

Embedding Social Justice in Twin Transition Research: Systems Inquiry for Transformative Policy in Energy, Housing, and Transport

Extended Abstract

The European twin transition—green and digital—has been framed as both an economic opportunity and a sustainability imperative. Yet without deliberate intervention, transition policies risk reproducing or deepening structural inequalities, particularly in essential systems such as energy, housing, and transport. This paper presents the methodological framework developed within the FITTER-EU project to embed social justice systematically into twin transition research and policymaking. Building on this work, the paper refines an integrated approach that combines systems inquiry, risk assessment, and impact assessment within a rights-based framework.

Objective and Contribution

The objective of this paper is twofold. First, it introduces a structured methodology for embedding justice concerns (particularly distributive, recognitive, and participatory justice) into climate and digital transition policy design. Second, it demonstrates how a systems inquiry approach can help policymakers move beyond reactive mitigation of harms toward transformative redesign of the underlying structures that generate both ecological overshoot and social inequality.

The contribution lies in operationalising justice within complex socio-technical systems. Rather than treating fairness as an ex-post consideration, the FITTER-EU methodology integrates human rights principles, climate justice, and systems redesign into policy appraisal. This offers a practical toolset for anticipatory governance in the context of accelerating climate risks and uneven digitalisation.

Conceptual and Normative Framework

The methodology is grounded in a human rights-based approach (HRBA), drawing on international and European legal frameworks to anchor transition policies in principles of universality, non-discrimination, participation, and accountability. Justice is situated within a broader systems trilemma linking ecological limits, socio-economic reproduction, and political structures. The framework recognises that current business-as-usual pathways are incompatible with both climate targets and social equity, requiring systemic transformation rather than incremental optimisation.

Methods and Data

The methodology integrates three complementary components: (1) systems inquiry, (2) risk assessment, and (3) impact assessment.

Systems inquiry is structured in three stages: envisioning and challenging dominant paradigms; understanding system dynamics; and prioritising high-leverage interventions. Tools include the iceberg model, causal loop diagrams, stock and flow analysis, and leverage point analysis.

Risk assessment evaluates the likelihood and severity of adverse impacts on disadvantaged groups, supplementing conventional short-term risk analysis with systems thinking to capture structural drivers of inequality.

Impact assessment examines distributional, gendered, and intersectional impacts to ensure that policy benefits and burdens are equitably shared.

Empirically, the approach is applied to case studies across six European countries, focusing on renewable energy, electric mobility, and climate-resilient housing. Sectoral analysis draws on policy reviews, scenario modelling, stakeholder consultation, and digital platform-based modelling.

Tentative Findings

Preliminary findings reveal common structural dynamics across sectors.

In energy, rapid decarbonisation without redistributive design risks exacerbating energy poverty. In housing, financialisation and speculative investment reinforce affordability crises while retrofit policies often fail to reach low-income households. In transport, induced demand and infrastructure lock-in perpetuate car dependency, whereas road space reallocation and integrated mobility systems demonstrate higher transformative potential than subsidies for private electric vehicles.

Across sectors, policies focused solely on technological substitution tend to alleviate symptoms rather than address root causes. High-leverage interventions reshape incentives, rules, and power distributions within systems.

Conclusions

The twin transition cannot be assumed to be inherently just. Without systemic redesign, it risks entrenching inequalities while failing to meet climate goals. Integrating systems inquiry with rights-based risk and impact assessment enables policymakers to design interventions that both reduce immediate harms and transform the underlying dynamics that produce inequality and ecological overshoot.

Transformative justice-oriented policymaking is therefore not only normatively desirable but analytically necessary for achieving a fair and sustainable twin transition in Europe.