

## Tools for Transformative Social-Ecological Infrastructure

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### 1 ABSTRACT

The social-ecological transformation of mobility systems poses major challenges for local and regional governance, as entrenched institutional structures, political incentives, and vested interests often impede change beyond technical solutions. This paper presents findings from the exploratory research project “LEIWAND – Lokale Entscheidungen für den sozial-ökologischen Infrastrukturwandel” (Local decisions for social-ecological infrastructure transformation), which develops a governance-oriented toolbox for decision making with regard to infrastructure decisions. Based on two case studies in Austria and a review of international good practices, the project analyses political-economic decision-making dynamics in transport and land-use planning. Building on these insights, the paper introduces tools that propose new and adapted process elements – such as transparency mechanisms, funding and alternative deliberation – to support more inclusive, transparent, and transformation-capable decision-making in mobility governance.

Keywords: sustainable mobility, governance, transport infrastructure, spatial planning, urban development

### 2 INTRODUCTION & METHODOLOGY

The transition towards sustainable and socially just mobility systems can be seen as a key element of broader social-ecological transformation processes, which are defined as long-term, multi-level and disruptive change processes (Brand and Wissen, 2017). Such transformations require more than technological innovation or spatial reconfiguration; they also depend on fundamental changes in political and institutional decision-making. Although many regions formally commit to sustainable mobility and integrated land-use planning, transformative change is frequently impeded by path dependencies, vested interests, and institutional constraints (Gössling and Cohen, 2014, Mattioli et al, 2020, Getzner et al., 2025).

Research on transport and land-use planning has largely focused on the linkages between policy design, technological options, and user behaviour. Comparatively little attention has been paid to the political dynamics and decision-making processes that shape whether well-known and effective measures are actually implemented (Kębłowski et al., 2022, Sang et al., 2026). This gap is critical, as the impacts of many mobility policies are well understood, yet their translation into practice often fails due to political, administrative, and institutional barriers.

The research project addresses this gap through an exploratory study focusing on decision-making processes in Austria with regard to land-use and transport infrastructure. The empirical basis consists of three parts: (1) two qualitative case studies (the redesign of a public square in a large city and the construction of a bypass road in a small municipality), where semi-structured interviews were conducted with political and administrative actors as well as with scientists, entrepreneurs and civil society<sup>1</sup>, (2) two expert workshops with the aim to identify barriers and drivers and discuss tools and instruments to adapt decision making processes and (3) a review of international good practices in transformation-oriented governance, conducted as non-systematised desktop research, drawing on academic literature, grey literature, existing tools and policy instruments.

The development of the toolbox was mainly driven by the second expert workshop involving 13 participants. The group included transport planners from local planning companies, representatives from the federal

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<sup>1</sup> While the empirical findings of the case studies informed the development of the toolbox, they are not the primary focus of this paper and are reported elsewhere (Gallian, Hauschild et al., under review).

transport ministry (BMIMI), academics from political science and mobility research, practitioners from intermediary organisations such as KEM regional managers, members of civic initiatives, and local politicians. After an introduction to the project, participants worked in small groups of four to five people. Each group was first presented with two proposed tools and invited to provide structured feedback. Subsequently, participants discussed additional tool ideas, drawing both on their own experience and on suggestions collected by the project team. The workshop concluded with plenary presentations and joint reflection, allowing participants to comment on the proposed tools and provide feedback on further development.

Based on the workshop outcomes, the case study insights, and the literature review, the project team conducted an internal synthesis to identify those tools most relevant and suitable for inclusion in a governance-oriented toolbox for social-ecological infrastructure transformation. The focus was on tools that introduce new or adapted process elements in political and planning practice – particularly those that increase transparency in decision-making, clarify roles and responsibilities, and enable the inclusion of actors and perspectives that are typically underrepresented. Many tools also aim to create deliberative spaces that foster learning, mutual understanding, and the integration of diverse forms of knowledge into mobility and infrastructure decisions.

