REPUBLIC OF TÜRKİYE
MINISTRY OF INDUSTRY
AND TECHNOLOGY

TÜRKIYE INDUSTRIAL DECARBONISATION
INVESTMENT PLATFORM (TIDIP)

IPPS

Investment Plan and Policy Strategy

DRAFT

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List of Abbreviations

Abbreviation	
ADB	Asian Development Bank
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
ALUTEAM	Aluminium Test, Training and Research Centre (Alüminyum Test Eğitim ve Araştırma Merkezi)
BAT	Best Available Technology
BAU	Business As Usual
BF-BOF	Blast Furnace – Basic Oxygen Furnace
BOF	Basic Oxygen Furnace
BOTAŞ	State Pipeline Company (Boru Hatları ile Petrol Taşıma A.Ş.) (Türkiye)
BREFs	Best Available Techniques Reference Documents (EU)
BRSA	Banking Regulation and Supervision Agency
CAGR	Compound Annual Growth Rate
CBAM	Carbon Border Adjustment Mechanism (EU)
CCfD	Carbon Contracts for Difference
CCS	Carbon Capture and Storage
CCUS	Carbon Capture, Utilisation and Storage
CDW	Construction and Demolition Waste
CEMBUREAU	European Cement Association
CIF	Climate Investment Funds
CMB (SPK)	Capital Markets Board (Sermaye Piyasası Kurulu) (Türkiye)
COP26-30	UNFCCC Conference of the Parties, 26th to 30th sessions
CST	Concentrated Solar Thermal

Abbreviation	
CTF	Clean Technology Fund
ÇCSIB	Cement, Glass, Ceramics and Soil Products Exporters Association
ÇİB	Turkish Steel Exporters' Association (Çelik İhracatçıları Birliği)
DFIs	Development Finance Institution(s)
DİR	Inward Processing Regime (Türkiye)
DRI	Direct Reduced Iron
DRI-EAF	Direct Reduced Iron – Electric Arc Furnace
EAF	Electric Arc Furnace
EBRD	European Bank for Reconstruction and Development
ECR	Energy and Carbon Reduction
ECSC	European Coal and Steel Community (Agreement)
EEP (VAP)	Efficiency Enhancing Project (Verimlilik Artırıcı Proje) (Türkiye)
EIA	Environmental Impact Assessment
ELV	End-of-Life Vehicles
EN	European Norm (standard)
EMRA	Energy Market Regulatory Authority (Enerji Piyasası Düzenleme Kurumu)
EPC	Engineering Procurement & Construction
ESG	Environmental, Social and Governance
ETS	Emissions Trading System
EU	European Union
EUR	Euro
FID	Final Investment Decision
FTS	Faster Transition Scenario

Abbreviation	
GALSIAD	Entrepreneur Aluminium Industrialist & Businessman Association (Girişimci Alüminyum Sanayicileri ve İş İnsanları Derneği) (Türkiye)
GAR	Green Asset Ratio
GCCA	Global Cold Chain Analysis
GCF	Green Climate Fund
GEF	Global Environment Facility
GET	EBRD Green Economy Transition (programme)
GHG	Greenhouse Gas
GW	Gigawatt
HVDC	High Voltage Direct Current
H2	Hydrogen
H2 PCI	Hydrogen Pulverised Coal Injection
IAPCR (SKHKKY)	Industrial Air Pollution Control Regulation (Sanayi Kaynaklı Hava Kirliliğinin Kontrolü Yönetmeliği) (Türkiye)
IBRD	International Bank for Reconstruction and Development (World Bank)
ICMA	International Capital Market Association
IDP	Industry Decarbonization Program (Climate Investment Funds)
IEA	International Energy Agency
IF	Induction Furnace
IFA(s)	Investment Focus Area(s)
IFC	International Finance Corporation
IPPS	Investment Plan and Policy Strategy
IPPU	Industrial Processes and Product Use
ITA	Industrial Transition Accelerator

Abbreviation	
KKDIK	Türkiye REACH
KOSGEB	Agency for the Development and Support of Small and Medium-sized Enterprises (Küçük ve Orta Ölçekli İşletmeleri Geliştirme ve Destekleme İdaresi Başkanlığı)
KPI	Key Performance Indicator
LCP(s)	Low Carbon Pathway(s) (Türkiye)
LTS	Long-Term Strategy (Türkiye's LTS 2053)
LULUCF	Land Use Land Use Change and Forestry
MAPEG	Mining and Petroleum Affairs General Directorate (Maden ve Petrol İşleri Genel Müdürlüğü) (Türkiye)
MDBs	Multilateral Development Bank(s)
M&E	Monitoring and Evaluation
MBT	Mechanical-Biological Treatment
MENR	Ministry of Energy and Natural Resources (Türkiye)
MoAF	Fertiliser Support Programme
MoEUCC	Ministry of Environment, Urbanisation and Climate Change (Türkiye)
MoIT	Ministry of Industry and Technology (Türkiye)
MPP	Mission Possible Partnership
MRV	Monitoring, Reporting and Verification
Mt	Million Tonnes
NAP	National Allocation Plan
NCQG	New Collective Quantified Goal (COP29 climate finance goal)
NCESAP (UDESEP)	National Circular Economy Strategy and Action Plan (Türkiye)
NDC	Nationally Determined Contribution
NEEAP	National Energy Efficiency Action Plan (Milli Enerji Verimliliği Eylem Planı) (Türkiye)

Abbreviation	
NGDAP	(National) Green Deal Action Plan (Türkiye)
NID	National Inventory Document (Türkiye)
NPV	Net Present Value
OECD	Organisation for Economic Co-operation and Development
OG	Official Gazette
OHS	Occupational Health and Safety (İş Sağlığı ve Güvenliği)
OIZ	Organised Industrial Zone (Türkiye)
PCMS	Private Capital Mobilisation Strategy
PFC	Perfluorocarbon
POA (KGK)	Public Oversight, Accounting and Auditing Standards Authority (Kamu Gözetimi, Muhasebe ve Denetim Standartları Kurumu) (Türkiye)
PPA(s)	Power Purchase Agreement(s)
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals (EU regulation)
RDF	Refuse-Derived Fuel
SAYEM	TÜBİTAK 1833 Green Transformation (technology network programme) (Türkiye)
SCM	Supplementary Cementitious Material
SME(s)	Small and Medium-sized Enterprise(s)
SPS	Stated Policies Scenario
SRF	Solid Recovered Fuel
SOGAD	Cold Rolling, Galvanized and Coated Coil Manufacturers Association (Soğuk Hadde, Galvanizli ve Boyalı Sac Üreticileri Derneği)
TA	Technical Assistance
TALSAD	Turkish Aluminium Industrialists Association (Türkiye Alüminyum Sanayicileri Derneği)
TÇÜD	Turkish Steel Producers Association

Abbreviation	
TENMAK	Turkish Energy, Nuclear and Mineral Research Agency (Türkiye Enerji, Nükleer ve Maden Araştırma Kurumu)
THBB	Turkish Ready Mixed Concrete Association (Türkiye Hazır Beton Birliği)
TMB	Turkish Contractors Association (Türkiye Müteahhitler Birliği)
TÜDÖKSAD	Turkish Foundry Association (Türkiye Döküm Sanayicileri Derneği)
TIDIP	Türkiye Industrial Decarbonisation Investment Platform
TL	Turkish Lira
TR ETS	Türkiye Emissions Trading System
TSE	Turkish Standards Institution
TSRS	Türkiye Sustainability Reporting Standards
TTP	Technology Tracking Platform
TURKSTAT	Turkish Statistical Institute
TÜBİTAK	Scientific and Technological Research Council (Türkiye Bilimsel ve Teknolojik Araştırma Kurumu)
TÜDÖKSAD	Turkish Foundry Association (Türkiye Döküm Sanayicileri Derneği)
UK	United Kingdom
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollar
WEEE	Waste Electrical and Electronic Equipment
WHR	Waste Heat Recovery
WoM	Without Measures (scenario)
YEK-G	Renewable Energy Guarantee of Origin (Yenilenebilir Enerji Kaynak Garanti Belgesi) (Türkiye)
YİSAD	Flat Steel Exporters and Manufacturers' Association (Yassı Çelik İhracatçılar Birliği) (Türkiye)

Executive Summary

Türkiye’s cement, iron and steel, aluminium, and fertiliser industries are collectively among the country’s most emissions and trade-intensive sectors. They stand at a decisive juncture, shaped by Türkiye’s national climate commitments, the accelerating reach of the EU Carbon Border Adjustment Mechanism (CBAM), and a global shift of capital towards low-carbon industrial assets.

The Republic of Türkiye’s Ministry of Industry and Technology (MOIT) has established the Türkiye Industrial Decarbonisation Investment Platform (TIDIP) by signing a Joint Declaration (JD) on 25 November 2024 outlining the cooperation of multilateral development banks (MDBs) including EBRD, IBRD and IFC. TIDIP is established to facilitate the decarbonisation of Türkiye’s industrial sector in line with its climate and development goals, National Green Deal Action Plan (NGDAP), Nationally Determined Contribution (NDC) and 2053 Net-Zero target. The platform aims at mobilising investments needed to implement, inter alia, the roadmaps set out by Low Carbon Pathways for the decarbonisation of the Turkish cement, fertilizer, aluminium, iron and steel sectors in line with the Turkish Government’s sustainable development and decarbonisation goals while supporting industrial competitiveness, export resilience and sustainable economic growth.

TIDIP is a government-led national platform for industrial transformation. Rather than addressing decarbonisation through fragmented, project-by-project engagement, it provides a coordinated framework, under the coordination of the Ministry of Industry and Technology, through which government, industry, multilateral development banks, financial institutions and development partners, each acting under its own mandate and procedures, can align investment decisions with Türkiye's industrial policy objectives. By aggregating investment opportunities, coordinating enabling infrastructure development and linking policy priorities with capital deployment, TIDIP strengthens Türkiye's ability to mobilise large-scale international finance for investments that contribute simultaneously to emissions reduction, industrial competitiveness, export resilience, technological modernisation and long-term economic growth. As the platform matures, it is intended to provide a scalable architecture that can accommodate new sectors, financing instruments and partners, creating a long-term mechanism for industrial transformation rather than a temporary financing initiative.

TIDIP is designed to serve as the institutional bridge between policy ambition and investment implementation, and technical efforts ensuring that decarbonisation pathways are converted into tangible projects with measurable economic and environmental outcomes. This integrated approach aims to result in reduced time to materialize investments, improved financial decision-making, risk mitigation, lower transaction costs and an acceleration of low-carbon industrial investments.

The Investment Plan and Policy Strategy (IPPS) is the overarching strategic document of the TIDIP to guide industrial decarbonisation investments. IPPS therefore serves as a critical mechanism for linking industrial policy objectives with practical investment planning and implementation. It is designed as a living strategic document, updated periodically as sectoral LCPs, policy instruments, and financing conditions evolve.

IPPS Version 1 (V1) translates the four sectoral Low Carbon Pathways (LCPs) into a single, comprehensive baseline document. It provides a status assessment of Türkiye's industrial decarbonisation landscape, examining key policy drivers, sectoral emissions profiles, technology pathways, investment requirements, infrastructure needs and implementation barriers.

Türkiye's National Inventory Document (NID) 2026 confirms the scale of the challenge: national GHG emissions reached 584.5 Mt CO_2eq in 2024, of which Industrial Processes and Product Use (IPPU) — dominated by cement, followed by metals and chemicals — accounted for 75,652 kt CO_2eq (12.9%) and grew 228% since 1990, the fastest-growing major category in the national inventory (Section 2.2.2). CBAM exposure compounds this pressure unevenly across sectors: cement carries a defined but contained near-term exposure, steel faces both a carbon cost and a faster-growing regulatory risk from EU safeguard quotas, aluminium's exposure is concentrated in Scope 3 emissions embedded in imported primary ingots, and fertilisers' direct CBAM exposure is limited in export volume but structurally hard to reduce given gas-fed ammonia production, with the TR ETS the more immediate carbon-cost driver (Sections 2.2.3 and 3.1.4).

The sectoral LCPs indicate a combined investment requirement of at least USD 70 billion to 2053, excluding shared enabling infrastructure: approximately USD 29.8 billion for cement, USD 31–34 billion for iron and steel, USD 4.9 billion for aluminium, and USD 5.26–7.66 billion for fertilisers. Five cross-sectoral Investment Focus Areas (IFAs) — i) green hydrogen, ii) carbon capture, utilisation and storage (CCUS), iii) energy efficiency and circular economy, iv)

renewable electricity for industry, and v) emerging climate technologies — represent the highest-priority themes for capital mobilisation across all four sectors (Section 3.2).

Meeting this investment requirement will depend on a differentiated financing strategy rather than a single funding channel. While relatively mature efficiency and renewable-electricity investments can be financed primarily through commercial capital; first-of-a-kind technologies such as hydrogen, CCUS, and green ammonia will require concessional and blended instruments, including guarantees, viability-gap funding, and carbon contracts for difference (CCfDs); and shared infrastructure — hydrogen networks, CO_2 transport and storage, and grid reinforcement — will require platform- or cluster-level structuring.

The enabling policy framework — Climate Law No. 7552, the Türkiye Emission Trading System (ETS), the Green Taxonomy, and a portfolio of investment incentives — is substantially in place or in development (Annex II). The IPPS's strategic recommendations call for coordinated action across three fronts: i) the manufacturing plants should translate LCPs into bankable, company-level transition plans and strengthen emissions-data and monitoring, reporting and verification (MRV) systems; ii) the policy-makers should establish sectoral implementation roadmaps, prioritise enabling infrastructure, and create demand for low-carbon industrial products; and iii) the finance industry should move from general funding to a differentiated, technology-appropriate instrument mix linked to project preparation support (Section 5.2.3). These are set against a defined risk landscape — technology maturity, financing and bankability, energy availability and cost, and institutional capacity — balanced by transition opportunities in export competitiveness, new value chains, and circular economy development (Section 5.3).

Implementation progress will be considered against the quantitative ambitions set out in the Joint Declaration, with the approach to reporting to be defined under the TIDIP Governance Framework, and the IPPS itself will be reviewed and updated as LCPs are refined, as TR ETS pricing and CBAM equivalence outcomes become clearer, and as TIDIP's investment pipeline matures.

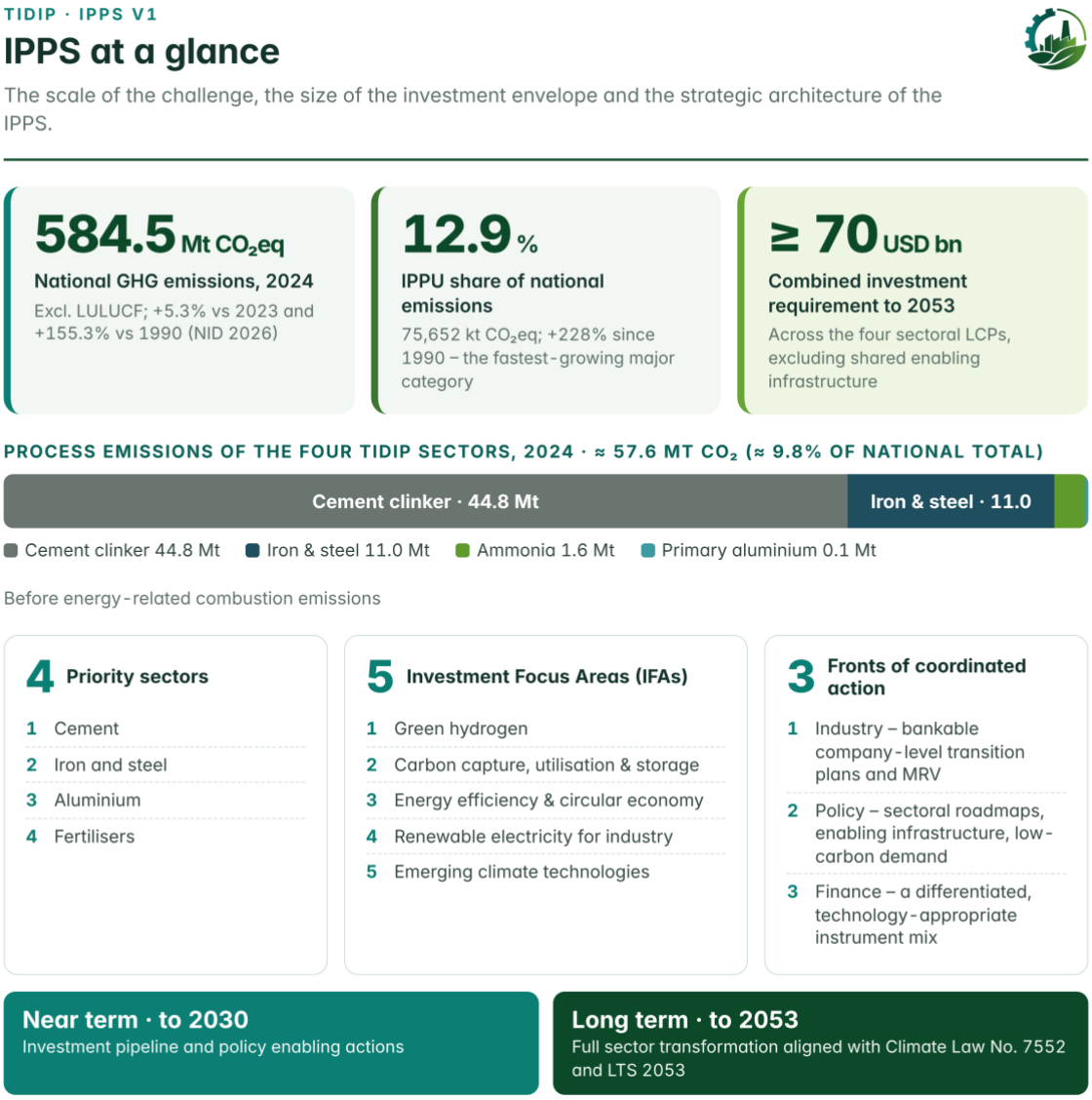


Figure 0-1: IPPS at a Glance

1 Introduction and Mandate

This section sets out the foundational architecture of the IPPS: its purpose and core functions, the scope and time horizon of TIDIP's four priority sectors, and the national and international policy landscape within which it is positioned. It also situates TIDIP within the broader global context of industrial decarbonisation and notes how the Platform's progress will be reported under the TIDIP Governance Framework. Together, these elements establish the strategic and institutional foundation on which the sectoral baseline, pathways, and recommendations presented in the following sections are built.

1.1 Purpose of the IPPS

Türkiye's industrial sector stands at a pivotal juncture. The four industries targeted by TIDIP, namely cement, iron and steel, aluminium, and fertilisers, collectively represent some of the most energy-intensive and carbon-intensive economic activities in the country, contributing a substantial share of Türkiye's total greenhouse gas (GHG) emissions[1]. According to Türkiye's NID 2026, process emissions from cement clinker (44.8 Mt CO_2), iron and steel (11.0 Mt CO_2), ammonia (1.6 Mt CO_2) and primary aluminium (0.1 Mt CO_2) production alone totalled approximately 57.6 Mt CO_2 in 2024, around 9.8% of total national GHG emissions excluding LULUCF (584.5 Mt CO_2eq), before the energy-related combustion emissions of these sectors are counted (Section 2.2.2).[2]

The IPPS is the overarching strategic document of TIDIP. It provides an integrated analytical and strategic framework aligning industry decarbonisation pathways, investment mobilisation needs, and enabling policy recommendations into a single, coherent strategy. It is designed as a living document updated annually to reflect the changes in the conditions necessary for industrial transformation; the global economy, sector specific conditions, technology

[1] European Bank for Reconstruction and Development (EBRD). (2024). *Türkiye Launches Industrial Decarbonisation Investment Platform.* Available at: https://www.ebrd.com/home/news-and-events/news/2024/trkiye-launches-industrial-decarbonisation-investment-platform.html

[2] TurkStat (2026). Türkiye National Inventory Document (NID) 1990-2024, submitted to the UNFCCC in April 2026; categories 2.A.1, 2.C.1, 2.B.1 (net of urea CO_2 recovery) and 2.C.3.

developments, policy and regulatory changes as well as the strategic signals needed by investors, policymakers, and industry stakeholders.

The IPPS fulfils four core functions:

- Synthesises the sectoral LCPs for cement, iron and steel, aluminium, and fertilisers into a cross-sectoral strategic narrative, preserving analytical rigour while deriving economy-level insights.[3]
- Analyzes the status of five Investment Focus Areas (IFAs); green hydrogen, CCUS, energy efficiency and circular economy, renewable electricity for industry, and emerging climate technologies, as the highest-priority cross-sectoral themes for capital mobilisation.
- Maps the enabling policy and regulatory conditions necessary to unlock identified investments, including carbon pricing, green finance instruments, demand-side policies, and capacity development measures.
- Serves as a guidance document to the TIDIP Steering Committee, MOIT, MDB partners, and the Secretariat on potential risks and challenges as well as recommendations on prioritising actions across the Platform's operational lifetime.

The IPPS treats the sectoral LCPs as its analytical foundation and translates their recommendations into a consolidated, actionable strategic framework.

Status and intended use: IPPS Version 1 is a government-owned strategic reference prepared by the TIDIP Secretariat for the Ministry of Industry and Technology. It is intended for MoIT and other public institutions, industry and sector associations, MDBs and other financial institutions, and development partners engaged in TIDIP, as a common reference for consultation, prioritisation and investment preparation. The document combines three types of content: (i) findings drawn from existing sources, principally the four sectoral LCPs, the NID 2026 and official policy and regulatory documents, which are cited throughout; (ii) strategic choices made through the IPPS process, such as the Investment Focus Areas, the sequencing of the investment agenda and the priority policy reforms, which were developed with MoIT and reviewed through consultations with MDB partners and industry stakeholders, including the TIDIP industrial workshop of 17 September 2026; and (iii) actions proposed for TIDIP, which

[3] International Energy Agency (IEA). (2025a). *Policy Toolbox for Industrial Decarbonisation*. Available at: https://iea.blob.core.windows.net/assets/PolicyToolboxforIndustrialDecarbonisation.pdf

are recommendations for consideration by the Government. Recommendations addressed to financial institutions are proposals for dialogue and do not represent roles, commitments or endorsements agreed by those institutions; each institution retains responsibility for its own strategy, appraisal and financing decisions. Platform governance arrangements, including the roles of the Steering Committee, the Secretariat and partner institutions, are set out in the TIDIP Governance Framework, to which this document defers.

1.2 Scope and Coverage

The IPPS covers:

- **Target industries:** Cement, iron and steel, aluminium, and fertiliser sectors are selected based on combined GHG contribution, economic importance, CBAM exposure, and LCP availability. [4,5]
- **Expanding scope:** Other sectors such as glass, ceramics, and chemicals will be able to be incorporated into the IPPS with respect to level of progress on relevant studies. LCP studies for glass and ceramics have commenced in 2026.
- Given the capital intensity and long technology lock-in cycles in these sectors — particularly glass, where furnace rebuild decisions are tied to 15–20-year cycles — earlier integration of glass and ceramics into the IPPS, ahead of full LCP completion where possible, would help avoid missed investment windows tied to near-term furnace rebuild decisions. Beyond heavy industry, the platform's architecture could also accommodate other strategically important, export-oriented sectors facing growing climate-related pressures, such as textiles and the automotive industry and its supplier base, subject to the decision of TIDIP's governance bodies.
- **Time horizons:** Near-term (to 2030) refers to investment pipeline and policy enabling actions. Long-term (to 2053) refers to full sector transformation aligned with Climate Law No. 7552, LTS 2053 and other related policies.[6]

As such, IPPS is not a project database or investment prospectus. It does not replace the sectoral LCPs, Nationally Determined Contribution (NDC), Long Term Strategy (LTS), or other national strategy documents or roadmaps.

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[4] Ministry of Industry and Technology (MoIT). & Multilateral Development Bank (MDB) Partners. (2025). *Terms of Reference for the Türkiye Industrial Decarbonization Investment Platform (TIDIP).*
[5] EBRD, (2024), *op. cit.*
[6] Official Gazette. (2025a). *Climate Law (No.7552).*
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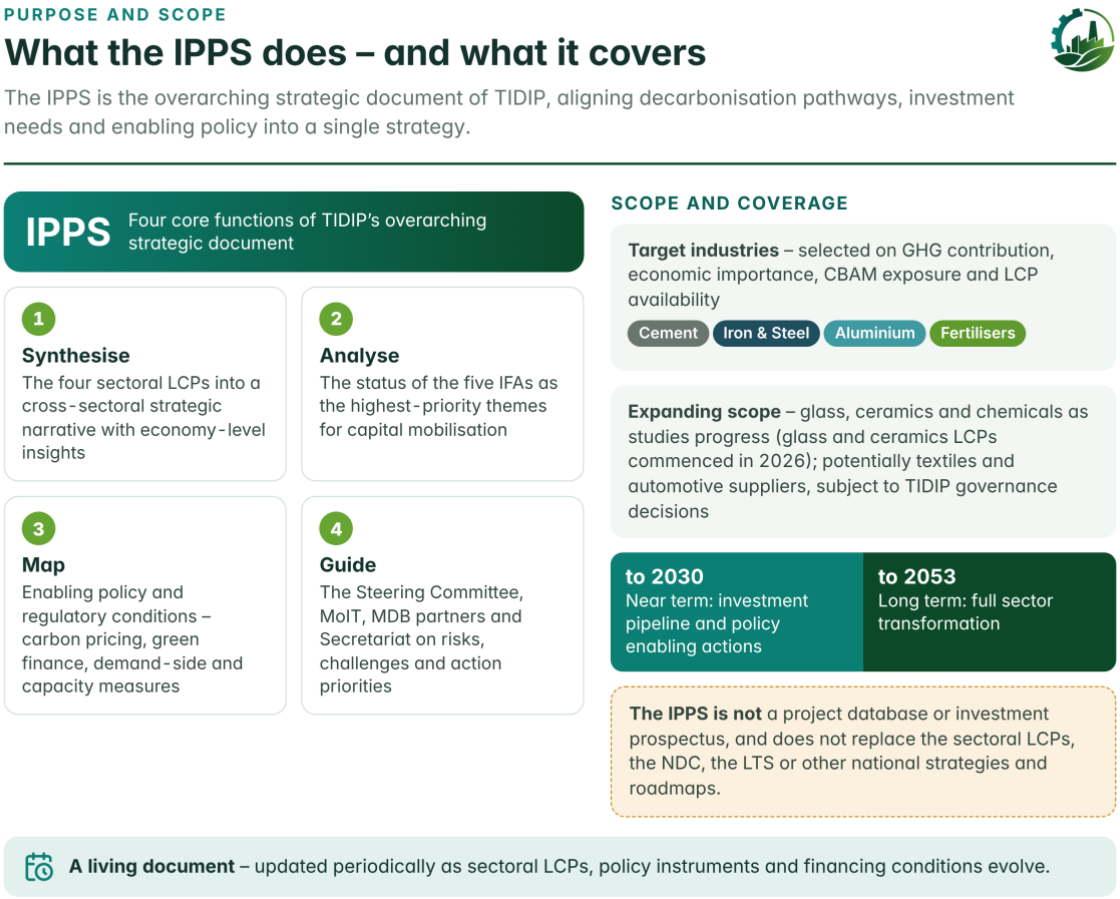


Figure 1-1: Purpose, Functions and Scope of the IPPS

1.3 Linkages to National and International Frameworks

Türkiye's national and international climate and industrial policy architecture is comprehensive and structurally complex, comprising a dense layer of international commitments and a parallel, evolving body of domestic legislation and strategy documents. At the international level, Türkiye's obligations under the Paris Agreement[7] are given quantitative expression through the Updated First NDC[8] and the Second NDC (NDC 3.0), adopted at COP30 in

[7] Official Gazette. (2021). *Law on the Approval of the Paris Agreement (No. 7335)*.
Available at: https://www.resmigazete.gov.tr/eskiler/2021/10/20211007-7.pdf
[8] Ministry of Environment, Urbanization and Climate Change (MoEUCC). (2023). *Republic of Türkiye Updated First Nationally Determined Contribution*. Available at: https://unfccc.int/sites/default/files/NDC/2023-04/TR_First_NDC

Belém[9], and are extended to a long-term horizon through LTS 2053[10]. Domestically, this international architecture is being progressively codified through Climate Law No. 7552[11], which establishes the legal basis for the TR ETS, the Green Taxonomy, and the domestic CBAM mechanism, and is further reinforced by sector- and ministry-specific strategies, including the (National) Green Deal Action Plan (NGDAP) and Green Transformation Strategy[12], the Climate Change Mitigation Strategy and Action Plan[13], the Twelfth Development Plan[14], and the 2030 Industry and Technology Strategy[15]. Externally, the EU CBAM Regulation[16,17] adds a further, trade-linked layer of obligation directly affecting TIDIP's four priority sectors.

