DRIVING EUROPEAN RESILIENCE THROUGH SUSTAINABILITY: THE DYNAMICS OF SUSTAINABLE TRANSIT IN THE METROPOLIS AND THE POLITICAL STRATEGIES OF THE EUROPEAN UNION

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ABSTRACT

This thesis explores the case study of sustainable transit strategies of Madrid and Vienna in the context of international relations, and how IR theories can be used to demonstrate relationships between local, national, and international actors in explaining why and how different local-level actors go about implementing sustainable transit policies with varied levels of success. The central focus are the contrasting approaches and outcomes towards achieving infrastructures for zero-emission vehicles, as an alternative to traditional privately-owned petrol and diesel-powered vehicles. The study draws upon Constructivism, Global Political Economy (GPE), and Multi-Level Governance (MLG) on sustainable transit policies in major EU capitals, using Vienna and Madrid as case studies.

This study applies qualitative methods, discourse analysis, and semi-structured interviews with the transportation officials of Vienna and Madrid, to demonstrate social acceptance outcomes of EU-aligned Madrid's policies and the politically fraught state of Vienna's transit policies. Interestingly, Madrid's effective alignment with European Union mandates fostering significant social acceptance and resilience to economic disruption, while Vienna's more hesitant, fragmented policy execution remained stalled by federal-municipal tensions between Austria and Vienna, limiting infrastructure investment. Additionally, the thesis positions sustainable transit infrastructure as an economic and security resilience priority due to the EU's strategic reorientation after the Coronavirus pandemic, along with now-heightened competition from international market players like China in the EV market.

AUTHOR'S DECLARATION

I, the undersigned, Zenon Hanappi, candidate for the MA degree in International Relations declare herewith that the present thesis titled "Driving European Resilience Through Sustainability: The Dynamics of Sustainable Transit in the Metropolis and the Political Strategies of the European Union" is exclusively my own work, based on my research and only such external information as properly credited in notes and bibliography. I declare that no unidentified and illegitimate use was made of the work of others, and no part of the thesis infringes on any person's or institution's copyright.

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Vienna, 20 May 2025

Zenon Hanappi

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Introduction

The public push for sustainable urban mobility has become an increasingly critical aspect of public discourse surrounding transit infrastructures and their economic viability, environmental impact, and capacity in an ever-expanding and urbanised European Union (EU). Throughout the past few decades, one mode of transit has been heralded as the symbol of transport innovation and the potential solution to the bleak future of unsustainable urban alike: the zero-emission automobile. By 2025, we have yet to answer the question of whether modern societies are able to mass-produce affordable zero-emission vehicles at a large scale. Furthermore, the technological and scientific path to how such vehicles would operate and propel themselves has yet to be answered, as vehicle power infrastructures from hydrogen to electricity are being experimented with in cities and towns across the world. And yet, despite ambitious efforts on an international scale with initiatives such as the European Green Deal and the Sustainable and Smart Mobility Strategy, significant implementation gaps remain between EU-wide mandates and local or municipal-level uptake. These gaps are particularly salient in cities such as Vienna, where a strong network of established public transit networks and urban environmental planning paradoxically coexist with an insufficient policy attempting to change the city's petrol-heavy automobile landscape.

This thesis will attempt to interrogate and understand the core issue driving this paradox, in particular by using a comparative case study approach that contrasts two cities that have been early to adopt zero-emission vehicle infrastructure and policy incentives, and one that hasn't despite a strong social demand for sustainable transit networks: Madrid and Vienna. Both Madrid and Vienna, as major cities and national capitals in Western EU countries, have grappled with

social constructs which have split the city between those who depend on the individual-centric mode of privately owned vehicle transit, which traditionally and most prolifically on contemporary markets means the use of petrol-driven vehicles. And while one has managed to effect notable evolution at a societal level towards zero-emission vehicle uptake, both the Madrid and Viennese public have had to ask themselves the question: Is the electric vehicle truly a viable alternative to the status quo?

In this thesis, I will use a number of theoretical frameworks, including of constructivism, global political economy (GPE), and multi-level governance (MLG), to contextualise and further apply original and existing research and studies, which together help narrate the differences between the Madrid and Vienna cases. At the urban level, I hope to show with this thesis two primary issues for consideration. Firstly, this thesis would argue that the relationship between public and private modes of transport and their efficacy in urban mobility have a significant impact on how public institutions negotiate understandings of social demands on transit policy and infrastructure. Secondly, the process of negotiating these social demands is fundamentally dependent on, at least in the EU case, the process of transnational political processes setting the boundaries of such social, rather than solely political debates, with the locality acting as a site for contestation, rather than formation of social discourses around transport and mobility needs. Furthermore, this thesis is timely in the sense that it is being written in the aftermath of the Covid-19 pandemic, and as a result can consider the outcome of global trade disruption and recognise the pandemic both as a disruptor and as a catalyst of geopolitical reconsideration and recalibration of efforts towards zero-emission vehicle alternative infrastructures. Given the new race trade partners and competitors in the zero-emission vehicle market such as the EU and the People's Republic of China find themselves in, I would propose understanding the following study through the lens of three levels of geopolitical and social negotiation of boundaries for

social demand negotiation: the international, the regional and the local/municipal. With these three localities stated, I would propose the following research questions:

- How has the increased social demand for politically resonant and sustainable vehicle alternatives influenced trading blocs with regard to their own perception of economic and transit-infrastructure resilience?
- How has the European Union's geopolitical stature after the renormalisation of trade post-pandemic evolved the bloc's understanding of its priorities as a trader on the global market?
- How have political narratives of self-reliance entrenched or challenged municipal constructivist reactions to existing and proposed efforts for evolving current transit policies?

To provide better insight into these questions, I will use a mix of quantitative data provided by empirical academic studies and statistics provided by the governments of Madrid and Vienna, respectively, regarding EV uptake and infrastructure proliferation, as well as qualitative data. This qualitative data will come in the form of news reports, published materials on consumer motivations regarding transit choices, and interviews with members of government institutions who work in departments relevant to implementing transit policies. By undertaking document analyses, interviews and discourse analyses of public sentiment shifts towards different transit modes and their perceived viability to satisfy the criteria of contemporary transit social demands, this thesis should provide an account of what social, political and economic elements must be present for more progressive and successful transitions towards zero-emission transit environments under common EU frameworks.