### 3 TOOLS

In the following, we shortly present exemplary tools included in the toolbox.

#### 3.1 Transparency Register

Our analysis indicates that decision-making processes in mobility and land-use infrastructure planning are often insufficiently transparent. Affected individuals and groups frequently lack information about the status of projects, the structure of decision-making processes, and the basis on which decisions are taken. To address these shortcomings, the introduction of a transparency register at the project level could provide a valuable governance instrument.

Such a register would systematically document and make publicly accessible who participates in infrastructure decision-making processes, including organisations, interest groups, consultancies, and individual actors. In addition, it could record meetings, formal submissions, and other forms of influence related to specific infrastructure projects, thereby increasing the visibility of political and administrative interactions throughout the planning process.

Comparable transparency instruments already exist in other governance contexts. A prominent example is the EU Transparency Register<sup>2</sup>, which documents lobbying activities at the European level. Moreover, Odparlik and Köppel (2013) review project-related registers in the context of Environmental Impact Assessment, highlighting their role in enhancing transparency and public participation in planning procedures.

#### 3.2 Transformation Fund

The concept of a transformation fund aims to provide targeted financial support for measures required to advance social-ecological transformation. Such a fund could be established at the federal level and designed to create dedicated funding opportunities for municipalities and provinces. Access to funding would be conditional on projects meeting clearly defined criteria aligned with social, and sustainability objectives, thereby enabling public finance to actively steer transformation rather than merely support isolated investments. Achieving climate neutrality in Austria until 2040/2050 requires additional investments of 1.1 to 1.9% of GDP; about one third of investments would be undertaken by the public sector, especially municipalities (Weyerstraß et al., 2024). A specific funding opportunity for these investments could be an important mobilizer for carbon neutrality.

In Austria, several existing funding instruments already link public co-financing to the fulfilment of specific criteria, such as the “Kommunales Investitionsprogramm”<sup>3</sup> or the “Klimapartnerschaft”<sup>4</sup>, through which the

<sup>2</sup> [https://transparency-register.europa.eu/index\\_en](https://transparency-register.europa.eu/index_en)

<sup>3</sup> <https://www.bmf.gv.at/themen/budget/finanzbeziehungen-laender-gemeinden/kommunales-investitionsprogramm.html>

federal government supports regional railway infrastructure. A transformation fund could build on these experiences while broadening their scope and strategic orientation. Financing for such a fund could be drawn from multiple sources, including revenues generated through “polluter pays” instruments such as congestion charges, road pricing schemes, increased parking fees, or CO<sub>2</sub> pricing mechanisms. Similar approaches are discussed in recent studies on financing future-oriented transport systems, for example in the German context (Agora Verkehrswende and Dezernat Zukunft, 2025).

Germany has already established a “Klima- und Transformationsfonds” as a special federal fund (Sondervermögen), illustrating how earmarked financial instruments can be used to support structural transformation across sectors. At the same time, the design of a transformation fund raises important challenges, particularly with regard to defining robust and transparent criteria to assess whether funded projects genuinely contribute to climate goals and social equity. If investments are leveraged, efficiency and distributional problems would have to be addressed (Damjanovic et al., 2024). Addressing these challenges is crucial for ensuring the credibility and effectiveness of such a funding instrument.

### 3.3 Participatory and Deliberative Formats

Participatory processes and public deliberation have become increasingly important instruments in infrastructure and climate-related decision-making. These formats aim to enable citizens to express their views on projects and policies, contribute local knowledge, and engage in collective problem-solving. In Austria, however, political decision-making is primarily organised through representative democratic institutions, while participatory procedures are generally not mandatory. Binding participation rights mainly exist in specific legally regulated context, particularly in environmental decision-making processes subject to EU law and the Aarhus Convention.