This layered structure is not static: it is shaped in successive cycles by the Conference of the Parties (COP) process itself. Industrial decarbonisation has progressively moved from a peripheral theme to a central pillar of the multilateral climate agenda from the Breakthrough Agenda launched at COP26, through the Sharm el-Sheikh Implementation Plan at COP27 and the Dubai Industrial Transition Framework at COP28, to the Belém Declaration on Global Green Industrialization adopted at COP30 in November 2025[18,19,20,21]. Each cycle has expanded the international expectation that industrial transformation be pursued through

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[9] MoEUCC. (2025a). *The Second Nationally Determined Contribution (NDC 3.0)*.
Available at: https://unfccc.int/sites/default/files/2025-11/TR_Second_NDC

[10] Republic of Türkiye. (2024a). *Türkiye's 2053 Long-Term Climate Strategy*. United Nations Framework Convention on Climate Change. Available at: https://unfccc.int/sites/default/files/resource/Turkiye_Long_Term_Climate_Strategy.pdf

[11] Official Gazette, (2025a), *op. cit.*

[12] Ministry of Trade. (2021). *Green Deal Action Plan*. Available at: https://ticaret.gov.tr/data/Green_Deal

[13] MoEUCC. (2024a). *Climate Change Mitigation Strategy and Action Plan (2024-2030)*.
Available at: https://iklim.gov.tr/db/turkce/icerikler/files/Climate_Change_Mitigation_Strategy.pdf

[14] Presidency of Strategy and Budget. (2023). *Twelfth Development Plan (2024-2028)*. Available at: https://www.sbb.gov.tr/wp-content/uploads/2025/03/Twelfth-Development-Plan_2024-2028.pdf

[15] MoIT. (2025a). *2030 Industry and Technology Strategy.*
Available at: https://www.sanayi.gov.tr/assets/pdf/plan-program/2030IndustryAndTechnologyStrategyENG.pdf

[16] European Parliament. & Council of the European Union. (2023). *Regulation (EU) 2023/956 of the European Parliament and of the Council of 10 May 2023 establishing a carbon border adjustment mechanism*. Official Journal of the European Union.
Available at: https://eur-lex.europa.eu/eli/reg/2023/956/oj/eng

[17] European Commission. (2023). *Commission Implementing Regulation (EU) 2023/1773 of 17 August 2023 laying down the rules for the application of Regulation (EU) 2023/956 as regards reporting obligations for the purposes of the carbon border adjustment mechanism during the transitional period*. Available at: https://eur-lex.europa.eu/eli/reg_impl/2023/1773/oj

[18] UK Department for Business, Energy and Industrial Strategy. (2021). *COP26 World Leaders Summit - Statement on the Breakthrough Agenda.* Available at: https://www.gov.uk/government/publications/cop26-world-leaders-summit-statement-on-the-breakthrough-agenda-2-november-2021/cop26-world-leaders-summit-statement-on-the-breakthrough-agenda

[19] United Nations Framework Convention on Climate Change (UNFCCC). (2022). *Sharm el-Sheikh Implementation Plan.*
Available at: https://unfccc.int/sites/default/files/resource/cop27

[20] United Arab Emirates Ministry of Industry and Advanced Technology. (2023). *Ministry of Industry and Advanced Technology wraps up a successful participation in COP28.* Available at: https://moiat.gov.ae/en/media-center/news/2023/12/18/cop-28

[21] United Nations for Industrial Development Organization (UNIDO). (2025a). *Leaders unite to launch Belém Declaration on Global Green Industrialization at COP30.*
Available at: https://www.unido.org/news/leaders-unite-launch-belem-declaration-global-green-industrialization-cop30.

coordinated, multi-stakeholder delivery mechanisms rather than through policy alone, and each has fed directly into the design logic underpinning TIDIP.

Within this trajectory, the emergence of national "country platforms" as a delivery model is particularly significant. At COP30, Brazil, in partnership with the United Kingdom, launched the Brazil-UK Industrial Decarbonisation Hubs, explicitly framed as a collaborative country-platform model for coordinating international assistance to industrial transition[22]. This reflects a broader international convergence around the country-platform approach as the preferred instrument for aligning government policy, MDB finance, and industry action within a single national structure. TIDIP can accordingly be positioned within this emerging international family of country platforms, both drawing on and contributing to this growing body of practice.

Taken together, these frameworks do not constitute a single, unified policy track but a multi-layered and continuously evolving structure, spanning several ministries (MoIT, Ministry of Environment, Urbanisation and Climate Change (MoEUCC), Ministry of Trade), regulatory authorities, and international commitments, each with its own timelines, reporting requirements, and institutional owners. This complexity is compounded by the pace of change in the international environment, most notably the tightening of NDC targets at COP30, the start of the CBAM definitive period in January 2026[23,24], and the parallel proliferation of comparable industrial decarbonisation platforms among Türkiye's peer economies.

In light of these developments, TIDIP is not designed to sit within any single one of these frameworks, nor is it conceived as a fixed, sector-bound structure. Rather, it is designed as a cross-cutting platform that operates horizontally across this landscape: translating international commitments and national legislative requirements into an actionable investment strategy, while coordinating the institutional mandates that intersect within it. TIDIP will engage systematically with a diverse set of stakeholders such as the national authorities responsible for climate, trade, and industrial policy; the MDB partners; and sector-level industry associations and enterprises, so that the Platform's strategic direction remains coherent with, and responsive to, this broader and continuously evolving policy and institutional environment, rather than treating it as a fixed reference point.

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[22] UNIDO. (2025b). *Brazil advances industry decarbonization and hydrogen hubs ahead of COP30.* Available at: https://decarbonization.unido.org/news/brazil-industry-decarbonization-hubs/

[23] European Parliament & Council of the European Union, (2023), *op. cit.*

[24] European Commission, (2023), *op. cit.*

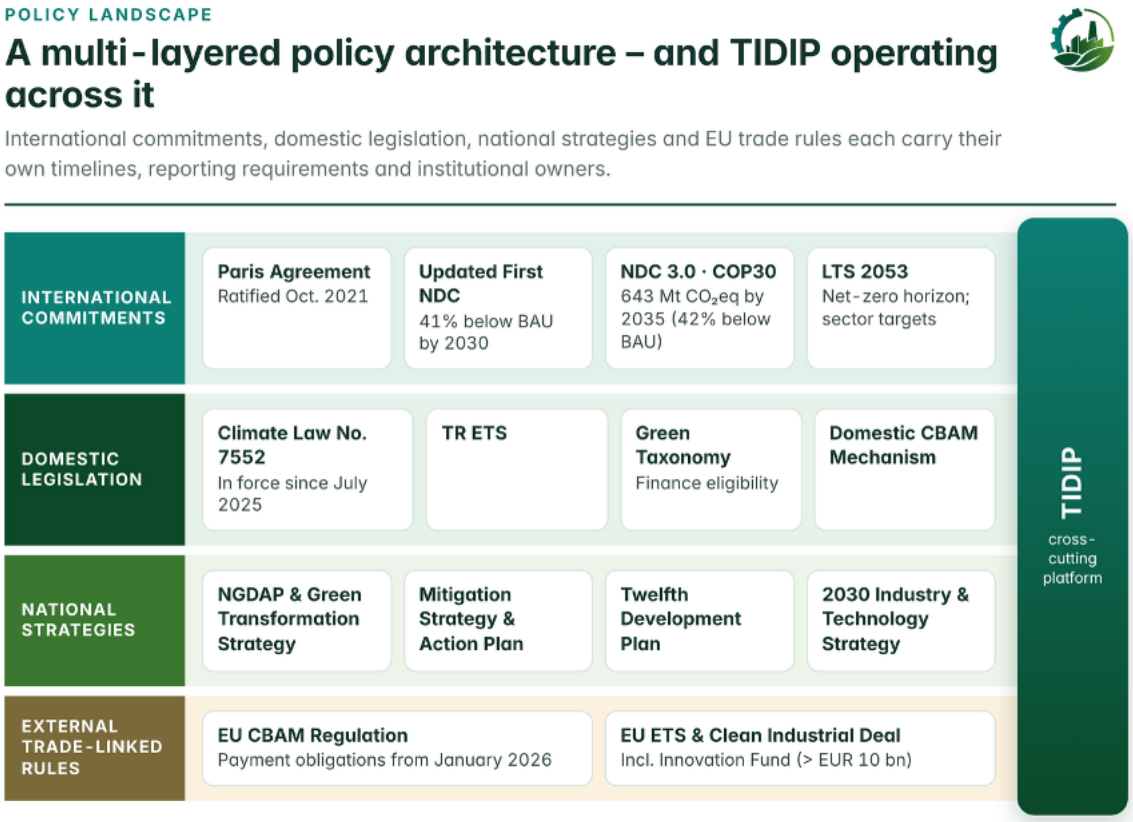


Figure 1-2: Multi-Layered Policy Architecture and the Position of TIDIP

1.4 Global Context: Industrial Decarbonisation as a Strategic Imperative

Türkiye's industrial decarbonisation challenge cannot be assessed in isolation: it is shaped by an accelerating global transition in which trade policy, carbon pricing, technology deployment, and competitive dynamics are converging simultaneously.

This section situates TIDIP's four priority sectors within that global context; from the scale and pace of the challenge (Section 1.4.1) and the pipeline of projects and capital already in motion (Section 1.4.2), to the external policy forces bearing directly on Türkiye's competitiveness (Section 1.4.3) before assessing how these dynamics translate into Türkiye's own starting position (Section 1.4.4).

1.4.1 Scale of the Global Challenge

The scale of the industrial decarbonisation challenge is best understood along two dimensions: how much needs to change, and how fast. Heavy industry accounts for approximately 24% of global GHG emissions, and reducing process emissions in cement, iron and steel, aluminium, and chemicals requires high-capex, long-horizon interventions that go well beyond simple electrification[25]. On pace, the requirement leaves little room for delay: global heavy industry emissions must fall by ~20% by 2030 and ~93% by 2050 to remain on a 1.5°C pathway.

The cost of closing that gap is similarly steep. International Energy Agency (IEA)'s analysis[26] estimates that a carbon price of approximately USD 200/t CO_2eq is needed to close the gap between deep-decarbonisation technologies and conventional production routes for iron and steel, cement, and aluminium. Carbon pricing alone, however, is not sufficient: the IEA Policy Toolbox (2025)[27] identifies five categories of effective industrial decarbonisation policy such as carbon pricing and ETS; standards and regulations; incentives and subsidies; demand-side measures; and international collaboration and it is against this five-part framework that the IPPS's own policy architecture (Section 2.1) is structured.

This global cost gap is directly relevant to TIDIP's four sectors: Türkiye's own IPPU emissions grew 228% between 1990 and 2024 (Section 2.2.2), a trajectory that tracks the same carbon-intensive growth pattern the IEA analysis identifies as requiring active policy intervention rather than reversal through incremental efficiency gains alone.

1.4.2 Global Project Pipeline; Trajectory and Gaps

Global deployment data confirms both the direction and the gap still to cover. The Mission Possible Partnership (MPP)/Industrial Transition Accelerator (ITA) Global Project Tracker (November 2025) shows 144 commercial-scale, net-zero-aligned industrial plants at Final Investment Decision (FID) globally, of which 82 are operational and 62 have secured funding,

[25] IEA. (2023). *Net Zero by 2050.* Available at: https://www.iea.org/reports/net-zero-by-2050
[26] Intergovernmental Panel on Climate Change (IPCC). (2022). *Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report.*
Available at: https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_Chapter11.pdf
[27] IEA, (2025a), *op. cit.*

with clean industrial plants in development or operational across 70 countries and representing approximately USD 2 trillion in remaining investment potential [28].

This pace remains well short of what is required: meeting 2030 targets requires approximately 595 plants to reach FID; a seven-fold acceleration from the current rate[29]. The IEA's 2025 Demand and Supply Measures report[30] documents 3.3 Mt of buyer-supplier demand commitments in 2024, improving offtake certainty and project bankability in ways directly relevant to TIDIP's own IFA strategy (Section 3.2).

Türkiye's position within this global pipeline is nascent, with none of TIDIP's four priority sectors yet hosting a commercial-scale, net-zero-aligned facility at FID. This places Türkiye's industrial transition at an early-stage relative to the pace the IEA and MPP/ITA tracking data suggest is needed globally, but it also means early-mover projects in Türkiye could capture a disproportionate share of the buyer-supplier offtake commitments referenced above, particularly given the country's existing strengths in steel, aluminium, and cement export markets.

1.4.3 Global Policy Drivers Shaping Türkiye's Strategic Position

Türkiye's strategic position is bounded by a set of international policy developments that are directly relevant to its industrial competitiveness, given the country's specific trade profile in the four TIDIP sectors. The EU's evolving industrial policy, extending from CBAM and the EU ETS to the 2025 Clean Industrial Deal[31] and its associated Innovation Fund of over EUR 10 billion[32,33], is the dominant external policy force acting on Türkiye's CBAM-exposed sectors precisely because of the scale of Türkiye's EU market exposure: Türkiye is the EU's largest

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[28] Mission Possible Partnership. (2025). *A new dawn for industry with over 1,000 clean projects in development worldwide, setting the stage for near-term acceleration*. Industrial Transition Accelerator.
Available at: https://ita.missionpossiblepartnership.org/news/clean-projects-in-development-worldwide-setting-the-stage-for-near-term-acceleration/

[29] Mission Possible Partnership. (2024). *Global Project Tracker: Mapping the pipeline to 2030 goals for industrial decarbonisation*. Available at: https://dvvfw3pu42z1e.cloudfront.net/assets/custom/010856/downloads/MPP-Global-Project-Tracker_Insights_April-2024-1.pdf

[30] IEA. (2025b). *Demand and Supply Measures for the Steel and Cement Transition*.
Available at: https://iea.blob.core.windows.net/assets/DemandandSupplyMeasuresfortheSteelandCementTransition.pdf

[31] European Commission. (2025). *The Clean Industrial Deal: A joint roadmap for competitiveness and decarbonisation.* Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52025DC0085

[32] European Commission. (2026). *Innovation Fund 2025 auctions attract almost €10 billion bids for European industry decarbonisation*. Climate Action. Available at: https://climate.ec.europa.eu/news-other-reads/news/innovation-fund-2025-auctions-attract-almost-eu10-billion-bids-european-industry-decarbonisation-2026-03-20_en

[33] Burt, A. (2023). *Carbon contracts for difference: Germany's €50 billion scheme to help companies decarbonize.* Impakter.
Available at: https://impakter.com/carbon-contracts-for-difference-germanys-e50-billion-scheme-to-help-companies-decarbonize/

cement supplier and its steel sector, while structurally advantaged through its predominantly EAF-based production, remains directly subject to CBAM's carbon-cost calculations at the EU border. Changes in the design of CBAM or the Clean Industrial Deal therefore translate directly into changes in the cost competitiveness of Turkish exports.

The United States' Inflation Reduction Act, which has committed USD 6 billion to industrial demonstration projects[34], and China's announced extension of its national ETS to aluminium, cement, and steel are relevant to Türkiye for a different reason: both developments intensify global competition for green industrial investment and alter the relative carbon-cost position of Türkiye's competitors in third-country export markets. Where the US is scaling public co-financing for clean industrial technology and China is beginning to internalise carbon costs domestically, Türkiye's ability to mobilise comparable de-risking instruments will have a direct bearing on whether Turkish industry can maintain its current cost position rather than lose ground to both markets simultaneously.

At the multilateral level, the G7 Climate Club and the Organisation for Economic Co-operation and Development (OECD) have produced a policy toolkit. The IEA Policy Toolbox (2025) sets out the five categories of effective industrial decarbonisation policy against which the IPPS's own policy architecture (Section 2) is structured, while the Climate Club Financial Toolkit 2026 Update[35] and the IEA's Demand and Supply Measures Report (2025)[36] provide the underlying analytical basis for TIDIP's approach to blended finance and offtake-linked de-risking respectively.

This multilateral toolkit is complemented by the Breakthrough Agenda, under which sector-specific initiatives such as the Steel Standards Principles and the Global Ratings for cement are establishing internationally recognised definitions of near-zero emissions production[37,38]. These definitions are not abstract: they determine, in practice, whether a given Turkish cement or steel producer's decarbonisation investment is recognised as CBAM-compliant and whether its output can access premium green-product markets and preferential green finance terms.

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[34] U.S. Department of Energy. (2023). *Industrial Demonstrations Program.* Office of Clean Energy Demonstrations. Available at: https://www.energy.gov/oced/industrial-demonstrations-program

[35] Organisation for Economic Co-operation and Development (OECD). (2026). *Climate Club Financial Toolkit 2026 Update*. Available at: https://www.oecd.org/content/dam/oecd/en/publications/reports/2026/05/climate-club-financial-toolkit-2026-update

[36] IEA, (2025b), *op. cit.*

[37] IEA. (2025c*). Breakthrough Agenda Report 2025*. pp.33. Available at: https://www.iea.org/reports/breakthrough-agenda-report-2025

[38] IEA, (2025c), *op. cit.* pp.38-42.

TIDIP's LCPs and IFAs are designed to align with these definitions so that Turkish producers' investments translate directly into recognised, tradable decarbonisation credentials rather than unrecognised domestic improvements.

The most recent development in this policy sequence is the Belém Declaration on Global Green Industrialization, adopted at COP30 in November 2025, which extends the Breakthrough Agenda–Sharm el-Sheikh–Dubai line of multilateral industrial decarbonisation instruments[39,40,41,42]. Its direct relevance to Türkiye lies in its institutional architecture rather than its technical content: the Declaration establishes the country-platform model exemplified by the Brazil-UK Industrial Decarbonisation Hubs launched in the same COP30 cycle, as the reference delivery mechanism for aligning government policy, MDB finance, and industry action within a single national structure.

1.4.4 Türkiye's Competitive Position

Building on this global policy landscape, Türkiye's four priority sectors enter the transition from markedly different starting points. The iron and steel sector holds the strongest structural position: with an EAF share reaching approximately 75% of production capacity in 2024[43] , compared with 69.9% of actual crude steel output under the 2024 National Inventory Document. With an average carbon intensity of around 1 tonne of CO_2 per tonne of steel, Turkish steel already sits well below the emissions intensity of Blast Furnace – Basic Oxygen Furnace (BF-BOF)-dominated sectors, giving it a comparative CBAM-cost advantage. This advantage is not permanent: it will reduce over time unless reinforced by continued decarbonisation of EAF electricity supply and by progress in transitioning the remaining BF-BOF capacity (see Section 3.1.2).

Cement occupies a different kind of strength: as one of the world's leading cement exporters, with approximately 5.4 Mt of cement and clinker (around 25% of the sector's total exports) supplied to the EU-27 in 2025[44], Türkiye's commercial position is tightly coupled to its ability

[39] UK Department for Business, Energy and Industrial Strategy, (2021), *op. cit.*
[40] UNFCCC, (2022), *op. cit.*
[41] United Arab Emirates Ministry of Industry and Advanced Technology, (2023), *op. cit.*
[42] UNIDO, (2025a), *op. cit.*
[43] Türkiye Sınai Kalkınma Bankası (TSKB) Danışmanlık Hizmetleri. (2026). Demir-Çelik Sektörü. Finansal ve Teknik Danışmanlık, İstanbul, p.5.
[44] TÜRKÇİMENTO. (2026). *Export Statistics*. Available at: https://www.turkcimento.org.tr/tr/istatistikler/ihracat

to reach near-zero production — making decarbonisation as much a market-access imperative as a climate one.

Aluminium's competitive position is shaped by its recycling-based industry structure, which gives it a lower process-emission intensity than primary-aluminium producers[45]. The sector's principal exposure lies not in its own operations but in the embedded Scope 2 electricity footprint and the Scope 3 emissions carried by imported primary aluminium ingots a supply-chain risk requiring active management as CBAM's scope and reporting requirements mature.

Fertilisers sector is shaped by its dependence on natural gas as feedstock. This is the industry's central and most persistent competitiveness constraint, and its medium-term pathway rests on the cost trajectory set out in Türkiye's Hydrogen Strategy for green ammonia production[46].

Taken together, these differing starting points support the same strategic conclusion: Türkiye's industrial sectors are positioned to become early movers in the emerging global market for low-carbon industrial goods, provided that the policy signals, finance access, and technology readiness needed to convert existing structural advantages are mobilized into realised competitive gains.

[45] MoIT. (2023a). *A Low Carbon Pathway for the Aluminium Sector in the Republic of Türkiye.* Available at: https://www.ebrd.com/green-economy-transition/low-carbon-pathways/Aluminium_Sector_in_Turkey.pdf

[46] MoIT. (2024a). *A Low Carbon Pathway for the Fertiliser Sector in the Republic of Türkiye*. Available at: https://www.sanayi.gov.tr/assets/pdf/birimler/turkiye-gubre-sektoru-icin-dusuk-karbonlu-yol-haritasiEN.pdf

SECTOR PROFILES

Four sectors, four starting points

Each sector combines a distinct form of economic exposure that shapes the policy and investment response it requires.

Cement
Export market concentration

~25%

of 21.9 Mt cement & clinker exports went to the EU-27 in 2025 (5.4 Mt)

- World's 5th-largest producer; EU's largest cement supplier
- 77 facilities, ~119 Mt capacity (2024)
- Largest single decarbonisation burden within TIDIP scope

CBAM EXPOSURE

Defined but contained near-term exposure; CBAM cost pass-through is calculable

Iron & Steel
Structural EAF advantage

~75%

of 60 Mt capacity is EAF-based (2024); ~1 t CO_2 per t steel

- EU = largest export market in 2025: 40.7% (7.9 Mt)
- EU-bound exports +76% in 2024 to 3.8 Mt
- Advantage erodes without clean EAF power and BF-BOF transition

CBAM EXPOSURE

Larger and faster-growing; EU safeguard quotas could cut EU access by >60%

Aluminium
Embedded supply-chain emissions

5.34

t CO_2/t Al at the primary smelter (Scope 1+2), vs. 17 t global average

- Recycling- and remelting-based industry structure
- ~75% of processing inputs are imported primary ingots
- 61.8% of USD 6.7 bn exports to the EU (2022)

CBAM EXPOSURE

Concentrated in Scope 3 emissions embedded in imported primary ingots

Fertilisers
Feedstock-cost sensitivity

70–80%

of ammonia production cost is natural-gas feedstock

- Strategic for food security and agricultural exports
- ~95% of production inputs are imported
- Direct emission intensity ~68% above EU-27 average

CBAM EXPOSURE

Least favourable: embedded carbon tied to gas feedstock, not a quickly closable technology gap

Figure 1-3: Sector Starting Points and CBAM Exposure

2 Baseline: Initial Status

This section establishes Türkiye's current starting point across four dimensions; policy and regulatory readiness; industry and market context; financing landscape; and institutional capacity, against which the transition pathways set out in Section 3 are assessed.

2.1 Policy and Regulatory Landscape

Türkiye's policy and regulatory landscape for industrial decarbonisation is undergoing its most significant transformation in decades. This section provides an assessment of relevant policy documents, laws, and regulations including an explicit analysis of how each instrument relates to TIDIP's mandate, sectoral coverage, and investment strategy. Details of the policy summary table is given in Annex II.

