Review Article

Energy Policy Integration Through Transport Diplomacy: Türkiye-Eu Perspective

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Abstract: This study examines how transport diplomacy can serve as a mechanism for energy policy convergence between Türkiye and the European Union. Specifically, it investigates the following research question: To what extent and under which conditions can transport infrastructure projects function as instruments of transport diplomacy to promote regulatory alignment, enhance energy security, and facilitate decarbonized energy cooperation between Türkiye and the EU? The study employs a qualitative comparative case-study design grounded in George and Bennett's (2005) structured-focused comparison. Two cases were selected using a "most-similar systems" approach, emphasizing shared features such as direct physical linkages to EU markets, the need for multilateral coordination, and post-2021 operational relevance: the Trans-Anatolian Natural Gas Pipeline (TANAP) within the Southern Gas Corridor (SGC) and the Baku–Tbilisi–Kars (BTK) railway as the land backbone of the Middle Corridor (TITR). Drawing on process-tracing and thematic content analysis, the research analyzes primary sources including intergovernmental agreements, EU–Türkiye High-Level Dialogue communiqués (2022–2025), European Commission regulations on PCI/PMI lists and TEN-E/TEN-T guidelines, and official project reports, supplemented by secondary sources from the IEA, World Bank, OECD, and EBRD (2022–2025). The findings reveal that transport diplomacy has enabled partial regulatory convergence and improved supply diversification, but its impact is limited by geopolitical tensions and incomplete market liberalization. This contributes to the literature by refining transport diplomacy as a tool for selective policy integration in non-accession contexts, offering empirical insights into Türkiye-EU energy relations and actionable strategies for sustainable cooperation amid decarbonization challenges.

Keywords: Transport Diplomacy, Türkiye-EU Relations, SGC, TEN-T, TANAP, BTK, REPowerEU
Jel Codes: F50, L92, Q48, R40.

Ulaştırma Diplomasisi Yoluyla Enerji Politikası Entegrasyonu: Türkiye-AB Perspektifi

Öz: Bu çalışma, ulaştırma diplomasisinin Türkiye ile Avrupa Birliği arasındaki enerji politikası yakınsaması için nasıl bir mekanizma olarak işlev görebileceğini incelemektedir. Özellikle çalışma şu araştırma sorusuna odaklanmaktadır: Ulaştırma altyapı projeleri hangi ölçüde ve hangi koşullar altında düzenleyici uyumu teşvik etmek, enerji arz güvenliğini artırmak ve Türkiye ile AB arasında karbonsuzlaştırılmış enerji iş birliğini kolaylaştırmak amacıyla ulaştırma diplomasisinin araçları olarak işlev görebilir? Araştırma, Alexander L. George ve Andrew Bennett'in (2005) yapılandırılmış–odaklı karşılaştırma yaklaşımına dayanan nitel karşılaştırmalı bir vaka incelemesi tasarımını benimsemektedir. İki vaka, AB pazarlarıyla doğrudan fiziksel bağlantılar, çok taraflı koordinasyon gereksinimi ve 2021 sonrası dönemde operasyonel önem gibi ortak özellikleri vurgulayan "en benzer sistemler" yaklaşımı kullanılarak seçilmiştir. Bu vakalar, Güney Gaz Koridoru (SGC) kapsamında yer alan Trans-Anatolian Natural Gas Pipeline (TANAP) ile Orta Koridor'un (TITR) kara omurgasını oluşturan Baku–Tbilisi–Kars Railway (BTK) demiryolu hattıdır. Süreç izleme (process-tracing) ve tematik içerik analizi yöntemlerinden yararlanan çalışma; hükümetler arası anlaşmalar, AB–Türkiye Yüksek Düzeyli Diyalog bildirileri (2022–2025), Avrupa Komisyonu'nun PCI/PMI listeleri ile TEN-E/TEN-T yönergelerine ilişkin düzenlemeleri ve resmi proje raporları gibi birincil kaynakları analiz etmektedir. Bu analiz, ayrıca International Energy Agency, World Bank, Organisation for Economic Co-operation and Development ve European Bank for Reconstruction and Development tarafından yayımlanan ikincil kaynaklarla

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desteklenmiştir (2022–2025). Bulgular, ulaştırma diplomasisinin kısmi bir düzenleyici yakınsama sağladığını ve arz çeşitlendirmesini iyileştirdiğini, ancak etkisinin jeopolitik gerilimler ve enerji piyasalarında tamamlanmamış liberalleşme nedeniyle sınırlı kaldığını ortaya koymaktadır. Çalışma, ulaştırma diplomasisini katılım süreci dışındaki bağlamlarda seçici politika entegrasyonu için bir araç olarak yeniden kavramsallaştırarak literatüre katkı sunmakta; Türkiye–AB enerji ilişkilerine ilişkin ampirik içgörüler ve karbonsuzlaşma sürecindeki zorluklar karşısında sürdürülebilir iş birliği için uygulanabilir stratejiler önermektedir.

Anahtar Kelimeler: Ulaştırma Diplomasisi, Türkiye-AB İlişkileri, SGC, TEN-T, TANAP, BTK, REPowerEU
Jel Kodları: F50, L92, Q48, R40.

1. Introduction

Türkiye's relationship with the European Union (EU) has been a complex and evolving dynamic, shaped by historical, geopolitical, and economic factors. Since the signing of the Ankara Agreement in 1963, which established an association agreement, Türkiye has sought closer integration with the EU (Rumelili, 2008, pp. 97-110). While the accession process has faced challenges, cooperation in strategic areas such as energy and transport has remained a cornerstone of Türkiye-EU relations. These sectors are critical due to their interconnected roles in fostering regional stability, economic growth, and sustainable development. However, existing literature often overlooks how transport diplomacy can bridge persistent policy divergences in these areas amid stalled accession negotiations, creating a research gap in understanding selective integration mechanisms. This study addresses this gap by refining transport diplomacy as a tool for energy policy alignment, contributing empirical insights into Türkiye-EU relations and actionable strategies for decarbonized cooperation. Specifically, it investigates: To what extent and under which conditions can transport infrastructure projects function as instruments of transport diplomacy to promote regulatory alignment, enhance energy security, and facilitate decarbonized energy cooperation between Türkiye and the EU?

Türkiye's strategic location as a bridge between Asia, the Middle East, and Europe makes it a pivotal player in energy and transport networks. The country serves as a crucial transit hub for energy resources, particularly natural gas, linking resource-abundant regions such as the Caspian Basin to European markets (Austvik & Rzayeva, 2017, pp. 539-540). Türkiye's role in enhancing the EU's energy security by diversifying supply routes away from traditional dependencies has been underscored by projects like the Baku-Tbilisi-Ceyhan (BTC) pipeline and the Trans-Anatolian Natural Gas Pipeline (TANAP) (Korkmaz, 2021, pp. 65-110). Similarly, Türkiye's transport infrastructure, including the Baku-Tbilisi-Kars (BTK) railway and its expanding high-speed rail network, positions it as a key node in transcontinental connectivity, complementing the EU's Trans-European Transport Network (TEN-T) objectives (Şenol & Erbilen, 2022, p. 161).

The EU has prioritized energy security, defined here as reliable, affordable, and sustainable access to energy amid geopolitical risks and climate imperatives, along with decarbonization and sustainable transport under frameworks like the European Green Deal and the Energy Union strategy (Fetting, 2020, p. 53; Vezzoni, 2023). These initiatives aim to achieve climate neutrality by 2050 while ensuring secure supplies. The EU structures its energy policy around the classic energy trilemma: security of supply, affordability, competitiveness, and environmental sustainability, first formally articulated as the foundational pillars of the EU (European Commission, 2015, COM(2015) 80 final). This tripartite framework was subsequently elevated and integrated into the European Green Deal (European Commission, 2019, COM(2019) 640 final), which legally commits the EU to climate neutrality by 2050, and further operationalised through the REPowerEU Plan (European Commission, 2022, COM(2022) 108 final). In this study, energy security is operationalized through measurable indicators such as import dependency ratios (e.g.,

percentage of energy imports from non-EU sources), supplier diversification (assessed via the Herfindahl-Hirschman Index for concentration risks), renewable energy shares in the total mix, and infrastructure reliability metrics (e.g., gas storage coverage in days of demand), drawing on multidimensional frameworks like the Energy and Climate Security Risk Index (Center for the Study of Democracy, 2023) and integrated MCDM approaches (Brodny & Tutak, 2023). These indicators are systematically applied in the empirical analysis to trace the effects of transport diplomacy on regulatory alignment and supply diversification.

The EU's reliance on external energy, exacerbated by events like the 2022 Ukraine war, coupled with the need for efficient transport corridors, necessitates collaboration with non-member states like Türkiye. The convergence of energy and transport policies is thus a mutual economic benefit and strategic imperative for addressing global issues such as geopolitical instability and climate change (Tagliapietra et al., 2016).

The REPowerEU Plan was launched in May 2022 explicitly in response to Russia's full-scale invasion of Ukraine in February 2022, which starkly exposed the Union's acute external vulnerability in energy supply. Prior to the war, in 2021, Russia accounted for approximately 45% of the EU's total extra-EU natural gas imports (pipeline gas plus liquefied natural gas [LNG]; European Commission, 2022; Eurostat, 2025a). By 2025, this share had declined significantly to around 13–16% (combined pipeline and LNG), or approximately 6% for pipeline gas alone, depending on the scope of measurement, as a result of rapid supply diversification (notably increased LNG from the United States and Norway pipeline volumes), demand reduction measures, and accelerated deployment of renewables and energy efficiency (European Commission, 2025e; Eurostat, 2025b; Council of the European Union, 2025).

Table 1 presents a concise overview of the evolution in Russia's share of EU natural gas imports based on consistent Eurostat and European Commission reporting.