Beyond conventional consultation formats, there is growing international interest in deliberative participation methods designed to support climate action and long-term transformation. These include citizens’ assemblies, citizens’ councils, and other structured deliberative formats that aim to facilitate informed discussion rather than opinion polling. In Austria, an important example is the Klimarat der Bürgerinnen und Bürger, which was convened by the federal climate ministry and developed recommendations for the Austrian parliament (ARGE Klimarat, 2022). Such formats are increasingly discussed as complements to representative decision-making, particularly in complex and contested policy areas such as mobility transformations.

Citizens’ councils (Bürgerinnen- und Bürgerräte) are a particularly institutionalised form of deliberative participation. They typically consist of randomly selected citizens who deliberate on socially relevant issues and develop recommendations for public administration, political decision-makers, and planning authorities. Their key strength lies in fostering trust and mutual understanding by enabling dialogue beyond organised interests, as well as in allowing early articulation of concerns that might otherwise emerge later as conflicts in formal planning procedures. In addition, such formats have a learning function, contributing to the development of deliberative culture and institutional learning within public governance. At the same time, citizens’ councils also have clear limitations. Their recommendations are politically but not legally binding, and implementation depends largely on the willingness of decision-makers. Without systematic feedback mechanisms, participation risks remaining symbolic. Moreover, due to the small number of participants, representativeness is necessarily limited. Despite these constraints, institutional experience shows their potential. Since 2013, they have been anchored in regional law in the Austrian province of Vorarlberg, where Article 1(4) of the regional constitution explicitly promotes additional forms of democracy. Notably, citizens also have an initiative right: a citizens’ council can be requested with a minimum of 1,000 signatures.

### 3.4 Information Fact Sheets

Information fact sheets are a transparency-oriented governance tool aimed at creating a shared knowledge base among all actors involved in decision-making processes. By condensing complex planning, environmental, and policy-related information, such fact sheets seek to make relevant facts, arguments, and implications of projects or policy proposals accessible to a broad audience. They are typically produced by public authorities and are often used in the context of contested decisions, such as infrastructure projects.

<sup>4</sup> <https://www.bmimi.gv.at/themen/verkehrsplanung/ausbauplan/klimapartnerschaft.html>

A prominent example is the official voting booklet (Abstimmungsbüchlein) used in Switzerland. These booklets are sent to all eligible voters and made available online. They are issued by the federal government and prepared by the Federal Chancellery in cooperation with the relevant ministries. Their content includes the full wording of the proposal, explanations by the Federal Council, arguments from supporters and opponents, as well as voting recommendations from both the government and parliament. The primary objective is to fulfil an information obligation rather than to ensure strict neutrality.<sup>5</sup>

As a governance tool, information fact sheets can support more inclusive and informed decision-making by reducing information asymmetries, clarifying trade-offs, and making arguments transparent. At the same time, their design raises important questions regarding accessibility, authorship, balance, and institutional independence. If carefully designed, such fact sheets can complement participatory and deliberative processes by providing a common factual reference point and thereby improving the quality of public debate in mobility and land-use decision-making.

#### 4 CONCLUSION

Drawing on two Austrian case studies, expert workshops and international good practice, this paper identifies governance tools that can help address persistent transparency deficits, power asymmetries, and implementation barriers in mobility and land-use infrastructure planning. The toolbox focuses on decision-making processes and highlights how such instruments can broaden the range of perspectives considered and strengthen the integration of social and ecological concerns. At the same time, the analysis underscores that such tools are not neutral: their effectiveness depends on political commitment, institutional embedding, and careful design to avoid symbolic participation or selective implementation. By combining political-economic analysis with practice-oriented governance tools, the paper contributes to debates on regional governance, just transitions and illustrates how regions can enhance their capacity to actively steer sustainable mobility and land-use transformations.

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<sup>5</sup> Bundeskanzlei Schweizerische Eidgenossenschaft: Entstehung des Abstimmungsbüchleins. URL: <https://www.bk.admin.ch/bk/de/home/dokumentation/entstehung-abstimmungsbuechlein.html>