2.1.1 Policy Instruments

The following table provides a structured overview of all key policy instruments and regulatory developments directly relevant to TIDIP, their status, and their specific TIDIP linkage:

Table 2-1: Policy Instruments

Policy / Regulatory Instrument	Legal Basis / Status	Relevance to TIDIP	Direct TIDIP Linkage
Paris Agreement (2021)	Ratified in Oct. 2021	All sectors — NDC/LTS framework	TIDIP investments operationalise Paris NDC and LTS implementation
Updated First NDC (April 2023)	Active; 41% below BAU by 2030	All sectors — Industrial Processes and Product Use (IPPU) explicitly covered	Near-term emission reduction anchor for TIDIP
NDC 3.0 (Nov. 2025)	COP30; 643 Mt CO_2eq by 2035, 42% below BAU by 2035	All sectors; legally backed by Climate Law	Increases urgency of 2025-2030 TIDIP pipeline

Policy / Regulatory Instrument	Legal Basis / Status	Relevance to TIDIP	Direct TIDIP Linkage
LTS 2053 (Nov. 2024)	COP29; 89 titles	Cement -93%, Steel -99%, Aluminium -75%	Long-term quantitative targets per sector for IPPS
Mitigation Strategy & Action Plan	Active; 49 strategies, 260 actions	Industry component complements all TIDIP IFAs	TIDIP implements industry actions; M&E alignment
Adaptation Strategy & Action Plan	Active; MoEUCC	Physical climate risk to TIDIP sector operations	Climate risk assessment required for all TIDIP projects
BTR1 (United Nations Framework Convention on Climate Change (UNFCCC), 2024)	Submitted; BTR2 due 2026	National GHG accounting framework	TIDIP M&E should feed into future BTRs
Climate Law No. 7552 (July 2025)	In force; Official Gazette (OG) 32951, 9 July 2025	All TIDIP sectors — ETS, Taxonomy, CBAM, finance, NDC	Primary enabling law for TIDIP's full policy architecture
GHG Monitoring, Reporting and Verification (MRV) Regulation (2014, amended)	Repealed by the TR ETS Regulation (27 August 2026); ~800 installations covered	All TIDIP sector installations above threshold	Verified emissions baseline for TR ETS, LCPs, and PINs
Draft Carbon Crediting & Offsetting Regulation (2025)	Expecting to get in force; MoEUCC	All sectors — offset project registration	Carbon credit monetisation for non-ETS TIDIP investments
Energy Market Regulatory Authority (EMRA) ETS Method Declaration (2025)	In force; EMRA	ETS allowance exchange and registry mechanics	ETS transaction cost understanding for TIDIP sector companies
TR ETS Regulation (published and in force, 27 August 2026)	In force; pilot 2026–2027; first implementation period expected from 2028 (not yet confirmed)	Power + industry >50,000 t CO_2e/yr	Primary carbon price signal driving TIDIP investment economics

Policy / Regulatory Instrument	Legal Basis / Status	Relevance to TIDIP	Direct TIDIP Linkage
Turkish Green Taxonomy Regulation (published and in force 24 Sept 2026)	6 objectives; technical screening criteria to be published by the Climate Change Presidency	All TIDIP sectors — defines" green" investments	Reference framework for taxonomy-aligned classification, not a precondition for issuance under the CMB Guidelines; coverage of transition activities in the technical screening criteria = key advocacy
Domestic CBAM (secondary legislation pending)	Climate Law basis established	Imports into the Turkish Customs Territory (Climate Law Art. 8)	Addresses carbon leakage from imports; distinct from the deduction of TR ETS costs from EU CBAM obligations (EU CBAM Art. 9)
EU CBAM Regulation (EU) 2023/956	Transitional Oct. 2023; definitive period from Jan. 2026; certificate sales from Feb. 2027	Cement, iron and steel, aluminium, fertiliser	Primary trade policy driver of decarbonisation urgency
NGDAP (2021) / Green Transformation Strategy (2024)	Active; Ministry of Trade	Mandates CBAM sector roadmaps (= LCPs + IPPS)	IPPS is the investment implementation instrument
EU Customs Union / European Coal and Steel Community (ECSC) Agreement (1996)	Active; review of investment limits called for in Steel LCP	Steel — tariff-free EU market access	ECSC investment limitation review = near-term TIDIP bilateral policy action
Inward Processing Regime (DİR)	Active; Customs Law 4458	Iron and steel, aluminium, fertiliser — CBAM interaction	DİR-CBAM compliance guidance = TIDIP MRV TA priority
EU Steel Safeguard Measures (2019+)	Active; tightening proposed post-June 2026	Steel sector — quota and tariff compounding risk	TIDIP engages on trade policy and investment tracks simultaneously

Policy / Regulatory Instrument	Legal Basis / Status	Relevance to TIDIP	Direct TIDIP Linkage
MENR 2019-2023 Strategic Plan	Expired; superseded by the MENR 2024-2028 Strategic Plan (Nov. 2024)	Energy enabling conditions for all sectors	Sets Renewable Energy (RE) targets enabling electrification pathways
Renewables Roadmap to 2035 (Oct. 2024)	Active; 7.5–8 GW/year target	EAF steel, aluminium — Scope 2 reduction	Grid decarbonisation reduces EAF/aluminium Scope 2
Energy Efficiency Law No. 5627 (2007, amended 2024)	Active; May 2024 adds carbon intensity criteria	All 4 sectors	IFA 3 delivery framework; Efficiency Enhancing Project (EEP / VAP) and Energy and Carbon Reduction (ECR) programme access
EEP Programme (under Law 5627)	Active; 2026 cap: 27,092,663 TL	Energy efficiency investments; Waste Heat Recovery (WHR); kiln upgrades	Up to 30% cost support for qualifying TIDIP efficiency projects
ECR Programme (under Law 5627, 2024)	Active; 2026 cap: 18,061,775 TL	All sectors — carbon intensity reduction	First national programme explicitly rewarding carbon reduction
2030 Energy Efficiency Action Plan (2024)	Active; 16% reduction; USD 20 billion	All sectors — industrial efficiency	TIDIP IFA 3 investments count towards national target
Hydrogen Technology Strategy (2023)	Active; Ministry of Energy and Natural Resources (MENR)	Cement, iron and steel, fertiliser — end-use sectors	Policy foundation for TIDIP IFA 1 (Green Hydrogen)
YEK-G (Renewable Energy Certificates)	Active; amendments ongoing	All sectors — Scope 2 certificate management	Enables TIDIP sector companies to certify RE procurement for CBAM/ETS
Electricity Market Law No. 6446 (2013)	Active; EMRA	EAF steel, aluminium — RE access via Power	PPA regulatory reform = key enabler for TIDIP Scope 2 reduction

Policy / Regulatory Instrument	Legal Basis / Status	Relevance to TIDIP	Direct TIDIP Linkage
		Purchase Agreement(s) (PPAs)	
Natural Gas Market Law No. 4646 (2001+)	Active; BOTAŞ framework	Fertiliser — feedstock pricing; transition economics	Determines financial viability of green hydrogen transition
Twelfth Development Plan (2024–2028)	Active	National green and industrial transformation framework	TIDIP investments contribute to Plan's green transformation objectives
2030 Industry and Technology Strategy (MoIT, 2023)	Active	Technology-intensive and green industrial development	Strategic framework within which TIDIP's technology IFAs operate
Investment Incentive Decree No. 9903 (May 2025)	In force; OG 32915	All sectors — Priority Investment = Green Transformation	Alignment of CCUS, Direct Reduced Iron (DRI), H_2 as Targeted/Strategic = key policy reform
Technology Tracking Platform (TTP, Steel LCP)	Proposed by MoIT; to be established	Steel sector — low-carbon technology monitoring	TIDIP Secretariat should support TTP operationalisation and feed project data
Türkiye Green Industry Project (WB – TÜBİTAK – KOSGEB)	Active; World Bank-financed	Industry green R&D and innovation umbrella	1831, 1832, 1833 and KOSGEB programmes — TIDIP TA complement
TÜBİTAK 1501 (Industrial R&D)	Active; 75% R&D costs; 2026/1 Call Jan. 2026	All TIDIP sectors — decarbonisation R&D	Applicable to CCUS, H_2, novel binders, DRI process R&D
TÜBİTAK 1831/1832/1833 Programmes	Active; various calls 2024-2026	Small and Medium-sized Enterprise (SMEs) and R&D platforms for green transformation	Company roadmaps, pilot projects, SAYEM technology networks

Policy / Regulatory Instrument	Legal Basis / Status	Relevance to TIDIP	Direct TIDIP Linkage
KOSGEB Green Industry + SME Energy Efficiency	Active	SMEs in TIDIP supply chain	Green transformation support for smaller TIDIP sector companies
Turkish Energy, Nuclear and Mineral Research Agency (TENMAK) H_2 and CCUS R&D Calls (2022+)	Active; new calls expected	Hydrogen, CCUS, and inert anode technology R&D	Key national R&D funding channel for TIDIP IFA 1 and IFA 2
Türkiye Sustainability Reporting Standards (TSRS)	Active; IFRS S1/S2 aligned	Entities covered by POA Board Decisions that exceed the specified threshold criteria	TIDIP M&E data; CBAM compliance; green finance due diligence baseline
Environment Law No. 2872 (1983, incl. 2020 amend.)	Active	All sectors — permitting, enforcement, CE baseline	MRV enforcement; circular economy obligations
Environmental Permit and License Regulation	Active; MoEUCC	All TIDIP sector facilities — integrated permitting	Bankability prerequisite; CCUS/DRI/H_2 permitting pathways to be developed
Environmental Impact Assessment (EIA) Regulation (OG 31907, 2022)	Active; ongoing reform	CCUS, DRI, green hydrogen — new technology EIA	Streamlining for low-carbon tech = key enabling reform
Industrial Air Pollution Regulation (IAPCR, 2009)	Active; Best Available Technology (BAT) requirements	Cement kilns, steel furnaces, aluminium smelters	BAT compliance baseline for TIDIP sector process improvement projects
Zero Waste Regulation (2019, amended 2023)	Active; 35% recycling target	Cement (Refuse-Derived Fuel (RDF)/Solid Recovered Fuel (SRF) availability)	Municipal waste processing drives alternative fuel supply

Policy / Regulatory Instrument	Legal Basis / Status	Relevance to TIDIP	Direct TIDIP Linkage
RDF and Alternative Fuels Regulation (2015+)	Active; reform opportunities	Cement sector — fuel switching pathway	Regulatory modernisation = near-term high-impact TIDIP reform
National Circular Economy Strategy and Action Plan (NCESAP) 2025-2028 (Presidential Circular 2025/17)	In force in October 2025; MoEUCC	All sectors — secondary raw materials, recycled content	IFA 3 national strategy framework; alignment required
Water Pollution Control Regulation	Active	All TIDIP sector facilities	H_2 electrolysis water demand; CCUS cooling; effluent compliance
Construction and Demolition Waste (CDW) Management Regulation	Active; MoEUCC	Cement — supplementary cementitious material (SCM) and alternative raw material supply	CDW recovery supports clinker substitution targets
Mining Law No. 3213 / Mining and Petroleum Affairs General Directorate (MAPEG)	Active; quarrying licensing	Cement raw materials; future CCUS geological storage	MAPEG = central actor for future CCUS subsurface permitting
OHS Law No. 6331 (2012+)	Active; all hazardous workplaces	All TIDIP sector facilities	MDB due diligence prerequisite; CCUS/H_2 novel hazard assessment
Republic of Türkiye Sustainable Finance Framework (2021)	Active; Ministry of Treasury and Finance	All sectors — sovereign green bond framework	Sovereign issuance framework of the Ministry of Treasury and Finance; corporate issuance by TIDIP-sector companies is governed by CMB legislation and Guidelines (the Framework may serve only as a non-binding reference)
CMB Guidelines on Green Sustainable and	In force; adopted by CMB Board decision of 13	Issuers of green, sustainable and social capital market	Adapts the ICMA Green Bond Principles; eligible green project types

Policy / Regulatory Instrument	Legal Basis / Status	Relevance to TIDIP	Direct TIDIP Linkage
Social Capital Market Instruments	August 2026; replaces the 2022 Guidelines	instruments, including industrial issuers	include climate change mitigation (including hydrogen and carbon capture and storage), renewable energy, energy efficiency, pollution prevention and control and circular economy, and therefore do not preclude industrial transition projects; eligibility under the Guidelines is assessed separately from alignment with the Türkiye Green Taxonomy
CMB Guidelines on Sustainability Linked Capital Market Instruments[47]	In force; adopted by CMB Board decision of 13 August 2026 (new instrument type)	Issuers linking financing conditions to KPIs and sustainability performance targets	Not limited to use of proceeds: coupon or other terms vary with achievement of KPIs and sustainability strategies; suited to company-level transition plans of TIDIP sector companies
BRSA Communiqué on Banks' Green Asset Ratio Calculation (2025)	In force	Banks — green lending portfolios	Drives bank allocation to TIDIP investments once taxonomy technical screening criteria apply
BRSA Guidelines on Credit Granting and Monitoring (2021), Sustainable Banking Plan (2022-2025)	Active	Turkish banks — ESG risk integration	Credit readiness for TIDIP projects

[47] Capital Markets Board of Türkiye (CMB). (2026). Guidelines on Green, Sustainable and Social Capital Market Instruments and Guidelines on Sustainability Linked Capital Market Instruments, adopted by CMB Board decision of 13 August 2026; English translations not yet published on the CMB website. Press release available at: https://spk.gov.tr/duyurular/basin-duyurulari/2026/yesil-surdurulebilir-ve-sosyal-sermaye-piyasasi-araclari-rehberi-ve-surdurulebilirlik-baglantili-sermaye-piyasasi-araclari-rehberi-basin-duyurusu

Policy / Regulatory Instrument	Legal Basis / Status	Relevance to TIDIP	Direct TIDIP Linkage
Green Cement Communiqué (MoEUCC, 2024)	In force; public procurement	Cement — demand-side: mandatory low-carbon cement	Creates immediate market for low-carbon cement; expand to private sector
TS EN 197 Cement Standards	Active; Turkish Standards Institution (TSE)	Cement — clinker substitution limits	Standard revision = near-term key decarbonisation enabler
Public Procurement Law No. 4734 (2002+)	Active	Public construction — cement, iron and steel	Basis for extending green procurement requirements to all materials
BAT Reference Documents (BREF) — Iron and steel	Active; EU IED alignment	Iron and steel sector — emission benchmarks and process BAT	Defines process improvement investment baseline for iron and steel TIDIP projects
F-Gas / PFC Emissions Regulation (EU alignment)	Alignment ongoing under accession	Aluminium — PFC emissions from electrolysis	PFC MRV and TR ETS scope determination for primary aluminium operations
ELV and Packaging Waste Regulations	Active; OG 28269 (2012)	Aluminium — recycled scrap availability	Enforcement quality improves recycled input for remelters
European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) / Hazardous Materials Transport Regulation	Active; aligned with ADR	Fertiliser — ammonia and ammonium nitrate logistics	Affects logistics costs and EPC (Engineering, Procurement, and Construction) risk profiles for TIDIP fertiliser projects
REACH Alignment Programme / KKDIK (Türkiye REACH) Regulation	Alignment ongoing; full by 2028	Fertiliser — chemical substance registration	CBAM embedded carbon documentation alignment with REACH requirements
Fertiliser Product Standards (TSE / EU FPR)	Active; alignment with EU 2019/1009 ongoing	Fertiliser — market acceptance for low-carbon products	New low-carbon fertiliser category recognition = demand creation enabler

Policy / Regulatory Instrument	Legal Basis / Status	Relevance to TIDIP	Direct TIDIP Linkage
Nitrate/Nitrogen Management Regulation	Active; EU Nitrates Directive alignment	Fertiliser — nitrogen use efficiency	Affects long-term domestic fertiliser demand forecasts for TIDIP pipeline

2.1.2 Areas of Regulatory Uncertainty and Key Priorities

The following cross-cutting and sector-specific uncertainties present highest risks to industry decarbonization efforts and investment planning and should be actively addressed through collective action:

Among these, four reforms stand out as the highest-priority near-term actions given their cross-sectoral impact and readiness for implementation: (i) TR ETS operationalisation together with CBAM deductibility alignment; (ii) industrial PPA regulatory reform; (iii) design of a Carbon Contracts for Difference (CfD) scheme for steel and fertiliser investments; and (iv) building code and cement standard reform to remove restrictions on SCM use in cement. These four are elaborated further below and are treated as Phase 1 priorities in the policy and regulatory pathway (Section 5.1.1).

- TR ETS carbon price trajectory and free allocation design: Pilot price level and National Allocation Plan (NAP) benchmark methodology for hard-to-abate sectors must drive investment without creating windfall allocations. The TR ETS Regulation was published and entered into force on 27 August 2026, replacing the 2014 GHG Monitoring Regulation. Per Carbon Market Board Decision KPK/2026/1, the 2026-2027 pilot phase is limited to Category B (50,000-500,000 t CO_2e/yr) and Category C (>500,000 t CO_2e/yr) facilities in electricity generation, cement, iron and steel, aluminium, and fertiliser, with 100% free allocation; 2026 is a reporting-only year with no surrender obligation, and the price mechanism begins in 2027. Facilities must obtain a GHG emission permit by 9 July 2028. Once the price mechanism is operational, the carbon price effectively paid under the TR ETS can be claimed as a reduction in the number of CBAM certificates to be surrendered under Article 9 of the EU CBAM Regulation; the domestic CBAM provided for in Article 8 of Climate Law No. 7552 is a distinct, import-side mechanism covering goods imported into the Turkish Customs Territory.

Under Article 12 of Climate Law No. 7552, revenues from the system, including primary-market allowance sales, are recorded as special revenue in the general budget and may not be used for purposes other than green transformation and combating climate change, with up to 10% usable for just transition activities[48]; this provides a potential channel for supporting industrial decarbonisation and just transition programmes in TIDIP sectors.

- CBAM equivalence recognition: The extent to which the carbon price paid under the TR ETS will be deductible from CBAM obligations — which depends on the TR ETS price level, the treatment of free allocation, the Commission's implementing rules and any agreement under Article 2(12) of the CBAM Regulation — remains to be determined and is the single most important bilateral policy outcome for industry export economics.
- Green Taxonomy transition category coverage: CCUS, DRI, green hydrogen, and alternative fuel use in cement are important to be included in the Taxonomy's technical screening criteria. Without such criteria, taxonomy-aligned classification will have limited reach for industry's most important investment themes; eligibility for green capital market instruments under the CMB Guidelines is assessed separately.
- CCUS geological storage regulatory framework: No dedicated regulatory framework currently exists for CO_2 geological storage in Türkiye. Developing site selection, permitting, liability, and long-term stewardship frameworks, and engaging MAPEG, MoEUCC, and the Climate Change Presidency is a medium-term industry decarbonisation policy priority and a prerequisite for commercial CCUS deployment.
- Industrial PPA regulatory reform (Phase 1 priority): Current limitations on long-term industrial renewable PPAs constrain EAF steel producers and aluminium remelters from securing the bankable Scope 2 decarbonisation they need. PPA access is a prerequisite for bankable Scope 2 decarbonisation and should be pursued as a Phase 1 enabling-environment priority.
- Carbon Contracts for Difference (CfD) scheme design: Although CCfDs are discussed extensively as a financing de-risking instrument, Türkiye currently has no regulatory framework or mechanism for issuing them. Steel (NG-DRI, H_2-DRI) and fertiliser (green ammonia) investments both cite the absence of a CfD scheme as a barrier to

[48] Climate Law No. 7552, Article 12 (Official Gazette No. 32951, 9 July 2025).

investment certainty; designing and piloting a CfD mechanism is a cross-cutting policy priority for TIDIP.

- Building code reform for cement SCM use: Prescriptive building codes and cement product standards (TS EN 197-1/-5) currently restrict the share of supplementary cementitious materials (SCM) permitted in structural applications, independent of the Green Cement Communiqué's clinker-ratio requirements.
- RDF regulation modernisation: Bottlenecks constraining alternative fuel scale-up critical for cement near-term decarbonisation.
- Investment Incentive alignment with IFAs: Decree No. 9903 does not yet explicitly categorise CCUS, DRI, and green hydrogen as Targeted or Strategic investments.
- Green Cement Communiqué expansion: Extension to private sector procurement and increased ambition in mandatory SCM content requirements would substantially increase the domestic market for low-carbon cement.
- DİR/CBAM compliance guidance: Absence of specific CBAM reporting guidance for goods produced under the Inward Processing Regime (DİR) creates compliance uncertainty for Turkish steel and aluminium exporters.
- ECSC Agreement investment limitation review: Iron and Steel LCP identifies this as a near-term bilateral policy action; unresolved, it could constrain certain green transformation investment structures for Turkish steel companies.
- Low-carbon fertiliser product category: The absence of a recognised Turkish regulatory category for green ammonia and low-carbon fertiliser products limits market creation and premium pricing that would improve fertiliser sector investment economics.

2.2 Industry and Market Context

This section situates the four TIDIP sectors within Türkiye's broader economy and trade profile and presents the national emissions baseline against which sectoral decarbonisation trajectories are measured.

2.2.1 Economic Importance of Target Industries

Türkiye's identified four industry sectors occupy a structurally significant position in both the national economy and global trade, which is central to understanding why their decarbonisation trajectory matters beyond their direct emissions footprint. Türkiye is the

world's prominent cement exporter and its fifth-largest producer, operating 56 integrated factories and 21 grinding plants (77 facilities in total) with a combined capacity of approximately 119 Mt of cement as of 2024[49]. The sector's EU exposure is substantial: Türkiye exported approximately 21.9 Mt of cement and clinker in 2025, of which around 5.4 Mt (approximately 25%) was destined for the EU-27[50]. Cement's trade weight and structural position in Türkiye's industrial emissions profile make it one of the sector's clearest points of leverage for TIDIP.

The iron and steel sector is of comparable strategic weight: Türkiye is the largest steel producer supplying the EU and the 6th largest globally in 2024[51], with production capacity reaching 60 Mt in 2024, of which approximately 75% is EAF-based. This EAF-dominant structure gives the sector a comparatively low average carbon intensity of around 1 tonne of CO_2 per tonne of steel, but the scale of the transition still required is significant: Turkish Steel Producers Association (TÇÜD) estimates an average investment of approximately USD 1 billion per year through 2053 to achieve full sector decarbonisation. The sector's EU market dependence has also intensified: the EU was Türkiye's largest export market by volume in 2025, accounting for 40.7% of total exports (7.9 Mt), and steel exports to the EU grew by 76% in 2024 to reach 3.8 Mt[52] placing it directly in the path of CBAM cost exposure[53,54].

Aluminium plays a different but equally strategic role. Türkiye's aluminium industry is dominated by recycling and remelting activity, which gives it inherently lower process emissions than primary aluminium producers[55]. The sector is a critical supplier to the automotive, packaging, construction, and electrical industries, though this recycling-based structure means that a significant share of its full emissions footprint is embedded in imported primary aluminium ingots; a Scope 3 exposure that requires active management as CBAM and downstream customer requirements evolve.

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[49] TÜRKÇİMENTO. (2025). *Capacity Statistics.* Available at: https://www.turkcimento.org.tr/tr/istatistikler/ihracat

[50] TÜRKÇİMENTO, (2026), *op. cit.*

[51] Türkiye Sınai Kalkınma Bankası (TSKB) Danışmanlık Hizmetleri. (2026). Demir-Çelik Sektörü. Finansal ve Teknik Danışmanlık, İstanbul, p.5.

[52] MoIT. (2023b).

[53] Industrial Development Bank of Türkiye (TSKB) Consultancy Services. (2026). *Demir-Çelik Sektörü*. Financial and Technical Consultancy Services, İstanbul, p.5.

[54] Turkish Steel Exporters' Association. (2026). *Statistics*. https://www.cib.org.tr/en/statistics.html

[55] MoIT, (2023a), *op. cit.*

The fertiliser sector's importance is rooted primarily in food security and agricultural export revenues rather than trade volume alone. Because domestic ammonia production is gas-fed, the sector's cost base and competitiveness are highly sensitive to gas price movements and to the carbon cost exposure that follows from this feedstock dependence[56].

Taken together, these four sectors illustrate why TIDIP's sectoral prioritisation is grounded in more than emissions volume: each combines a distinct form of economic exposure; export market concentration for cement and steel, embedded supply chain emissions for aluminium, and feedstock-cost sensitivity for fertilizer, that shapes the specific policy and investment response each sector requires.

2.2.2 Emissions Baseline; National Inventory Document (NID) 2026 (1990-2024)

Türkiye's NID 2026, submitted to UNFCCC by TURKSTAT (TÜİK) in April 2026 and covering the period 1990-2024, is the primary GHG emissions baseline for the IPPS. Key figures for 2024 are as following: Total GHG emissions (excl. LULUCF) reached 584.5 Mt CO_2eq, this shows an increase of 5.3% (29.4 Mt) compared to 2023 and a 155.3% increase relative to 1990. IPPU accounted for 12.9% of total emissions (75,652 kt CO_2eq). CO_2eq emissions per capita reached 6.8 tonnes in 2024. This is up from 4.2 tonnes in 1990, reflecting Türkiye's sustained economic growth and population increase to 85.5 million. Total IPPU emissions grew by 228% between 1990 (23,092 kt CO_2eq) and 2024 (75,652 kt CO_2eq), making it the fastest-growing major sector in the national inventory[57,58].

[56] MoIT, (2024a), *op. cit.*
[57] Turkish Institutional Institute (TURKSTAT). (2026a). *Greenhouse Gas Emissions Statistics, 1990-2024*. Available at: https://veriportali.tuik.gov.tr/en/press/58000
[58] TURKSTAT. (2026b). *Greenhouse Gas Inventory of Türkiye, 1990-2024*. pp.25-26.
Available at: https://unfccc.int/sites/default/files/resource/TUR_NID_2026.pdf

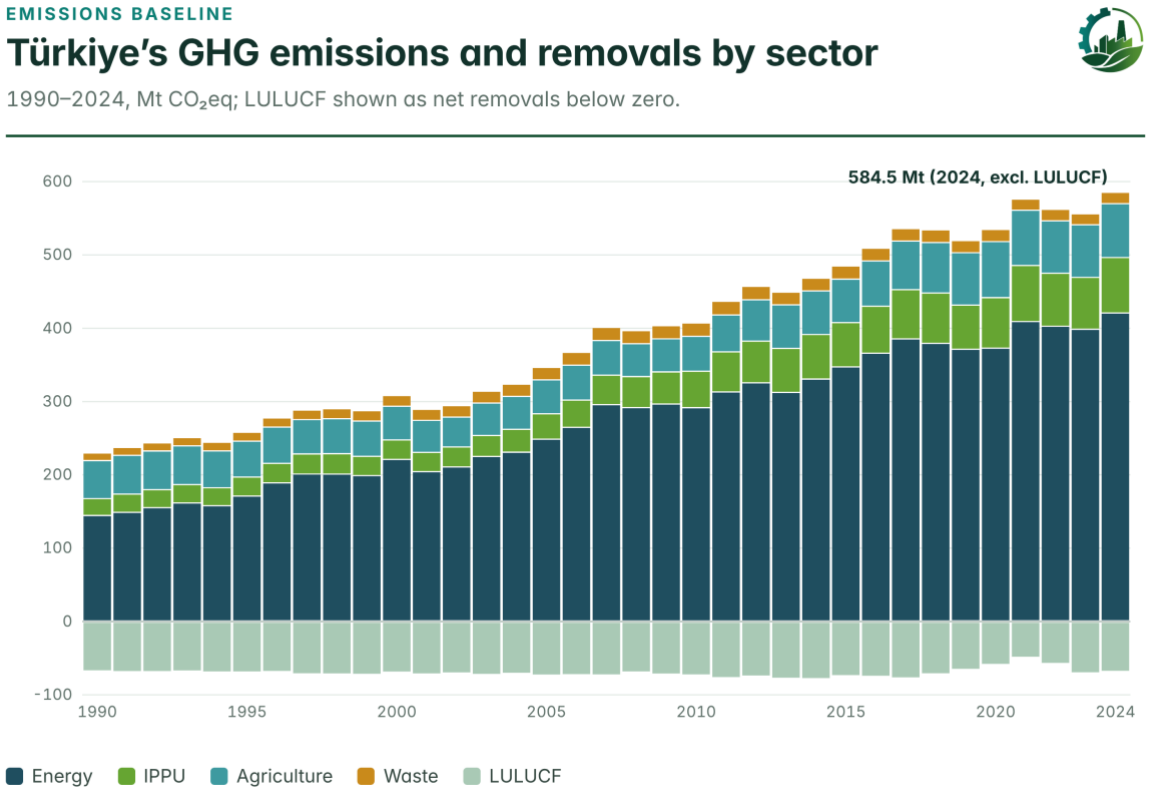


Figure 2-1: Türkiye's GHG Source and Sink Categories

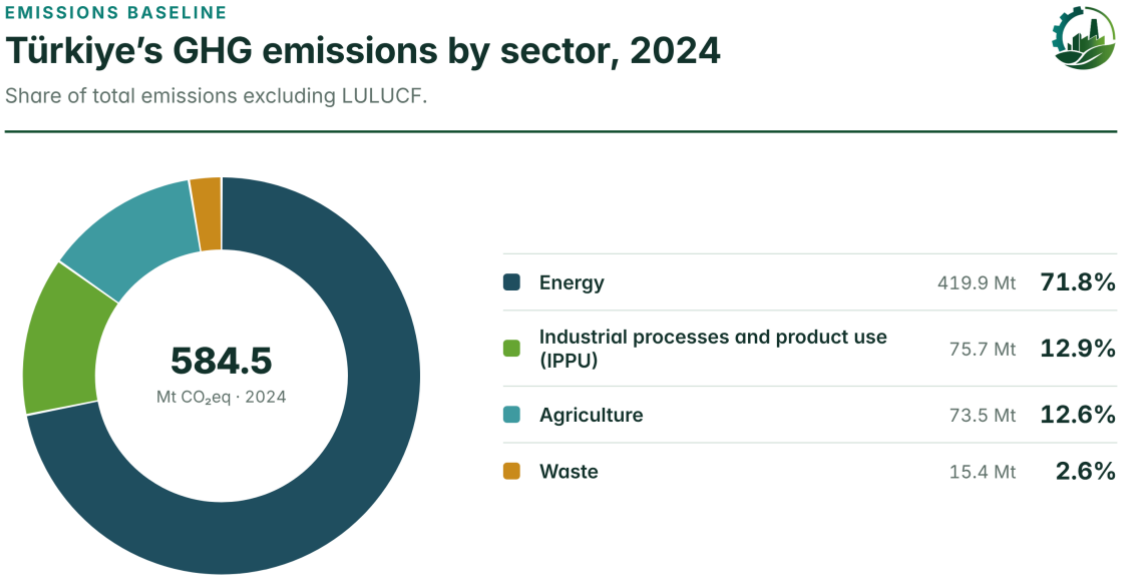


Figure 2-2: Türkiye's GHG Emission's Sectoral Distribution

IPPU sectoral breakdown (NID 2026, 2024 data):

- Mineral industry (dominated by cement): 50,255 kt CO_2eq in 2024 — 66.4% of IPPU and 8.6% of total national GHG. Cement process emissions (category 2.A.1): 44,782 kt CO_2 from 82,415 kt of clinker production in 2024 — a 313% increase since 1990. Energy-related combustion in the non-metallic minerals sub-sector adds a further 31,580 kt CO_2eq (2024), representing 47.3% of total industrial manufacturing energy emissions.
- Metal industry (iron, steel, aluminium, ferroalloys, other): 11,726 kt CO_2eq in 2024 — 15.5% of IPPU. Iron and steel (2.C.1): 11,039 kt CO_2 in 2024, comprising 6,933 kt from integrated BF-BOF plants, 1,840 kt from EAF plants, and 2,180 kt from sinter production. Total crude steel production: 36,992 kt in 2024 (BOF: 11,155 kt; EAF: 25,837 kt). Steel combustion energy emissions add 5,244 kt CO_2eq (2024).
- Aluminium production (2.C.3): 110.5 kt CO_2 from primary aluminium production at Eti Aluminium Seydişehir in 2024 — a 0.4% increase from 110.1 kt in 2023, and an 11% increase from 1990 (99.2 kt). All production has used prebaked cell technology since the 2015 plant modernisation. The sector's full GHG footprint is substantially larger when Scope 2 electricity and Scope 3 embedded emissions in imported aluminium ingots are included.
- Chemical industry (including ammonia/fertiliser, 2.B): 3,907 kt CO_2eq in 2024 — 5.2% of IPPU. Net CO_2 emissions from ammonia production: 1,628 kt in 2024 (gross 1,919 kt minus CO_2 removal via urea production of 291 kt). Ammonia production in 2024 was the highest on record (index 188 vs 1990=100), reflecting the strong sensitivity of Turkish fertiliser sector output to gas supply conditions and agricultural demand cycles[59,60].