Table 1. Russia's share in EU total natural gas imports (pipeline + LNG), selected periods

Periods	Russia's share (%)	Key notes / Scope	Source(s)
2021 (pre-war)	~45%	Annual average; total extra-EU imports (pipeline + LNG)	Eurostat (2025a); European Commission (2022)
2024	~19%	Annual; reflects early REPowerEU impacts	European Commission (2025b)
2025 (full year / latest available)	13–16% (combined); ~6% (pipeline only)	Annual / Q3 2025 quarterly data; pipeline decline sharper due to Ukraine transit halt	Eurostat (2025b); Council of the EU (2025)

In parallel, the Sustainable and Smart Mobility Strategy (European Commission, 2020, COM(2020) 789 final) and the revised TEN-T and TEN-E regulations treat decarbonised, resilient transport corridors as indispensable complements to energy security, targeting a 90 % reduction in transport-sector greenhouse-gas emissions by 2050.

These interlinked priorities generate a clear strategic imperative for structured cooperation with key transit and partner countries such as Türkiye. Such collaboration delivers mutual economic benefits, diversified supply routes, enhanced infrastructure resilience, and joint progress on decarbonisation, while addressing shared challenges of geopolitical instability and climate change.

Despite potential synergies, Türkiye-EU cooperation faces challenges, including divergent regulatory frameworks, geopolitical tensions (e.g., Eastern Mediterranean disputes), and differing energy transition priorities. While the EU emphasizes renewables and transport electrification, Türkiye's policy has historically relied on fossil fuels, though

its 2053 net-zero commitment signals alignment (Dönmezçelik et al., 2023). A nuanced examination of diplomacy's role in facilitating policy alignment is essential.

Transport diplomacy, distinct from broader energy diplomacy, refers to the strategic use of transport infrastructure and policies, such as pipelines, railways, and ports, to foster international cooperation, enhance connectivity, and achieve shared objectives (Kuzemko et al., 2017). This concept aligns closely with related discussions in the literature on infrastructure diplomacy, which emphasizes the geopolitical signaling and economic leverage derived from major projects (Grgić et al., 2023); corridor diplomacy, often applied to energy transit routes like the Southern Gas Corridor for regional integration (Novikau & Muhasilović, 2023); and connectivity diplomacy, which focuses on bridging countries, societies, and economies through networked infrastructures (Gaens et al., 2023; Winter, 2020). In contrast to energy diplomacy, which centers on resource negotiations and supply agreements, transport diplomacy differs systematically across key dimensions: in terms of actors, it involves multilateral institutions (e.g., EU bodies, EBRD) and private infrastructure firms alongside states, whereas energy diplomacy primarily engages resource producers (e.g., Azerbaijan) and state-owned enterprises; regarding tools, it relies on physical and regulatory investments in connectivity (e.g., interoperable networks) rather than bilateral pricing contracts or extraction deals; and concerning outcomes, it yields long-term interdependence, regulatory harmonization, and sustainable mobility, as opposed to short-term supply security and market access. In Türkiye-EU relations, transport diplomacy integrates energy policies by enabling physical and regulatory infrastructure for energy flows and sustainable mobility, leveraging the interdependence of these systems.

The significance of transport diplomacy lies in bridging policy gaps. For instance, the Southern Gas Corridor (SGC), involving Türkiye but also encompassing routes that sometimes bypass it (e.g., earlier Nabucco proposals), enables Caspian gas delivery to Europe, reducing dependence on Russian supplies (Yorucu & Özay, 2018, pp. 66-67; Austvik & Rzayeva, 2017, p. 545). This highlights how transport infrastructure can align energy security goals, though success depends on factors beyond geography, such as institutional cooperation and market dynamics. Similarly, Türkiye's multimodal investments, like the Middle Corridor (Trans-Caspian International Transport Route-TITR), enhance East-West connectivity and complement TEN-T (Şenol & Erbilen, 2022, p. 161), fostering dialogue, trust, and interdependence.

Transport diplomacy also addresses environmental dimensions. The EU's Green Deal promotes transport decarbonization via electrification and sustainable fuels (Bilginan, 2025), while Türkiye's renewable investments position it as a partner in green corridors, such as hydrogen pipelines or electrified rails (Melikoğlu, 2017, pp. 485-492; Baş et al., 2025b). Aligning infrastructure with clean energy goals advances climate commitments and bilateral ties.

However, effectiveness requires overcoming regulatory misalignment, financing constraints, and geopolitical rivalries (Avatkov & Klimenko, 2024, pp. 67-87). Sustained dialogue, joint investments, and harmonized policies are essential.

This study makes several contributions to the fields of international relations and energy policy, particularly in the context of Türkiye-EU cooperation and the broader application of transport diplomacy.

Firstly, it advances the conceptualization of transport diplomacy as a subset of economic and energy diplomacy by linking specific findings, such as the role of infrastructure projects in enabling partial regulatory convergence, to theoretical frameworks like functionalism, neo-liberal institutionalism, and energy geopolitics. The analysis demonstrates how technical cooperation in transport generates spill-over effects into broader integration through mechanisms like institutional coordination (e.g., High-Level Dialogues), under conditions of stalled accession processes, thereby extending functionalist principles (Haas, 2020); it also shows how such mechanisms reduce transaction costs and facilitate reciprocity, supporting neo-liberal institutionalism

(Keohane, 1984), while highlighting Türkiye's transit role in mitigating regional risks, contributing to energy geopolitics debates (Kuzemko et al., 2025).

Secondly, it provides empirical insights into the interplay between energy and transport policies in the Türkiye-EU context by tracing findings like enhanced supply diversification via the SGC to mechanisms of multilateral institutional coordination (e.g., intergovernmental agreements and blended financing), under conditions of geopolitical shocks such as the 2022 Ukraine crisis. Case studies of TANAP and the BTK railway illustrate how these mechanisms operationalize policy integration, offering comparative examples for other regions and enriching discussions on infrastructure as a diplomatic tool (Griffiths, 2019; Novikau & Muhasilović, 2023).

Thirdly, it contributes to the policy discourse on sustainability and energy security by connecting findings on synergies in green hydrogen and electrified corridors to mechanisms of diplomatic collaboration (e.g., joint roadmaps and funding instruments), under conditions of divergent transition timelines. This alignment with global decarbonization efforts, such as the EU's Green Deal, provides evidence-based insights for integrating sustainability into bilateral ties, advancing literature on renewable energy diplomacy (Obanor et al., 2026; Vezzoni, 2023).

Lastly, it addresses the challenges of policy alignment between a non-member state and the EU by linking findings on constrained effectiveness (e.g., due to incomplete market liberalization) to mechanisms like ring-fenced institutional frameworks, under conditions of persistent geopolitical barriers (e.g., Eastern Mediterranean disputes). This offers a nuanced perspective on EU external relations with candidate countries, emphasizing the conditional role of institutions in fostering cooperation and contributing to broader debates on selective integration (Sartori, 2021; Avatkov & Klimenko, 2024).

In conclusion, transport diplomacy offers a transformative approach to integrating Türkiye's and the EU's energy and transport policies, leveraging infrastructure to foster cooperation, enhance energy security, and promote sustainability. While challenges such as geopolitical tensions and regulatory divergences persist, the strategic use of transport diplomacy can overcome these barriers, creating a resilient partnership that aligns with global climate and security goals. Türkiye's role as an energy and transport hub positions it as a key partner for the EU, with significant potential to shape a sustainable and secure energy future through continued collaboration.

2. Theoretical Framework

This study situates transport diplomacy within broader international relations and energy policy scholarship by drawing on three complementary perspectives in a hierarchical structure: (1) a refined conceptualization of transport diplomacy, (2) energy policy integration as a cooperative process, and (3) a focused theoretical lens that privileges neo-liberal institutionalism as the primary explanatory framework for testable mechanisms (e.g., transaction cost reduction and reciprocity), while employing functionalism and energy geopolitics as supporting perspectives to account for spill-over dynamics and structural constraints, respectively.

2.1. Conceptualizing Transport Diplomacy

Transport diplomacy is defined here as the strategic use of cross-border transport infrastructure projects, networks, and related regulatory frameworks to advance foreign policy objectives, build mutual interdependence, and facilitate cooperation in functionally linked policy domains—particularly energy (adapted from Kuzemko et al., 2017; Rodrigue et al., 2006). Unlike general energy diplomacy, which centres on resource access and pricing negotiations, transport diplomacy emphasizes the physical and institutional "hardware" (pipelines, railways, ports, multimodal corridors) and "software" (harmonized standards, joint financing mechanisms, interoperability agreements) that make energy flows possible and sustainable.

In the Türkiye-EU relations, transport diplomacy operates at the intersection of economic integration, regulatory alignment, and geopolitical signalling. Infrastructure is not merely technical; it creates durable interdependence that can spill over into trust-building and policy convergence (Nye, 2004). Projects such as TANAP and the Baku-Tbilisi-Kars (BTK) railway illustrate how transport investments can serve as diplomatic tools even when full political integration remains blocked.

2.2. Energy Policy Integration as Regional Cooperation

Energy policy integration refers to the deliberate alignment of national energy strategies, market rules, infrastructure planning, and decarbonisation pathways to achieve shared goals of security, affordability, and sustainability (Goldthau & Sitter, 2015). For a non-member state like Türkiye, integration with the EU does not require accession but rather selective adoption of the EU acquis via instruments such as the Energy Community Treaty (observer status since 2006) and bilateral High-Level Energy Dialogue.

Transport infrastructure is the indispensable enabler of such integration: pipelines and interconnectors physically materialize market coupling, while rail and maritime corridors support the EU's sustainable mobility and REPowerEU objectives. Successful integration therefore depends on institutional mechanisms that reduce transaction costs, align incentives, and manage asymmetries—the core concern of neo-liberal institutionalism.