Background

Vienna case background

Over the previous decades, the Austrian Federal Government and some State Governments, such as the left-leaning Vienna City Government (also known as Stadt Wien), have been increasingly vocal about the issue of the national and municipal carbon footprint. These political debates emerged as part of a wider wave of renewed social demands for sustainable alternatives to existing, highly polluting transit methods, among other social demands for more sustainable aspects of urban life across the European Union. At the forefront of this debate, two different options for power in the transit sphere emerged: hydrogen fuel cell vehicles (HFCVs) and battery electric vehicles (BEVs). While this debate settled into municipal-level discourse over which technology was the best to invest in, the Austrian Federal Government took a major guiding role in the Viennese debate when it announced the Klima Aktiv mobil initiative in 2013. The programme, which seeks to promote alternatives to existing methods of fossil fuel-powered transport, promoted public transit usage, cycling, and, notably, electromobility. With this new emphasis on BEVs in public discourse due to the introduction of Klimaaktiv mobil, many legislators began pivoting towards whether and how to fund and incentivise the uptake of BEVs among the general public, across regulated transit sectors such as taxicabs, and public transit spaces, such as buses.

This public discourse shift was so drastic that, according to statistics published by the Federal Ministry of Climate Action, Environment, Energy, Mobility, Innovation and Technology, by March 2021, while there were 50,574 BEVs registered in Austria, only 47 HFCVs were registered on the road in Austria by comparison (Federal Ministry for Climate Action,

Environment, Energy, Mobility, Innovation and Technology, Department II/6, Active Mobility and Mobility Management 2021). Shortly before this, in 2020, A policy step was taken which exacerbated this lopsided preference for BEVs when the Austrian Federal Government announced a programme to subsidise EV purchases in Austria by 5000 euros, with additional funding options available for those who wished to install home charging solutions for their EVs(Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology, Department II/6, Active Mobility and Mobility Management 2021). These policies not only exacerbated the infrastructural and economic argument for BEVs rather than HFCVs, but arguably have been actively interventionist regarding their influence on Viennese tendencies towards EVs. And yet, Vienna still remains the site of what one could describe as worn out by the frictions of translating policy responses to social demands into tangible changes in a city's transit ecosystem.

Vienna, being a city known for its comprehensive and well-designed transit ecosystem and pedestrian-friendly design, has still underperformed in adopting and facilitating the mass adoption of BEVs. On a policy level, this has led to a struggle in direction, as Vienna had previously committed itself to an objective of automobile reduction rather than substitution and had by the mid-2010s already been funding its public transit alternatives heavily rather than investing heavily in the proliferation of BEV support infrastructure. Funding similarly made many automobile-friendly areas more pedestrian-friendly and resulted in a vast network of bike lanes and infrastructure, which has made it a very bike-friendly city with plenty of bike lanes and newer bike-sharing and rental systems. This emphasis on automobile reduction is not without its merits, as the two decades between 1993 and 2013 saw the automobile share of transit usage across Vienna, in 1993 sitting at 40%, drop around a third to 27%, with public transit taking in a large portion of this share to become nearly as utilised as automobiles previously were, sitting

around 39% by 2013, as shown in Figure 1. As we can see, in the Viennese case, the proportion of those who were walking or cycling did not decrease during the period that automobiles did, even increasing slightly. Coupled with affordability measures such as the Vienna public transit company's (Wiener Linien) introduction of the Annual 365-euro pass, or Jahreskarte Wien (Vienna annual card), the urgency for automobile reduction, let alone substitution, began to stagnate with the public's contentment with public transit options translate into a less visible social demand for sustainable automobile alternatives.

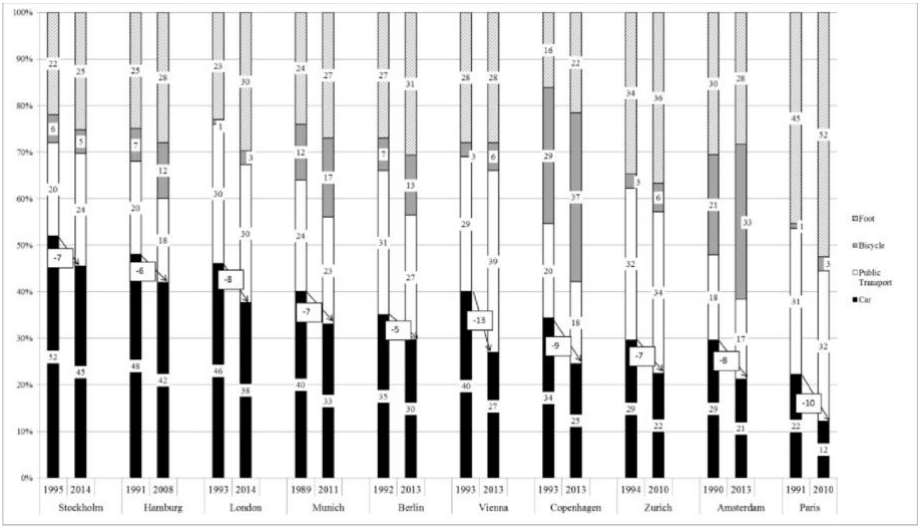

Figure 1: Trends in day-to-day usage of cars, public transit, bicycles or foot as primary transport methods in major European cities between 1993-2013 (Buehler, Pucher, and Altshuler 2016)

Coupled with this lack of urgency in attaining solutions to a less vocal social demand for fossil fuel-powered vehicle alternatives, the Austrian Federal Government and the Viennese City Governments' responses to these questions began to increasingly diverge. These issues have often been complicated by political ambiguities and divergences between the municipal and transnational levels of governance, with global market participation being increasingly understood as a point of failure in the project of sustainable BEV manufacturing, especially as cheaper Chinese-made alternatives to EU-made Volkswagen BEVs have begun to flood the

Viennese market in the aftermath of the Covid-19 pandemic. Audouin and Finger contend in their article that one of the main ways the Viennese City government diverged from the vocal support for proactive EV introduction by national figures such as Leonore Gewessler, the Austrian Minister for Climate Action, Environment, Energy, Mobility, Innovation and Technology between 2020 and 2025 was what they call the Viennese government's approach of shifting from "governing by doing" to "governing by enabling", which they state was in order to attract the foundation and proliferation of MaaS, or Mobility-as-a-Service schemes and companies (Audouin and Finger 2019, 9). Furthermore, some, including Remme et al., have argued that cities like Vienna are examples of what they label as "justice pitfalls" in the evolution toward sustainable mobility. Specifically for Vienna, they argue that Vienna's politicisation of the issue has allowed for such limited BEV support infrastructure development, such as charging stations and specialists in BEV maintenance, that the limited affordability and accessibility of BEVs as alternatives to fossil fuel-powered vehicles has made it something of a luxury (Audouin and Finger 2019, 2-3).