[59] TURKSTAT, (2026a), *op. cit.*
[60] TURKSTAT, (2026b), *op. cit.*

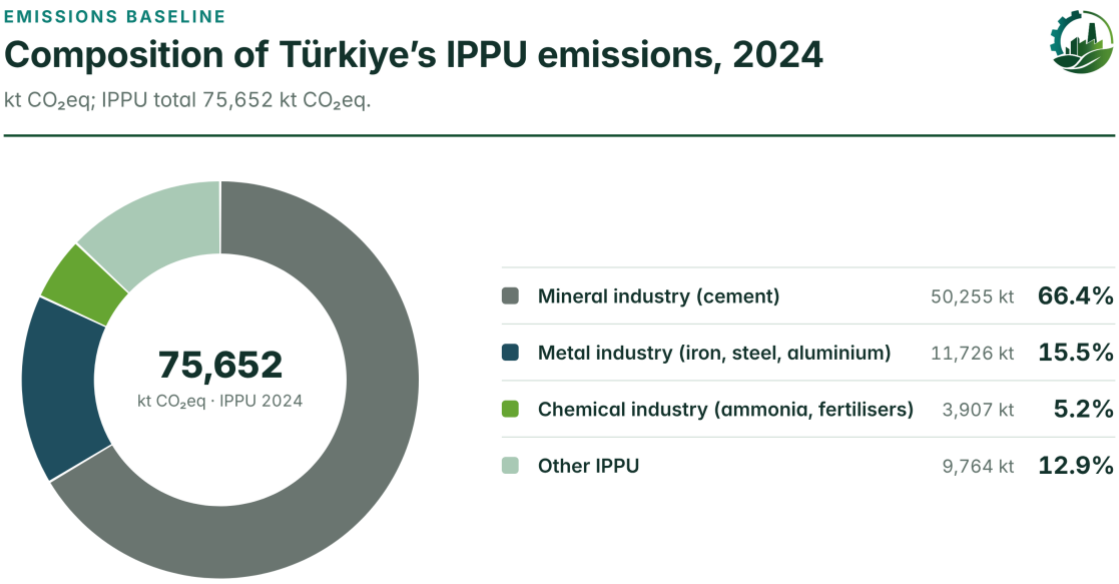


Figure 2-3: Composition of Türkiye's IPPU Emissions by Subsector (2024)
(Source: Türkiye NID 2026 (submitted to UNFCCC, April 2026), Table 2.7.)

The trajectory across IPPU subsectors reveals an important prioritisation signal for TIDIP: mineral industry emissions (cement) grew 263% between 1990 and 2024 in absolute terms and now represent two-thirds of all IPPU emissions, while metal industry emissions grew more moderately (55%) despite comparable production growth — reflecting the EAF-dominant, lower-carbon-intensity structure of Turkish steelmaking described in Section 3.1.2. This divergence explains why cement carries the largest single decarbonisation burden within TIDIP's scope even though steel and aluminium face steeper CBAM-driven trade exposure. The chemical/fertiliser subsector, though smallest in absolute IPPU share (5.2%), shows the highest year-on-year volatility, tracking gas price and agricultural demand cycles rather than a structural growth trend — a distinction relevant to how financing instruments for this sector should be designed.

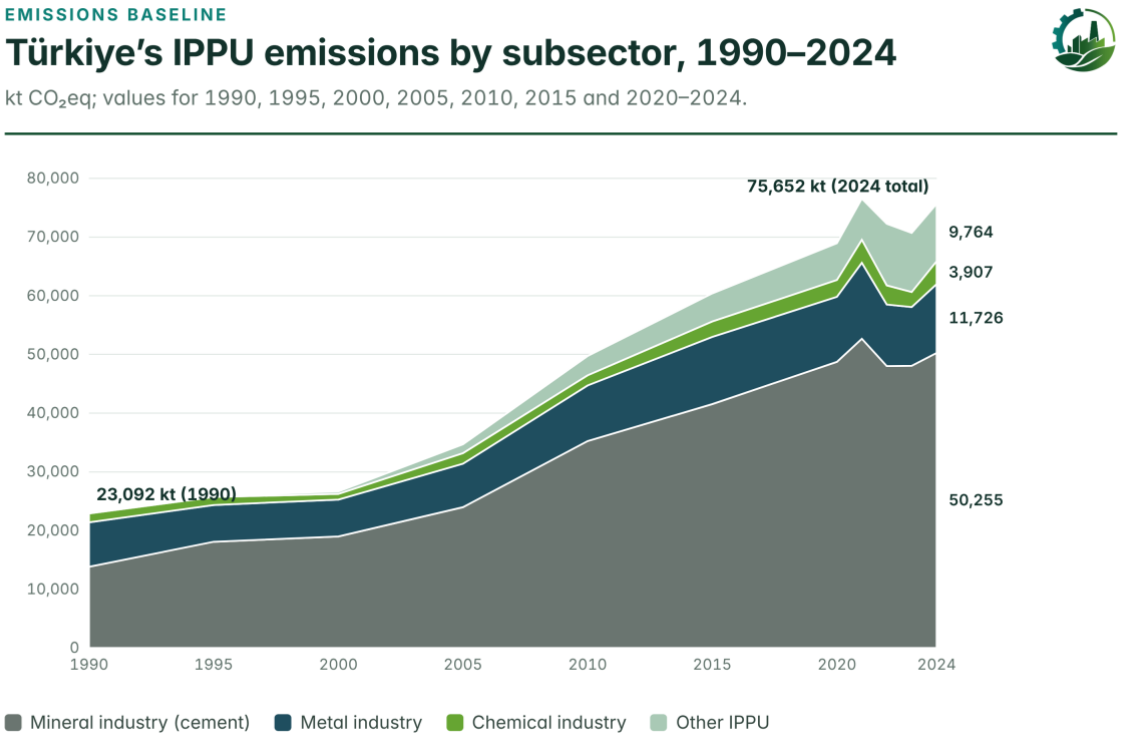


Figure 2-4: Türkiye IPPU Emissions by Subsector (1990-2024) (kt CO_2eq)
(Source: Türkiye NID 2026 (submitted to UNFCCC, April 2026), Table 2.7.)

2.2.3 CBAM Exposure and Trade Implications

CBAM exposure varies significantly in scale and structure across the four priority sectors but converges on a shared strategic risk: the transfer of an unpriced carbon cost onto Turkish exporters at the EU border unless carbon prices paid domestically are recognised for deduction under the CBAM.

Cement sector carries a defined but contained near-term exposure: Türkiye exported approximately 21.9 Mt of cement and clinker in 2025 (15 Mt of cement and 6.9 Mt of clinker), of which around 5.4 Mt (approximately 25%) was destined for the EU-27 (3.2 Mt of cement and 2.2 Mt of clinker)[61] — a trade volume for which CBAM cost pass-through is calculable but which does not, on its own, threaten the sector's overall EU market position.

[61] Turkish Cement Manufacturers' Association. (2025). *Cement exports statistics, 2025.*

Iron and steel sector's exposure is both larger and faster-growing: EU-bound exports grew 76% in 2024 to reach 3.8 Mt (41% growth in long products, 86% in flat products), placing an increasing share of sector revenue directly in CBAM's path.[62] The compounding risk is regulatory rather than purely financial; according to TÇÜD, the planned tightening of EU steel import quotas could reduce Turkish steel export volumes to the EU by as much as 60%[63], a materially larger threat to the sector than the CBAM carbon cost itself.

Aluminium sector's CBAM exposure is structurally different from the other three sectors: because the industry is recycling-based, its own process emissions are comparatively low, so its principal CBAM risk lies not in domestic production but in the Scope 3 emissions embedded in imported primary aluminium ingots, which must be tracked, reported, and ultimately reduced to avoid CBAM liabilities accruing on inputs the sector does not itself produce[64].

Fertiliser sector has a limited but structurally persistent exposure: ammonia and nitrogenous fertilisers fall within CBAM's product scope, and because domestic ammonia production is gas-fed, the sector's embedded carbon intensity — and therefore its CBAM cost exposure — is directly tied to feedstock choice rather than to a technology gap that can be closed quickly[65]. Because the sector is driven mainly by domestic agricultural demand and fertiliser exports totalled only about USD 300 million in 2023, its direct CBAM exposure is limited in volume, and the more immediate carbon-cost exposure arises under the TR ETS (Section 3.1.4).

Across all four sectors, the single most consequential unresolved policy variable is the extent to which carbon prices paid under the TR ETS will be recognised for deduction from CBAM obligations (Article 9 of the CBAM Regulation), which determines whether Turkish exporters pay for carbon once or twice (see Section 2.1.2).

Available at: https://view.officeapps.live.com/op/TurkCimento_İhracat2025

[62] KPMG Türkiye. (2025). Çelik Sektörel Bakış 2025. Available at: https://kpmg.com/tr/tr/insights/2025/08/celik-sektorel-bakis-2025.html

[63] S&P Global Commodity Insights. (2026). Interview: EU safeguard measures, CBAM expansion threaten Turkish steel industry – TCUD (13 January 2026). Available at: https://www.spglobal.com/energy/en/news-research/latest-news/metals/011326-interview-eu-safeguard-measures-cbam-expansion-threaten-turkish-steel-industry---tcud

[64] MoIT, (2023a), *op. cit.*

[65] MoIT, (2024a), *op. cit.*

2.3 Financing Landscape

This section maps the global and domestic climate finance architecture available to Türkiye's industrial sectors, the strategy for mobilising private capital, and the principal financing challenges.

2.3.1 Global Climate Finance Architecture

Global climate finance reached USD 1.9 trillion in 2023, exceeding USD 2 trillion for the first time in 2024[66]. Private climate finance exceeded USD 1 trillion in 2023 for the first time[67].

Despite this, access to affordable capital in emerging markets including Türkiye remains constrained by higher financing costs, shorter tenors, and limited blended finance capacity.

The UNFCCC COP29 New Collective Quantified Goal (NCQG) committed to at least USD 300 billion/year in climate finance to developing countries by 2035, with a broader goal of USD 1.3 trillion/year from all sources[68].

Table 2-2: Financial Mechanisms

Mechanism	Total Pledges / Scale	Sector Focus	Access for Türkiye	Key Instrument
Green Climate Fund (GCF)	**USD 13+ billion pledged**	Mitigation & adaptation; industry-relevant	Limited access (classification); not eligible advocacy ongoing	Concessional loans, grants, guarantees
Climate Investment Funds (CIF) — Industry Decarbonisation Program	**USD 1 billion global IDP (seven countries); Türkiye s-TIP requests an indicative USD 250 million in CIF**	Cement, iron and steel, aluminium, chemicals — Türkiye selected Jun. 2025	ACTIVE — Türkiye s-TIP submitted to the CTF Trust Fund Committee (Sept. 2026); implementing	Concessional; USD 1:12 co-finance ratio (Türkiye s-TIP: 1:11.2)

[66] Climate Policy Initiative (CPI). *Global Landscape of Climate Finance 2025.* Available at: https://www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2025/
[67] Ibid.
[68] UNFCCC. (2024). *COP29 UN Climate Conference agrees to triple finance to developing countries, protecting lives and livelihoods*. Available at: https://unfccc.int/news/cop29-un-climate-conference-agrees-to-triple-finance-to-developing-countries-protecting-lives-and

Mechanism	Total Pledges / Scale	Sector Focus	Access for Türkiye	Key Instrument
	IDP concessional resources[69]; USD 11.6 billion total CIF		MDBs: ADB, EBRD, IBRD, IFC	
Asian Development Bank (ADB)	**Interim Country Partnership Strategy 2025-2027: USD 1 billion by end-2025 and USD 3 billion per year in 2026 and 2027[70] (all sectors, not industry-specific)**	No dedicated ADB industry decarbonisation programme for Türkiye yet, although ADB has been allocated an indicative USD 50 million under the Türkiye CIF IDP s-TIP (facility decarbonisation window); ADB's regional private-sector operations have supported industrial decarbonisation and hydrogen TA elsewhere in Asia and could be a future TIDIP co-financing partner	EMERGING — Türkiye, an ADB member since 1991, became a regional member on 6 May 2025[71], currently not a TIDIP Joint Declaration signatory	Ordinary capital resources lending; public and private sector
Clean Technology Fund (CTF)	**USD 8.93 billion contributions**	Clean energy and industrial technology	Active via EBRD/World Bank; ETS development support	Concessional loans; USD 1:12 catalytic

[69] Climate Investment Funds (2026). Seven Countries Developing Investment Plans to Decarbonize Heavy Industry, 22 May 2026. Available at: https://www.cif.org/news/seven-countries-developing-investment-plans-decarbonize-heavy-industry; Climate Investment Funds (2026). Türkiye Industry Decarbonization Program Investment Plan (s-TIP), CTF/TFC.38/3, 14 September 2026. Available at: https://www.cif.org/sites/cif_enc/files/2026-09/ctf_tfc.38_03_turkiye-industry-s-tip_09142026.pdf

[70] Asian Development Bank (2025). ADB Launches Operations in Türkiye with $3 Billion Annual Financing Planned for 2026-2027, 13 November 2025. Finance. Available at: https://www.adb.org/countries/turkiye

[71] Asian Development Bank (2025). ADB Welcomes Türkiye as Regional Member. Available at: https://www.adb.org/news/adb-welcomes-turkiye-regional-member

Mechanism	Total Pledges / Scale	Sector Focus	Access for Türkiye	Key Instrument
Global Environment Facility (GEF)	**USD 5+ billion annual portfolio**	Industrial efficiency; circular economy; capacity building	Active; historical Turkish recipient	Grants; enabling activity co-financing
EU Innovation Fund	**EUR 10+ billion (2020-2030)**	Large-scale CCUS, hydrogen, industrial demonstration	Accessible via EU accession process; CBAM alignment	Competitive grants for demonstration projects
World Bank Group (IBRD and IFC)	**Multi-billion annual climate envelope**	Lending through public sector borrowers (IBRD); private sector (IFC); Policy Development TA (PMI ETS support)	TIDIP MDB partners (Joint Declaration signatories)	IBRD loans, guarantees, grants; IFC loans, equity/quasi-equity products, participation to capital market issuances; TA programs
EBRD (EBRD Green Economy Transition (programme)(GET))	**Contributes, with other partners, to the Joint Declaration quantitative ambition of over EUR 5 billion of decarbonisation projects under implementation in line with TIDIP objectives (not an institution-specific commitment)**	Private sector industrial decarbonisation; SMEs	TIDIP MDB partner (Joint Declaration signatory); active Turkish portfolio	Loans, equity, guarantees; concessional blending, TA programs
Bilateral donors (EU, Germany, UK, US)	**USD billions collectively**	Industrial decarbonisation; just transition; CCUS; H_2	Active in Türkiye via MDB co-financing	Grants; concessional loans; TA; debt swaps

Türkiye's selection as one of seven inaugural countries for the CIF Industry Decarbonisation Program[72] positions Türkiye at the forefront of a global clean industry finance ecosystem. The CTF's co-finance ratio of USD 1:12 means well-structured investment projects can generate exceptionally high leverage ratios for commercial capital mobilisation. The Türkiye IDP investment plan (s-TIP; CTF/TFC.38/3, 14 September 2026) requests an indicative USD 250 million in CIF IDP concessional resources (USD 228 million for facility decarbonisation, USD 20 million for shared enabling infrastructure and USD 2 million for project preparation and technical assistance), expected to leverage USD 2,798 million in MDB and private co-financing, an overall leverage ratio of 1:11.2.[73]

2.3.2 Domestic Climate Finance Landscape

The Republic of Türkiye Sustainable Finance Framework (2021) of the Ministry of Treasury and Finance, Guidelines on Green, Sustainable and Social Capital Market Instruments and Guidelines on Sustainability Linked Capital Market Instruments published by the CMB in August 2026[74], and 2025 Communiqué on Banks' Green Asset Ratio Calculation provide a partial enabling framework. The Türkiye Green Taxonomy Regulation, which entered into force on 24 September 2026[75], is the critical catalyst for scaling domestic green industrial finance.

Several domestic development banks, such as TSKB (mobilizing funds from other development finance institution(s) (DFIs) and international capital markets for long term, thematic funding), TKYB (green finance through international credit lines); Eximbank (export finance aligned with climate change); commercial banks and leasing companies play significant role with growing green lending portfolios supported by BRSA's Sustainable Banking Strategic Plan[76]. Commercial banks and leasing companies are also very keen on extending their funding base via green and blue bond issuances in international and domestic

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[72] Climate Investment Funds (CIF). (2025a). *Annual Report 2025*, *Roots for Resilience and Ambition*. p.12. Available at: https://www.cif.org/sites/cif_enc/files/knowledge-documents/cif-annual-report-2025.pdf

[73] Climate Investment Funds (2026). Türkiye Industry Decarbonization Program Investment Plan (s-TIP), CTF/TFC.38/3, 14 September 2026. Available at: https://www.cif.org/sites/cif_enc/files/2026-09/ctf_tfc.38_03_turkiye-industry-s-tip_09142026.pdf

[74] Capital Markets Board of Türkiye (CMB). (2026). Guidelines on Green, Sustainable and Social Capital Market Instruments and Guidelines on Sustainability Linked Capital Market Instruments, adopted by CMB Board decision of 13 August 2026; English translations not yet published on the CMB website. Press release available at: https://spk.gov.tr/duyurular/basin-duyurulari/2026/yesil-surdurulebilir-ve-sosyal-sermaye-piyasasi-araclari-rehberi-ve-surdurulebilirlik-baglantili-sermaye-piyasasi-araclari-rehberi-basin-duyurusu

[75] Official Gazette. (2026). Türkiye Green Taxonomy Regulation, Official Gazette No. 33380, 24 September 2026; Climate Change Presidency announcement available at: https://iklim.gov.tr/turkiye-yesil-taksonomisi-yonetmeligi-yayimlandi-haber-6008

[76] Banking Regulation and Supervision Agency (BRSA). (2021). *2022-2025 Sustainable Banking Strategic Plan*. Available at: https://www.bddk.org.tr/KurumHakkinda/EkGetir/18?ekId=360

capital markets. DFIs like EBRD, IFC, DEG and Proparco are also active in financing them either through extending credit facilities or investing in their bond issuances. QNB Türkiye's October 2024 dual issuance, a green bond of up to USD 100 million (IFC and EBRD each investing up to USD 50 million) and Türkiye's first blue bond of up to USD 25 million (IFC as sole investor), illustrates this DFI–commercial bank co-financing model and is a relevant precedent for TIDIP-linked instruments.

The relative early-stage status of this domestic framework, particularly while the Green Taxonomy, in force since September 2026, is operationalised through its technical screening criteria, means that near-term financing will depend on international concessional and blended instruments, with domestic institutions playing a more prominent co-financing and distribution role while green finance definitions, sector benchmarks, and appraisal tools mature (Section 5.1.3.5). TSKB and TKYB's existing DFI credit lines are the most readily deployable channel for blending international concessional finance with domestic lending capacity in the interim.

The CMB Guidelines on Green, Sustainable and Social Capital Market Instruments do not preclude industrial transition projects: their eligible green project types include climate change mitigation projects such as hydrogen (production, transport, storage and related infrastructure) and carbon capture and storage, alongside renewable energy, energy efficiency, pollution prevention and control and circular economy activities. Eligibility under the CMB Guidelines and classification as environmentally sustainable under the Türkiye Green Taxonomy are distinct assessments: a project eligible under the Guidelines is not automatically taxonomy-aligned, and the fact that the taxonomy's technical screening criteria are not yet complete does not by itself prevent such projects from being financed under the Guidelines. Where taxonomy alignment is sought, the taxonomy's substantial-contribution and do-no-significant-harm criteria apply; the related near-term priority is to ensure that the technical screening criteria, once published, provide clear pathways for the industrial decarbonisation activities identified in the LCPs.

The domestic financing gap is not evenly distributed across the four sectors. Cement sector's CBAM exposure is contained, and its LCP investment profile front-loads lower-risk efficiency measures (Section 3.1.1), making it a plausible early candidate for domestic green lending once eligibility criteria are in place. Iron and steel and fertiliser sectors, by contrast, combine growing carbon-cost exposure — through CBAM for steel and primarily through the TR ETS for fertiliser (Sections 3.1.2 and 3.1.4) — with capital requirements concentrated in frontier

technologies such as DRI-EAF and green ammonia, and are therefore more likely to require blended or concessional structuring for longer, even once the Taxonomy's technical screening criteria are published and applied. Domestic financial institutions' product design should reflect this differentiation rather than apply a uniform green-lending approach across sectors.

Borrower-side constraints also apply. The TSRS, which are mandatory for entities covered by the Board Decisions of the Public Oversight, Accounting and Auditing Standards Authority (POA) that exceed the specified threshold criteria, require Scope 1, 2 and 3 GHG disclosure by these entities[77], creating the corporate data baseline the Green Asset Ratio mechanism will eventually rely on (Annex II). In practice, however, most industry facilities do not yet hold carbon footprint baselines calculated to CBAM or TR ETS standard, meaning that even taxonomy-eligible projects may struggle to meet banks' green-lending due-diligence requirements.

2.3.3 Private Capital Mobilisation Strategy

The USD 70+ billion investment need to 2053[78] requires a Private Capital Mobilisation Strategy (PCMS) structured around four pillars, drawing on the OECD Climate Club Financial Toolkit (2026 Update)[79]:

Pillar 1 — De-risking instruments: First loss guarantees, political risk insurance, and currency risk mitigation. Carbon Contracts for Difference (CCfD) are the highest-impact single instrument for CCUS and hydrogen projects — bridging the gap between prospective TR ETS prices and the ~USD 200/t threshold required for commercial viability[80].

Pillar 2 — Blended finance structures: Blended finance structures combining concessional and commercial financing — to be designed by implementing MDB partners[81] in accordance with applicable fund governance frameworks.

[77] Public Oversight, Accounting and Auditing Standards Authority (POA/KGK). Board Decisions on the scope of TSRS application and the related Procedures and Principles. Available at: https://kgk.gov.tr
[78] MoIT & MDB Partners, (2025), *op. cit.*
[79] OECD, (2026), *op. cit.*
[80] Global CCS Institute. (2025). *Carbon Contracts for Differences in Europe*. Available at: https://www.globalccsinstitute.com/wp-content/uploads/2025/08/Carbon-Contracts-for-Differences-in-Europe-Global-C.pdf
[81] CIF. (2025b). *Industry Decarbonization Investment Program*. Available at: https://www.cif.org/industry-decarbonization

Pillar 3 — Demand-side signals: Expanding the 2024 Green Cement Communiqué[82] to private procurement; green public procurement standards for low-carbon steel; buy-clean commitments from major industrial consumers. These signals improve offtake certainty and bankability.

Pillar 4 — Capital market development: Transition bonds and sustainability-linked bonds; green sukuk; infrastructure bonds for long-tenor assets. The Türkiye Green Taxonomy, in force since September 2026, is an important enabling condition for standardised and widely credible green bond issuance; labelled issuances under ICMA Green Bond Principles[83] and the CMB Guidelines adopted in August 2026 remain accessible to corporate issuers.

The PCMS will be developed in full detail in Section 5.1.2 (Financing Strategy).

2.3.4 Key Financing Challenges

Several structural constraints currently limit the pace at which financing can be mobilised for the four industry sectors, and these constraints, rather than the underlying technologies themselves, are frequently the binding factor on project bankability.

When the technical screening criteria of the Türkiye Green Taxonomy are published and applied, taxonomy-based eligibility framework will support labelled green bond and loan markets for the industry sectors, constraining the depth and international comparability of Turkish green capital markets. The IPPS and TIDIP's project pipeline function are designed to identify and advance eligible investments as the Taxonomy is operationalised, providing market participants with a pipeline of verifiable transition investment opportunities under the CMB Guidelines in force (August 2026), which adapt the ICMA Green Bond Principles and the ICMA Sustainability Linked Bond Principles[84,85,86,87].