2.3. Core Theoretical Lens: Neo-Liberal Institutionalism (Primary)

Neo-liberal institutionalism provides the most robust framework for explaining both the achievements and the persistent limitations of Türkiye–EU energy-transport cooperation (Keohane, 1984; Moravcsik, 2013). Institutions lower transaction costs, increase information and transparency, extend the shadow of the future through iterated interactions, and create conditions in which reciprocity and credible commitments become rational strategies for self-interested states. In this dyad, the relevant institutions include:

- The Energy Community (Türkiye as observer/participant in selected technical areas)
- The EU–Türkiye Customs Union and its ongoing modernisation negotiations
- The High-Level Energy and Transport Dialogues (re-launched in 2022 and held regularly, e.g., High-Level Economic Dialogue on April 3, 2025, in Brussels with a joint statement on economic cooperation including energy alignment (European Commission, 2025a); and the 3rd High-Level Dialogue on Climate—encompassing energy transition themes—on October 2, 2025, in Brussels with a focus on post-Climate Law collaboration (European Commission, 2025b)
- The extended Trans-European Networks (TEN-T corridors and TEN-E hydrogen/PMI eligibility) • Blended financing vehicles (EBRD, EIB, Connecting Europe Facility, IPA-III)

These mechanisms have demonstrably insulated technical projects such as TANAP and BTK from broader geopolitical crises—for instance, TANAP's completion in 2020 amid the 2015–2017 political freeze through binding intergovernmental agreements—and have generated measurable regulatory spill-overs, such as Türkiye's partial adoption of EU gas network codes (e.g., capacity allocation and congestion management under Regulation (EC) No 715/2009, as documented in the Energy Community Annual Implementation Reports for 2023–2025, which note Türkiye's progress in aligning transit rules for TANAP (Energy Community Secretariat, 2023; 2025); and BTK's interoperability enhancements with TEN-T standards, leading to customs facilitation protocols in 2024 (European Commission, 2024).

To avoid the risk that the theory remains merely decorative, the following table translates the core mechanisms of neo-liberal institutionalism into concrete, observable, and measurable indicators that are systematically applied throughout the empirical

chapters. The indicators are drawn directly from Keohane's transaction-cost approach (1984, 1989) and have been adapted to the EU–Türkiye infrastructure context.

Table 2. Theoretical Mechanism, Empirical Indicators, Operational Measurement / Data Sources, and Process-Tracing Tests

Theoretical Mechanism	Empirical Indicators	Operational Measurement / Data Sources
Reduction of transaction costs[1]	(a) Number and speed of joint project approvals (b) Establishment of dedicated task forces / working groups	Time elapsed between MoU and financial close/loan effectiveness[2]; number of High-Level Dialogue technical subgroups (2022–2025)[3]; IPA-III project pipeline timelines[4]
Increase in information / transparency[5]	(a) Regular data-exchange protocols (b) Public availability of tariffs, capacity data, and compliance reports	Energy Community Annual Implementation Reports (Türkiye observer reports 2023–2025); TANAP transparency filings under EU network codes; joint communiqués
Extension of the shadow of the future[6]	Duration and binding character of commitments	Length of intergovernmental/transit agreements (TANAP: 25-year capacity allocation contracts); multi-year financing envelopes (CEF 2021–2027, IPA-III 2021–2027)
Facilitation of reciprocity[7]	Cross-issue linkages and mutual concessions	EU grant/loan disbursements conditional on regulatory alignment milestones; Turkish adoption of EU acquis elements in exchange for market access or funding (documented in Energy Community progress reports and High-Level Dialogue outcomes)
Dispute mitigation & focal points[8]	Use of pre-agreed rules and successful project completion despite exogenous shocks	Presence of arbitration clauses in Host Government Agreements; project completion despite 2015–2017 political crisis (TANAP) and 2022 geopolitical shock (BTK/Middle Corridor surge)

This theoretical framework is operationalized as follows: In Section 5 (Empirical Findings), neo-liberal institutionalism's primary claim—that institutions facilitate reciprocity and reduce transaction costs—is tested through process-tracing of indicators like joint project approvals and data-exchange protocols in the TANAP and BTK cases, observable via intergovernmental agreements and Energy Community reports. Functionalism's supporting claim on spill-over effects (e.g., from technical to political integration) is examined in Section 6 (Strategic Implications) using traces such as regulatory alignments post-2022 dialogues, under conditions of geopolitical tensions. Energy geopolitics' role in explaining limits (e.g., power asymmetries constraining cooperation) is assessed in Section 5.4 (Comparative Assessment) via evidence of unresolved disputes (e.g., Eastern Mediterranean) impacting project outcomes, drawn from OECD and World Bank evaluations. This roadmap ensures disciplined application and falsifiability across the study.

2.4. Supporting Perspectives

[1] Hoop test: If mechanism holds, dedicated subgroups and timelines should be less than 12 months (failure eliminates hypothesis). Straw-in-the-wind: Recurring mentions of task forces in communiqués weakly supports. (Beach, 2018; Collier, 2011).

[2] TANAP: IGA signed 26 June 2012; major financing agreements / shareholder commitments by late 2012–early 2013; World Bank ICR P157416, 2022; AIIB Completion Note, 2022 — rapid progress is observed in approximately 6–12 months.

[3] Number of High-Level Dialogue technical subgroups (2022–2025) (European Commission joint statements, 2025a/b).

[4] IPA-III project pipeline timelines (DG NEAR IPA-III documents, 2021–2027 envelopes).

[5] Hoop test: If transparency mechanism present, regular reports and public filings must exist (failure falsifies). Smoking-gun: Specific Energy Community milestone on TANAP capacity data strongly confirms (Beach, 2018; Collier, 2011).

[6] Hoop test: Commitments must be long-term (>10 years) and binding (e.g., send-or-pay clauses). Doubly decisive: Eliminating the 25-year GTA duration rivals explanations strengthens the mechanism. (Beach, 2018; Collier, 2011).

[7] Smoking-gun: Explicit conditionality in loan agreements or reports (e.g., IPA funds tied to milestones) strongly affirms reciprocity. Straw-in-the-wind: Mutual concessions in communiqués weakly supports (Beach, 2018; Collier, 2011).

[8] Smoking-gun: Arbitration clauses + completion despite crisis uniquely supports insulation mechanism. Hoop test: Pre-agreed rules must be documented (failure eliminates).

Functionalism (Haas, 2020; Ashworth, 2013) offers a complementary but secondary explanation: cooperation in low-politics technical domains (infrastructure may gradually spill over into higher-politics areas. While the Türkiye-EU case shows limited spillover to date (accession freeze, Eastern Mediterranean tensions), functionalist logic helps explain why both sides continue investing in joint infrastructure even during political downturns.

Energy geopolitics (Overland, 2019; Austvik & Rzayeva, 2017) remains relevant for understanding structural constraints. Türkiye's transit role and the EU's diversification imperative create overlapping interests, yet competing regional projects (e.g., EastMed vs. Southern Corridor variants) and maritime disputes remind us that institutions alone cannot eliminate power-political considerations.

2.5. Synthesis and Analytical Strategy

Neo-liberal institutionalism is adopted as the primary lens because it best accounts for observable outcomes: sustained project implementation (TANAP, BTK) despite accession deadlock and geopolitical friction. Functionalist and geopolitical arguments are retained to explain, respectively, the direction and the limits of cooperation. The framework therefore guides the empirical sections by asking: To what extent have transport diplomacy initiatives generated institutional mechanisms that reduce transaction costs and lock-in mutual gains, and facilitate regulatory convergence between Türkiye and the EU?

Table 3. Türkiye's Bilateral Energy Trade with EU Countries: Electrical Energy and Anthracite (2019–2024)

	Export				Import			
Years	Electrical Energy Trade Value (1000USD)	Quantity (1000 kWh)	Anthracite Trade Value (1000USD)	Quantity (kg)	Electrical Energy Trade Value (1000USD)	Quantity (1000 kWh)	Anthracite Trade Value (1000USD)	Quantity (kg)
2019	104,425.15	1,941,618	125.94	644,287	30,948.21	701,453	2,739.04	20,149,786
2020	68,918.99	1,407,486	155.82	798,550	48,463.05	1,338,209	161.31	231,556
2021	172,033.08	2,332,798	64.63	326,965	5,036.90	157,308	847.32	1,064,497
2022	225,652.86	562,886	241.01	707,606	7,173.42	451,036	6,794.39	19,398,781
2023	149,048.69	1,056,727	3,975.77	19,824,443	113,422.06	1,126,318	6,969.02	14,229,727
2024	138,726.21	1,406,800	4,489.66	35,434,602	36,178.56	817,573	7,189.23	25,785,463

Source: World Integrated Trade Solution (WITS) (2025)[9].

3. Türkiye's Energy and Transport Landscape

Türkiye's geostrategic location—at the crossroads of Europe, the Black Sea–Caucasus–Caspian corridor, and the Middle East—positions it as a critical transit hub for Eurasian energy flows and multimodal logistics. Transport diplomacy has become a strategic instrument for advancing economic diversification, expanding non-energy trade volumes, and projecting regional influence (OECD, 2023; 2025).

[9] https://wits.worldbank.org/. This table focuses exclusively on electrical energy (trade code HS 2716) and anthracite (HS 2701.11 – high-quality hard coal) because these are the energy commodities in which Türkiye has recorded both meaningful exports and imports with EU countries during 2019–2024, according to WITS/UN Comtrade data. Electrical energy reflects Türkiye's growing role as a net exporter of electricity to Europe (via interconnectors), while anthracite captures bilateral coal trade dynamics (primarily imports from EU countries, with minor exports). Major energy commodities such as natural gas (HS 2711) and crude oil/petroleum oils (HS 2709–2710) were excluded from this table because bilateral trade with EU countries in these categories was either negligible, unidirectional, or not consistently reported at the bilateral level in the WITS dataset for the selected period.

By systematically upgrading land, maritime, and air infrastructure, Türkiye has positioned itself as the primary European gateway of the Middle Corridor (Trans-Caspian International Transport Route, TITR). Cargo volumes along this corridor surged to 4.5 million tonnes in 2024—a 62–63 % increase year-on-year—while container traffic reached approximately 50,500–55,000 TEU (more than 2.6-fold growth compared with 2023). Current throughput capacity stands at 5.8–6 million tonnes annually, with World Bank projections indicating that targeted investments could triple volumes to 10–11 million tonnes by 2030 (World Bank, 2023; OECD, 2025; Kazakhstan Ministry of Transport / TITR International Association, 2025).

These developments underscore the corridor's rising competitiveness as a resilient alternative to northern routes amid geopolitical reconfiguration, directly supporting Türkiye's goals of increasing transit revenues, deepening regional integration, and enhancing leverage in global supply chains. In particular, Türkiye's "Middle Corridor" transportation route plays a crucial role in accelerating trade flows from Western Europe to Central Asia and China (Şenol & Erbilen, 2022, pp. 161-163).

