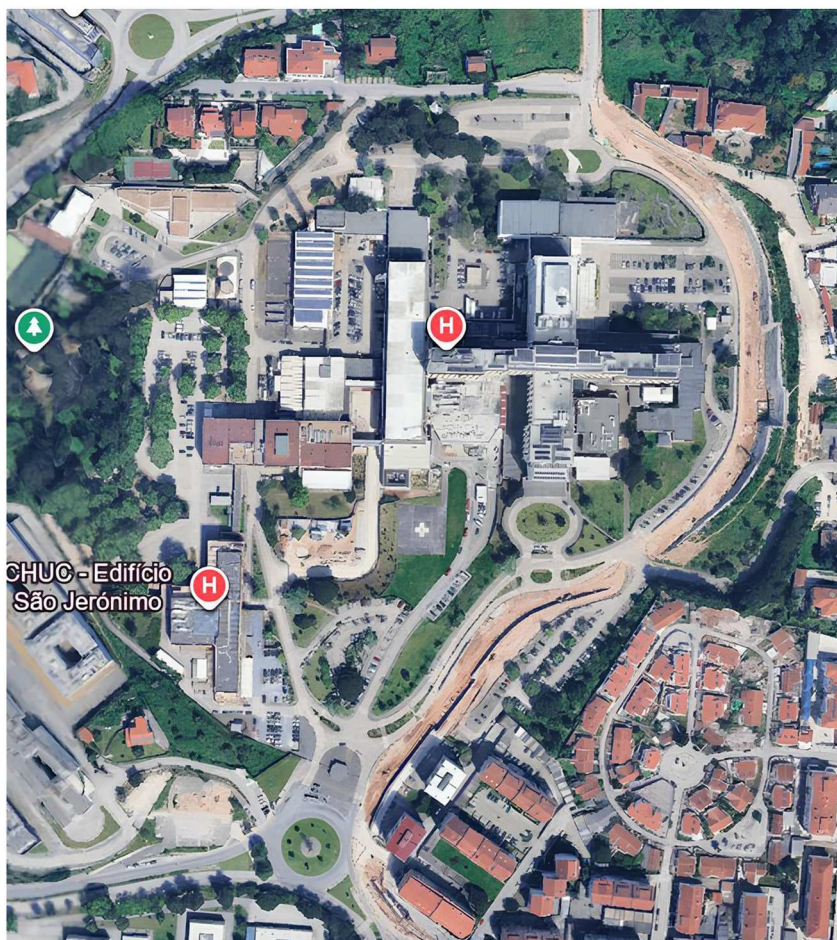


Figure 10. Top Left: Photomontage showing the planned Metro Mondego route through the grounds of the University of Coimbra Hospital Centre (HUC), highlighting the wooded area that was scheduled (and later subjected) to tree removal. // Top Right: Photomontage presenting an alternative route that would have preserved most of the trees in the same area. Source: Gonçalves (2022). Bottom: Image of the HUC route after the tree removal. Source: Google Earth.



Figure 11. Protest in the Lourenço Azevedo Almeida street in front of the jacarandas, with signs reading 'Today you cut trees, tomorrow you breathe dust' (left) and 'Nature cries Heeeelp (sic)' (Right).

5. Discussion and conclusions

This paper analyses contradictions in the 'sustainable mobility' project, the BRT Metro Mondego in Coimbra, and the discursive strategies employed by the Municipality and the IP in promoting and defending it. The analysis draws on the grassroots movement that emerged to protect trees, reacting to the project's environmental costs, lack of democratic participation, and social justice concerns – particularly the closure of the city centre's train station and lack of BRT service to urban peripheries. Overall, the findings suggest that carbon-washing may become a defining governance strategy in contemporary climate urbanism, particularly where large-scale infrastructure investments intersect with growth imperatives and externally funded climate agendas.

The study shows how the project's justification shifted from replacing the regional train service to promoting 'sustainable mobility,' urban greening, cohesion, and emissions reductions – discourses resonant with contemporary climate politics. Despite significant impacts on urban green spaces, municipal authorities and Metro Mondego deployed green/carbon-washing strategies through advertising, media interventions, public speeches and legislative interventions to legitimize the project. Promotional campaigns portrayed a greener future while emphasizing mitigation planting and projected emissions savings, downplaying and even ridiculing the concerns about the high number of trees being cut. Officials invoked climate urgency and potential funding penalties to frame the project as unavoidable, discouraging debate or design reconsideration.

However, a technocratic, top-down process prioritizing visual appeal, efficiency, and existing car infrastructures (avoiding reducing car lanes or affecting 'traffic flow, building more parking lots), undermined these claims. They emphasized urgency and inevitability, driven by electoral considerations rather than sustainability. Their public arguments of equivalence between electric buses and mature trees was symbolic of the contradictions of econometric and modernization principles which see technologies as replacements for ecosystems, and trees as numbers to be traded in a spreadsheet. And while the project will service rural areas of the interior (Miranda do Corvo, Serpins), its routes inside Coimbra cover areas already well-served by public transport, ignoring the urban peripheries and villages surrounding the city, from where thousands commute daily for work.