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[82] MoEUCC. (2024b). *Communiqué on the Promotion of the Use of Low-Carbon Green Cement in Public Procurement Contracts*. Available at: https://www.resmigazete.gov.tr/eskiler/2024/03/20240316-3.htm

[83] International Capital Market Association (ICMA). (2022). *Green Bond Principles (GBP).* Available at: https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/green-bond-principles-gbp

[84] International Capital Market Association (ICMA). Sustainability-Linked Bond Principles (SLBP). Available at: https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/sustainability-linked-bond-principles-slbp/

[85] Capital Markets Board of Türkiye (CMB). (2026). *Guidelines on Green, Sustainable and Social Capital Market Instruments.* Available at: https://www.spk.gov.tr/surdurulebilirlik (not yet available in English) *; CMB. (2026). Guidelines on Sustainability Linked Capital Market Instruments. Both Guidelines were adopted by CMB Board decision of 13 August 2026; English translations have not yet been published on the CMB website.*

[86] Ministry of Treasury and Finance (MoTF). (2021). *Sustainable Finance Framework.* Available at: https://ms.hmb.gov.tr/uploads/2021/11/Republic-of-Turkey-Sustainable-Finance-Framework.pdf

[87] BRSA, (2021), *op. cit.*

Emerging technologies such as CCUS, DRI, and green hydrogen carry elevated technology, offtake, regulatory, and first-mover risk that conventional lenders are typically not positioned to absorb. Compounding this, most industry facilities lack the internal capacity to prepare bankable investment proposals.[88,89]

Concessional finance remains scarce relative to the at least USD 70 billion (excluding the full cost of shared enabling infrastructure) investment need identified across the four sectors[90], making leverage through CIF and MDB blending instruments critical rather than supplementary.

Finally, two financial challenges recur across all four sectors: insufficient long-term financing for capital intensive, innovative, new emerging technologies and limited capacity to assess the financial viability of such projects.

These challenges are addressed in detail — including the specific financing instruments and institutional roles appropriate to each in the Financing Strategy set out in Section 5.1.2.

2.4 Capacity and Readiness

This section assesses the institutional, stakeholder, and project-preparation capacity currently available to create desired investment pipeline and identifying the gaps.

2.4.1 Institutional and Stakeholder Capacity

Türkiye's institutional capacity for managing industrial decarbonisation has developed substantially through the LCP process. The steel association TÇÜD has been particularly active in this regard, publicly quantifying an average investment need of approximately USD 1 billion per year through 2053.

[88] MoIT & MDB Partners, (2025), *op. cit.*
[89] TIDIP Secretariat. (2025). *Technical Proposal for Secretariat of the Türkiye Industrial Decarbonisation Investment Platform (TIDIP)*.
[90] MoIT & MDB Partners, (2025), *op. cit.*

A dense network of sector associations already underpins the industry's ecosystem, each with their own governance, technical, or advocacy function. In the cement sector, Türkçimento represents 53 integrated plants and 16 grinding units (only 3 integrated plants and 5 grinding units are not the members of Türkçimento). The TÜRKÇİMENTO AKADEMİ delivers sector training on ETS, EU Taxonomy, and sustainability governance. The Cement, Glass, Ceramics and Soil Products Exporters Association (ÇCSIB) complements this role by coordinating export policy and market intelligence relevant to CBAM compliance and competitiveness agenda.

In iron and steel, TÇÜD leads sector engagement, with particular emphasis on ETS free allocation, CBAM advocacy, and trade policy; its General Assembly in May 2025 addressed the sector's decarbonisation investment needs directly. The Turkish Steel Exporters' Association (ÇİB), representing more than 3,400 companies, serves as the primary CBAM compliance interface for the sector, while the Flat Steel Exporters and Manufacturers' Association (YİSAD) and Cold Rolling, Galvanized and Coated Coil Manufacturers Association (SOGAD), representing the flat steel and cold rolling sub-sectors respectively, have been designated participants in the iron and steel LCP's Monitoring and Evaluation Committee.

In aluminium, the Turkish Aluminium Industrialists Association (TALSAD), Aluminium Test, Training and Research Centre (ALUTEAM), Entrepreneur Aluminium Industrialist & Businessman Association (GALSİAD), and Turkish Foundry Association (TÜDÖKSAD) together form a full sector cluster, providing technical testing, R&D support, foundry representation, and entrepreneurial sector engagement respectively.

On the demand side, THBB (Turkish Ready Mixed Concrete Association) and TMB (Turkish Contractors Association) are key stakeholders whose engagement on embodied carbon standards and green public procurement is essential for creating domestic demand for low-carbon cement and steel. Finally, TÜBİTAK and TENMAK (Turkish Energy, Nuclear and Mineral Research Agency) remain the country's primary national R&D institutions supporting the technology pathways of the IFAs.

Workforce capacity building is a related institutional need that should be made explicit alongside this sector-association landscape. Industry sounding sessions indicate that workers across all four sectors will need retraining to operate new low-carbon technologies (e.g. DRI-EAF, CCUS, electrolysis-based ammonia synthesis).

2.4.2 Project Preparation and Bankability Constraints

Beyond the availability of finance itself, a distinct set of project preparation constraints currently limits the number of eligible investments. Most industry facilities lack product base GHG emissions calculated to the standard required for CBAM and pilot-phase MRV compliance under the TR ETS Regulation in force since 27 August 2026, and many lack the internal technical capacity to conduct the techno-economic analysis needed to develop a credible, company-level decarbonisation roadmap. This is the gap that TÜBİTAK's 1831 programme addresses for SMEs. For frontier technologies such as CCUS, Direct Reduced Iron - Electric Arc Furnace route (DRI-EAF), green hydrogen, and inert anode technology, a further layer of uncertainty stems from the lack of operating experience under Turkish conditions, compounding the technology risk already inherent in these routes. This is reinforced by the current absence of enabling infrastructure: CO_2 transport networks, hydrogen supply chains, industrial PPA frameworks, and geological storage sites do not yet exist at the scale the LCPs require.

3 Goal: Industry Decarbonisation Pathways

This section presents the core analytical backbone of the IPPS: the four sectoral LCPs and the five cross-sectoral IFAs derived from them. The LCPs, developed by the MoIT with EBRD support, establish scenario-based emission trajectories, technology deployment timelines, investment cost estimates, and policy recommendations for each of the four TIDIP priority sectors. The IPPS synthesizes these sectoral analyses into a unified strategic framework without introducing parallel scenarios or replacing the analytical depth of the individual LCPs, to which the reader is directed for detailed sector-level findings.

3.1 Sectoral Low Carbon Pathways (LCPs)

Each LCP models four scenarios across the 2023-2053 horizon: (i) Without Measures (WoM) Scenario; no additional decarbonisation action; (ii) Stated Policy Scenario (SPS); current policies implemented as stated; (iii) LCP Scenario; least-cost optimal mitigation scenario with all feasible technologies and financial/regulatory policies; and (iv) Frontier Technologies Scenario (FTS) most ambitious scenario with earlier and more aggressive deployment of frontier technologies. The LCP scenario is the IPPS's strategic reference pathway[91].

Note on data basis: *The sector overviews below present the LCPs' own 2022 baseline figures, held constant as the fixed starting point of each 2023-2053 scenario. These figures may differ from the more recent industry-association statistics presented in Section 2.2.1 (e.g., 2024 capacity data from* TÇÜD *and Türkçimento), which describe the sectors' current economic scale rather than the LCP modelling baseline. The two data sets serve different purposes and are not interchangeable.*

[91] MoIT, (2023a), *op. cit.*

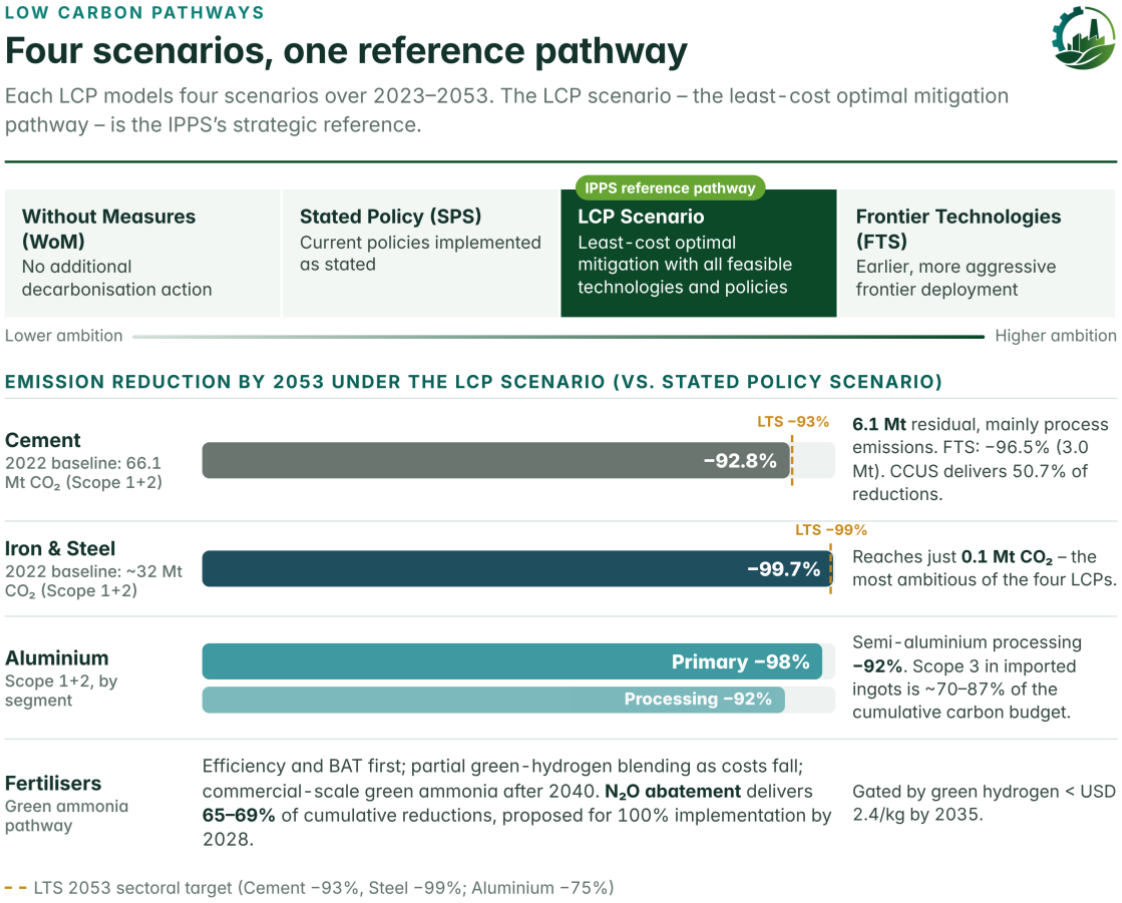


Figure 3-1: LCP Scenario Framework and 2053 Emission Reduction Outcomes

3.1.1 Cement Industry

Sector overview and emissions profile: Türkiye is the world's prominent cement exporter and the fifth-largest cement producer globally. In the LCP's 2022 baseline, the sector operated 56 integrated factories and 21 grinding plants, producing 72.4 Mt of clinker and 77.0 Mt of cement, with combined Scope 1 and Scope 2 emissions of 66.1 Mt CO_2. Under the Without Measures scenario, emissions would rise to 89.4 Mt CO_2 by 2053; under the Stated Policy Scenario, to 84.8 Mt CO_2. The LCP scenario achieves a 92.8% reduction against the Stated Policy Scenario by 2053, leaving 6.1 Mt CO_2 of residual emissions, primarily process

emissions not capturable by CCUS, while the Frontier Technologies Scenario reaches a 96.5% reduction, or 3.0 Mt CO_2.[92]

Key decarbonisation levers: The LCP identifies nine technology and input levers in order of deployment priority:[93]

Two operate continuously across all phases: recarbonation, the natural re-absorption of CO_2 by concrete over its service life, accounts for a 13.5% reduction from the Without Measures baseline on its own, while grid emission improvement, driven by renewables-based grid decarbonisation, reduces Scope 2 emissions by a further 5.2%. Through the near and medium term (2023-2038), thermal efficiency improvements from kiln optimisation and BAT adoption, increased use of alternative fuels such as RDF/SRF and biomass, enabled by MBT facility development and contributing a 9.1% reduction from Without Measures by 2053, and clinker substitution using blast furnace slag, fly ash, and calcined clay (LC3), which together with concrete efficiency measures deliver a combined 14.0% reduction, form the core of the sector's near-term effort, alongside Waste Heat Recovery for on-site electricity generation. Within clinker substitution, LC3 (Limestone Calcined Clay Cement) merits particular attention: it can reduce CO_2 emissions by up to 40% (LC3 Project)[94] relative to Ordinary Portland Cement while maintaining comparable strength and durability, and Türkiye's widely available clay and limestone resources make it a favourable near-term substitution pathway; its deployment, however, remains constrained by the same building-code and cement-standard restrictions on SCM content discussed under Areas of Regulatory Uncertainty. From 2034 onward, the pathway shifts toward frontier technologies: green hydrogen for thermal energy, contingent on cost trajectory, and above all CCUS, which becomes the dominant lever for final decarbonisation delivering 50.7% (45.4 Mt CO_2) of total emission reductions in the LCP scenario by 2053 and representing the technological prerequisite for reaching the LTS's -93% sectoral target. Process improvement and BAT adoption such as digital monitoring, energy management, kiln benchmarking run in parallel across all phases as an enabling layer beneath these technology transitions.

[92] MoIT. (2024b). *A Low Carbon Pathway for the Cement Sector in the Republic of Türkiye*.
Available at: https://www.ebrd.com/content/dam/ebrd_dxp/assets/pdfs/green-economy-transition/low-carbon-pathways/Cement
[93] Ibid.
[94] LC3 Project – Limestone Calcined Clay Cement. Available at: https://lc3.ch/

Investment requirements: Total nominal investment cost for the LCP scenario: USD 29.8 billion (2023-2053). NPV at 7% discount rate: USD 6.2 billion. Investment is heavily back-loaded: USD 0.8 billion in 2024-2030 (renewables and efficiency); USD 0.9 billion in 2031-2040 (BAT, alternative fuels); USD 28.2 billion in 2041-2053 (dominated by CCUS at NPV USD 5.0 billion). Annualised NPV requirement: USD 499 million/year across 2023-2053.[95]

Table 3-1. Investment Requirements for Cement Decarbonisation

Period	Nominal Investment	Focus
2024-2030	USD 0.8 billion	Renewables and efficiency
2031-2040	USD 0.9 billion	BAT, alternative fuels
2041-2053	USD 28.2 billion	CCUS-dominated (NPV USD 5.0 billion)
Total (2023-2053)	**USD 29.8 billion**	**NPV @ 7%: USD 6.2 billion; annualised: USD 499 m/year**

Implementation roadmap:[96]

Table 3-2: Cement Implementation Roadmap

Phase	Period	Key Actions
1	2023-2025	Baseline MRV alignment; clinker substitution studies; WHR incentive enhancement; MBT facility planning; CBAM MRV preparation; CCUS feasibility studies initiated
2	2026-2033	TR ETS integration; alternative fuel scale-up; major WHR rollout; industrial symbiosis network development; green cement public procurement standards

[95] Ibid., p.55
[96] Ibid.

Phase	Period	Key Actions
3	2034-2038	CCUS pilot installations; advanced clinker substitution at scale; green hydrogen cost monitoring and first commercial trials; BAT full deployment
4	2039-2053	Large-scale CCUS deployment; commercial-scale green hydrogen for thermal energy; net-zero production at leading facilities; full CO_2 transport and storage network operation

Structural strengths and challenges: Türkiye's position as the world's fifth-largest producer is the sector's primary strategic asset, providing an established export base from which to capture emerging low-carbon product premiums. Three structural challenges remain, however: clinker substitution is constrained by current cement standards, which limit the share of supplementary cementitious materials that can be used without further standards revision; the investment pathway is heavily back-loaded and dominated by large-scale CCUS expenditure after 2040, creating a late-stage investment-cliff risk if the CO_2 transport and storage framework is not established in time (see Investment requirements above); and the sector faces competitiveness risk from cement imports originating in countries that have not adopted equivalent decarbonisation measures, requiring active trade-policy monitoring alongside CBAM implementation.

3.1.2 Iron and Steel Industry

Sector overview and emissions profile: In the LCP's 2022 baseline, Türkiye ranked 8th globally in crude steel production, with 35.1 million tonnes, and was the second-largest producer in Europe. Production was dominated by the EAF/IF route at 71.6% of capacity, with the remaining 28.4% via integrated BF-BOF; a route mix that underpins a marked emission-intensity gap between the two technologies: EAF averages 0.29 t CO_2/t steel (Scope 1: 0.04; Scope 2: 0.25), against 2.20 t CO_2/t steel for BOF. Total sector emissions were approximately 32 Mt CO_2 (Scope 1+2) in 2022. Of the four sectoral LCPs, steel sets the most ambitious

target: the LCP scenario achieves a 99.7% reduction against the Stated Policy Scenario by 2053, reaching just 0.1 Mt CO_2[97].

Key decarbonisation levers: The sector's technology pathway builds its already EAF-dominant structure. EAF route optimisation remains the backbone of production across all phases, with EAF share held at approximately 62% under the LCP by 2053, contingent on secure scrap supply and renewable electricity access[98]. Natural-gas-based DRI-EAF, introduced from 2029, provides an early, commercially manageable route for partially decarbonising BOF-route production, ahead of the shift to 100% green-hydrogen DRI-EAF from 2043. This requires green hydrogen below USD 2.4/kg by 2035 (the national hydrogen strategy target) and reaches 25% of total production (21.8 Mt) by 2053 under the LCP. NG-DRI, which in the Steel LCP technology assessment reduces emissions by 1.33 tCO_2 per tonne of steel when replacing the blast furnace (against an integrated-route intensity of 2.20 tCO_2 per tonne in Türkiye)[99] and is deployable ahead of green hydrogen infrastructure maturing, is the critical medium-term transition pathway bridging near-term EAF efficiency upgrades and long-term H_2-DRI; Carbon Contracts for Difference and shared infrastructure are essential policy complements given the scale of investment required. In parallel, BAT upgrades to existing BF-BOF facilities begin immediately in 2024, followed by partial hydrogen injection into blast furnaces (Hydrogen Pulverized Coal Injection (H_2PCI) from 2035 and natural-gas-based DRI-Melt-BOF from 2036 as intermediate steps for integrated facilities that cannot transition directly to EAF). From 2044, CCUS is layered onto remaining BF-BOF capacity, reaching 12% of production (10.8 Mt) by 2053 and delivering a further 16.2 Mt CO_2 of reductions, with biomass co-firing providing supplementary mitigation for the facilities that remain.

Investment requirements: Key figures are summarized below[100]:

- Average annual investment 2023-2033: USD 333 million (LCP), USD 602 million (FTS).
- Average annual investment 2034-2043: USD 1.3 billion (LCP), rising to USD 1.7 billion (LCP) in 2044-2053 with CCUS deployment.

[97] MoIT, (2023b), *op. cit.*
[98] Ibid.
[99] Ministry of Industry and Technology / EBRD (2023). A Low Carbon Pathway for the Steel Sector in the Republic of Türkiye. Table 3 (p. 39) and Section 1 (p. 32).
[100] Ibid.

- Total cumulative investment: between USD 31-34 billion depending on technology mix and hydrogen cost trajectory.
- NPV of total investment at a 7% discount rate over 2023-2053: approximately USD 11 billion under the LCP scenario and USD 12.5 billion under FTS.

Table 3-3: Investment Requirements for Iron and Steel Decarbonisation

Period	Average Annual Investment (LCP)	Note
2023-2033	USD 333 million	USD 602 million under FTS
2034-2043	USD 1.3 billion	—
2044-2053	USD 1.7 billion	CCUS deployment period
Total Cumulative	**USD 31-34 billion**	**Range depends on technology mix and hydrogen cost trajectory**

TÇÜD *separately estimates an average sector-wide investment requirement of approximately USD 1 billion per year across the full 2023-2053 period, broadly consistent with the LCP's own cumulative range.*

Implementation roadmap:[101]

Table 3-4: Iron and Steel Implementation Roadmap

Phase	Period	Key Actions
1	2023-2025	MRV and CBAM compliance preparation; EAF efficiency benchmarking; scrap supply studies; renewable electricity PPA regulatory engagement; BAT upgrades to existing BF-BOF facilities (from 2024)
2	2026-2033	TR ETS integration; natural-gas DRI-EAF pilots from 2029; CCUS feasibility studies; scrap quality certification development; Technology Tracking Platform established
3	2034-2043	Hydrogen injection into blast furnaces (H_2PCI, from 2035); natural-gas and 100% green-hydrogen DRI-Melt-BOF replacing blast furnaces (from 2036); 100% green-hydrogen DRI-EAF (from 2043); preparation of CCUS on

[101] MoIT, (2023b), *op. cit.*

Phase	Period	Key Actions
		integrated facilities ahead of deployment from 2044; hydrogen supply chain development
4	2044-2053	Large-scale CCUS on BF-BOF route; 100% green-H_2 DRI at scale; near-zero integrated steel production

Structural strengths and challenges: The sector's EAF-dominated structure is its primary strategic asset in the transition, providing a structural carbon-cost advantage over BF-BOF-dominated competitors under CBAM. Four structural challenges remain, however: high dependence on imported scrap and energy inputs; relatively low R&D and innovation capacity for value-added, low-carbon products; trade risk from the compounding effect of EU safeguard measures and CBAM; and the commercial complexity of transitioning remaining BF-BOF capacity within a viable timeframe[102].

3.1.3 Aluminium Industry

Sector overview and emissions profile: In the LCP's 2022 baseline, Türkiye's aluminium sector produced 82,000 tonnes of primary aluminium at the Eti Aluminium facility in Seydişehir and 1.91 Mt of semi-aluminium processing products (extrusion, rolling, casting, forging), with semi-aluminium output growing at an 8.6% Compound Annual Growth Rate (CAGR) between 2012 and 2021[103]. The sector exported USD 6.7 billion of aluminium products in 2022, of which 61.8% by value went to the EU; the highest EU export concentration among the four focus sectors. The primary aluminium facility benefits from a favourable emission intensity of 5.34 t CO_2/t Al (Scope 1+2), well below the global average of 17 t CO_2/t Al, owing to its high renewable electricity use.

Emissions structure and decarbonisation challenge: The defining feature of the aluminium LCP is the dominant role of imported, embedded Scope 3 emissions: approximately 75% of semi-aluminium processing inputs are imported primary ingots, carrying an average embedded intensity of approximately 10.7 t CO_2/t Al. As a result, Scope 3 emissions dominate

[102] Ibid.
[103] MoIT, (2023a), *op. cit.*

the sector's total carbon budget — 821 Mt CO_2 under the Without Measures scenario over 2023-2053. This indicates the sector's decarbonisation challenge requires managing imported supply-chain emissions in parallel with domestic process decarbonisation.[104]

Key decarbonisation levers[105]: On the primary aluminium side, the pathway follows a sequenced technology transition from coal boiler to gas boiler (2028) to concentrated solar thermal boiler (2032) for digestion, hydrogen calciner for calcination (2047), and inert anode technology for smelting (2040) collectively reducing primary aluminium Scope 1 and 2 emissions by 98% against the Stated Policy Scenario by 2053. Semi-aluminium processing follows a parallel path, transitioning to advanced reverberatory furnaces, then electric reverberatory furnaces from 2040, with Carbon Capture and Storage (CCS) integration on furnaces between 2040 and 2047, achieving a 92% Scope 1 and 2 reductions by 2053. Alongside these process transitions, the LCP raises the recycled scrap share from approximately 25% today to 35% (LCP) or 50% (FTS) by 2053, contingent on improved ELV and Waste Electrical and Electronic Equipment (WEEE) collection systems and increases renewable electricity's share of energy consumption to 50% by 2053. Given that input-related Scope 3 emissions embedded in imported aluminium ingots account for roughly 70-87% of the sector's cumulative 2023-2053 carbon budget across the LCP scenarios[106] , expanding secondary (recycled) aluminium production — which requires nearly 10 to 15 times less energy than primary production[107] — is the highest-impact near-term intervention available to the sector and merits more prominence than a generic electrification narrative; accelerating ELV/WEEE scrap collection infrastructure is therefore a priority enabling investment in its own right, not only a contingency for the recycled-share target. Because Scope 3 emissions dominate the sector's footprint, supply-chain decarbonisation is treated as a lever in its own right: prioritising ingot imports from low-carbon sources, tracking and reporting embedded emissions for CBAM compliance, and engaging international suppliers on their own decarbonisation roadmaps.

[104] Ibid.
[105] Ibid.
[106] Ministry of Industry and Technology / EBRD (2023). A Low Carbon Pathway for the Aluminium Sector in the Republic of Türkiye. Figure 3 (p. 16); share calculated by the TIDIP Secretariat from cumulative 2023-2053 carbon budgets (e.g. 488.2 of 597.2 Mt CO_2 under the Stated Policy Scenario).
[107] Ministry of Industry and Technology / EBRD (2023). A Low Carbon Pathway for the Aluminium Sector in the Republic of Türkiye. p. 14.

Investment requirements[108]: Total NPV of investment at a 7% discount rate is USD 1.73 billion under the LCP scenario (USD 2.25 billion under FTS). Primary aluminium accounts for NPV USD 176 million, with technology investment concentrated in 2028-2047. Semi-aluminium processing represents the largest share at NPV USD 1.55 billion, or 88.9% of the total, comprising USD 0.96 billion brownfield and USD 2.73 billion greenfield investment at nominal cost. Renewable energy investment adds a further USD 0.67 billion nominal to support a 50% renewable electricity share by 2053.

Table 3-5: Investment Requirements for Aluminium Decarbonisation

Component	NPV (LCP, 7% discount)	Share
Primary Aluminium	USD 176 million	—
Semi-aluminium Processing	USD 1.55 billion	88.9% of total
Renewable Energy	USD 0.67 billion (nominal)	Supports 50% renewable share by 2053
Total	**USD 1.73 billion (LCP)**	**USD 2.25 billion under FTS**

Note: NPV figures (Primary Aluminium, Semi-aluminium Processing, Total) and the nominal Renewable Energy figure are not additive — the LCP source (Fig. 60-61) presents them on separate bases. Nominal total for semi-aluminium processing (brownfield + greenfield + renewable) = USD 4.37 billion, consistent with the HDU model's "Aluminium Processing" total of USD 4.36 billion.

Investment by phase: *The underlying LCP report does not provide a year-by-year disbursement schedule; it reports investment costs at the level of individual technologies; each anchored to its deployment year. The table below maps these technology-level costs onto the roadmap's three phases, which is the most granular breakdown available without further LCP modelling work*[109].

[108] MoIT, (2023a), *op. cit.*
[109] Ibid., p.63.

Table 3-6 Aluminium Investment by phase

Phase	Period	Primary aluminium	Semi-aluminium Processing	Renewable Energy
1	2023-2025	— (No technology capex; scrap inventory, PPA strategy, CBAM reporting preparation)	— (preparatory phase)	—
2	2026-2038	Gas boiler (2028) and CST boiler (2032) deployment	Advanced reverberatory furnace transitions begin	Renewable capacity build-up toward the 2053 target
3	2039-2053	Inert anode (2040, ~USD 400 million — the single largest technology cost) and hydrogen calciner (2047)	Electric reverberatory furnaces at scale from 2040; CCS integration 2040-2047	Renewable share reaches 50% of total energy consumption by 2053

Implementation roadmap[110]:

Table 3-7: Aluminium Implementation Roadmap

Phase	Period	Key Actions
1	2023-2025	Scrap supply inventory; domestic collection improvement studies; renewable electricity access strategy; CBAM reporting preparation; PFC emissions monitoring established
2	2026-2038	TR ETS integration; advanced reverberatory furnace transitions; inert anode feasibility studies; CST boiler installation at Eti Alüminyum; supply chain emissions tracking
3	2039-2053	Inert anode deployment (2040); electric reverberatory furnaces at scale; CCS integration on processing facilities; full supply-chain decarbonisation through low-carbon ingot procurement

[110] MoIT, (2023a), *op. cit.*

3.1.4 Fertiliser Industry

Sector overview and emissions profile: Türkiye's fertiliser sector is of strategic importance to national food security and agricultural export revenues. Ammonia-based fertiliser production is principally via natural-gas-fed Haber-Bosch processes. The sector is among the most energy- and carbon-intensive chemical manufacturing activities globally. Natural gas feedstock represents approximately 70-80% of ammonia production costs and is the primary embedded carbon source for CBAM compliance purposes[111]. The sector faces two compounding pressures: CBAM certificate obligations accruing on imports from 2026, since ammonia and nitrogenous fertilisers fall within CBAM scope, and feedstock cost exposure to natural gas price volatility through BOTAŞ supply contracts.