3.1. Energy Policy Priorities and Constraints

Türkiye remains heavily import-dependent. In 2025, approximately 95% of its natural gas supply was imported (domestic production covered about 5% of consumption; total gross domestic consumption ≈60 bcm, net imports ≈56.8 bcm, with domestic production ≈3.2 bcm from the Black Sea fields and minor onshore sources), calculated as (net imports / total gross domestic consumption including transmission losses) × 100, based on aggregated monthly sector report series from the Energy Market Regulatory Authority (Energy Market Regulatory Authority (EPDK), 2026; Institute for Diplomacy and Economy, 2025). Oil import dependency stood at approximately 90% (total primary oil supply ≈38 million tonnes, net imports ≈34 million tonnes, domestic production ≈4 million tonnes primarily from onshore fields), defined as the ratio of net imports to total primary oil supply (including crude and refined products, adjusted for stock changes and exports), derived from annual energy balance methodologies in official reports (International Energy Agency (IEA), 2026; Energy Institute, 2026).

The country's energy policy rests on three enduring pillars: (a) supply security through diversification, (b) increasing the share of renewables, and (c) maximising the transit role without claiming to be a pricing or trading "hub" in the strict.

3.1.1. Current Achievements (as of end-2025)

• Renewable sources reached 62% of total installed electricity capacity (75.64 GW out of 122 GW), driven primarily by hydropower (32 GW), solar (22.6 GW), and wind (13.4 GW), with smaller contributions from geothermal (2.3 GW) and biomass (2.4 GW) (Republic of Türkiye Ministry of Energy and Natural Resources (MENR), 2026; Ember, 2026). These figures are based on year-end installed capacity data aggregated from monthly operational reports, verified against primary MENR statistics.

• Commercial production from the Sakarya field (Black Sea) began in 2023 and reached an annual volume of approximately 3.5 bcm in 2025 (≈9.5 million m^3/day average output), providing a modest but growing contribution to supply security (MENR/TPAO data via Reuters, 2025; Offshore Technology, 2025; Energy Market Regulatory Authority (EPDK), 2026). This domestic production, defined as the share of indigenous output relative to total gross domestic natural gas consumption (including end-user demand, transmission losses, and stock changes; ≈60 bcm total consumption in 2025), accounted for about 5% of consumption (domestic output ≈3.5 bcm from Sakarya plus ~0.2 bcm from minor onshore fields). Measurements are in billion cubic meters (bcm) annually for totals and million cubic meters (m^3) per day for rates, based on aggregated monthly production and consumption data from TPAO operational reports, cross-verified with EPDK sector statistics, BOTAŞ import records, and TEİAŞ energy balance assessments.

• Pilot green-hydrogen projects with European partners (Germany, Netherlands) are operational under the framework of the 2023 Hydrogen Technologies Strategy and Roadmap.

3.1.2. Policy Targets (distinct from current performance)

• The Türkiye National Energy Plan (2022, with updates reflected in the 2024 Long-Term Climate Strategy) sets a target of ≈ 65 % renewables in installed electricity capacity by 2035 and net-zero emissions by 2053 (MENR, 2022; Republic of Türkiye, 2024).

• The same documents envisage a substantial expansion of green-hydrogen production capacity (electrolysis targets rising to 5 GW by 2035 and 70 GW by 2053).

These priorities generate partial convergence with EU objectives (REPowerEU, European Green Deal), yet important gaps remain: Türkiye's coal phase-out timetable is still undefined, and full liberalisation/unbundling of the natural-gas market (in line with the EU's Third Energy Package) has not been completed.

3.2. Türkiye's Role in Regional Transport Networks

Türkiye's geographic position makes it a natural transit corridor for both energy and goods. Two multimodal axes dominate:

1. Southern Gas Corridor (East–West Energy Corridor (SGC): TANAP (16 bcm/y capacity, expandable to 31 bcm) + TAP forms the only operational non-Russian pipeline route delivering Caspian gas to the EU. Türkiye receives transit fees (~$300–350 mn/year) and 1.2 bcm discounted gas annually, but does not control pricing at the Greek border.
2. Middle Corridor / Trans-Caspian International Transport Route (TITR): BTK railway (operational since 2017, 6.5 mt/year current capacity) + Caspian ferry links + Kars–Iğdır–Dilucu high-speed rail extension under construction. Container traffic on this route rose from <10,000 TEU in 2019 to >120,000 TEU in 2024, still far below the Russia-northern route but growing 40–50% annually since the Ukraine war.

3.3. Selected Infrastructure Projects as Transport Diplomacy Instruments

Two projects were chosen for in-depth analysis because they (a) directly link Turkish territory to EU markets, (b) required sustained bilateral/multilateral institutional coordination, and (c) illustrate both successes and limits of transport diplomacy:

3.3.1. Trans-Anatolian Natural Gas Pipeline (TANAP)

- Intergovernmental Agreement (2011) and Host Government Agreement (2014) between Türkiye and Azerbaijan, with EU political and financial backing from the EU.
- Unlike the failed Nabucco project (2002–2013), TANAP succeeded because institutional mechanisms (bilateral treaties + EBRD/EIB loans) insulated it from broader political tensions.
- Demonstrates neo-liberal institutionalist logic: repeated interaction and credible commitments enabled completion despite the 2016 Türkiye-EU political freeze.

3.3.2. Baku–Tbilisi–Kars (BTK) Railway and Middle Corridor

- Financed largely by Azerbaijan ($780 mn loan) with Turkish and Georgian equity; EU provided only technical assistance.
- Traffic growth post-2022 shows how geopolitical shocks (Ukraine war) can accelerate usage of alternative routes, aligning with TEN-T diversification goals.
- Institutionalisation remains weaker than in the gas sector (no dedicated EU–Türkiye railway treaty), highlighting the limits of functionalist spillover.

3.4. Key Challenges

- Regulatory divergence: Türkiye has not yet fully transposed the EU Third Energy Package, particularly Directive 2009/73/EC concerning common rules for the internal market in natural gas. Specific incompatibilities include non-compliance with Article 9 (requiring ownership unbundling of transmission

system operators from production and supply activities), Article 10 (certification of independent transmission operators), and Article 26 (unbundling of distribution system operators), as evidenced by the suspension of BOTAŞ unbundling and the persistence of non-transparent, non-cost-reflective pricing in the natural gas market law (European Commission, 2025; Energy Community Secretariat, 2025). This divergence impacts TANAP by limiting third-party access to transit capacity and increasing regulatory risks for cross-border gas flows, thereby constraining supply diversification and market coupling with the EU despite partial alignment with network codes for throughput. For the BTK railway, while less directly affected (as it falls under TEN-T transport guidelines rather than energy directives), the incomplete gas market liberalization indirectly hampers integrated multimodal corridors, such as those supporting decarbonized energy transport (e.g., hydrogen via rail), by perpetuating asymmetries in institutional coordination and financing decisions.

- Financing: large-scale green infrastructure (hydrogen-ready pipelines, electrified rail) requires EU grants/loans that are currently limited by political conditionality.
- Eastern Mediterranean tensions continue to poison trust and delay potential new routes (e.g., EastMed or Türkiye–Israel reconciliation pipelines.

In summary, Türkiye functions as a critical transit state and increasingly as a renewable electricity and future hydrogen exporter, but not as a genuine "energy hub" in the trading sense. Its infrastructure projects have deepened institutional entanglement with the EU in specific corridors, creating path dependencies that neo-liberal institutionalism predicts will favor continued cooperation even amid political friction.

4. The EU's Energy and Transport Policy Framework

The EU has developed a comprehensive framework for energy and transport policies, emphasizing decarbonization, energy security, and sustainability as part of its broader strategic objectives. This framework, shaped by initiatives such as the European Green Deal and the TEN-T, provides a foundation for cooperation with non-member states like Türkiye. This section examines the EU's energy policy goals, the role of transport in its Green Deal and TEN-T networks, its approach to external cooperation, and the challenges of aligning policies with non-member states, particularly in the context of transport diplomacy and energy policy integration with Türkiye.

4.1. Evolution of EU External Energy Policy Post-2022

The Russian full-scale invasion of Ukraine in February 2022 fundamentally reshaped EU external energy policy. The REPowerEU Plan (launched in May 2022) and the ensuing legislative packages adopted between 2023 and 2024 markedly accelerated three interconnected priorities:

- Rapid reduction of Russian gas imports (the share of Russian-origin gas in total extra-EU natural gas imports declined from approximately 45% in 2021 to around 12–16% by 2025, depending on whether pipeline gas or combined pipeline and LNG flows are considered; European Commission, 2025; Eurostat, 2025a; Eurostat, 2025b);
- Massive scaling-up of renewable energy deployment and energy efficiency measures (with the 2030 renewable energy target raised to 42.5%, and an aspirational 45% goal);
- Diversification of external supply routes and suppliers, encompassing increased LNG volumes, new pipeline corridors, and preparations for future hydrogen imports.
- Massive scaling of renewables and energy efficiency (2030 renewable target raised to 42.5%, with a 45% aspirational goal);
- Diversification of external supply routes and suppliers, including LNG, new pipelines, and future hydrogen corridors.

In this context, Türkiye has gained renewed strategic relevance as a non-Russian transit hub and potential green hydrogen partner, despite its non-member status. EU external energy governance now operates through a mix of multilateral (Energy Community, G7+ frameworks) and bilateral instruments (High-Level Energy Dialogue with Türkiye, restarted in 2022).

4.2. Core Policy Frameworks and Instruments

4.2.1. The Energy Union and External Dimension

The Energy Union's five dimensions (security, solidarity, fully integrated market, efficiency, decarbonisation) remain the backbone. For non-EU countries, the main institutional vehicle is the Energy Community Treaty. Türkiye, as an observer since 2006 and participant in selected areas, is expected to progressively adopt the Third Energy Package and network codes, although full membership talks remain frozen.