The lack of a policy framework that facilitates the effective integration of BEVs into Vienna's urban mobility system also indicates a more fundamental contradiction within the transit landscape of Vienna. While some hope for a promising environmentally progressive scenario based on SAEV deployment and replacement in Vienna, the simulation-based future projections of SAEVs as a viable alternative in Vienna highlights a major gap: the socio-political support for infrastructure supporting new systems such as SAEVs fundamentally determines its feasibility, and such support is lacking in the current local landscape (Dworak 2025). This has had a direct impact on the reality of putting goals into practice, with only 2.6% of Vienna's taxis transitioning to electric vehicles, despite a 2025 deadline for vehicles to be carbon-neutral to be allowed to operate as taxis, with the lack of charging infrastructure and administrative systems to

manage access to these limited chargers, as has been successfully implemented elsewhere in the EU being cited as a main reason for the lack of will among drivers to change their vehicles to electric ones (Beck 2024).

Further studies also show that BEVs are not necessarily a key solution to the problem at all in limited form. If SAEVs were well integrated with the current mobility system and operated at scale, Peer et al. (2024) argues they could achieve significant decongestion and emission reduction in the city as a whole, but current parts of Vienna, in the suburban areas where transit lines become less comprehensive or end and car ownership is more common, the positive emission effects of electric vehicles could have is limited. They argue that the impact on emissions would only be a reduction of 5-11%, and the majority of those who would be converted to SAEVs or BEVs would be those already using foot or public transit, therefore potentially reducing emissions by a small amount, but having effectively no impact on the urban space issue and the problem of high private vehicle ownership (Peer et al. 2024, 239-241).

Madrid case background

Similarly to Vienna, Madrid has also had to answer the call of social demands among its population for sustainable transport infrastructure. Unlike cities such as Vienna, which have seen only symbolic or incremental changes in specific areas, Madrid, and in particular the Empresa Municipal de Transportes de Madrid (EMT-Madrid, the public transit services company of the city of Madrid), has been much more aggressive in not only advocating, but in realising transit policy reform, the decarbonisation of its fleets, and in ensuring long-term sustainable and environmental resilience for its offered services. The resulting transit landscape of the city is one that is heavily electrified and hydrogenised, even if systemic issues and institutional frictions have arisen or persisted.

While Austria's government took the stance of BEVs as a foundation for achieving solutions after 2013, the Spanish government and municipal governments, including Madrid's have been much more diverse in their adoption of sustainable vehicles, including a mix of HFCVs and BEVs in their new transit environments, compared to Austria's near-exclusive BEV landscape. Rosales-Tristancho et al. argue that one of the primary reasons for this was the perception among policymakers and the public that HFCVs would require fewer short-term technological challenges than BEVs, which could only enter semi-mass use with a large-scale, successful effort to implement charging and maintenance infrastructure beforehand (Rosales-Tristancho et al. 2022, 22-23).

Despite the strong preference and potential for market penetration by HFCVs, Madrid has also made significant efforts to introduce BEVs into their ecosystem in order to ensure diversification among their fleet, a strategic consideration which would ensure the transit system does not face a fatal flaw if one technology begins experiencing a significant issue that would impact service. The city's public transit company, EMT-Madrid, is one of the largest municipal bus operators in Europe, with over 2000 buses in their fleet, and recently has been regarded as one of the leaders in public transit decarbonisation in Europe. As of 2023, EMT-Madrid had fully replaced 222 of their roughly 2000 buses with electric-hydrogen powered buses, the others of which are a mix of diesel and hybrid units (Pedrotti 2023). What is notable about this effort is not that there is a mix of hydrogen and electric technologies being utilised but rather that it is revealing of another aspect of transit evolution that has not existed in the same way in Vienna: a sense of urgency. The Vienna case, as previously discussed, has suffered from a lack of urgent social and logistical demands for these changes to occur, whereas the case in Madrid was not made more urgent by social demands as much as legislative demands, given the existence of

lower legal limits on air quality indexes and the counts of particulate matter and nitrogen oxides in the air, much of which have been attributed to vehicular traffic.

That being said, while Hydrogen is not a significant air quality pollutant in and of itself, the Government of Madrid ultimately has favoured electric vehicles in their expansion of sustainable transit infrastructure due to relative cost-effectiveness (Fernández-Sánchez, Terrón, and Fernández-Heredia 2020). Furthermore, electric buses could have their charging solutions much more centralised with charging hubs requiring less structure for charging stations, and with the advent of increasingly quick chargers, allowed for a quicker turnaround of more buses than in the case of HFCV buses, meaning that while the disparity between electric and hydrogen vehicles in Madrid is not as extreme as the Austrian case, BEV infrastructure has seen much more investment and proliferation, making hydrogen infrastructure less and less fit for purpose to enable equity between hydrogen and electric vehicles.

While Madrid's public transit infrastructure has made a lot more progress towards sustainability than Vienna's, the private transit sectors are more similar between the two cities since the adoption of private sustainable vehicles is much less pronounced. A white paper published by the International Council on Clean Transportation (ICCT) in 2020 stated that Madrid's BEV uptake share was around 1.7% in 2018, while other major European cities such as Amsterdam or Oslo were at 7% and 61%, respectively (Wappelhorst et al. 2020, 14). Wappelhorst et al. attribute this partially to the weak financial incentives available to consumers for sustainable vehicle uptake and inconsistent governmental efforts to promote BEVs as a viable alternative, both as a sustainable alternative and economically.