Key decarbonisation levers: The fertiliser LCP structures the sector's transition around a progressive shift from fossil-gas-based to green-hydrogen-based ammonia production, with energy efficiency and process electrification as near-term levers and green ammonia as the long-term decarbonisation technology[112]. Energy efficiency improvements under the Law No. 5627 EEP/ECR programmes and BAT upgrades to existing ammonia plants provide the near-term abatement, ahead of the shift to green hydrogen: partial blending into Haber-Bosch processes begins as costs decline, before the pathway reaches full commercial-scale green ammonia production through electrolysis-based nitrogen synthesis, consistent with the LTS's industrial chemicals pathway.

Two levers deserve more explicit treatment alongside these: N_2O catalytic abatement in nitric acid production is a high-impact, low-CAPEX intervention that is investable today, ahead of any hydrogen cost trajectory, and should be prioritised as an immediate near-term action; and blue ammonia — natural-gas-based ammonia production paired with carbon capture — merits treatment as a transitional pathway alongside green ammonia, given the current green hydrogen cost differential and Türkiye's existing gas supply infrastructure through BOTAŞ.

Investment requirements: The sector's investment pathway is highly sensitive to the green hydrogen cost trajectory: achieving green hydrogen below USD 2.4/kg by 2035— consistent with the Hydrogen Strategy's 2035 cost target — is the gating condition for the commercial

[111] MoIT, (2024a), *op. cit.*
[112] Ibid.

viability of green ammonia at scale. Under the fertiliser LCP (published February 2024), investment needs to 2053 are estimated at USD 5.26 billion under the LCP scenario and USD 7.66 billion under the Frontier Technologies Scenario, dominated by renewable energy, heat pump, and organic/organomineral fertiliser investments, with green and blue ammonia the fourth-largest investment category; a domestic-production variant, under which all raw materials are produced within Türkiye rather than imported, would require approximately USD 16.6 billion[113,114].

Table 3-8: Investment Requirements for Fertiliser Decarbonisation

Period	Indicative Focus	Investment Status
2024-2030	N_2O abatement (full by 2028), efficiency, BAT, MRV/CBAM preparation; first green ammonia (about 5% by 2030)	Near-term, lower capital intensity
2031-2040	Green and blue ammonia scale-up (green ammonia about 30% by 2040); partial H_2 blending; Organised Industrial Zone (OIZ)-level projects	Medium-term, rising capital intensity
2041-2053	Green ammonia at scale (80-90% penetration by 2053)	Long-term, electrolysis/renewables-dominated
Total (2023-2053)	**USD 5.26 billion (LCP) / USD 7.66 billion (FTS)**	**Fertiliser LCP published February 2024**

Implementation roadmap: As with the investment figures above, the periods below follow the investment periods used in the fertiliser LCP published in February 2024 (2024-2030, 2031-2040 and 2041-2053); the LCP itself schedules its mitigation measures in three phases: Phase 1 (2024-2025), Phase 2 (2026-2038) and Phase 3 (2039-2053)[115].

[113] Ibid.
[114] Ministry of Energy and Natural Resources (MENR). (2023). *Türkiye Hydrogen Technologies Strategy and Roadmap*. Available at: https://enerji.gov.tr//Media/Dizin/SGB/en/HSP_en/ETKB_Hydrogen_T_Strategies.pdf
[115] MoIT, (2024a), *op. cit.*

Table 3-9: Fertiliser Implementation Roadmap

Phase	Period	Key Actions
1	2024-2030	N_2O catalytic abatement in nitric acid plants (full implementation by 2028); energy efficiency improvements under Law No. 5627 EEP/ECR programmes; BAT upgrades to existing ammonia plants; MRV and CBAM carbon-accounting preparation; feasibility studies and first projects for green ammonia (about 5% penetration by 2030 under the LCP scenario)
2	2031-2040	Scale-up of green ammonia (to about 30% penetration by 2040 under the LCP scenario) alongside blue ammonia; partial green hydrogen blending into Haber-Bosch processes as hydrogen costs decline; OIZ-level projects with access to renewable electricity and electrolysis infrastructure
3	2041-2053	Green ammonia production at commercial scale (80-90% penetration by 2053); electrolysis-based nitrogen synthesis; near-zero fertiliser production consistent with the LTS industrial chemicals pathway

Structural strengths and challenges: The sector's alignment with green initiatives, reflected in growing industry interest in green ammonia, organic/organomineral (OM) fertilisers, and net-zero ambitions, together with an ongoing shift toward renewable energy and continued capacity expansion, are identified in the fertiliser LCP as the sector's primary strategic assets[116].

Three structural challenges remain. First, production and supply are highly sensitive to market conditions and price fluctuations, which can lead to production stoppages. Second, the sector is vulnerable to external shocks, including geopolitical developments and exchange-rate volatility, because around 95% of fertiliser production inputs are imported. Third, direct exposure to CBAM is relatively limited, as the sector is driven mainly by domestic agricultural demand and fertiliser exports totalled only about USD 300 million in 2023. However, exposure to the TR ETS is more significant due to the emission-intensive nitric acid production process.

[116] Ibid.

The emission intensity of nitric acid production in Türkiye is approximately 68% higher than the EU average.

3.2 Investment Focus Areas (IFAs) across Industries

The five IFAs covered under TIDIP activities represent the cross-sectoral investment themes that cut across all four sectors. Each IFA is analytically grounded in the sectoral LCPs, is supported by Türkiye's emerging policy framework, and identifies specific technology, infrastructure, and financing needs.

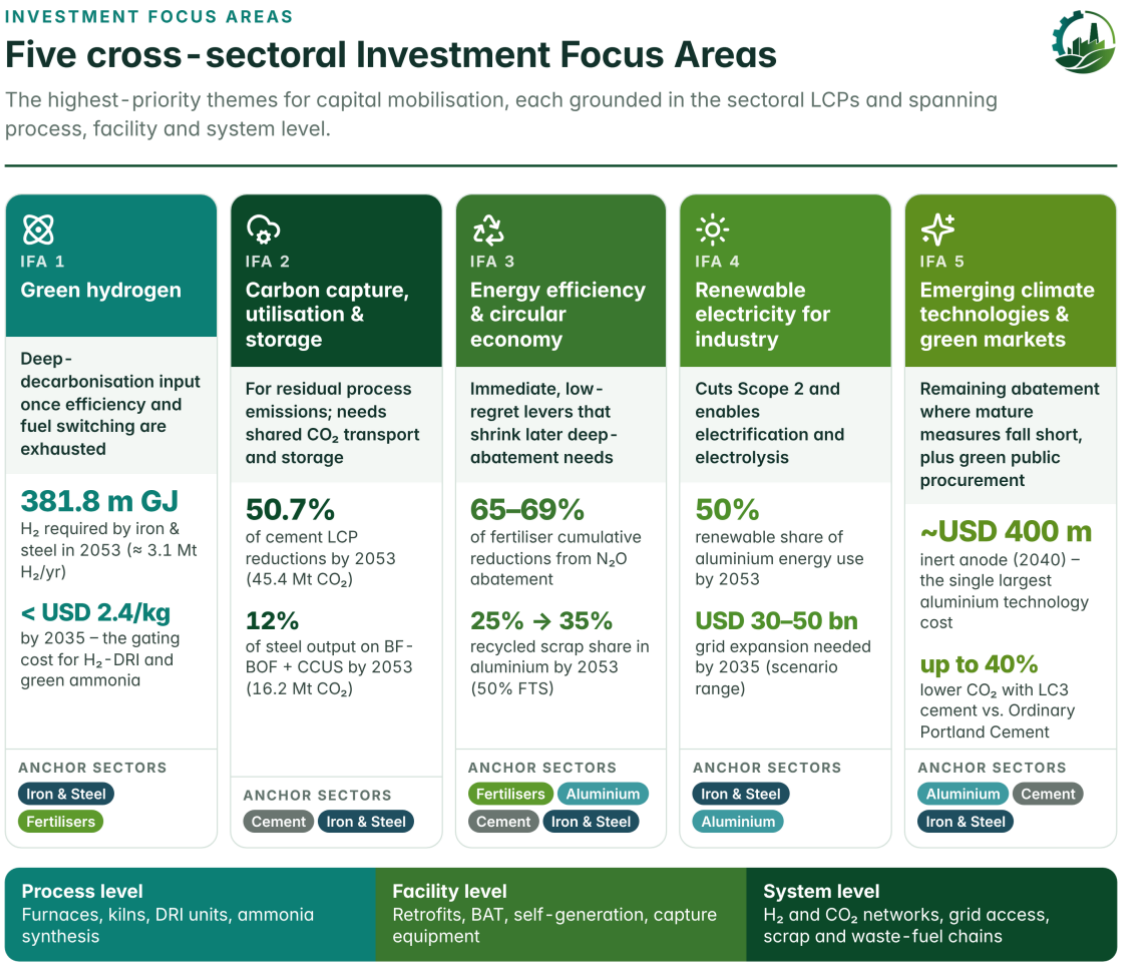


Figure 3-2: Five Cross-Sectoral Investment Focus Areas

3.2.1 Green Hydrogen

Green hydrogen is positioned as a deep-decarbonisation input for Türkiye's hard-to-abate industries, with relevance rising as the transition moves beyond efficiency and incremental fuel switching. In Türkiye, this need is sharpened by the start of the CBAM definitive period on 1 January 2026, with certificate obligations accruing on 2026 imports across the four sectors, which increases the value of credible pathways to reduce embedded emissions for exported products[117,118]. Among the four LCP focus sectors, green hydrogen applies at process level, facility level, and system level through production, storage, and distribution infrastructure that enables industrial offtake at scale.

Purpose, sectoral relevance and needs: Green hydrogen has different applications across hard-to-abate sectors. Hydrogen-based DRI route is the main source of hydrogen usage in iron and steel sector. Iron and steel sector LCP suggests a long-run requirement of 381.8 million GJ of hydrogen in 2053[119]. In fertilisers, the LCP treats green and blue ammonia as the second most important mitigation measure (17-20% of cumulative reductions), with phased uptake, after N_2O abatement (65-69%; Section 3.2.3). Cement and aluminium reference hydrogen more selectively as longer-term process or fuel options[120,121]. Across sectors, hydrogen requires a system-scale investment focus requiring coordinated supply and demand development. Türkiye's institutional context supports a cross-sector approach, as highlighted in the Hydrogen Technology Strategy and Roadmap[122]. Iron and steel and fertilisers provide the clearest anchor demand signals; synchronizing them strengthens bankability for shared infrastructure and reduces duplication across sectors.

Technology maturity and supply chain: Electrolysis is technically established, but the reviewed LCPs for the four focus sectors frame industrial use as a mid- to long-term scaling theme, with near-term focus on readiness and early deployment. In Türkiye, this interacts with the evolving carbon policy architecture, and the carbon price trajectory is a key variable for hydrogen-linked projects.

[117] European Parliament & Council of the European Union, (2023), *op. cit.*
[118] European Commission, (2023), *op. cit.*
[119] MoIT, (2023b), *op. cit.*
[120] MoIT, (2024b), *op. cit.*
[121] MoIT, (2023a), *op. cit.*
[122] MENR, (2023), *op. cit.*

The upstream operations of green hydrogen consist of renewable electricity supply for electrolysis and electrolyser equipment. Midstream consists of hydrogen production hubs, storage, and distribution, whereas downstream operations focus on industrial conversion and integration of green hydrogen to DRI units, ammonia synthesis adaptations and hydrogen-ready combustion and safety systems. Türkiye's immediate constraints are framed around cost competitiveness, infrastructure gaps, and offtake frameworks rather than technical feasibility alone.

Existing projects and aggregated LCP demand outlook: Türkiye's R&D channel is tangible, with TENMAK grant calls for hydrogen technologies, indicating an emerging domestic innovation base to support early pilots and capacity building[123]. This foundation is further strengthened by dedicated national R&D and demonstration programmes, notably TÜBİTAK 1832 (Industrial Green Transformation) and 1833 (SAYEM Green Transformation), which provide structured funding for pilot-scale, late-stage R&D, and industry-academia collaboration platforms[124,125]. These programmes play a critical role in bridging the gap between feasibility studies and early commercial deployment. In parallel, targeted financial support under Investment Incentive Decree No. 9903 enhances the investment for hydrogen production and storage infrastructure by offering preferential treatment for green transformation investments. However, the commercial viability of scaling green hydrogen production is closely tied to access to competitively priced renewable electricity, particularly for electrolysers. In this context, limitations in the current regulatory framework governing long-term power purchase agreements (PPAs) under the EMRA framework constrain industrial consumers' ability to secure stable, low-cost renewable electricity supply. On the demand side, LCPs show that demand of green hydrogen in Türkiye is back-loaded and system-critical. Fertiliser sector shows early penetration milestones, while iron and steel sector provides a quantified long-run demand signal at 2053 scale. In Türkiye's CBAM and ETS context, near-term priorities are therefore enabling investments (renewables access, pilots, hydrogen-ready assets), with scaling aligned to infrastructure and carbon price maturation.

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[123] Turkish Energy, Nuclear and Mineral Research Agency (TENMAK). (2023). *Hydrogen Technologies and Fuel Cell Calls and Carbon Capture, Utilization and Storage (CCUS) Calls*. Available at: https://en.bilgem.tubitak.gov.tr/en/tenmak-project-and-scholarship-support-tracking-system-project-started-operations

[124] The Scientific and Technological Research Council of Türkiye (TÜBİTAK). (2025a). *1832 Call for Green Transformation in Industry.* Available at: https://tubitak.gov.tr/en/funds/industrial/national-support-programs/1832-call-green-transformation-industry

[125] TÜBİTAK. (2024). *1833 - SAYEM Green Transformation Call*. Available at: https://tubitak.gov.tr/en/funds/industrial/national-support-programs/1833-sayem-green-transformation-call

3.2.2 Carbon Capture, Utilisation and Storage (CCUS)

Carbon capture, utilisation and storage (CCUS) is positioned as a set of technologies to decarbonise Türkiye's hard-to-abate industries where residual process emissions remain after efficiency, fuel switching, and material measures. In the cement sector, the LCP explicitly states that reduction of process emissions is limited and therefore CCUS plays a major role in meeting emission reduction goals. In iron and steel sector, CCUS appears as a late-stage complement to hydrogen-based transitions for achieving net-zero by 2053.

In Türkiye's context, CCUS is framed as a cross-sector investment theme because it requires not only capture equipment but also CO_2 transport and storage infrastructure to enable deployment at scale. Among the four LCP focus sectors, CCUS applies at facility level (e.g., cement kilns and integrated steel routes) and system level through CO_2 aggregation, transport and storage networks.

Purpose, sectoral relevance and needs: CCUS has differentiated roles across the four sectors, with the highest quantified relevance in cement. In cement sector, the LCP quantifies that CCUS reduces 45.4 Mt of emissions in the LCP scenario and that the impact of CCUS is 50.7% of total emissions reduction compared to the WoM scenario. Furthermore, the LCP for cement reports the NPV of CCUS investment as USD 4.98 billion, including capture, transportation and storage costs[126]. In iron and steel sector, CCUS is positioned as a later-stage component of the pathway that complements hydrogen-based transformation in order to achieve deep reductions by 2053. CCUS technologies account for 12% of the output in 2053 and deliver 16.2 Mt of CO_2 reduction in 2053[127]. In aluminium industry, CCS appears as an integration option in semi-aluminium processing technology pathways, but it is not presented as the primary near-term lever relative to electricity and scrap dynamics. In fertilisers industry, the LCP modelling notes that negative emissions outcomes under LCP imply that CO_2 needed for urea production will need to be supplied from other sources if green ammonia dominates the market. Across sectors, CCUS therefore requires system-scale planning where early anchor facilities can justify shared CO_2 transport and storage infrastructure.

[126] MoIT, (2024b), *op. cit.*
[127] MoIT, (2023b), *op. cit., p.20*

Technology maturity and supply chain: Scaling of CCUS is constrained by full-chain readiness and enabling conditions. In cement sector, the LCP indicates CCUS as a "breakthrough technology" that is not expected to be deployed in the near term within modelling assumptions. In iron and steel sector, the LCP shows CCUS entering the modelled technology mix in 2044 for BF-BOF route archetypes.

The upstream operations of CCUS consist of capture system design, equipment packages and plant integration activities at industrial facilities. Midstream consists of CO_2 dehydration/compression, aggregation and transport logistics. Downstream focuses on storage site development, storage operations and monitoring arrangements. Türkiye's immediate constraints in the LCP framing relate primarily to infrastructure and enabling frameworks rather than the absence of a technical pathway.

Existing projects and aggregated LCP demand outlook: Demand is structurally highest in cement sector (where CCUS underpins most residual abatement) and material in iron and steel sector as a complement to hydrogen-enabled route changes. In Türkiye's trade-exposed context described in the LCPs (CBAM-linked reporting and competitiveness pressure), near-term priorities implied by the roadmaps are enabling investments (storage screening, early capture demonstrations, and clustering/transport planning) that unlock large-scale deployment in the later horizon. In this context, early development efforts are supported by national and international initiatives, including TÜBİTAK SAYEM platform development for CCUS technology R&D and adaptation through the SAYEM Industrial Innovation Networks Programme, alongside upcoming large-scale EU- and EBRD-funded CCUS projects that are expected to play a critical role in advancing demonstration and scaling efforts[128].

3.2.3 Energy Efficiency and Circular Economy

Energy efficiency and circular economy are positioned in the LCPs as immediate, low-regret levers for Türkiye's hard-to-abate industries: they reduce fuel and electricity demand, improve input productivity, and lower the scale of later deep-abatement requirements. In Türkiye's sector context, this IFA is also linked to structural characteristics highlighted in the LCPs,

[128] TÜBİTAK. (2023). *1704 - SAYEM - Industrial Innovation Networks*. Available at: https://tubitak.gov.tr/en/funds/sanayi/ulusal-destek-programlari/1704-sayem-industrial-innovation-networks

notably the strong role of EAF-based steel production (and its dependence on electricity emissions and scrap availability), and Türkiye's growing semi-aluminium processing base where domestic scrap supply growth lags demand. Among the four LCP focus sectors, energy efficiency and circularity apply at process and facility level (retrofits, optimisation, best available techniques), and at system level (scrap collection/quality, waste-derived fuels, and secondary material value chains).

Purpose, sectoral relevance and needs: The purpose of energy efficiency and circular economy, and the inclusion of this in the IFAs is to capture early abatement while strengthening competitiveness and resilience. In fertiliser sector, the LCP quantifies the dominance of "quick-impact" measures: N_2O abatement delivers 65-69% of cumulative reductions and is proposed for 100% implementation by 2028, supported by available technology. Fertiliser "use efficiency" contributes 8-9% and is treated largely as operational/capacity-building rather than other CAPEX-heavy options[129]. In cement sector, the LCP decomposition quantifies meaningful contributions from efficiency and related levers: 23.7% of additional reductions are attributed to thermal efficiency, electricity efficiency and hydrogen/alternative fuels in the LCP narrative decomposition, while CCUS dominates the residual abatement[130]. In iron and steel sector, the LCP highlights Türkiye's EAF advantage: the EAF route average intensity is reported as 0.29 tCO_2/t steel (with a large Scope 2 component), and the sector's continued decarbonisation is tied to grid emissions and scrap inputs[131]. In aluminium sector, the LCP provides a concrete circularity constraint: recycled scrap supply reached 330,000 tonnes in 2021 but is not growing fast enough to meet semi-aluminium processing demand; semi-aluminium processing reached 1.91 Mt (2021), indicating why scrap system maturity matters[132]. Across sectors, these needs converge on shared infrastructure: scrap collection and upgrading systems, waste stream quality management (for cement fuels), and plant-level modernisation programmes.

Technology maturity and supply chain: Most of the measures are largely commercially mature and deployable in the near term, which is why they appear early in the sector's timelines. This includes concrete, sector-specific applications such as kiln and process optimisation in cement manufacturing via reducing specific thermal energy consumption

[129] MoIT, (2024a), op. cit.
[130] MoIT, (2024b), *op. cit.*
[131] MoIT, (2023a), *op. cit.*
[132] MoIT, (2023b), *op. cit.*

(kcal/kg clinker) and electrical energy consumption (kWh/tonne cement) through BAT implementation, digital monitoring, and continuous process benchmarking; waste heat recovery installations in cement industry for electricity self-generation. In iron and steel sector, EAF efficiency upgrades in steel through energy management systems, transformer upgrades, heat recovery, and scrap pre-heating; advanced reverberatory furnace transitions in aluminium as near-term emission reduction and energy cost measures; and fertiliser plant energy auditing and optimisation through BAT adoption, heat integration, and energy management systems.

The listed measures are closely tied to the development of circular and symbiotic value chains. This includes the use of blast furnace slag and fly ash as cement additives, the expansion of RDF and SRF supply chains from municipal waste, the valorisation of red mud from aluminium production, and the strengthening of scrap collection and quality certification systems. In fertiliser sector, the LCP states the N_2O catalytic abatement system (≥95% capture) is currently available and proposes full implementation by 2028.

The upstream operations of this IFA include efficient equipment supply and engineering services for plant retrofits and upgrades. Midstream includes circular input systems such as scrap collection/sorting/processing, industrial by-product logistics, and waste-derived fuel preprocessing. Downstream operations focus on plant integration, operations and maintenance practices, and assurance of input quality (scrap grades, alternative fuel specifications, substitute materials) to sustain performance. Constraints in Türkiye's context as described in the LCPs include ageing assets, uneven maturity of scrap and waste collection systems, and the financing and skills needed for widespread retrofit programmes.

Existing projects and aggregated LCP demand outlook: Aggregated demand is front-loaded and persistent. Efficiency and circular economy investments are required immediately (to 2030) and remain important throughout the horizon because they reduce the size, cost and risk of later hydrogen and CCUS deployments. Key enabling conditions for scaling this investment area are already partially in place within the policy and support landscape. Access to national support mechanisms such as the EEP Support Programme[133] and the ECR Support Programme[134] is critical to enable qualifying industrial facilities to implement energy efficiency

[133] MENR. (2025a). *Implementation Procedures and Principles on the Efficiency Enhancement Project Support Program*. Available at: https://enerji.gov.tr/Media/(VAP)_Destek_Programi_Hakkinda_Uygulama_Usul_Esaslari.pdf
[134] MENR. (2026). *Implementation Procedures and Principles on the Energy and Carbon Reduction (ECR) Support Program.*

and carbon reduction investments on a scale. These programmes provide direct financial support for efficiency upgrades, process optimisation, and emissions reduction measures, thereby lowering upfront investment barriers and improving project bankability.

In parallel, the widespread adoption of energy management systems, particularly ISO 50001 certification, serves as an important institutional enabler. For smaller facilities and supply chain actors, targeted technical support programmes such as TÜBİTAK 1831 Climate-informed and Green Innovation Technology Extension Program play a complementary role by providing mentoring, building internal capacity, supporting decarbonisation roadmaps, and facilitating access to financial and technical assistance.

Finally, unlocking circular economy and alternative fuel pathways requires modernizing RDF framework. Addressing current bottlenecks in waste classification, permitting, and inter-municipal waste logistics is essential to scale the availability of high-quality alternative fuels, thereby enabling higher substitution rates and delivering immediate emissions reductions at relatively low cost.

3.2.4 Renewable Electricity for Industry

Renewable electricity is positioned as a cross-cutting requirement for Türkiye's industrial decarbonisation because it reduces Scope 2 emissions in electricity-intensive routes and enables electrification and electrolysis assumptions embedded in the LCP mitigation pathways. In Türkiye, steel production is dominated by EAF/IF routes and aluminium is strongly oriented toward semi-processing (and imports of primary metal), both of which make electricity emissions central to competitiveness. Among the four LCP focus sectors, renewable electricity applies at facility level in the form of self-generation and procurements, applies at process level as electric furnaces and electrified auxiliaries, and at system level in the form of grid decarbonisation and industrial access to low-carbon electricity.

Purpose, sectoral relevance and needs: In iron and steel sector, the LCP notes that Türkiye's relatively high grid emissions constrain further reductions despite the EAF structural advantage; the EAF route intensity is reported as 0.29 tCO_2/t steel with most emissions in

Available at: *https://enerji.gov.tr/(EKA)_Destek_Programi_hakkinda_Uygulama_Usul_ve_Esaslari.pdf*

Scope 2, underscoring why renewables and grid decarbonisation are pivotal. In aluminium sector, the roadmap quantifies renewables within investment needs: it assumes renewable share in energy consumption reaches 50% by 2053, with a renewable energy investment cost of USD 0.67 billion in the LCP scenario, and highlights that the primary producer's electricity is predominantly hydropower-based (assuming no climate risk will occur in the mentioned dam and water resources, which is relatively unlikely as the main electricity source is located in a closed basin and has recently confronted water scarcity) while further solar investments are being pursued. In fertiliser sector, the LCP indicates renewable energy consumption penetration reaching 80-90% by 2053 and identifies renewable energy investments among major capex items across scenarios. In cement sector, grid emission improvements are quantified in the LCP decomposition as 5.2% of emission reduction (with CCUS dominating the remainder), and renewables also intersect with onsite generation options such as waste heat recovery and plant electricity efficiency. Across sectors, the combined need is therefore both direct (Scope 2 reduction) and enabling (hydrogen and electrified technology viability).

Technology maturity and supply chain: In Türkiye, renewable electricity generation is mature, but the LCPs frame industrial deployment constraints primarily around integration, access and scale relative to industrial load. Upstream operations include renewable project development and equipment supply. Midstream includes grid connection, transmission/distribution capacity and contracting structures for industry, as well as metering/assurance for emissions accounting. Downstream operations include industrial energy management, electrified process integration, and electrolysis loads where hydrogen pathways scale. Türkiye's constraints in the LCPs are expressed through the "bottleneck" effect of grid emissions on EAF steel and the structural importance of electricity sourcing for aluminium, indicating that renewable electricity access is a binding condition for low-carbon product competitiveness.

Existing projects and aggregated LCP demand outlook: According to the LCPs, there is high demand for renewable electricity in the focus sectors of the LCPs. Near-term pressure is highest in iron and steel and aluminium due to immediate Scope 2 exposure, while fertilisers' renewable electricity needs grow in strategic importance as green ammonia pathways scale. For the cement sector, renewable electricity is supportive but not sufficient alone, functioning as part of an integrated lever set where CCUS remains decisive for net-zero pathways.