4.2.2. European Green Deal and REPowerEU

The Green Deal (2019) and REPowerEU together set binding targets that directly affect cooperation with Türkiye:

- 40 GW electrolyser capacity by 2030 → need for import corridors for green hydrogen/ammonia;
- Phase-out of coal and reduction of fossil gas demand → pressure on transit countries to prepare infrastructure for hydrogen blending or full conversion;
- Sustainable and Smart Mobility Strategy (2020) → prioritisation of rail over road and maritime decarbonisation.

4.2.3. Trans-European Networks (TEN-T and TEN-E)

The Trans-European Transport Network (TEN-T) guidelines are laid down in Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for the development of the trans-European transport network. The core network corridors have been extended to neighbouring countries through the European Commission's official indicative extension maps, published in 2024. These maps explicitly include the Middle Corridor (via the Eastern Partnership corridor maps covering Azerbaijan–Georgia–Türkiye) and the Mediterranean corridors passing through Türkiye (European Commission, 2024a; European Commission, 2024b).

The revised Trans-European Energy Infrastructure Regulation (TEN-E), Regulation (EU) 2022/869 of the European Parliament and of the Council of 30 May 2022 on guidelines for trans-European energy infrastructure (OJ L 152, 3.6.2022, p. 1), entered into force on 23 June 2022. It excludes all new natural-gas infrastructure projects from eligibility as Projects of Common Interest (PCI) while creating a dedicated infrastructure category for hydrogen transmission pipelines (including repurposed natural-gas assets), hydrogen storage, electrolysers, and smart gas grids that meet mandatory hydrogen-readiness and sustainability criteria (Articles 2, 4 and Annex II).

As a direct result, TANAP—classified as natural-gas infrastructure—lost its PCI status in the transition to the revised framework and does not appear on the first Union list of PCIs/PMIs (Commission Delegated Regulation (EU) 2024/1041 of 28 November 2023 amending Regulation (EU) 2022/869 as regards the Union list of projects of common interest and projects of mutual interest, OJ L 2024/1041). In its place, cross-border hydrogen projects involving third countries such as Türkiye are now eligible for designation as Projects of Mutual Interest (PMI). These projects must demonstrate high policy convergence with the EU acquis, net socio-economic benefits at Union level, and alignment with the 2030/2050 climate objectives. Hydrogen initiatives with Turkish partners have been assessed in the relevant regional groups and are eligible under the 2024 list and the second Union list adopted on 1 December 2025 (European Commission, 2025a).

4.3. Institutional Mechanisms for Cooperation with Türkiye

Neo-liberal institutionalism highlights how repeated interaction and shared frameworks reduce uncertainty. Key mechanisms include:

- EU–Türkiye High-Level Energy Dialogue (re-launched 2022) and Transport Dialogue;
- Connecting Europe Facility (CEF) blending with EIB/EBRD loans for cross-border segments;
- Western Balkans–Türkiye–EU "Green Agenda" alignment process (Sofia Declaration 2020, extended informally to Türkiye).

These institutions create incentives for regulatory convergence even when accession is off the table.

4.4. Remaining Challenges and Divergences

Despite institutional deepening, significant gaps persist:

- Market liberalisation: Türkiye has not fully unbundled Botas or opened its gas market, hindering the Energy Union's internal market logic.
- Regulatory misalignment: differing emissions standards, carbon pricing (EU CBAM vs. Türkiye's delayed ETS), and network codes.
- Political conditionality: rule-of-law and Eastern Mediterranean issues continue to limit access to major EU funding instruments.
- Timing mismatch: EU gas demand is set to fall ~30% by 2030, reducing the long-term value of new fossil infrastructure, while Türkiye seeks to maximize transit volumes in the coming decade.

4.5. Emerging Opportunities: Hydrogen and Green Corridors

Pilot initiatives and ongoing bilateral cooperation signal a strategic shift from fossil-fuel transit toward renewable energy carrier partnerships, particularly in green hydrogen and its derivatives (e.g., green ammonia). Notable examples include German–Turkish collaboration under the Turkish-German Energy Partnership's Task Force on Green Hydrogen (which has produced feasibility studies on hydrogen transport options from Türkiye to Germany; Turkish-German Energy Partnership, 2025) and Dutch-supported green ammonia developments aligned with broader EU import interests (e.g., via existing ammonia infrastructure and potential CBAM-compliant exports).

Türkiye's Hydrogen Technologies Strategy and Roadmap (Republic of Türkiye Ministry of Energy and Natural Resources [MENR], 2023), which targets 2 GW of electrolyser capacity by 2030, 5 GW by 2035, and 70 GW by 2053, provides the domestic framework for these efforts and has been highlighted in EU–Türkiye High-Level Dialogues on climate and economy (e.g., 2025 sessions emphasizing energy transition and connectivity; European Commission, 2025). Retrofitting segments of existing infrastructure, such as parts of the Trans-Anatolian Natural Gas Pipeline (TANAP), or developing dedicated hydrogen pipelines is now technically viable and financially supported through the Connecting Europe Facility (CEF) for Projects of Mutual Interest (PMI) and REPowerEU external-dimension funding, subject to regulatory alignment and socio-economic assessments under the revised TEN-E Regulation (European Commission, 2022; 2025).

In summary, the EU's post-2022 framework has transformed Türkiye from a controversial fossil transit partner into a strategically important diversification and decarbonisation bridge. Institutional entanglement through dialogues, funding instruments, and shared decarbonisation goals creates path dependencies that neo-liberal institutionalism predicts will drive further convergence — provided regulatory and political obstacles are gradually overcome.

5. Transport Diplomacy as a Bridge for Türkiye-EU Energy Policy Integration

Transport diplomacy serves as a critical mechanism for aligning Türkiye's and the EU's energy and transport policies, fostering cooperation, and addressing shared

challenges such as energy security and sustainability. By leveraging infrastructure projects and diplomatic engagement, transport diplomacy bridges policy gaps and creates opportunities for mutual benefit. This section examines the historical context of Türkiye-EU energy and transport collaboration, analyzes case studies of successful transport diplomacy initiatives, explores opportunities for synergy in sustainable projects, and identifies challenges to effective transport diplomacy.

5.1. Mechanisms of Integration through Transport Diplomacy

Transport diplomacy operates when cross-border infrastructure projects and their accompanying institutional frameworks are deliberately used to align energy policies, reduce transaction costs, and create mutual gains even in the absence of full political integration. In the Türkiye–EU case, it functions through three observable channels:

1. Physical interconnectivity (pipelines, railways, ports) that makes energy flows and trade possible.
2. Regulatory convergence required for interoperability (network codes, safety standards, customs facilitation).
3. Institutionalized cooperation platforms—such as the EU–Türkiye High-Level Dialogues on Energy and Transport (re-launched in 2022 and convened regularly in 2025), IPA-funded joint studies, and blended financing arrangements involving the European Bank for Reconstruction and Development (EBRD) and the European Investment Bank (EIB)—that extend the shadow of the future and incentivize reciprocity.

These mechanisms operate through complementary instruments: EBRD and EIB primarily provide concessional loans and risk-sharing facilities (e.g., under the Türkiye Green Economy Financing Facility [GEFF] series or co-financing for sustainable infrastructure), while EU grants (via IPA-III or Connecting Europe Facility [CEF]) support preparatory studies, technical assistance, and de-risking elements (e.g., feasibility assessments for hydrogen retrofitting or TEN-T corridor extensions). Such differentiation lowers transaction costs, mitigates perceived risks in cross-border projects, and fosters credible commitments, aligning with neo-liberal institutionalist predictions on iterated cooperation.

These channels correspond directly to neo-liberal institutionalist predictions: repeated interaction within shared frameworks transforms potential conflicts into iterated bargaining games with positive-sum outcomes.

5.2. Case Selection and Methodology

This study employs a qualitative comparative case-study design grounded in George and Bennett's (2005) structured-focused comparison framework, supplemented by process-tracing techniques (Beach, 2018; Collier, 2011) to investigate the extent to which transport infrastructure projects serve as instruments of transport diplomacy for promoting regulatory alignment, enhancing energy security, and facilitating decarbonized energy cooperation between Türkiye and the EU.

Case selection follows a purposive, theory-guided "most-similar systems" approach (George & Bennett, 2005, pp. 151–179; Gerring, 2006). The two selected cases—TANAP (as the core segment of the Southern Gas Corridor) and the Baku–Tbilisi–Kars (BTK) railway (as the land backbone of the Middle Corridor/TITR)—share critical structural similarities: Türkiye's central transit role, direct physical linkages to EU markets, requirements for multilateral institutional coordination (e.g., intergovernmental agreements, blended financing), and post-2021 operational relevance amid geopolitical shocks (e.g., Ukraine war). At the same time, they vary systematically on the sectoral dimension (energy pipeline vs. multimodal rail transport), allowing isolation of causal mechanisms related to regulatory frameworks, financing models, and geopolitical insulation while holding constant Türkiye's transit-country position.

Within-case analysis relies on process-tracing to trace causal mechanisms linking transport diplomacy initiatives to policy outcomes (Beach, 2018; Collier, 2011). This

involves chronological reconstruction of each project's life-cycle (agenda-setting, treaty negotiations, financing, construction, operation) and application of diagnostic tests to evaluate competing explanations derived from the neo-liberal institutionalist framework (Table 2, Section 2.3):

- Hoop tests (necessary but not sufficient evidence): Used to assess whether predicted intermediate steps or conditions are present (e.g., "If High-Level Dialogues reduce transaction costs, we must observe dedicated technical subgroups and accelerated approval timelines in TANAP/BTK documentation" — failure eliminates the mechanism).
- Smoking-gun tests (sufficient but not necessary): Employed for unique, highly confirmatory evidence (e.g., "If institutional insulation explains project completion despite 2015–2017 political freeze, we should find explicit references in intergovernmental agreements to binding arbitration clauses or ring-fenced financing that decoupled projects from broader bilateral tensions" — presence strongly affirms the hypothesis).
- Straw-in-the-wind tests (weak confirmatory/disconfirmatory): Applied to preliminary or supportive evidence (e.g., recurring mentions of reciprocity in joint communiqués slightly strengthen the mechanism).
- Doubly decisive tests (necessary and sufficient): Reserved for rare, decisive pieces of evidence that confirm one mechanism while eliminating rivals (e.g., Energy Community reports documenting specific network code alignment milestones that directly link to TANAP transit rules).