The question of infrastructure has long underpinned the discourse over the viability of different sustainable technologies when it comes to the implementation of sustainable alternative transit frameworks in Spain, much less in Madrid. Since the capital was an early adopter of

measures to make their public transit system more sustainable, the city was something of a political and economic testbed for the country, let alone logistically and infrastructurally. Vassallo et al. tackled the issue of approaches to transit and its sustainable evolution in 2009, arguing that Madrid's increasing government subsidisation of transit networks had led to something of an economic bottleneck for the continued future development of the city's transit network in the future, the ramifications of which may still come to pass today as Madrid struggles to continue replacing their fleet (Pontes 2024, 265-267). Cost-cutting has been a critical aspect of their ability to sustain themselves so far, with the lessen dependence on heightening fuel prices being a potential answer to EMT-Madrid's slim financial margins - acting as an intriguing case study for other city transit authorities across Europe that are also concerned about the economic viability of moving to sustainable vehicles.

This economic urgency to realise savings from the projected impact of lessening dependence on fossil fuels is also compounded by the public's realisation of Madrid's environmental situation. Fernández-Sánchez et al. crucially note that public expectations and social demands regarding transportation and sustainability have not been coupled to EU or global waves of discourse on the topic. After years of heatwaves and urban expansion, the city of Madrid worked with researchers to conduct a series of economic and scientific studies over a period in December 2018, when the city centre was closed to private vehicles, and pedestrian or public transit usage was the primary method of city centre transit (Fernández-Sánchez, Terrón, and Fernández-Heredia 2020). Not only were significant air quality improvements noted, but the aftermath was a surge in public support for fossil fuel vehicle-free areas and positive outlooks on reducing fuel dependency in the public and private transit sectors.

Theoretical framework

When attempting to interrogate these two cases in order to understand the complexities of implementing successful sustainable transport policies and programs, a strong theoretical toolkit is required. In this thesis, I propose the use of three distinct yet for these purposes, complementary International Relations theories: Constructivism, Global Political Economy (GPE), and Multi-Level Governance (MLG). These theories together allow me to frame and interpret the varying outcomes of sustainable vehicle transitions in Madrid and Vienna, as each theory sheds light on different dimensions of policymaking at three critical levels that influence each other in these sociopolitical negotiations. They are also important for determining the causes of institutional behaviour, public discourse, and the broader geopolitical economy that shapes sustainable mobility efforts in major trading blocs and regions, such as the European Union.

Constructivism provides a powerful and critical theoretical lens that allows me to understand how collective meanings, norms, and identities create a city-wide transport character that policymakers must consider and react to. Ted Hopf (1998) argues that constructivism, unlike rationalist theories, prioritises the mutual constitution of structure and agency through intersubjective meanings and social practices, which in the context of mobility transitions means constructivism allows for an interrogation of how environmental imperatives become embedded in public discourse (Hopf 1998). This is also useful for determining how city identities, such as Vienna's self-image as a "green city" and a public transit marvel or Madrid's self-image as a moderniser, can influence policy choices regarding BEVs and HFCVs and automatically preclude or prioritise certain discourses.

This approach is particularly useful when explaining the divergence between symbolic policies and tangible policy implementations that have a noticeable impact. Maja Zehfuss

critiques simplistic understandings of norm diffusion by arguing how identity and normative claims are politically constructed and contested (Zehfuss 2002). This means that, for instance, in Vienna, policies promoting battery electric vehicles are not simply understood as technocratic solutions but are filtered through local city or district-wide narratives of automobile reduction and urban environmentalism, placing more importance on local communities and municipal institutions as actors in these negotiations. Constructivism is, if nothing else, crucial for addressing why certain technologies become dominant within a particular policy discourse. As we can denote in Hopf's analysis, social context determines the acceptability and framing of technologies by political and social actors and institutions (Hopf 1998, 174). In Madrid, BEVs have come to symbolise modernity and institutional effectiveness, while in Vienna, their slow rollout can be seen as the result of a policy culture that frames automobility as antithetical to public transit ideals and, in present times, as a frivolous luxury rather than a trans-class solution.

The second theoretical framework this thesis will use is the theory of Global Political Economy (GPE), which helps us understand the relations between economic systems and political structures, especially with regard to sociopolitical power relations, the logic of capitalist markets, and the flow of capital. The green transition, as Angelakis, Manioudis, and Koskina argue, would best be understood if contextualised within the context of the macroeconomic frameworks of global capitalism and competition among industries, since the transition to sustainable vehicles is highly dependent on new and diverted investment from existing transit structures (Angelakis, Manioudis, and Koskina 2025, 15). Their article helps demonstrates how, at times, technological responses to climate change are determined by the needs of major economic benefactors in the global economy which often ignores the regional and municipal needs and discourses - and thus demonstrates the relevance of Global Political Economy as a framework through which to interpret the open questions dealt with by this thesis.

In both Madrid and Vienna, the rollout of electric and hydrogen vehicle infrastructure is part of a larger trend across the EU since it has been encouraged by the EU's climate strategy, which exists largely due to the bloc's economic considerations as a global trader. Policies that favor BEVs over HFCVs, are exemplary of broader patterns in the international automotive industry. EU-based manufacturers, like Volkswagen or Renault-Nissan, for example, have heavily invested in electric propulsion technologies due to the clear-cut boundaries of the EU's emissions standards, and therefore need to cement their position in the face of a potentially expansive HFCV market. Additionally, GPE demonstrates how the trends in trade and transnational economies have impacted the strategies of both cities' governments in what policies they implement and how quickly.

The recently more pronounced risk of Chinese EV manufacturers entering the European market post-pandemic at competitive rates which undercut EU-based manufacturers is concerning to both national governments and the EU, which has caused a renewed focus on "strategic autonomy", as emphasised by the 2024 Draghi report, which cited the choice between funding defence and sustainable, economic resilience and technological innovation leadership and "existential challenge" (Draghi 2024a, 1). This new focus on transnational political demands as a major influence on the limits of municipal-level sustainable transit discourse effectively reinvents the image of cities as battlegrounds, where policies are fought over on a global scale through the process of determining the needs of individual cities, and cities being much more directly in tune with international trade flows and market stability.