3.2.5 Emerging Climate Technologies and Green Markets

Emerging climate technologies are positioned in the LCPs as necessary to deliver the remaining abatement required, as Türkiye's sectors move toward 2053 net-zero endpoints, particularly where mature measures are not sufficient to achieve net-zero and residual emissions remain. These emerging climate technology options differ by industry and are complemented by evolving green market instruments, including the expansion of green public procurement, building on the 2024 Green Cement Communiqué to introduce embodied carbon standards for steel and aluminium in public construction and infrastructure procurement. Aluminium industry needs additional frontier technologies for deeper reductions. Iron and steel industry introduces frontier options after the 2040s to reach net-zero. For the cement sector, the LCP highlights electrification/plasma and microwave technologies as additional green energy sources and technologies for kiln heat, alongside hydrogen. In addition, novel cement binder chemistry, including LC3 (calcined clay-limestone), geopolymer binders, and other low-carbon cementitious materials, is identified as a key innovation pathway to further reduce process emissions. Further, LCP for the cement sector, includes recarbonation as an emerging accounting/mitigation lever (CO_2 sink) and recommends incorporating it in calculation/verification, reflecting "green markets" relevance through credible carbon accounting. The LCP for the iron and steel sector explicitly highlights hydrogen-based direct reduced iron (DRI) and hydrogen replacing pulverized coal injection as a key technology that add upon the green hydrogen technologies in the sector. In LCP for the aluminium sector identified inert anode as a major additional frontier technology, as well as boiler transition options such as CST boiler (in the frontier pathway chart) and indicates alternative boiler technology changes alongside inert anode/hydrogen calciner sequencing. Lastly, the LCP of the fertiliser sector explicitly highlights N_2O catalytic abatement systems as a key technology that is currently available and can deliver large near-term reductions.

4 Incremental Gap Analysis: What Needs to Happen

This section translates the LCP analysis into a structured assessment of what additional system-level and infrastructure requirements must be met, what investment flows must be activated, and what policy gaps must be closed to deliver the sectoral decarbonisation pathways described in Section 3. It provides the analytical bridge between the general and specific targets of the LCPs and the strategic steps to be taken for proper implementation.

4.1 System and Infrastructure Needs

Achieving the LCP emission reduction trajectories requires not only industrial facility-level investments in low-carbon production technologies but also the development of shared enabling infrastructure that creates the physical and institutional conditions for multiple facilities to decarbonise simultaneously. The LCPs identify several categories of system-level infrastructure needs that cut across all four sectors, and that cannot be addressed by individual companies acting alone.

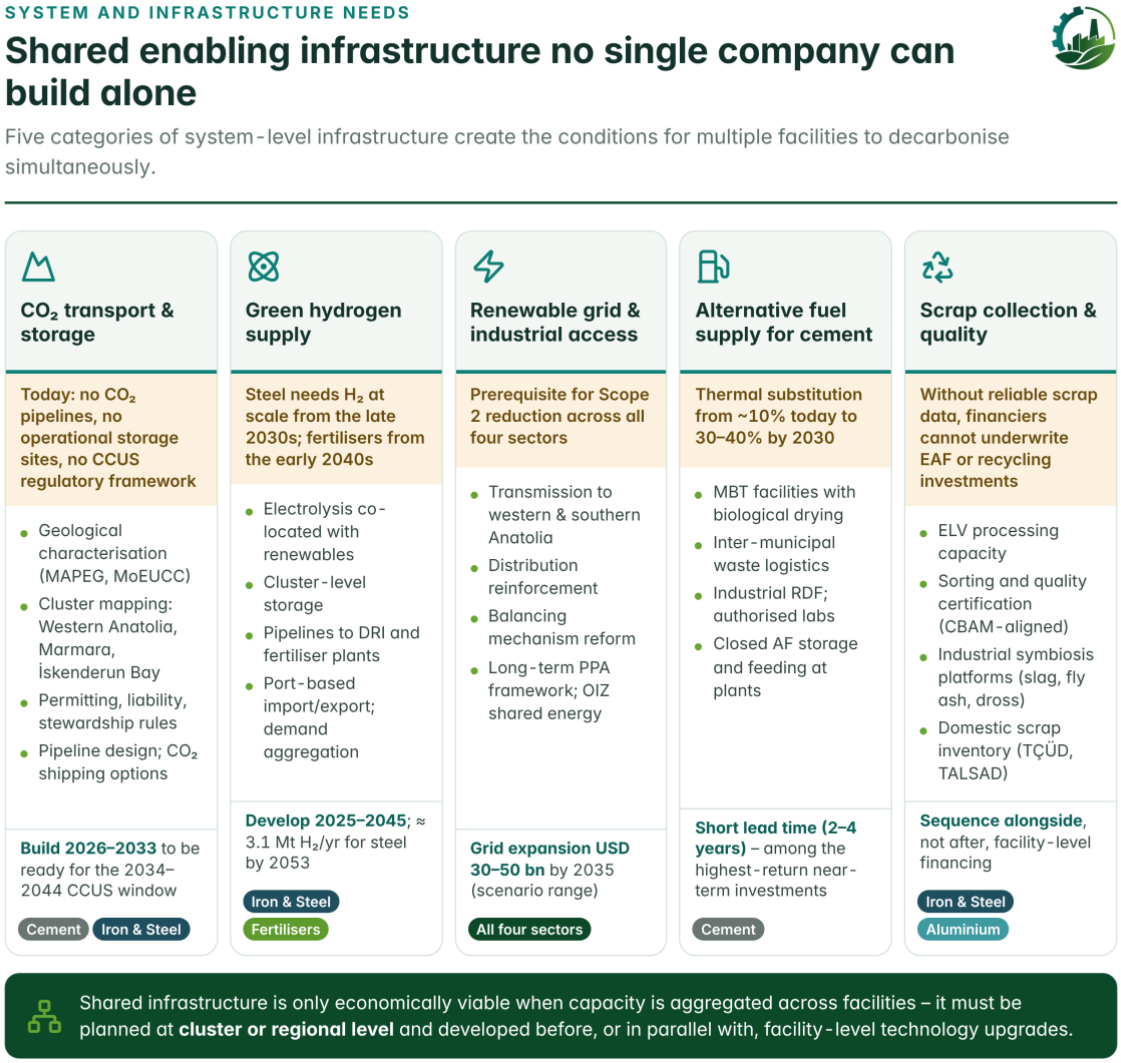


Figure 4-1: Shared Enabling Infrastructure Needs

4.1.1 CO_2 Transport and Storage Infrastructure

CCUS is the largest single decarbonisation lever for the cement sector and an essential technology for the remaining BF-BOF steel route[135,136]. Commercial CCUS deployment requires, beyond facility-level capture equipment, shared regional CO_2 transport infrastructure and geological storage access. Currently, Türkiye has no CO_2 transport pipelines, no

[135] MoIT, (2023a), *op. cit.*
[136] MoIT, (2024b), *op. cit.*

operational geological CO_2 storage sites, and no dedicated CCUS regulatory framework. Given that shared CO_2 infrastructure is only economically viable when capacity is aggregated across multiple facilities, development must commence within the 2026-2033 period (LCP Phase 2) to be operational ahead of CCUS deployment, which the LCPs project from 2042 in cement (2039 under the FTS) and from 2044 on the BF-BOF steel route.

The IPPS identifies the following sequence of required actions: (i) sub-surface geological characterisation studies for candidate CO_2 storage sites to be initiated by MAPEG and MoEUCC; (ii) CO_2 cluster mapping that leads to identification of cement and iron and steel facilities within viable pipeline distance of candidate storage sites, prioritising high-density industrial clusters (e.g., Western Anatolia and Marmara regions and İskenderun Bay area); (iii) CCUS regulatory framework development that is dedicated geological storage permitting, liability, and stewardship regulation; (iv) CO_2 transport pipeline feasibility and design studies; and (v) exploration of CO_2 shipping options for facilities without viable local storage (using existing port infrastructure).

The Cement LCP roadmap phases these actions: activities to increase carbon capture and utilisation capacity start in Phase 1 (2023-2025), while the establishment of a public and/or private regional CO_2 transport and storage network open to the cement sector, and the development of carbon utilisation through curing or injection in cementitious materials, are scheduled from Phase 2 (2026-2033) and continue through Phases 3 and 4 (to 2053).[137] Steps (i) to (iii) should therefore be completed within Phase 2, so that transport and storage capacity is available ahead of the early-2040s deployment window.

4.1.2 Green Hydrogen Supply Infrastructure

Green hydrogen is required by the iron and steel sector from the late 2030s (hydrogen-based DRI replacing blast furnaces from 2036, followed by 100% green-hydrogen DRI-EAF from 2043) and by the fertiliser sector for green ammonia, with penetration rising from about 5% by 2030 to 30% by 2040 under the fertiliser LCP scenario. The LCP models require 381.8 million GJ of hydrogen in the iron and steel sector alone by 2053; equivalent to approximately 3.1

[137] Ministry of Industry and Technology / EBRD (2024). A Low Carbon Pathway for the Cement Sector in the Republic of Türkiye. Section 3.1, A.2 (p. 60).

million tonnes of H_2/year. This requires a hydrogen production, storage, and distribution infrastructure of substantial scale that must be developed progressively over the 2025-2045 period.

The infrastructure development pathway must encompass: (i) large-scale electrolysis capacity co-located with new and existing renewable energy assets; (ii) hydrogen storage (compressed gas and liquid hydrogen) at industrial cluster level; (iii) pipeline distribution from electrolysis facilities to DRI plant and fertiliser facility end-users; (iv) port-based hydrogen import and export infrastructure that provides supply chain flexibility and allowing Turkish green hydrogen to access international markets; and (v) cross-sector hydrogen demand aggregation to ensure sufficient early offtake volume to justify investment in shared infrastructure.

4.1.3 Renewable Electricity Grid and Industrial Access Infrastructure

Grid decarbonisation and industrial access to renewable electricity are prerequisites for Scope 2 emission reduction across all four sectors. The Renewables Roadmap to 2035 provides a strong trajectory, but grid expansion investments (USD 30-50 billion by 2035 as per different scenarios, including expansion and renewal investments in distribution system and HVDC lines in addition to conventional lines in transmission system) and regulatory reforms for industrial PPAs are critical enabling conditions. Specifically required are: (i) transmission grid capacity expansion to connect industrial zones in western and southern Anatolia with new renewable generation concentrations in central and eastern Anatolia and offshore; (ii) reinforcing existing distribution lines and control systems as well as adding new capacities in order to ensure that the expected growth in renewable energy capacity can securely and timely be connected to the system, (iii) balancing mechanism reform to reduce industrial consumer balancing obligations for renewable self-generation; (iv) long-term PPA regulatory framework enabling long-term contracts between industrial consumers and renewable generators; and (v) improving OIZ-level shared energy infrastructure; collective solar and wind installations within OIZs serving multiple TIDIP sector facilities.

4.1.4 Alternative Fuel Supply Infrastructure for Cement

The cement sector's alternative fuel substitution pathway targeting thermal substitution rates from the current ~10% to 30-40% by 2030 and higher thereafter, requires a parallel expansion of RDF/SRF production infrastructure across Türkiye's waste management system. This includes: (i) Mechanical-Biological Treatment (MBT) facilities with biological drying processes in major metropolitan municipality waste systems; (ii) inter-municipal waste transfer logistics; (iii) industrial RDF production from manufacturing waste streams; (iv) authorised laboratories for alternative fuel biomass content analysis; and (v) closed alternative fuel stock areas and feeding systems at cement plants. This infrastructure has a relatively short lead time (2-4 years) and can deliver significant near-term emission reductions at relatively low cost — making it one of the highest-return near-term infrastructure investments.

4.1.5 Industrial Scrap Collection and Quality Infrastructure

Türkiye's EAF-dominated steel sector and aluminium recycling industry are both dependent on scrap availability and quality. Infrastructure requirements include: (i) ELV (end-of-life vehicle) processing capacity expansion, improving recovery rates for both ferrous and aluminium scrap; (ii) scrap sorting and quality certification systems aligned with CBAM embedded carbon accounting requirements; (iii) industrial waste exchange and symbiosis platforms connecting by-product generators (blast furnace slag, fly ash, aluminium dross) with users in the cement and construction sectors; and (iv) domestic scrap inventory systems — enabling TÇÜD and TALSAD to forecast scrap availability for investment planning purposes.

These infrastructure gaps are not solely technical: absent reliable scrap inventory and quality data, financiers cannot underwrite EAF capacity expansion or aluminium recycling investments with confidence, and CBAM-compliant carbon accounting for scrap-based production routes remains difficult to verify. Closing this gap is therefore a precondition for several of the steel and aluminium sector’s highest-priority IFA investments (Section 3.2), and should be sequenced alongside, rather than after, facility-level financing decisions.

4.2 Investment Needs

The sectoral LCPs provide quantified or indicative investment requirements for each of the four primary sectors. Collectively, LCPs indicate the transition will require a substantial industrial transition programme extended to 2053, with total investment needs estimated at least USD 70 billion (excluding the full cost of shared enabling infrastructure such as the investments which are expected to take place in electricity system, conversion facilities and ports). Cement and iron and steel sectors account for the largest share of this investment, followed by the fertiliser and aluminium sectors. Under the LCP scenario cement industry requires approximately USD 29.8 billion in nominal investment whereas iron and steel industry approximately USD 31-34 billion, fertiliser industry USD 5.26-7.66 billion (LCP-FTS), while aluminium industry requires USD 1.73 billion in net present value terms (USD 4.9 billion nominal).

These estimates largely relate to investments in sector-specific production facility assets. The overall investment requirement at cross sector level is expected to be higher once common infrastructure and broader system needs are considered, including renewable energy generation and grid upgrades, port expansion and/or renovation investments, natural gas conversion facilities, hydrogen production and distribution networks, CO_2 transport and geological storage infrastructure, industrial waste and scrap collection systems, and technology demonstration and innovation facilities.

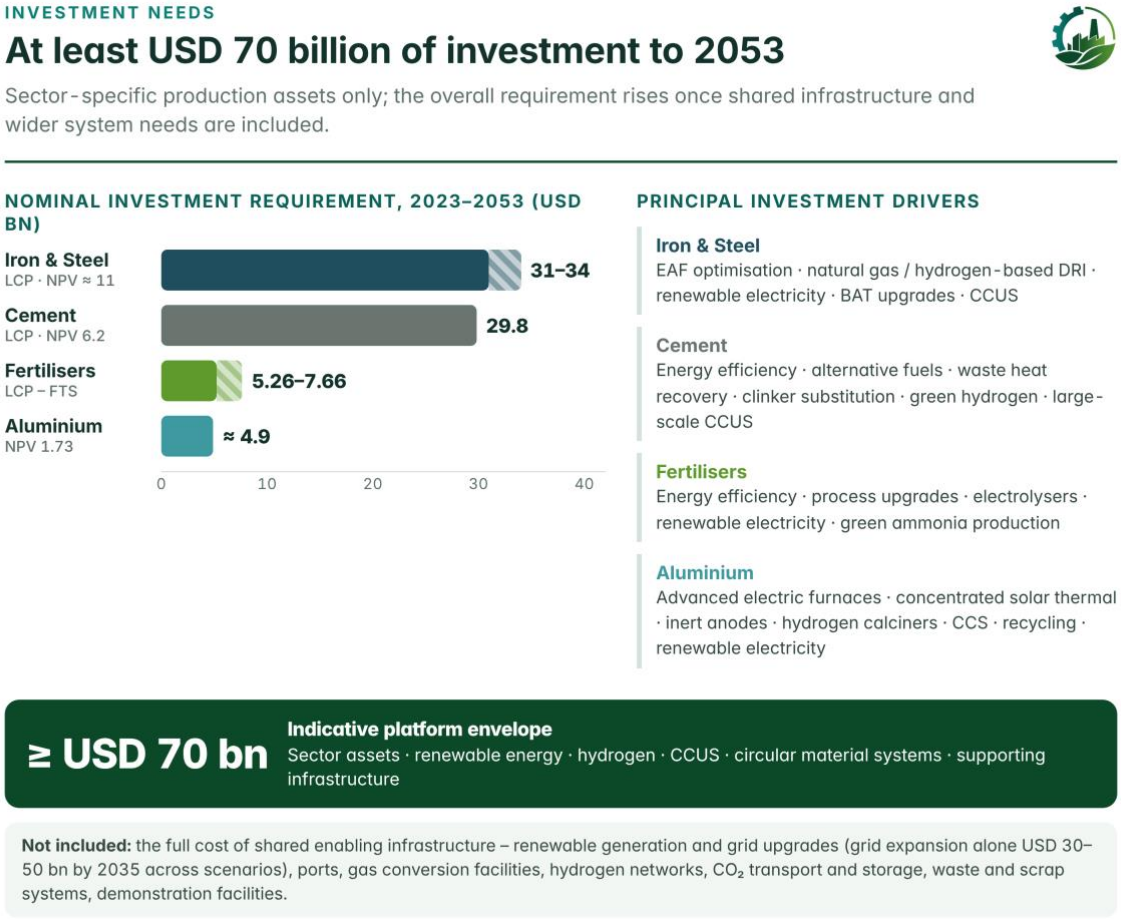


Figure 4-2: Investment Needs

(Source: Sectoral LCPs for cement, iron and steel, aluminium and fertiliser)[138,139,140,141]

4.2.1 Sector Specific Financing Approaches

4.2.1.1 Cement

Cement financing will evolve from conventional investment in efficiency, alternative fuels, waste heat recovery and clinker substitution towards a much more capital-intensive CCUS programme. According to the LCP for cement sector, investments undertaken during the remainder of the 2020s and into early 2030s are expected to be financed primarily through

[138] MoIT, (2023a), op. cit.
[139] MoIT, (2023b), op. cit.
[140] MoIT, (2024a), op. cit.
[141] MoIT, (2024b), op. cit.

corporate resources, commercial loans, green credit lines and equipment financing. Public support may be justified in targeted areas, particularly for the development of alternative-fuel infrastructure, material recovery systems, and the early-stage commercial deployment of emerging cement chemistries.

The main financing challenge is expected to emerge after 2040, driven by the sector's growing investment needs for CCUS. While cement producers may be able to finance a portion of required capture facilities, CO_2 transport and storage infrastructure will likely require coordinated financing arrangements. Commercial viability is expected to depend on a combination of effective carbon pricing, regulated access frameworks, public capital support, participation by the MDBs, and long-term mechanisms that provide a predictable value for CO_2 that is captured and permanently stored.

Table 4-1: Cement Sector Specific Investment Needs[142]

Cement	2024-2033 Total	2034-2043 Total	2044-2053 Total	TOTAL INVESTMENT
Thermal Efficiency Technologies	0.17	0.21	0.22	**0.60**
Energy Efficiency Technologies	0.39	0.46	0.42	**1.27**
Renewable Energy Investments	0.61	0.20	0.05	**0.86**
Hydrogen Technologies	0.00	0.02	0.06	**0.08**
CCS	0.00	2.03	25.00	**27.03**
TOTAL INVESTMENT	**1.17**	**2.92**	**25.75**	**29.84**

[142] MoIT, (2024b), *op. cit.*

4.2.1.2 Iron and Steel

The LCP for iron and steel sector combines incremental investments in EAF efficiency improvements and renewable electricity along with substantial capital requirements for DRI, green hydrogen and CCUS. EAF optimisation, scrap preparation, renewable energy and BAT upgrades are generally well suited for financing through corporate resources and commercial bank lending, with support from MDBs' credit lines and guarantees where necessary.

In the initial phase, natural gas-based DRI may require longer-tenor financing, given its high capital intensity and exposure to natural gas and electricity price volatility. Hydrogen-based DRI, however, is expected to require a more complex financing structure, combining industrial sponsor equity, concessional debt, guarantees, and potentially CCfD to address the cost difference between conventional and low-carbon steel production. Public procurement commitments, green-steel offtake agreements, and credible certification systems could further improve revenue certainty and enhance the bankability of low-carbon steel investments.

CCUS investments at integrated steel facilities are expected to face financing constraints similar to those in the cement sector and should therefore be developed in coordination with shared CO_2 transport and storage infrastructure. PPPs may also be appropriate to support scrap collection, sorting, and quality management systems, given the broader system-wide benefits these measures provide beyond individual iron and steel producers.

Table 4-2: Iron and Steel Sector Specific Investment Needs[143]

Steel (in USD-nominal)	2024-2033 Total	2034-2043 Total	2044-2053 Total	TOTAL INVESTMENT
New Capacity	1.24	6.29	13.61	**21.14**
Passage Capacity	0.17	6.58	3.53	**10.28**
TOTAL INVESTMENT	**1.41**	**12.87**	**17.14**	**31.42**

[143] MoIT, (2023b), *op. cit.*

4.2.1.3 Aluminium

Aluminium decarbonisation investments include commercially proven measures such as furnace improvements and renewable electricity, alongside technologies that remain at earlier stages of commercial readiness — including inert anodes, hydrogen calciners, electric reverberatory furnaces and CCS. Advanced furnace upgrades, energy efficiency measures and renewable electricity deployment are expected to be financed primarily through company resources, commercial loans and green credit lines.

Early deployments of inert anodes and hydrogen-based process technologies are likely to require grants, concessional finance and risk-sharing support given the associated technology and performance uncertainties. The sector's reliance on imported primary aluminium also suggests that financing needs should extend beyond production equipment to include scrap collection, recycling capacity, supply chain traceability and low-carbon material procurement.

Public finance can support the development of improved end-of-life vehicle and electronic waste collection systems, while MDB-backed facilities may enable smaller processors to invest in advanced equipment and renewable electricity. Sustainability-linked working-capital and trade-finance instruments could also encourage the procurement of lower-carbon aluminium inputs.

Table 4-3: Aluminium Sector Specific Investment Needs[144]

Aluminium (in USD-nominal)	2024-2033 Total	2034-2043 Total	2044-2053 Total	TOTAL INVESTMENT
Primary Aluminium	0.08	0.40	0.02	**0.50**
Aluminium Processing	1.09	1.19	2.08	**4.36**
TOTAL INVESTMENT	**1.17**	**1.59**	**2.10**	**4.86**

[144] MoIT, (2023a), *op. cit.*

4.2.1.4 Fertiliser

The fertiliser pathway is expected to begin with energy efficiency measures and upgrades to existing plants, before gradually shifting towards the partial and over time, full replacement of fossil-based hydrogen with green hydrogen. Efficiency improvements and BAT investments should generally be financeable through corporate resources and commercial bank lending, although exposure to natural gas price volatility may affect borrower capacity and overall project economics.

Pilot projects for green hydrogen blending and green ammonia production are likely to require blended finance, as their competitiveness will depend strongly on the cost of renewable electricity and electrolysis. MDBs and DFIs can play an important role by offering longer tenor financing, concessional pricing, and guarantees. Public grants may also be needed for the first-of-a-kind projects, and the supporting infrastructure required to bring these technologies to market.

At commercial scale, green ammonia projects may become suitable for project finance, particularly where renewable electricity supply, hydrogen production and ammonia offtake are secured through long-term contracts. Financing could involve joint ventures between fertiliser producers, renewable energy developers, and hydrogen suppliers. Revenue support, carbon-price signals and growing demand for low-carbon fertilisers will remain important until green ammonia becomes cost-competitive with conventional production.

Table 4-4: Fertiliser Sector Specific Investment Needs[145]

Fertiliser (in USD-nominal)	2024-2033 Total	2034-2043 Total	2044-2053 Total	TOTAL INVESTMENT
Renewable Energy	0.14	0.73	0.69	**1.56**
Organic/Organomineral Fertiliser	0.09	0.57	0.56	**1.22**
Electrification/Heat Pump	0.14	0.43	0.89	**1.46**
Energy Efficiency	0.01	0.06	0.08	**0.15**

[145] MoIT, (2024a), *op. cit.*

Fertiliser (in USD-nominal)	2024-2033 Total	2034-2043 Total	2044-2053 Total	TOTAL INVESTMENT
Blue Ammonia	0.00	0.10	0.52	**0.62**
Green Ammonia	0.00	0.23	0.00	**0.23**
N_2O Catalyst Investment	0.01	0.01	0.00	**0.02**
TOTAL INVESTMENT	**0.39**	**2.13**	**2.74**	**5.26**

4.3 Policy Enhancement Areas and Enabling Options

Building on the investment needs and typology set out in the previous section, this section identifies the policy areas for enhancement and enabling options required to convert the LCP investment envelope into bankable projects and coordinated policy support.

It considers combinations of policy instruments such as carbon pricing, support schemes, and demand-side measures.

Across Türkiye's hard-to-abate industries, investment is constrained less by the absence of policy instruments than by regulatory uncertainty, incomplete alignment, and missing enabling frameworks. Priority policy enhancement areas are therefore to strengthen the predictability and credibility of the carbon pricing architecture, remove critical legal gaps for infrastructure-based abatement options, and create market conditions that allow low-carbon products to differentiate and scale. At the same time, as emphasized before, Türkiye's industrial decarbonisation pathway requires a platform-level investment envelope of at least USD 70 billion to 2053. The policy challenge is therefore not only to identify relevant instruments, but to create the enabling conditions under which different types of investment can become financeable, bankable and executable at the required scale.

First, the TR ETS, in force since 27 August 2026 and in its 2026-2027 pilot phase, requires enhanced predictability on the carbon price trajectory, free allocation design, and benchmark methodology under the National Allocation Plan (NAP). Uncertainty at these points prevents industrial actors from reliably forecasting compliance costs and evaluating the commercial viability of capital-intensive decarbonisation investments. This is amplified by unresolved

questions on CBAM equivalence recognition, i.e., the extent to which the EU will recognise the TR ETS for deduction against CBAM obligations—an outcome that remains decisive for export economics across all four sectors.

Second, deep-decarbonisation technologies must be fully enabled through the Green Taxonomy and the national incentive system. In its current state, key technologies (including CCUS, green hydrogen, DRI, inert anodes, and alternative fuels) are not yet assured coverage in taxonomy screening criteria and are not explicitly categorized as priority technology classes in the investment incentives framework (notably under Decree No. 9903). The enabling option is a targeted alignment package: explicit taxonomy recognition of transition activities and explicit incentive eligibility for flagship industrial decarbonisation technologies.

Third, CCUS deployment requires a dedicated CO_2 transport and storage regulatory framework. The absence of rules on permitting liability, long-term stewardship, and infrastructure development blocks the investment pipeline in sectors where residual process emissions remain material. To further incentivize early-mover projects in this area, CCfDs may pose a viable de-risking instrument.

In parallel, Türkiye needs bankable industrial renewable PPAs, including reforms that allow longer contract tenors and address cost components that currently undermine PPA attractiveness for large industrial consumers. To enable investments in the IFAs (see section 3.2), under Investment Incentive Decree No. 9903 (i.e. for hydrogen production and storage infrastructure, competitive renewable electricity access for electrolysers) long-term PPAs are needed which will require EMRA framework reform.

Finally, cross-sector policy must address the absence of formal product definitions and standards for low-carbon materials. Without recognised definitions, certification, and standardised MRV-compatible claims, lead markets cannot form, and demand-side measures (including procurement) remain weak. The enabling option is to establish sector-specific low-carbon product definitions, supported by certification systems that can be used in procurement, finance eligibility, and trade-facing documentation.



Figure 4-3: Policy Enhancement Areas and Targeted Reforms

Policy enhancement areas and enabling options specified for TIDIP sectors are elaborated below.

4.3.1 Cement

In cement industry, policy enhancement should focus on demand creation, product standards enabling higher clinker substitution, and removing binding regulatory barriers to CCUS and alternative fuels, reflecting the sector's reliance on both near-term material/fuel levers and long-term capture solutions.