Data coding and analysis proceed deductively-inductively. An initial deductive codebook is derived from theoretical mechanisms (e.g., "transaction cost reduction", "reciprocity facilitation", "shadow of the future extension"; see Table 2). Inductive sub-codes emerge from the data (e.g., "High-Level Dialogue subgroup outputs", "regulatory spill-over via Energy Community progress milestones"). Coding is conducted using qualitative software (e.g., NVivo), with transparency ensured through a detailed codebook (Appendix A: definitions, inclusion/exclusion rules, example quotes), illustrative coding excerpts (Appendix B), and a research audit trail documenting decisions. Cross-case structured-focused comparison then applies standardized questions (e.g., "To what extent did iterated institutional interactions reduce transaction costs and facilitate regulatory convergence?") across both cases to identify patterns of convergence/divergence, equifinality, and transferable lessons (George & Bennett, 2005, pp. 67–72).

5.2.1. Case-Selection Criteria and Theoretical Justification

The two projects were selected according to a "most-similar systems" design (Przeworski & Teune, 1970; George & Bennett, 2005, pp. 151–179). They share several critical structural features that make them comparable—Türkiye as the central transit state, a direct physical link between Caspian-origin resources/routes and EU markets, the necessity of sustained multilateral institutional coordination (intergovernmental treaties, joint operating companies, blended international financing), and post-2021 operational relevance with observable outcomes (throughput volumes, regulatory spill-overs, resilience to geopolitical shocks). At the same time, they vary systematically on the key sectoral dimension (energy pipeline versus rail transport infrastructure). This controlled variation allows the researcher to isolate the causal influence of regulatory frameworks, financing models, and geopolitical insulation mechanisms while holding constant Türkiye's transit-country role and the multi-actor coordination requirement.

The selected cases are:

- The Trans-Anatolian Natural Gas Pipeline (TANAP) as the core segment of the Southern Gas Corridor (SGC) – an energy project completed in 2018–2020 and operational under EU-linked regulatory and financing arrangements.
- The Baku–Tbilisi–Kars (BTK) railway as the land backbone of the Middle Corridor (Trans-Caspian International Transport Route, TITR) – a rail-transport project completed in 2017 and acquiring heightened strategic significance after Russia's full-scale invasion of Ukraine in 2022.

These two projects are frequently paired in recent scholarship precisely because they exemplify Türkiye's dual energy-and-transport connectivity role under comparable geopolitical conditions (OECD, 2023; World Bank, 2023; Altunışık, 2026). The design thus follows George and Bennett's (2005) recommendation for "structured-focused comparison" and enables within-case process tracing to identify causal mechanisms that are generalisable to other infrastructure diplomacy contexts.

5.2.2. Data Sources

This study draws on a combination of primary and secondary sources to ensure comprehensive coverage of institutional, regulatory, and policy dimensions of transport diplomacy in Türkiye–EU energy relations.

Primary sources were purposively selected using the following criteria:

- Direct relevance to the core cases (TANAP within the Southern Gas Corridor and BTK railway within the Middle Corridor/TITR) or to the overarching research question on regulatory alignment, energy security, and decarbonized cooperation;
- Temporal focus on the post-2021 period (operational relevance and post-Ukraine war dynamics), with inclusion of foundational intergovernmental agreements from 2011–2014 where necessary for process-tracing;
- Official status and public accessibility (e.g., ratified treaties, Commission regulations, joint communiqués);
- Exclusion of confidential/internal documents, draft versions without final adoption, or sources lacking verifiable authorship/date.

Primary sources encompass:

- Intergovernmental and Host Government Agreements for TANAP and related Southern Gas Corridor infrastructure (accessed via official project consortia websites and national gazettes);
- Union lists of Projects of Common Interest (PCI) and Projects of Mutual Interest (PMI) under the revised TEN-E Regulation (EU) 2022/869, including the first (2023) and second (2025) lists (accessed via the European Commission's energy portal and EUR-Lex database);
- Joint statements and communiqués from the EU–Türkiye High-Level Dialogues on Energy and Transport (re-launched 2022; key sessions 2022–2025), retrieved from the European Commission press corner and Türkiye Ministry of Foreign Affairs archives;
- IPA-III programming documents and action fiches relevant to energy and transport sectors (e.g., thematic priorities under Windows 3–4), sourced from the Directorate-General for Neighbourhood and Enlargement Negotiations (DG NEAR) and Türkiye's IPA Coordination authority.

These primary documents were collected through systematic searches of official online repositories (EUR-Lex, ec.europa.eu/energy, enlargement.ec.europa.eu, enerj.gov.tr, and project-specific sites such as tanap.com) using targeted keywords in English and Turkish (e.g., "High-Level Energy Dialogue", "TANAP intergovernmental agreement", "TEN-E PCI/PMI list 2025", "IPA-III energy", "Orta Koridor BTK", "yeşil hidrojen yol haritası"). All sources were cross-verified for authenticity, recency, and consistency against multiple access points where available.

Secondary sources include peer-reviewed academic literature (searched via Scopus, Web of Science, and Google Scholar with keywords such as "transport diplomacy Türkiye EU", "Southern Gas Corridor regulatory alignment", "Middle Corridor decarbonization") and authoritative reports from the International Energy Agency (IEA), International Renewable Energy Agency (IRENA), World Bank, Organisation for Economic Co-operation and Development (OECD), and European Bank for Reconstruction and Development (EBRD) published between 2022 and 2025, selected for their empirical data, policy analysis, and alignment with the study's theoretical framework.

5.2.3. Data Analysis Procedures

Empirical material was analysed in three sequential, replicable steps to ensure transparency, analytical rigour, and inter-coder reliability potential. The approach

combined process-tracing for within-case causal inference with structured-focused comparison for cross-case pattern detection.

• Process-tracing (George & Bennett, 2005; Beach, 2018): This involved chronological reconstruction of each project's life-cycle—from agenda-setting and treaty negotiations, through financing decisions, construction, commissioning, and post-completion operation—to identify critical junctures, causal mechanisms (e.g., institutional insulation from exogenous shocks such as sanctions or geopolitical crises, regulatory spill-over effects via network code alignment, and geopolitical buffering through multilateral financing), and scope conditions under which transport diplomacy succeeded or encountered constraints.A deductive-inductive thematic coding scheme was applied, guided by the neo-liberal institutionalist framework (Table 2 in Section 2.3). Key diagnostic tests included hoop tests (necessary evidence that must be present for the mechanism to hold) and smoking-gun tests (sufficient evidence uniquely supporting one mechanism over alternatives). Coding proceeded in NVivo (or equivalent qualitative software), with an initial deductive codebook derived from theoretical mechanisms (e.g., "transaction cost reduction", "reciprocity facilitation", "shadow of the future extension") and inductive sub-codes emerging from the data (e.g., "High-Level Dialogue subgroup outputs", "Energy Community progress report alignment milestones"). An example coding excerpt is provided in Appendix B, illustrating application to a TANAP intergovernmental agreement segment.

• Structured-focused comparison (George & Bennett, 2005, pp. 67–72): Cross-case comparison was conducted along theoretically derived dimensions (e.g., institutional insulation, regulatory convergence depth, financing blendedness, geopolitical shock resilience) to detect patterns of convergence/divergence, equifinality (multiple paths to similar outcomes), and policy-transferable lessons for EU–Türkiye cooperation in hybrid geopolitical environments. Standardized questions (e.g., "To what extent did iterated High-Level Dialogues reduce transaction costs in project approval timelines?") were applied uniformly to both cases, facilitating systematic aggregation of findings.

5.3. Empirical Findings

5.3.1. TANAP and the Southern Gas Corridor

Completed in 2018–2020 despite the 2015–2017 Türkiye–EU political crisis, the Trans-Anatolian Natural Gas Pipeline (TANAP) remains a textbook example of successful transport diplomacy under adverse conditions. Institutional safeguards—bilateral Türkiye–Azerbaijan intergovernmental agreements, blended financing from the EBRD and EIB, and consistent EU political sponsorship—shielded the project from accession-related sanctions and enabled uninterrupted construction and operation.

By September 2025, cumulative deliveries of Azerbaijani (Caspian-origin) natural gas to Europe via the Southern Gas Corridor (SGC)—of which TANAP constitutes the central 1,811 km segment—had exceeded 50 billion cubic metres (bcm) since the start of commercial operations in late 2020 (Trans Adriatic Pipeline AG [TAP AG], 2025a). By early 2026, this cumulative volume had risen further toward 56 bcm (TAP AG, 2026; Azerbaijan Ministry of Energy, 2026). Annual deliveries to Europe stabilized at approximately 12.8 bcm in 2025, reflecting a slight year-on-year decline of 0.78% amid production constraints and infrastructure limits (Azerbaijan Ministry of Energy, 2026; OilPrice.com reporting on Ministry data, 2026).

This volume represented roughly 7–8% of the EU's total pipeline gas imports (predominantly non-Russian sources post-2022 diversification), positioning Azerbaijan as the Union's fourth-largest pipeline gas supplier after Norway, Algeria, and residual Russian flows (TAP AG, 2025b; European Commission, 2025b; Eurostat energy import statistics, 2025). These figures underscore the SGC's contribution to EU supply diversification, though constrained by current TAP capacity (approximately 10–11.5 bcm/a operational in 2025, with phased expansion to 11.7 bcm/a from 2026).

The project has also produced measurable regulatory spillovers. Turkish gas transit rules have been progressively aligned with key elements of the EU network codes, while hydrogen-readiness work has advanced on both the Turkish and downstream segments. Laboratory testing of pipeline materials for hydrogen blending (up to 20 % by volume) on the Trans-Adriatic Pipeline (TAP, which receives gas directly from TANAP at the Greek border) commenced in 2024; first results were received in Q4 2024 and further testing continued into 2025 (TAP AG, 2025; Trend News Agency, 2025). TANAP itself has conducted internal compatibility assessments of its pipeline, compressor stations, and facilities for hydrogen transport as part of its 2023–2024 sustainability roadmap (TANAP, 2024).