While Constructivism and GPE both offer powerful tools to examine ideas and structural constraints observed in these cases, the Multi-Level Governance (MLG) theory is still essential for understanding institutional and procedural complexities inherent to transport authorities and their transitions to sustainable vehicle alternatives. Both Marsden et al. (2014) and Cevheribucak

(2024) have corroborated the idea that the governance of sustainable transport spans across multiple tiers - as is being used in the framing of this analysis, with different contexts existing at local, national, supranational, and international levels, often with overlapping responsibilities, conflicting mandates, and divergent resources. In Vienna, the tension between the Austrian Federal Government's active promotion of BEVs and the Vienna city government's car-reduction priorities illustrates exactly the challenges as viewed with an MLG framework, and more broadly, the challenges of vertical coordination in institutions. Similarly, Madrid's coordination between national environmental targets, such as previously discussed air quality index limits, and local transit reforms is often hindered by the absence of clear resource-sharing mechanisms between municipal, regional, and national bodies, which is worsened by bureaucratic entrenchment. Marsden et al. take this further, arguing that such institutional fragmentation often results in his key "muddling through" approach, where despite clear long-term, large scale national commitments, there is still "The absence of a clear cascade of responsibilities from national to local level creates uncertainty about who should achieve what." (Marsden et al. 2014, 13).

Moreover, MLG theory is important for emphasising the growing importance of non-state actors and public demands in shaping finalised policy implementation. Cevheribucak (2024) illustrates how local governance structures benefit from engaging in transnational networks, such as those provided by the EU, allowing them access to knowledge, funding, and best practices which officials can use to inform their own policies (Cevheribucak 2024). This phenomenon is evident in both case cities, where pilot schemes and smart city initiatives are often co-funded by national Federal or EU agencies, and EU grants for public infrastructure are worked into the overall funding for major public transit overhaul projects. The governance of sustainable transport is, therefore, revealed to be less about hierarchical control and more about hierarchical and complex networked problem-solving, which is an institutional dynamic prominently

discussed by MLG theory. It acknowledges the plurality of actors involved, whether they are EU commissioners, Ministers of Transport, to city mayors, and how their interaction can either facilitate or stall the implementation of meaningful change.

Methodology

In order to understand how ideas and infrastructures intersect with political action and public narratives, a qualitative methodological approach is required for a study such as this. Specifically, this research would benefit from using a semi-structured interview approach as its primary data collection method, supported by document analysis and discourse analysis. This choice of methodology is consistent with the epistemological underpinnings of constructivist International Relations theory since constructivism views meaning as intersubjectively constructed rather than objectively found, therefore making it necessary to investigate the ways in which stakeholders articulate values, expectations, and understandings of transit innovation and sustainability. From this perspective, data is not simply “gathered” but co-produced between researcher and participant, and interpretation is dialogical rather than linear. As Hopf argues, constructivist work aims to "denaturalise" practices and highlight how they are socially and discursively constituted (Hopf 1998, 182).

This study does not aim to measure behaviours in a positivist fashion among those I speak to but rather seeks to understand how actors such as city planners and experts in the applications of urban transit policies in Vienna and Madrid interpret and understand sustainable vehicle-related policies. This requires an interpretivist approach where qualitative interviews allow participants to construct meaning through their own narratives and present them in their own words (DiCicco-Bloom and Crabtree 2006).

Semi-structured interviews were selected for this thesis as the central method due to their suitability for capturing policy rationale and discursive complexity, as, unlike structured interviews, semi-structured formats allow interviewers to pursue thematic probes, enabling the co-construction of knowledge and emergence of novel insights in the interaction between the

researcher and participant. DiCicco-Bloom and Crabtree argue precisely this, stating that such interviews are the "most widely used" method in qualitative research because they strike a balance between consistency across interviews and flexibility to follow participant-generated leads (DiCicco-Bloom and Crabtree 2006).

For this thesis, these interviews will revolve around a thematic guide clustered into four main areas:

1. policy formation and institutional coordination,
2. public communication and narrative framing,
3. infrastructure and technical constraints, and
4. experiences with citizen engagement and social reception.

Such a structure helps make sure that data collected remains as analytically focused as possible while also providing ample scope for the interviewer to allow the participant to narrate their experience in a grounded and authentic manner that doesn't obfuscate or constrain potential answers through scope-limited questions. The participants in this case will include members of city-level/municipal government bodies who work in urban planning/transit offices and researchers involved in urban mobility. These interviewees were selected on the basis of their knowledge of policy implementation and planning around electric and hydrogen vehicle infrastructure or transit alternatives more generally, and to ensure that equal attention is given to both case studies.

Given the dispersed geographic locations of participants across Austria and Spain, interviews will be conducted online using a video conferencing medium such as Zoom, depending on which service worked best for the participants. While there is some discourse in academic spheres about the suitability of non-interpersonal settings for research and interviews, Gray et al. highlight the growing acceptance of video conferencing platforms as an effective medium for conducting

qualitative interviews. In their study, Zoom was shown to improve participation among geographically dispersed individuals, given the lack of pressure from being in an uncontrolled environment, let alone the added advantage of lowering costs and logistical burdens (Gray et al. 2020, 1291). Moreover, Zoom preserves the personalisation and non-verbal cues that are often lost in telephone interviews while ensuring flexibility for participants to engage from their preferred environment (Gray et al. 2020, 1291-1292). In line with research from Gray et al. and DiCicco-Bloom and Crabtree, prior to interviews, participants will be sent a consent form and an information sheet outlining the study's objectives and ethical safeguards. Consent will be recorded at the beginning of the session and again in writing, especially given Gray et al.'s recommendation that consent and interview be recorded in separate files and formats for confidentiality and clarity (Gray et al. 2020, 1293). Participants will be fully informed about the scope of the research, what they are entitled to, such as their right to withdraw at any time, and the measures taken to protect their anonymity if they should request anonymity. No personal identifiers will be used in all thesis outputs, and quotations will be anonymised unless explicit permission is granted to attribute statements to these individuals by name.