The Metro Mondego case highlights broader conflicts in urban sustainability and climate planning. It confirms critiques of urban regeneration processes focusing on mega-projects and urban growth, now adopting a 'sustainability' and 'climate' narrative. While the sustainable mobility concept has existed for decades, projects like Metro Mondego increasingly tie this idea to climate planning, revealing pervasive contradictions. Existing research often focuses on opposition from car-centric interests or concerns about gentrification, accessibility, and citizen participation (e.g. Flipo, Ortar, and Sallustio 2023; Rumé 2022; Scanu, Cloutier, and Trudelle 2021; Verlinghieri 2020; Wågsæther et al. 2022). While these concerns were significant in the Metro Mondego conflict, the main focus was on its environmental contradictions, particularly reducing green spaces under the guise of promoting green and climate benefits. Connecting to the literature on greenwashing and carbon-washing is valuable, as it helps expose how dominant actors conceal contradictions through marketing and slogans. This paper adds to that literature by examining these dynamics within the public sector, not just corporations, relevant in a neoliberal urbanization context where 'public-private' alliances are increasingly common.

In 2024, another 'sustainable mobility' initiative promoted by the Coimbra municipality – the proposed Porto–Lisbon high-speed rail connection – intensified these contradictions, threatening Coimbra's Choupal National Park through associated rail, highway, and luxury real estate developments. An independent assessment by the environmental NGO GEOTA (2023) identified significant negative impacts on energy consumption, forests, and protected areas, alongside insufficient analysis of environmental impacts, mitigation, and alternatives to the high-speed option. The case suggests a broader trend of carbon-washing in transport planning as EU and national policies increasingly align infrastructure expansion with climate policy narratives.

Beyond exposing the discursive contradictions of green/carbon-washing in municipal urban transport and climate planning, this study highlights the political and financial drivers shaping 'sustainable' megaprojects. While megaproject research shows their appeal to political and corporate interests, this insight remains insufficiently integrated into climate planning debates. Metro Mondego's framing aligned with European reconstruction agendas promoting large-scale investments under climate and greening narratives. Politically, BRT systems gained traction in Portugal because they could be delivered within electoral cycles and largely financed by EU funds. Critical scholarship should continue examining sustainability planning as a contested field where greenwashing helps explain gaps between rhetoric and outcomes, supported by tools such as life-cycle analysis and situated methods like walking-based research.

Finally, the study underscores the value of bottom-up, participatory planning. Knowledge produced by professionals and activists within the Save the Trees movement articulated more sustainable and socially just alternatives for the Metrobus routes, largely ignored by authorities. The movement fostered critical debate on sustainability and climate action, highlighting the ecological value of mature trees, limits of mitigation planting, the non-commensurability between transport emissions reductions and tree loss, and the need for transparency and meaningful participation. It opened new informal and institutional participatory spaces, increased public access to project information, and achieved partial reversals of planned tree removals, shaping a political context likely to strengthen future protection of urban green spaces. Indeed, in the November 2025 municipal elections, JM Silva and his coalition lost to an alliance led by the Socialist Party and smaller left and environmental parties (CpC, PAN, Livre). Tree cutting had become a prominent campaign issue, and members of these parties were active in the movement. Commentators thus suggested the electoral outcome reflected the conflict, indicating that mobilized environmental grievances may carry political costs.

Our study thus shows that movements are not always reactive or oppositional, much less ‘NIMBY’, as is often claimed by critics, but actually, often generate valuable knowledge about impacts and about alternatives. It also shows that movements, even when not fully successful, can counter green/carbon-washing and influence planning and politics. This supports Albrechts’s (2015) argument for a more radical planning based on creating processes for: (1) existing conflicts to take an agonistic form, which recognizes the legitimacy of a plurality of interests and demands; (2) collective co-production, where citizens are ‘part of action not its object’, and where needs and rights are integrated (107); and (3) a broader concept of legitimacy based not only on government mandates and elections, but in ‘performance as a creative and innovative force and its capacity to deliver positive outcomes and gaining benefits’ with ‘more attention to good governance and fewer fantasies about total control.’ (108). We thus call for continuing to develop engaged methodologies working closely with citizens and social movements to tap into the rich knowledge produced in these spaces, contributing to more just and sustainable urban futures.

In conclusion, rather than isolated controversies, conflicts such as Metro Mondego reveal emerging struggles over the meaning of climate action itself. Understanding and confronting carbon-washing will therefore be central to building genuinely democratic and socioecologically transformative urban futures.

Notes

1. Statistics form part of the modernization paradigm – not as its cause, but as a complementary element: quantification enables the evaluation and measurement of public services central to modernization processes.
2. No EIS was carried out for the final project version; only earlier studies exist, including the Coimbra-B station modification analysed in Section 4.4.3.
3. Evaluating this argument remains difficult given limited research and lack of consensus. Available evidence suggests trains may be more energy-efficient per passenger due to higher capacity and the absence of onboard batteries (Sertsoz, Kusdogan, and Altuntas 2013). The key issue, however, is questioning the presumed sustainability of electric buses.

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