However, Türkiye has not yet achieved full market coupling with the EU internal gas market, and the de-listing of certain legacy SGC components (including aspects of TANAP/TAP) from the EU's Projects of Common Interest (PCI) list during the 2022–2023 TEN-E revisions has restricted access to additional Connecting Europe Facility grants.

5.3.2. Baku–Tbilisi–Kars Railway and the Middle Corridor

BTK traffic surged after Russia's full-scale invasion of Ukraine in 2022, with container volumes along the broader Middle Corridor (Trans-Caspian International Transport Route, TITR)—of which the Baku–Tbilisi–Kars (BTK) railway forms the key land backbone—rising sharply from fewer than 10,000 TEU in 2019 (pre-operational surge baseline) to approximately 50,500–55,000 TEU in 2024 (full-year projection based on January–November data; TITR International Association, 2025; Kazakhstan Ministry of Transport, 2024; OECD, 2023; World Bank, 2023). This represents a roughly 5–6-fold increase, driven by geopolitical diversification away from northern routes, though absolute volumes remain modest relative to corridor capacity (~80,000–100,000 TEU potential annually).

The corridor now benefits from Connecting Europe Facility (CEF) technical assistance and inclusion in the TEN-T Orient–East-Med core network extension (European Commission indicative maps, 2023–2024). Institutional progress includes the 2024 multilateral protocol on customs facilitation among the EU, Türkiye, Azerbaijan, Georgia, and Kazakhstan, aimed at reducing border delays and harmonizing procedures.

Yet regulatory harmonisation lags, particularly due to differing track gauges (1520 mm in Azerbaijan/Georgia vs. 1435 mm in Türkiye), incompatible signalling systems, and transshipment requirements at key interfaces (e.g., Akhalkalaki–Kars border), while EU financial contributions remain marginal compared to dominant Azerbaijani, Kazakh, and Chinese funding for infrastructure upgrades.

5.4. Comparative Assessment and Limits

Despite its potential, transport diplomacy faces several challenges in facilitating Türkiye-EU energy policy integration. These barriers include geopolitical tensions, regulatory misalignment, financing constraints, and differing strategic priorities.

5.4.1. Geopolitical Tensions

Geopolitical disputes, particularly in the Eastern Mediterranean, have strained Türkiye-EU relations, complicating cooperation on energy and transport projects. Conflicts over maritime boundaries and gas exploration rights with Greece and Cyprus have delayed joint initiatives and undermined trust (Avatkov & Klimenko, 2024, pp. 67-87). These tensions require diplomatic resolution to ensure the success of projects like the SGC or future hydrogen corridors.

5.4.2. Regulatory Misalignment

Differences in regulatory frameworks pose a significant barrier. The EU's stringent energy and transport regulations, such as the Third Energy Package and TEN-T standards, contrast with Türkiye's less liberalized energy market and transport standards (Mohr, 2025, pp. 279-301). Harmonizing these frameworks requires extensive negotiations and technical assistance, which can delay project implementation.

5.4.3. Financing Constraints

Large-scale infrastructure projects, such as pipelines and rail networks, require substantial investments. While the EU provides funding through IPA and the EBRD, Türkiye's economic challenges and the high costs of sustainable projects necessitate additional financing from private and international sources (Bilginan, 2025). Securing these funds while ensuring economic viability is a persistent challenge.

5.4.4. Differing Strategic Priorities

The EU's focus on rapid decarbonization contrasts with Türkiye's historical reliance on fossil fuels, though its net-zero commitment signals a shift. Aligning these priorities requires compromize and coordination, particularly in emerging areas like green hydrogen, where Türkiye's capabilities are still developing (Baş et al., 2025a, pp. 1161-1163).

Transport diplomacy can address these challenges by fostering dialogue, leveraging institutional frameworks like the Energy Community, and promoting joint projects that align mutual interests. However, sustained political commitment and strategic alignment are essential to overcome these barriers and maximize the potential of Türkiye-EU cooperation.

5.5. Persistent Barriers

- Incomplete market liberalisation and unbundling in Türkiye
- Political conditionality linking IPA/CEF funds to rule-of-law criteria
- Timing mismatch: EU gas demand peaks have passed; rail decarbonisation requires massive investment that neither side is willing to fully finance alone
- Eastern Mediterranean maritime disputes continue to poison trust

5.6. Emerging Bridge: Green Hydrogen Corridors

The most promising new frontier is hydrogen. The EU's 2024 Hydrogen Strategy update explicitly lists Türkiye as a priority partner. Ongoing initiatives (German–Turkish H2MoLU, Dutch–Turkish ammonia pilots, World Bank–supported pre-feasibility for TANAP retrofitting) show that transport diplomacy is shifting from fossil transit to renewable energy carriers, with stronger institutional backing (CEF eligibility, REPowerEU external dimension funding).

In sum, transport diplomacy has already produced tangible, institutionally embedded energy policy integration in specific corridors (TANAP, BTK). It has not (yet) generated broad spillover into full Energy Union membership or deep decarbonisation alignment, but it has created path dependencies and bargaining frameworks that make further convergence more likely than reversal — exactly as neo-liberal institutionalism predicts.

6. Strategic Implications and Policy Recommendations

Transport diplomacy offers a powerful framework for deepening Türkiye-European Union (EU) cooperation, aligning energy and transport policies, and addressing shared challenges in energy security and sustainability. This section explores the strategic implications of leveraging transport diplomacy to strengthen bilateral relations, provides policy recommendations for aligning energy and transport strategies, addresses geopolitical and economic challenges, and evaluates future prospects for Türkiye as a key partner in EU energy security.

6.1. Strategic Implications

Transport diplomacy has produced three durable effects in Türkiye–EU relations, even during the accession freeze and Eastern Mediterranean tensions:

1. Institutional entanglement: TANAP and BTK have created permanent bilateral and multilateral frameworks (intergovernmental agreements, High-Level Dialogues, CEF/IPA programming) that survive political crises (neo-liberal institutionalist path dependency).

2. Partial regulatory convergence: Türkiye has selectively adopted targeted segments of the EU acquis in gas transit and rail interoperability, while full alignment remains incomplete (e.g., lacking ownership unbundling of transmission operators per Directive 2009/73/EC and carbon pricing mechanisms). Specific adoptions include:

- Gas transit (TANAP/Southern Gas Corridor): Progressive alignment with key EU network codes, particularly capacity allocation mechanisms (Regulation (EC) No 715/2009), congestion management procedures, and transparency requirements for transit flows, as documented in Energy Community Annual Implementation Reports for Türkiye (observer status) in 2023–2025, which note partial transposition of balancing and interconnection rules to facilitate non-discriminatory third-party access on TANAP.
- Rail interoperability (BTK/Middle Corridor): Adoption of select TEN-T technical standards and customs facilitation protocols, including the 2024 multilateral customs protocol (EU–Türkiye–Azerbaijan–Georgia–Kazakhstan) for simplified border procedures, alignment with TEN-T guidelines on multimodal interoperability (e.g., electronic data exchange and track gauge transition compatibility at Akhalkalaki–Kars), and inclusion in the extended TEN-T Orient–East-Med core network maps (European Commission, 2023–2024 indicative extensions).

These partial steps reflect functional spill-over in low-politics technical domains but are constrained by incomplete liberalization (e.g., BOTAŞ unbundling suspension) and divergent timelines on ETS/CBAM alignment.

3. Shift from fossil transit to green corridor partnership: the rapid emergence of hydrogen and ammonia initiatives (2023–2025) shows that transport diplomacy is adapting to the EU's decarbonisation imperative rather than locking both sides into declining gas flows.

The key implication is that transport diplomacy works best as a selective, transactionalist tool: it delivers concrete integration in specific corridors without requiring resolution of high-politics disputes (Cyprus, rule of law). It is therefore more resilient than traditional accession-driven cooperation.

6.2. Policy Recommendations

To maximize the potential of transport diplomacy, Türkiye and the EU must align their energy and transport strategies through targeted policy measures. The following recommendations provide a roadmap for achieving this alignment:

6.2.1. Enhancing Regulatory Harmonization

Regulatory divergence in energy market liberalisation, natural gas unbundling, and transport interoperability standards continues to generate high transaction costs, discriminatory transit regimes, and barriers to cross-border investment. Türkiye remains only an observer in the Energy Community, its natural gas market law is incompatible with the EU's Third Energy Package, and alignment with TEN-T and railway acquis remains incomplete (Mohr, 2025, pp. 279-301).

Türkiye should accelerate full adoption of EU-compatible regulations, particularly market liberalisation, pipeline safety, and transport standards, and seek full membership in the Energy Community. The EU, in turn, should provide targeted technical assistance and funding via the Instrument for Pre-Accession Assistance (IPA) to support these reforms (Bilginan, 2025).

Lead actors are the Turkish Ministry of Energy and Natural Resources, Ministry of Transport and Infrastructure, and the European Commission's DG Energy and DG MOVE. Incremental costs are modest (€15–25 million over 3–5 years, largely covered by IPA III allocations). Political constraints are manageable in the technical domain; while broader accession dynamics remain strained, energy and transport chapters have historically served as low-politics areas of pragmatic cooperation.

6.2.2. Promoting Joint Infrastructure Projects

Lack of joint, future-proof infrastructure (especially for green hydrogen and intermodal corridors) limits Türkiye's potential as an energy transit and connectivity hub and prevents alignment with the EU's REPowerEU and hydrogen strategies. Existing pipelines such as TANAP are not yet hydrogen-ready, and co-financing mechanisms remain fragmented (Wallin, 2018, pp. 323-324).

Co-financed retrofitting of TANAP and other corridors for hydrogen transport should be prioritized and electrified rail links as well as intermodal logistics hubs should be developed. Dedicated bilateral task forces should be established under the High-Level Energy Dialogue and Türkiye's participation in TEN-T and Energy Community initiatives should be expanded. Co-financing should involve the EBRD, Connecting Europe Facility (CEF), and private investors.

Key actors include BOTAŞ (as the Turkish transmission system operator), TANAP Natural Gas Transmission Company consortium partners (SOCAR, BOTAS, BP), the European Bank for Reconstruction and Development (EBRD), and the European Commission's Directorate-General for Energy (DG Energy).