Once interviews are transcribed, data will be analysed using a thematic coding approach guided by the theoretical frameworks of constructivism, MLG, and GPE. DiCicco-Bloom and Crabtree outline several strategies for this type of data analysis, including grounded theory, hermeneutics, and thematic coding. As a result, depending on the data gathered, this study could adopt a hybrid approach: open coding can be used to identify emergent themes while at the same time drawing on pre-constructed analytical categories based on the interview guide and theoretical lens. This approach resembles what is described in academic literature as a "template" method, where predetermined categories are refined as analysis progresses (DiCicco-Bloom and Crabtree 2006, 318-319).

Vienna interview analysis

For the case of the city of Vienna, I had the opportunity to conduct an interview with Dipl. Ing. Thomas Madreiter, who is the Planning Director at the Chief Executive's Office of the City of Vienna Government. The interview was incredibly enlightening, given his insights into a number of dynamics within bureaucratic settings, between bureaucrats and politicians, and the general social dynamics which permeate and are rooted in the theoretical frameworks used to contextualise this thesis. The interview was conducted in-person in a public setting, and according to the parameters I previously set out, I ensured the interviewee was informed of the purpose of the interview and its use case, and obtained his consent to use this information as part of my analyses. The interview touched on a number of topics, in particular with Mr. Madreiter emphasising his understanding of urban mobility transitions as being socio-politically-driven above anything else, and the reallocation of space for different transit purposes and methods are extensive sociocultural evolutions that must occur naturally in order to succeed, not only in terms of utilisation after construction, but in terms of acceptance and cooperative development of spaces with resident input. Recognising and respecting this necessary trait, for him, was part of the ultimate feature of planning urban transit landscape evolutions in Vienna: democratic legitimacy. In his words, "there's no way around discourse, no way around doing things with people."

He also went into detail about the role of Stadt Wien as a coordinator of multi-level organisations, and that the city was a participant in and key location of arbitration for the tension between the municipal and federal authorities' disconnect in the Austrian/Viennese case. This disconnect, he argued, was primarily centred around the question of funding, and in particular, the short-sighted nature of the terms which the federal government would have the city subscribe

to. Criticising the terms of the initial grants from the federal governments for Vienna's new metro lines in decades prior, he emphasised that the terms absolved the federal government of any ongoing operational cost burden, and has expected to be able to influence the policies of Viennese transport systems without taking responsibility for the increasing ongoing costs of running these networks. He also argued that the negotiation dynamics between Stadt Wien, the federal government and the EU situated the federal government as the effective arm of the EU when it comes to transit policies, as federal goals are shaped and designed by their commitments to EU transit policies, and as a result are not necessarily acting as arbiters or negotiators due to the time constraints that politicians perceive as making long-term understanding and negotiation futile to their career prospects. As a result, the extent of meaningful engagement between federal and municipal bodies takes place through the negotiation of subsidies and EU and federal grants to put into progress projects that help Austria advance towards EU sustainability goals without much concern for the viability of these projects in the long term. These points, alongside other examples cited by Madreiter in his interview, give us some critical insights into the state of Vienna's transit landscape and the viability of BEVs as a future alternative from his points. In particular, his statements shed light on a more nuanced understanding of Global Political Economy as it relates to the Viennese context, with the city's unique social history acting as a prominent actor in the development of a city-wide transit identity that can be understood within the constructivist context.

Constructivist theory, for the purposes of contextualising Vienna's case in a space of international exchange among cities and municipalities, let alone countries, understands that the mutual constitution of social structures and agency, with collective meanings and identities is an irrefutable aspect of policy negotiation between state and non-state groups and institutions alike (Hopf 1998, 172). Madreiter's responses corroborate this idea explicitly, given his emphasis on

sociocultural dynamics between the city government and the residents of areas being developed and undeveloped highlighting how Vienna's urban identity, which he understands as being centred around sustainability, democratic participation, and quality-of-life standards actively influences urban planning policy considerations for planners such as him who seek to repurpose existing spaces for more sustainable transit methods. As Madreiter noted, the city's eventual transition away from car-centric infrastructure aligns closely with a collective identity that values public space as democratically shared and is deeply embedded in the city's socialist background.

This idea of urban identities being oriented around sustainable uses of space and as being dependent on quality-of-life considerations reflects the constructivist idea of socially embedded policymaking, which some studying the topic, such as Zehfuss, have noted as being an increasingly integral aspect of urban constructivism in industrialised urban spaces (Zehfuss 2002, 198). Madreiter acknowledged that mobility decisions and suggestions for them are inherently contested within society and must reflect widely shared democratic norms not only to ensure legitimacy and compliance, but to ensure the likeliness of success in a city such as Vienna where constructivist identities rely on urban sustainability as a concept more to a tangible and high degree. Consequently, Madreiter offered a critique of policymakers and academics who advocate radical infrastructure transitions in an urban space like Vienna's given that such extreme measures do not fully consider the social feasibility of such quick changes when we consider the constructivist concerns of a city whose populations of automobile users, public transit users, cyclists and pedestrians are not very segregated by physical space.

Of the theoretical frameworks available, the one that Madreiter's conclusions do contest are that of Global Political Economy. According to Angelakis et al., GPE provides insight into how economic structures and transnational market pressures shape domestic policy decisions (Angelakis, Manioudis, and Koskina 2023). When asked about how he sees global political

economy manifesting itself in Vienna's transit discourse, Madreiter's reflections were primarily on the impact of EU-level regulations, arguing that the era of more global automobile influence, such as (historically) from the United States or Japan's automobile industries had waned to the point that they had no major tangible impact on Viennese transit discourse that he sees today. EU regulations in the past few years, however, such as the Omnibus Regulation, are for him the catalyst through which international discourse and tensions are funnelled into Austrian federal-municipal interactions and policy/funding negotiation.

While he did import the caveat of the EU as a funnel for GPE as a tangible dynamic in influencing Vienna's local transit discourse, he did acknowledge the global political economic impact of the recent trade wars which have gripped much of the western world and put the EU in a situation of choosing to align themselves between American and Chinese industry. He specifically identified energy independence and geopolitical disruptions to the flow of energy as critical influences on Vienna's infrastructure choices, particularly around the implementation of the green deal in Austria and the decision of whether to invest in BEV charging infrastructure. When relating this to his points on the unique position of Vienna as a city whose population constructs their identity on the basis of sustainable and high-quality-of-life indicators, his advocacy for the increased democratisation and inclusion of non-institutional actors in the process of finding ways to repurpose non-sustainable spaces reflects what Angelakis et al. term as the "science citizen" approach that their analysis of macro-economic approaches to successful political economic systems supports (Angelakis, Manioudis, and Koskina 2023, 16-17).