Capital costs for initial hydrogen retrofitting—such as material compatibility assessments, compressor modifications, valve/seal upgrades, and integrity testing for blending (up to 20% H_2) or full repurposing—are substantial. Industry benchmarks for repurposing existing natural gas pipelines in Europe estimate €0.2–0.6 million per kilometre for moderate retrofits (European Hydrogen Backbone studies; DNV and ACER reviews), significantly lower than new-build costs (€1.4–3.4 million/km). For a major TANAP segment (e.g., 500–1,000 km of critical trunkline with associated facilities), this translates to an indicative range of €100–600 million, depending on the extent of modifications, hydrogen purity targets, and site-specific conditions (e.g., terrain, compressor stations). These costs can be phased (e.g., starting with blending feasibility pilots) and de-risked through blended finance mechanisms, including EU grants (via Connecting Europe Facility for Projects of Mutual Interest), EBRD concessional loans and risk-sharing facilities (e.g., under the Green Economy Financing Facility series), and private equity from consortium partners or energy majors.

Political constraints in this domain are relatively low, as both Türkiye and the EU share clear mutual interests in supply diversification away from Russian sources and enhancing southern-corridor resilience under REPowerEU and the European Green Deal frameworks.

6.2.3. Developing Sustainable Transport Corridors

The Middle Corridor faces persistent bottlenecks—border delays, differing rail gauges, limited intermodal capacity, and insufficient decarbonisation measures—that undermine its competitiveness against northern routes and prevent full integration with the EU's Sustainable and Smart Mobility Strategy. Capacity is currently only ~6–7 million tons annually, with projections requiring major upgrades to reach 10–11 million tons by 2030 (Zeybek et al., 2023, pp. 477-497).

Türkiye and the EU should collaborate on multimodal, low-emission corridors (high-speed rail, EV charging networks, green maritime infrastructure) with priority on the Middle Corridor. Interoperability, digital customs harmonization, and environmental standards to ensure seamless TEN-T extension should be focused.

Main actors are the Turkish Ministry of Transport and Infrastructure, Azerbaijan and Kazakhstan counterparts, and the EU's DG MOVE (via Global Gateway and Central Asia connectivity initiatives). Upfront investment needs are high (€2–4 billion for priority rail/port segments by 2030), but can be met through a mix of national budgets, CEF, EBRD, and Asian Development Bank resources. Political constraints centre on regional coordination and customs harmonization; these are technical rather than existential, and recent EU interest in the corridor as a strategic alternative has created a window of opportunity.

6.2.4. Fostering Public-Private Partnerships (PPPs)

Capital-intensive energy and transport projects face chronic public-budget constraints and risk-aversion on both sides. Türkiye has extensive PPP experience (airports, hospitals, motorways), yet energy and cross-border segments remain under-developed due to regulatory uncertainty, currency risk, and limited bankability (Açıkgöz, 2020, pp. 105-108).

Türkiye should **e**xpand PPP frameworks for green hydrogen infrastructure, rail upgrades, and logistics hubs by offering tax incentives, risk-sharing mechanisms, and EU blending facilities. Integration of projects into the CEF pipeline and promotion of standardized PPP contracts aligned with international best practice are essential.

Core actors include the Turkish Presidency of PPP (within the Ministry of Treasury and Finance), potential private sponsors (e.g., European energy majors, infrastructure funds), and EU financial institutions (EBRD, EIB). Project-level costs vary widely, but blended PPP structures typically reduce public outlay to 20–40 % of total capex. Political/institutional constraints include legacy concerns over "rent-seeking" in Turkish PPPs and the need for currency-hedging instruments; these can be mitigated through transparent tendering, international arbitration clauses, and EU technical assistance on PPP governance.

6.3. Addressing Remaining Obstacles Realistically

- Political conditionality: tie new funding tranches explicitly and transparently to verifiable regulatory steps rather than to broader rule-of-law criteria.
- Financing gaps: use de-risking instruments (EU guarantees, EIB loans) and allow limited Chinese/Azerbaijani co-financing under strict CEF transparency rules.
- Eastern Mediterranean: keep energy/transport files ring-fenced from maritime disputes through confidence-building measures (technical working groups, UN-mediated format).
- Declining gas demand: accelerate hydrogen-readiness of existing assets (TANAP sections already tested in 2024–2025) to preserve the value of the infrastructure beyond 2035.

6.4. Outlook to 2030

If the above recommendations are implemented—including accelerated regulatory harmonization, joint hydrogen retrofitting projects, and expanded interconnectors—Türkiye could evolve from a primary fossil-gas transit hub into a highly competitive regional supplier of renewable electricity (via expanded interconnectors) and green hydrogen/ammonia by 2035, leveraging the institutional pathways (e.g., High-Level Dialogues, CEF/PMI eligibility, blended EBRD financing) established through transport diplomacy over the past decade.

Projections indicate strong cost advantages: Türkiye's blended solar-wind green hydrogen production could reach levelized costs (LCOH) as low as €2.9/kg by 2030 (with further declines anticipated toward 2035), driven by high renewable capacity factors and policy targets for electrolyser deployment (EBRD/Advisian, 2025; MENR Hydrogen Roadmap, 2023). This positions Türkiye favorably compared to higher-cost European domestic production (often €4–8/kg in 2030 benchmarks) and aligns with REPowerEU import needs, though it would compete with lower-LCOH potential in parts of North Africa (e.g., Morocco/Algeria) and the Middle East (e.g., Saudi Arabia). Renewable electricity exports via interconnectors (planned expansion to 6.75 GW export capacity by 2035) could similarly benefit from declining LCOE in solar/wind, supporting Türkiye's ambition to become a net power exporter (MENR National Energy Plan updates, 2024; Ember Türkiye Electricity Review, 2025).

If political blockages persist, cooperation will likely remain corridor-specific and sub-optimal, constrained to existing SGC/TITR routes and limited green pilots. Nevertheless, the sunk costs in infrastructure (e.g., TANAP, BTK) and entrenched institutional frameworks (e.g., Energy Community observer mechanisms, High-Level Dialogues)

make complete decoupling highly unlikely, as neo-liberal institutionalism predicts path-dependent continuity in iterated, low-politics cooperation.

Transport diplomacy thus offers a pragmatic, institution-driven integration path that does not depend on restarting accession talks — making it the most viable remaining channel for deepening Türkiye–EU energy and climate cooperation in the current political climate.

7. Conclusion

Transportation diplomacy serves as a critical tool for managing strategic interactions in the domains of economic, trade, and energy security, playing a significant role in enhancing Türkiye's regional and global influence. With its strategic geographical location and advanced transportation infrastructure, Türkiye holds substantial potential to be a key actor in both transit transportation and regional cooperation. Today, transportation diplomacy extends beyond merely increasing trade and improving transportation networks, encompassing broader areas such as environmentally friendly projects, sustainable development, and crisis management. Global health crises, for instance, can also impact transportation diplomacy relations. International organizations, multilateral agreements, and regional collaborations have made transportation diplomacy increasingly dynamic. Historically, transportation diplomacy has been a vital instrument in fostering cooperation between states, from ancient trade routes to the present day. It assumes a significant role in enhancing economic relations, security, and global integration. Modern transportation projects are not solely infrastructure investments but also serve as platforms for diplomatic cooperation and the shaping of global strategic interests. Through transportation diplomacy, Türkiye has strengthened regional cooperation, thereby consolidating both its economic and strategic interests. Türkiye's transportation connections with the Middle East, the Caucasus, and the Balkans are particularly significant in its trade relations with the European Union and Central Asia. Türkiye's role as a "transportation bridge" is especially evident in logistical activities around the Caspian Sea and the Black Sea.

This study has explored the role of transport diplomacy in facilitating energy policy integration between Türkiye and the EU, emphasizing its strategic, economic, and environmental implications. By examining Türkiye's energy and transport landscape, the EU's policy frameworks, and the mechanisms of transport diplomacy, the article highlights the potential for deeper bilateral cooperation. This conclusion summarizes the key findings, outlines the contributions to the fields of international relations and energy policy, and identifies areas for future research.

The analysis reveals that transport diplomacy serves as a critical bridge for aligning Türkiye's and the EU's energy and transport policies, fostering cooperation in a complex geopolitical and economic landscape. Türkiye's strategic geographic position as a transit hub for energy and goods, coupled with its robust infrastructure projects like the TANAP and the BTK railway, positions it as an indispensable partner in the EU's energy security and sustainable mobility strategies. These projects exemplify how transport infrastructure can facilitate diplomatic engagement, regulatory alignment, and economic interdependence, thereby supporting energy policy integration.

The EU's energy policy goals, decarbonization, energy security, and sustainability, align with Türkiye's ambitions to diversify its energy mix and achieve net-zero emissions by 2053. The EU's Green Deal and TEN-T framework provide opportunities for collaboration in sustainable transport and energy projects, such as green hydrogen corridors and electrified rail networks. The SGC, a flagship initiative, demonstrates the success of transport diplomacy in enhancing the EU's energy diversification while strengthening Türkiye's role as an energy hub.

However, the study identifies several challenges to effective transport diplomacy, including geopolitical tensions, regulatory divergences, and financing constraints. Disputes in the Eastern Mediterranean over gas exploration have strained Türkiye-EU

relations, complicating cooperation. Regulatory misalignment between the EU's stringent standards and Türkiye's less liberalized frameworks requires sustained efforts to harmonize policies. Additionally, the high costs of infrastructure projects necessitate innovative financing models and international support. Despite these challenges, transport diplomacy offers a pathway to address them through dialogue, joint investments, and institutional cooperation.

The strategic implications of transport diplomacy are significant. By leveraging infrastructure projects and diplomatic engagement, Türkiye and the EU can deepen their partnership, aligning energy and transport strategies to achieve shared goals in security and sustainability. Policy recommendations like enhancing regulatory harmonization, promoting joint projects, and fostering public-private partnerships provide a roadmap for overcoming barriers and maximizing mutual benefits. Looking ahead, Türkiye's potential to become a green hydrogen hub and a key node in transcontinental connectivity positions it as a vital partner in the EU's energy future.

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