Multi-Level Governance in this context emphasises the importance of institutional interactions across various governance levels, highlighting coordination challenges between municipal, national, and supranational entities (Marsden et al. 2014, 157; Cevheribucak 2019, 343). Madreiter understands this to be a prominent feature in the Viennese case. The friction he

describes between federal-level subsidies and Vienna's urban sustainability targets further underscores the MLG theory's concept of vertical coordination, specifically the failure of vertical coordination. His description of Vienna's constrained autonomy, such as limitations in setting speed limits or bike lane usage rules without federal approval, given their funding conditions and standardisation requirements for inter-state travel reinforces the idea that multi-tiered governance in a case like Austria's can hinder sustainable mobility transitions by tying the progress of sustainable transit ventures to standardisation and prospective compatibility requirements (Marsden et al. 2014, 162).

A critical point where multi-level governance as a framework provides a critical point of analysis is in emphasising the horizontal governance aspect, which is somewhat independent of the issues in vertical governance tensions. Marsden et al. (2014) argue that in case studies across Sweden, one of the critical aspects to successful sustainable transit development across different levels of government was the exchange of best practices across levels, as well as across municipalities. The lack of political cohesion between Vienna as a federal state, let alone of transit policy, is a major point for Madreiter's concerns, since in his experience the only way in which comprehensive sustainable public transit methods in particular can be affected across federal regions are when the political, social and cultural mindset around transit expansion is collaborative, which is highly conditional on the policy of regional governments. He does further corroborate Marsden et al. findings as he agrees that such horizontal collaborations can be observed in Vienna's case, highlighting the expansion of the Verkehrsverbund Ostregion to coverage in multiple federal states as an example of precisely this critical dynamic of MLG in action (Madreiter).

Madrid interview analysis

For the second case of the city of Madrid's public transport authority, I was able to secure an interview with Javier Tarriño Ortiz, who works as a researcher in the Centro de Investigación del Transporte/TRANSyT at the Polytechnic University of Madrid. He is interested in the areas of transport planning, mobility, and the assessment of low-emission zones and their success, especially in Madrid's case. The interview was performed as an exchange of emails, where the interviewee answered prepared semi-structured questions. This method was selected considering the time limitations the interviewee had to work with. Before the email exchange, I provided the participant with information regarding the study objectives and the intended application of their responses, and I received consent to utilize the content in my analysis. While I am aware it is not conventional in terms of verbal or face-to-face interviews, the written responses elicited were self-reflective and open about the considerations the Madrid city government must take, which enhanced my analytical framework, and with which I could conduct my analyses.

In his responses, Ortiz emphasised that Madrid's established urban identity revolved around its strong public transit insofar as widespread public uptake, affordability, and efficiency was concerned, with his interpretation of the relationship between Madrid's public and its transit systems being particularly oriented around economic considerations. He discusses the previous decade, which between changes of city and national governments and scepticism of the transit system as it evolved elicited a highly unexpected response, where for him people accepted changes introduced by Governments before the coronavirus pandemic in an effort to shift towards less car-friendly spaces once it was clear that subsequent governments committed to sustaining these programs, rather than letting them stagnate. However, he noticed that Madrid as a municipality is split in two, with the urban population being highly dependent on public transport

or petrol vehicle alternatives, with the suburban population remaining very car-centric in their transport preferences.

From a constructivist point of view, Ortiz explained his understanding of public acceptance of sustainable transit alternatives as being due to successful community engagement and communication, explaining that projects to implement new systems, both from an economic and social consideration need to have "such long timelines that they do not adjust to short-term economic trends", making them more immune to economic disruption while providing the time necessary to negate what he described as the public's views on sustainable transit programs "which are often negative due to fear of change." The process of introduction which he describes is demonstrative of the constructivist principle of legitimisation through gradual societal acceptance, which arguably has been a driving reason behind why Madrid's urban public now are willing to use the city's public transit system as their primary mode of transport in high numbers (Hopf 1998, 172). Public communication in the form of outreach has been a large contributor to this process, but for Ortiz this also requires a step farther, which is notably the explicit commitment of the government and municipality to the principle of sustainable mobility as its own principle, which for him has been demonstrated as a bulwark against public discontent and distrust in the transit system in the face of economic upheaval in a world verging on trade wars. Ortiz explained this through an example of controversies surrounding the introduction of low-emission zones in Madrid's city centre between 2015 and 2020. He describes how the zones were met with contention by the public on their implementation in 2015, with the controversy surrounding their implementation being a major facet of the political debate in Madrid's elections. Only once the incoming government established their commitment to continuing the zones did the controversy die down, according to him, which he interpreted as what could be

described as the acceptance of the low-emission zones as part of Madrid's collective meaning once several political hurdles of legitimacy had been navigated.

From a global political economy perspective, Ortiz primary perspective was that Madrid and the EU's policies regarding the implementation of sustainable transit methods towards emissions reduction weren't only compatible, but largely symbiotic in the sense that EU policies were the one of the largest influences on Madrid's transit policies, with the city prioritising any programs with EU funding due to fixed deadlines that are necessary for the EU to meet its emissions reduction goals. From a GPE perspective, one might argue that Madrid has demonstrated itself as more of a demonstration of GPE in action given the level of policy overlap and constructive collaboration which Mr Ortiz has described, especially since Mr. Madreiter interpreted Vienna's situation as being more tied to the whims of industries such as the automobile industry and their trends internationally, rather than seeing Vienna's policies as most deeply influenced by the EU's strategies.

This is arguably further corroborated by his previously discussed statement regarding the city's relationship with economic factors and the necessity of long-term timelines, given the lack of impact short-term fluctuations have on such projects and their viability, which further detaches Madrid's sustainable transit policies from micro-level factors and embeds them within the machinations of global political actors such as the EU.

With regards to multi-level governance, one of the central challenges that Marsden et al. (2014) identify is ensuring coordination and collaboration across multiple levels of governance without different methods towards similar goals emerging and creating a conflict that renders efforts ultimately untenable. For Mr. Ortiz, Madrid is exemplary of a top-down model solution to this challenge, emphasising that while one of Madrid's future challenges will be working along horizontal power structures to engage other municipalities in providing transit methods from

outside of Madrid into it, rather than only within Madrid, Madrid's current position as an agent of positive transit changes is most effective when it operates as an arm of the EU and its projects, and therefore within a vertical power structure. While Madrid has engaged with both these power dynamics and partners, Madrid's relationship to the EU in the transit sector is much more defined, with its relationships to neighbouring areas and their governments being much less formal. Notably, the vertical power structure Mr. Ortiz describes that the city government operates within is much more direct between the municipality and the transnational actor, bypassing the federal government, which in Vienna's case had a much more prominent place in Mr. Madreiter's opinion as an interpreter and middleman between the transnational and the local, making the Madrid case a more direct and illustrative case for assessing the impact of GPE on local transit systems.

Comparisons and considerations

When considering what these two interviews revealed about how these two cities approached the question of sustainable transit policies reveal about the interaction of local European transit sectors and international relations, both the Vienna and Madrid case studies corroborate the impact of constructivism while deviating on other points. Vienna's case illustrated, in Madreiter's opinion, that global economic disruptions can have a strong influence on local transit sectors and the opinions of their users towards sustainable public transit evolutions, and therefore impact whether transit authorities can garner legitimacy and acceptance for their projects, regardless of political trends in government or among populations. Meanwhile, by aligning with the EU's short- and long-term policies and projects, Madrid effectively affords itself a level of economic and social insulation from short term political and economic trends,

which accordingly has a positive impact on the population's reactions to such projects and the temperance of public scepticism to proposed changes.

Furthermore, multi-level governance was also a theoretical arena in which the two cases diverged. Madreiter's experience working in this space highlighted for him an overall friction that stems from antiquated and complex jurisdictions, constraints on municipal autonomy by the federal government, rather than by the EU, and the complexity of applying for, receiving, and allocating funding for projects introduced by the municipality or transnational actors. In contrast, Ortiz discusses the scenario for Madrid as facing the opposite challenge: while Vienna grapples with vertical power struggles and emphasises a need to have more horizontal capacity and it's own direction in such relationships, horizontal relationships have been a challenge to effectively and formally establish to the detriment of those travelling in and out of Madrid, while it has found relative success in engaging directly with a senior partner, the EU, in a vertical power structure whereby it acts as an agent for the EUs goals in European metropolises.

In effect, these case studies collectively address aspects of the research questions previously stated, where Madrid's effective vertical integration with EU structures exemplify how increased social demand for sustainable vehicle alternatives has led the EU to perceive transit infrastructure resilience as critical for long-term economic stability and prioritise it as a strategic focus for the EU's economic, infrastructural and even physical defence, while Vienna's arguably more cautious approach has allowed itself to be influenced by global economic and geopolitical disruptions. Furthermore, political narratives that promote self-reliance and energy independence have both challenged and entrenched municipal constructivist reactions depending on the economic and political landscape of a transit authority's interaction with the public, which then goes on to shape how city governments interpret and implement sustainable mobility

transitions within broader international contexts in the aftermath of previous initiatives, illustrating for us a constructivist-dependent cycle of transit evolution at the municipal scale.

Conclusion

This thesis has attempted to explore the complex dynamics of sustainable urban transit policies through a comparative case analysis of two metropolises similar in that they are both in the European Union, have policy emphasis on sustainable transit, and yet diverge in their relative success: Madrid and Vienna. This exploration has been situated within the broader theoretical frameworks of Constructivism, Global Political Economy (GPE), and Multi-Level Governance (MLG), and has demonstrated how both cities illustrate unique challenges and strategic considerations regarding sustainable transit infrastructure, providing valuable insights into the symbiotic relationship between local urban identities, international economic pressures, and multi-layered governance structures, but above all else, in demonstrating different approaches to how municipal and international actors operate today in the sphere of transit and international relations.

One of the core findings of this research puts on display the critical role that urban identity and public engagement play in shaping sustainable transit outcomes, where Madrid's success in embedding sustainability goals into local policies guided and introduced by the EU underscores the importance of consistent governmental commitment across political camps and clear public communication, facilitating the gradual societal acceptance of significant infrastructural changes. Conversely, Vienna's case has underscored the tensions inherent in aligning municipal identities, in muddying the future of transit projects through their politicisation between administrations, the issue of complicative federal mandates, and the resulting exposure to the impact of economic turmoil. These contrasts, if nothing else, highlight just how deeply rooted sociocultural perceptions of transit policy consistency can shape policy

effectiveness. Moreover, this analysis has attempted to clarify the significance of geopolitical disruptions, particularly in the post-pandemic era, and in redefining infrastructure resilience as a strategic economic and security priority for the European Union - which in turn has had a converse impact on the municipal actors whose cases have fed this strategic policy shift. The entry of competitive global players such as China into the European EV market has amplified the EU's sense of urgency regarding its technological autonomy and infrastructure resilience. As this thesis has arguably shown, such responsiveness has proven beneficial in Madrid, whereas Vienna's inability to encourage a response and understanding of its population reveals potential pitfalls. This problem exacerbates if local governments remain overly constrained by national political frictions or institutional inertia.

Considerations for further research can explore several actions that might be of value to local actors. Achieving sustainable transit transitions requires ongoing commitment to transparent, effective public communication, framing these transitions within established local identities to enhance public acceptance and legitimacy, meaning that constructivism at the social level is a critical consideration for the long-term familiarisation of efforts between proposals for new transit networks and the target audience. Municipalities also need to proactively manage their roles within the EU's strategic framework, regardless of the political orientations of ruling parties, which will help sooner, rather than later, establish a balance between local autonomy and EU-led cooperation which the population can gradually adopt into their own view of the city's urban identity. Ultimately, a comparative examination of Vienna and Madrid as sites for sustainable transit policy implementation emphasises that sustainable transit policies are influenced by multilayered governance structures and are deeply embedded into the sociocultural identities of target populations. As urban centres globally continue to grapple with the challenges

of sustainable mobility, these two cities serve as case studies which can inform different directions towards effective cooperation in an increasingly turbulent world.

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