A first priority is to strengthen demand-side signals. While the Green Cement Communiqué creates a public-procurement pull for low-carbon cement, the private market remains largely price-driven, weakening incentives for producers to invest in lower-carbon product lines and production routes. The enabling option is to expand the scope and ambition of demand creation by extending the Communiqué's logic beyond public works (and raising ambition levels where feasible), thereby supporting a scalable domestic market for low-carbon cement products alongside export-driven CBAM pressures.

Second, cement decarbonisation depends on enabling higher deployment of supplementary cementitious materials (SCMs) and alternative binders. Current cement standards constrain clinker substitution and do not formally recognise the full range of low-carbon cement types. The policy enhancement area is therefore standards revision and product recognition, notably via updates to relevant cement standards (e.g., TS EN 197 series) to permit higher substitution and support the formal recognition of low-carbon cement categories, paired with labels and certification that can be referenced in procurement and offtake requirements.

Third, CCUS is structurally constrained by the absence of a CO_2 transport and storage framework, despite its centrality to deep decarbonisation. This is explicitly reinforced by the cross-cutting reform priority to establish site selection, permitting, liability, and long-term stewardship rules. Given that cement investment needs are heavily back-loaded and dominated by large-scale CCUS expenditure after 2040, the central policy challenge is to avoid a late-stage investment cliff. The enabling option is to implement a comprehensive CCUS legal framework that covers both transport and storage as a prerequisite for project development and financing.

Finally, near-term abatement depends on alternative fuels and efficiency investments. Policy barriers persist in RDF regulation modernisation (a recognised reform priority) and in regulatory conditions affecting WHR and self-generation economics. The enabling option is to streamline and modernize relevant permitting and operational rules so that alternative fuel substitution and WHR can scale as simple measures while CCUS enabling conditions are built.

4.3.2 Iron and Steel

For iron and steel industry, policy enhancement should prioritise electricity cost and renewable access, export-facing CBAM compliance certainty, and explicit enabling DRI/hydrogen and CCUS pathways through taxonomy and incentives. The sector's competitiveness and decarbonisation trajectory are particularly sensitive to Scope 2 emissions and trade exposure, making regulatory clarity and bankable energy procurement essential.

The first enhancement area is the electricity framework. High electricity costs undermine the competitiveness of EAF-based production and reduce incentives for electrification. In parallel, current limitations on long-term industrial PPAs are a cross-cutting barrier. The enabling option is to implement PPA reforms that allow bankable tenors and improve the commercial case for renewable electricity procurement, including mechanisms that support renewable-linked industrial pricing models (e.g., tariff structures that reward credible renewable procurement commitments).

Second, the sector requires targeted action on CBAM-related regulatory certainty, particularly for exporters using the Inward Processing Regime (DİR). The absence of DİR-specific CBAM guidance creates compliance uncertainty and administrative burden. The enabling option is to develop DİR-specific CBAM reporting guidance to reduce exporter risk and ensure embedded carbon accounting can be demonstrated consistently under EU requirements.

Third, investment planning is affected by market and input uncertainties, including scrap market conditions and trade-related constraints. While these risks have multiple drivers, the IPPS identifies the need to address structural uncertainties that affect long-horizon investments. A practical enabling option is to improve policy predictability around scrap-related trade measures and input availability to reduce volatility that can deter investment in cleaner production routes.

Finally, deep decarbonisation requires clear eligibility and policy recognition for DRI, hydrogen, and CCUS in both taxonomy/incentive coverage and the need to clarify TR ETS parameters and CBAM interaction. In addition, the ECSC Agreement investment limitation review is flagged as a near-term bilateral policy action that could constrain certain green investment structures if unresolved.

4.3.3 Aluminium

In aluminium industry, policy enhancement should address three binding constraints: (i) the early-stage maturity of breakthrough technologies (notably inert anodes) and the absence of structured programmes for deployment; (ii) regulatory alignment and MRV clarity for fluorinated gases and PFC-related emissions; and (iii) the circularity system constraints that limit scrap availability and quality, alongside the cross-cutting need for renewable electricity access and predictable carbon policy.

First, the sector needs a clearer policy pathway to accelerate breakthrough technology readiness. The identified enhancement area is the lack of a structured implementation programme for technologies such as inert anodes. The enabling option is to establish a pipeline of pilot and demonstration projects to move from feasibility to early deployment and to create learning-by-doing under Turkish operating conditions.

Second, the sector requires clearer emissions regulation and MRV expectations. The incomplete alignment with EU frameworks with respect to fluorinated gases/PFC-related rules and the resulting compliance creates uncertainty and potential future cost increase exposure. The enabling option is to finalise alignment and associated MRV rules, ensuring that corporate and facility reporting can be executed consistently with evolving climate regulation and trade-facing documentation needs.

Third, aluminium's decarbonisation is constrained by scrap supply inefficiencies linked to limited enforcement of collection and waste-stream rules. The enhancement area is therefore circularity system performance (collection, sorting, and quality of scrap inputs). The enabling option is to strengthen enforcement and supporting collection infrastructure so that recycled input availability improves, and the sector can reduce embedded emissions through higher circular content.

Finally, the sector lacks a binding national definition for green/low-carbon aluminium, limiting product differentiation. The enabling option is to define product standards and certification in national regulation, aligning with recognised international/EU-aligned standards and to connect these definitions to procurement and financing eligibility. These actions should be sequenced alongside cross-cutting reforms on industrial PPAs and strengthened TR ETS

predictability, and with explicit taxonomy coverage for relevant aluminium transition investments.

4.3.4 Fertilisers

For fertiliser industry, policy enhancement priorities are driven by the sector's exposure to feedstock price uncertainty and the long-run requirement to transition toward lower-carbon hydrogen-based production routes. The sector also requires market creation for low-carbon products, strengthened MRV readiness aligned with trade and chemicals regulation, and demand-side measures that do not lock in carbon-intensive production.

A first enhancement area is input price and transition certainty, with natural gas pricing (and related contractual/tariff conditions) dominating near-term economics while future hydrogen cost trajectories remain unclear. This uncertainty directly suppresses investment decisions. The enabling option is to provide a clearer, long-term gas pricing and transition support framework that reduces volatility for the existing production base while establishing credible investment signals for the shift toward lower-carbon hydrogen inputs.

Second, the sector lacks a recognised low-carbon fertiliser product category which constrains market creation and premium pricing. The enabling option is to introduce a formal low-carbon fertiliser category and associated certification, enabling product differentiation for domestic buyers and improving the financeability of low-carbon supply investments.

Third, MRV and compliance readiness should be strengthened to support CBAM-facing reporting and chemical substance governance, while the alignment with REACH/KKDIK-related requirements is ongoing and interacts with embedded-carbon documentation needs. The enabling option is to strengthen MRV systems and align reporting practices across CBAM and chemicals regulations so that producers can demonstrate compliance and product claims credibly.

Finally, demand-side incentives are currently weak because subsidies are not linked to carbon intensity, limiting pull for low-carbon products. The enabling option is to redirect elements of demand-side support toward certified low-carbon fertilisers, thereby creating an early domestic market signal consistent with the transition pathway. In parallel, longer-run demand

uncertainty which is linked to tightening nitrogen management regulation should be incorporated into investment planning and regulatory design so that capacity decisions remain robust under evolving environmental constraints.

5 Consolidated Low-Carbon Pathway and Strategic Recommendations

This section consolidates the sectoral pathways presented in Section 3 into a single platform-level view, and translates the resulting policy, financing, and institutional needs into a set of actionable recommendations for the MoIT, MDBs and industry sector stakeholders.

5.1 Consolidated Low-Carbon Pathway

This subsection presents a consolidated, economy-wide low-carbon pathway derived from sectoral LCPs, covering technology deployment, infrastructure development, and energy carriers.

Across all four sectors, the investment agenda follows a common sequencing logic. Advanced-but-proven technologies — waste heat recovery, solar PV for captive use, heat pumps, alternative fuel integration, and process electrification — are deployable within the current programme horizon and form the backbone of the near-term bankable pipeline; these should be the immediate focus of TIDIP matchmaking and financing facilitation. CCUS and green hydrogen are important long-term pathways but require infrastructure development, regulatory frameworks (see Sections 4.1.1 and 4.1.2), and further cost reductions before anchoring large-scale programmes, and should be sequenced accordingly: near-term proven-technology deployment, followed by progressive scale-up of emerging technologies as enabling conditions mature.

5.1.1 Policy and Regulatory Pathway

Consolidated economy-wide policy recommendations

The sectoral low carbon pathways converge on a common set of economy-wide priorities: accelerating deployment of proven technologies, building shared enabling infrastructure, and establishing a coherent regulatory framework that aligns carbon pricing, market creation, and

investment incentives. The following recommendations consolidate these priorities into a unified policy direction.

Technology deployment

Across all sectors, policy should prioritise the accelerated deployment of best available technologies (BAT) as the foundation of near-term emission reductions, complemented by process electrification wherever technically and economically feasible. Beyond incremental improvements, the transition requires scaling of deep-decarbonisation technologies, notably hydrogen-based production routes (e.g. DRI in steel, green ammonia in fertiliser, high-temperature heat substitution in cement and aluminium sectors) and carbon capture, utilisation and storage (CCUS) for unavoidable process emissions. The latter necessitates the establishment of a dedicated regulatory framework for CO_2 transport and storage as a precondition for investment.

In parallel, policy should actively promote industrial innovation and breakthrough technologies, including inert anodes, alternative binders, and low-carbon primary production routes. This requires targeted R&D support programmes, demonstration funding, and public-private partnerships to bridge the gap between pilot and commercial deployment.

A third pillar for the technology deployment is the transition towards circular production models, including increased use of secondary materials, alternative feedstocks, and industrial symbiosis across sectors. Strengthening circularity systems reduces primary energy demand, lowers input-related emissions, and decreases the scale of required deep-abatement investments over time.

Infrastructure development

Delivering sectoral pathways at scale requires coordinated investment in shared enabling infrastructure, which individual industrial actors cannot develop in isolation. First, policy should ensure the rapid expansion of renewable electricity generation capacity, supported by investments in grid reinforcement, flexibility solutions, and storage. This is a prerequisite for both direct electrification and the production of green hydrogen.

Second, Türkiye should develop a national hydrogen infrastructure backbone, including production capacity, transport networks, and storage facilities. Infrastructure development

should prioritise industrial clusters, where aggregated demand enables economies of scale, supports early project bankability, and reduces overall system costs.

Third, policy must enable the creation of a national CO_2 transport and storage system, linking industrial clusters to suitable storage sites. Given the centrality of CCUS in addressing residual emissions in the cement and iron and steel sectors (and in blue ammonia production in the fertiliser sector), this infrastructure is a critical component of the long-term decarbonisation pathway. Its development must be coordinated at system level and supported by an appropriate regulatory and permitting framework.

Regulatory framework and market creation

At the core of the enabling framework is the full implementation of the TR ETS, in force since 27 August 2026, in a manner aligned with the EU ETS and compatible with the CBAM framework. The TR ETS should provide a clear and credible carbon price signal, while incorporating transitional measures, such as free allocation, to mitigate competitiveness risks for trade exposed sectors during the transition period. Predictability in carbon pricing and allocation design is essential to unlock investment in capital intensive decarbonisation technologies.

In parallel, policy should address the partial absence of demand-side signals by establishing standards and certification schemes depending on the individual circumstances of each sector. These standards should be robust, transparent, and aligned with international practices, enabling credible product differentiation in domestic and export markets.

To ensure market uptake, these standards should be embedded in public procurement frameworks, thereby creating lead markets for low-carbon materials and improving the bankability of related investments. Over time, such demand-side instruments should be complemented by mechanisms that extend beyond public procurement to stimulate private-sector demand and support the emergence of price premiums for low-carbon products.

Phased approach for economy-wide policy recommendations

Phase 1: Set the enabling framework to create bankable project conditions

Phase 1 should prioritise the core architecture of the transition by establishing regulatory certainty and the minimum bankable conditions for investment planning and early deployment. First, the TR ETS should be implemented with a clear direction of travel on carbon price expectations, allocation rules, and the NAP methodology, enabling firms to internalise carbon cost exposure in investment decisions. In parallel, policy dialogue should target clarity on the TR ETS-CBAM interaction, recognising that CBAM equivalence is a decisive determinant for export competitiveness and early mover behaviour.

Second, Türkiye should finalise the enabling conditions for transition finance by ensuring that the Green Taxonomy's technical screening criteria provide pathways for the taxonomy-aligned classification of the investment themes required in the sectoral pathways (CCUS, hydrogen, DRI, alternative fuels, inert anodes) and by aligning the national incentive framework accordingly. This phase should also initiate the regulatory workstream for CO_2 storage and transport (permitting, liability, stewardship) and establish the planning basis for hydrogen and CO2 infrastructure at cluster level.

Third, Phase 1 should remove binding barriers to renewable electricity procurement by advancing industrial PPA reform, thereby enabling bankable Scope 2 decarbonisation and preparing the foundation for electrification and electrolysis-linked pathways. Finally, Phase 1 should fund and facilitate first-mover pilots (hydrogen integration, CCUS feasibility/pilots, electrification demonstrations) to reduce technology and execution risk and to generate domestic learning.

Phase 2: Enable scale-up and deployment by providing infrastructure and market conditions

Phase 2 should focus on the "system build-out" required to convert sectoral pathways into an investable pipeline. This includes accelerating renewable capacity and enabling grid and industrial access investments, while operationalising industrial PPAs as an alternative procurement channel. In parallel, Phase 2 should enable the establishment of hydrogen clusters and networks by prioritising industrial hubs where aggregated demand can improve

bankability and develop CO_2 transport and storage networks connecting industrial clusters to candidate storage sites.

In market creation, Phase 2 should introduce or finalise product standards and certification schemes for low-carbon industrial products and integrate them into public procurement rules to create reliable lead markets. Where sector-specific regulation exists or is under preparation, Phase 2 should focus on implementation, compliance readiness, and scaling coverage. Phase 2 should also introduce demand-creation mechanisms that extend beyond public procurement, including approaches that strengthen private-sector uptake and offtake certainty for low-carbon materials.

Finally, Phase 2 should consolidate innovation and deployment support by expanding pilots into early commercial deployment, building capacity for MRV-compatible product claims, and ensuring that incentive and finance instruments remain aligned with the infrastructure and market conditions being put in place.

Phase 3: Foster system transformation

Phase 3 should tighten and mature the economy-wide policy regime in line with the transition pathway. This includes strengthening the TR ETS signal over time, maintaining credibility and predictability while progressively shifting from transitional protections toward a regime that supports deep-abatement investment at scale. In parallel, low-carbon product standards should be tightened to reflect technology maturation and infrastructure availability, ensuring that certification and procurement frameworks continuously ratchet ambition while remaining implementable and verifiable.

As hydrogen and CO_2 systems become operational at scale, Phase 3 should enable the mainstreaming of deep-decarbonisation production routes, supported by infrastructure, standards, and financing frameworks already established in earlier phases. Where fossil-based production routes remain material, Phase 3 should implement phase-down and phase-out pf fossil-fuel based production trajectories consistent with economy-wide decarbonisation objectives and with the sectoral pathway direction of travel, ensuring that policy signals, market rules, and investment incentives collectively reinforce the system transformation endpoint.

5.1.2 Financing Strategy

The financing strategy of Türkiye's industrial decarbonisation agenda will require a coordinated combined mix of private and public capital and financing schemes with the support of MDBs and other DFIs and donor funds. The sectoral LCPs provide the analytical starting point by identifying the scale, timing and technology profile of the investments. However, financing strategy should also reflect international experience in industrial decarbonisation finance, Türkiye's macroeconomic and financial-sector conditions, the practical realities of industrial project development, sector-specific constraints and expert judgement on how technically viable projects can be converted into bankable investments.

No single source of capital or financing instrument will be suitable across all priority sectors and IFAs. The financing approach should therefore be structured around four complementary assessment dimensions. First, the technology dimension relates to maturity, capital intensity, operational complexity and emissions-reduction potential. Second, the bankability dimension assesses revenue visibility, payback period, foreign-exchange exposure, tenor requirements, collateral structure and the allocation of construction, market and policy risks. Third, the policy and infrastructure dimension considers whether projects depend on carbon pricing, renewable electricity access, hydrogen and CO_2 infrastructure, public procurement, permitting, standards or market creation. Fourth, the country-specific dimension reflects Türkiye's context, including domestic banking capacity, industrial characteristics, the availability of alternative raw materials and waste streams, export exposure to CBAM, the TR ETS in its pilot phase and the ability of public institutions, MDBs and DFIs to provide targeted de-risking support.

5.1.3 Assessment of Financing Needs

Investment needs should be assessed both from the bottom-up technology requirements identified in the LCPs and from the broader enabling conditions required to implement these pathways in Türkiye. Facility-level investments such as efficiency upgrades, process optimisation, waste heat recovery, renewable electricity, electrification and equipment replacement may in certain cases, be planned and financed at company level. However, the successful implementation of these investments will vary by company, depending on factors such as technical capacity, investment readiness, financial strength, access to suitable

financing and exposure to implementation risks. Some investment areas such as hydrogen, green ammonia, CCUS, grid reinforcement, renewable electricity systems, CO_2 transport and storage, and industrial waste or scrap systems require a systematic approach. This is because the feasibility and economics of these technologies are shaped not only by individual project characteristics but also by shared infrastructure, coordinated demand, regulatory certainty and long-term purchase agreements.

This distinction is important because the financing challenge is not limited to the total amount of capital required. It is also a matter of sequencing, risk allocation and market design. Mature projects may fail to proceed if companies do not have access to sufficiently long-tenor finance or if energy and emissions data are not considered bankable. Emerging projects may struggle because technology and offtake risks are too high for conventional lenders. Shared infrastructure may also fail to materialise where no single company is able to carry the utilisation, permitting and coordination risks alone. For this reason, the financing strategy should therefore combine project-level instruments with platform-level and policy-level interventions.

Table 5-1: Summary of Financing Assessment

Investment Type	Typical Examples	Primary Constraint	Recommended Financing Response
Commercially Mature Investments	• Energy efficiency • Waste heat recovery • BAT upgrades • Process optimisation • Renewable electricity • Electrification and monitoring systems.	Usually bankable, but constrained by tenor, collateral, project-preparation quality, company leverage or uncertainty around savings	• Corporate capital • Commercial bank loans • Leasing • Green or sustainability-linked loans • Energy-efficiency credit lines • DFI-supported on-lending facilities • Technical assistance for standardising audits, MRV and savings verification
Emerging and First-of-a-Kind Technologies	• Hydrogen-based DRI • Green ammonia • Early CCUS • Hydrogen calciners • Inert anodes • Other demonstration-scale technologies	High technology, construction, demand, cost and policy risk; uncertain operating economics	Blended finance combining; • Sponsor equity • Concessional loans • Grants • Guarantees • First-loss capital • Risk-sharing instruments • CCfDs

Investment Type	Typical Examples	Primary Constraint	Recommended Financing Response
			• Strategic equity from technology providers or off-takers
Shared Enabling Infrastructure	• Grid reinforcement • Hydrogen hubs • CO_2 transport and storage • Port/logistics assets • Industrial waste and scrap systems • Cluster-level utilities	Coordination and utilisation risk; benefits are distributed across several users	• Public planning • PPPs • Regulated asset models • Sovereign-backed or municipal finance • MDB/DFI loans • Infrastructure funds • Long-term user agreements

The financing challenge can be considered across three broad investment groups:

The first group consists of mature commercially established measures, including energy efficiency, waste heat recovery, process optimisation, renewable electricity, electrification, and selected BAT upgrades. These investments generally generate identifiable energy savings, operating-cost reductions or compliance benefits. They should therefore be financed primarily through sponsor's equity, domestic and international commercial lending (including loans (thematic, green, sustainability linked loans), leasing products and capital market issuances).

The second group includes emerging or first-of-a-kind industrial technologies, such as hydrogen-based DRI, green ammonia, inert anodes, hydrogen calciners and early CCUS applications. These investments face higher technology, construction, market and operating risks and may not initially be suitable for conventional commercial debt. Their financing will require blended structures combining sponsor equity and commercial finance with concessional loans, guarantees, grants, first-loss capital and other risk-sharing mechanisms provided by public institutions, MDBs and DFIs.

The third group consists of shared enabling infrastructure, including grid reinforcement, renewable energy systems, hydrogen production and distribution networks, conversion facilities, CO_2 transport and geological storage, and industrial waste and scrap collection systems. Such infrastructure frequently often serves several facilities or sectors and cannot be financed efficiently by individual industrial companies acting alone. It will therefore require coordinated public planning and may be financed through private capital (if sufficient

guarantee and/or de-risking tools are in place), sovereign-backed financing, public-private partnerships, regulated infrastructure models, MDB and DFI loans, infrastructure funds and long-term institutional capital.

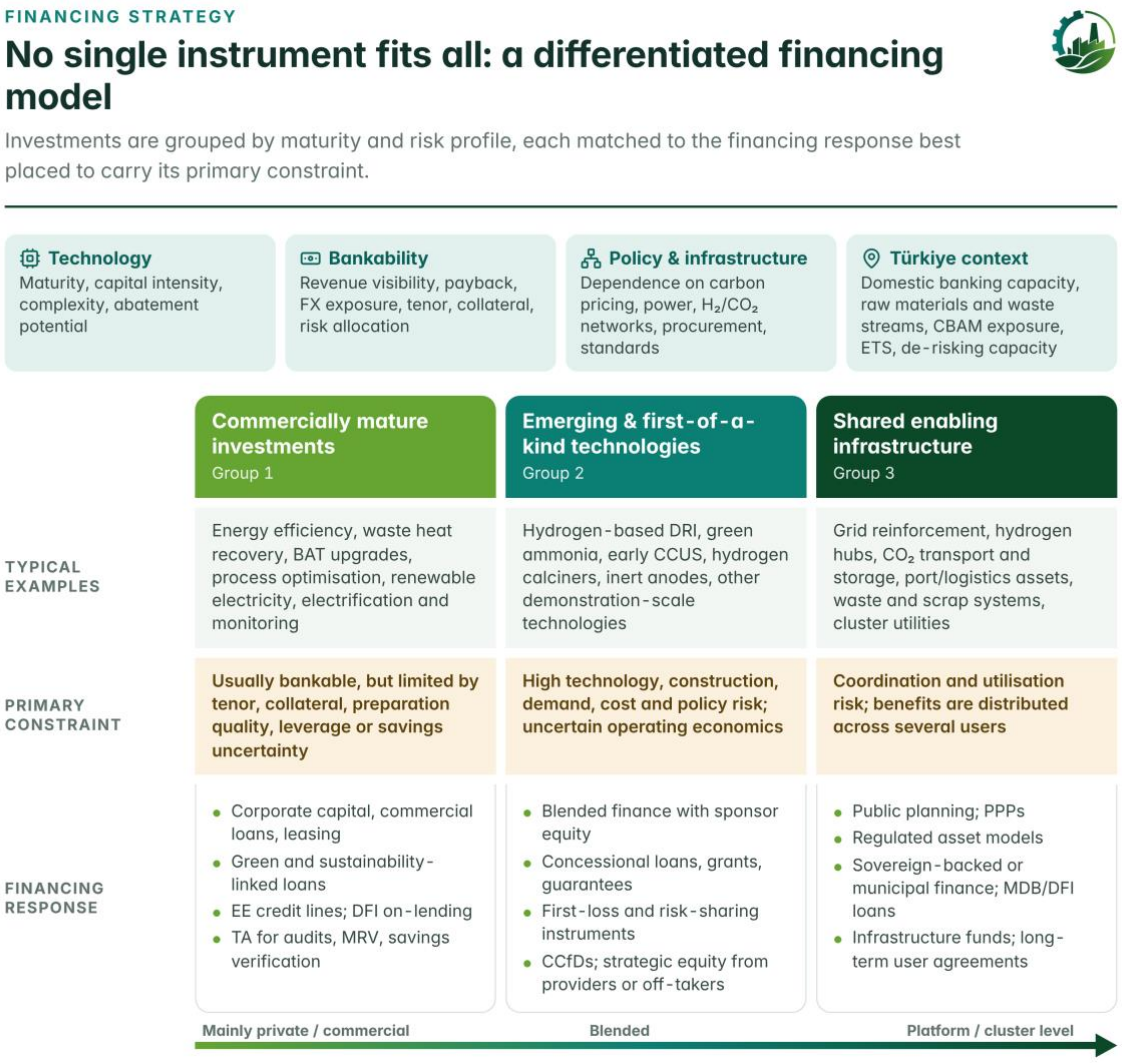


Figure 5-1: Differentiated Financing Model

5.1.3.1 Role of Public Finance

Public finance is ideally used selectively to address market failures, improve bankability and accelerate investments that have high strategic value but limited near-term commercial returns. It should not replace private capital in projects that are already commercially viable.

Instead, public resources should be directed towards reducing specific risks that private investors and commercial banks cannot efficiently absorb, such as early-stage technology risk, coordination risk, policy risk and the lack of enabling infrastructure.

In the near term, public support should prioritise project preparation, feasibility studies, industrial energy audits, emissions baselining, MRV systems, engineering studies and the preparation of investable project pipelines. This is particularly important in Türkiye where many industrial companies may have technically attractive investment opportunities, but lack the detailed feasibility, data quality, permitting clarity or financing documentation required by the banks, MDBs and institutional investors.

For emerging technologies and first commercial deployments, public finance should move from general incentives to targeted risk-sharing. Relevant instruments include capital grants, viability-gap funding, concessional co-financing, credit guarantees, carbon-price-linked support, CCfDs and other mechanisms that help close the cost gap between conventional and low-carbon production. These instruments should be designed transparently and should include eligibility criteria linked to emissions reduction, technology readiness, additionality, local value creation and long-term competitiveness.

Public participation will also be essential for common-user infrastructure. Hydrogen hubs, CO_2 transport networks, geological storage sites, conversion facilities, new or renovated ports, grid reinforcement and industrial material collection systems should be planned at industrial-cluster or regional level. Early public involvement can reduce coordination and utilisation risks, enabling private investors, infrastructure funds and industrial users to commit capital under clearer long-term arrangements.

5.1.3.2 Role of MDBs and DFIs

MDBs and DFIs should act as a bridge between Türkiye's policy objectives and the mobilisation of private capital. Their role will be particularly important for projects that are aligned with national decarbonisation objectives but face high upfront costs, long payback periods, technology risk, limited domestic lending capacity or foreign-exchange and tenor constraints.

MDBs and DFIs can support the investment agenda through long-term sovereign and non-sovereign lending, concessional facilities, guarantees, risk-sharing programmes, project preparation support, technical assistance and on-lending facilities through local financial institutions. Their participation can also strengthen confidence among commercial lenders and institutional investors by improving due diligence, environmental and social standards, procurement discipline and the credibility of emissions-reduction claims.

For large transformational investments, MDBs and DFIs can provide additional value through A/B loan structures, political-risk mitigation, partial credit guarantees, anchor-investor roles in green or transition bond issuances, and co-financing arrangements. For smaller projects, particularly those related to energy efficiency, renewable electricity, electrification and waste heat recovery, credit lines to domestic banks can help aggregate transactions that may otherwise be too small or fragmented for direct MDB financing.

MDBs and DFIs should also use their convening role to support cluster-level investment planning. Many of the technologies identified in the LCPs depend on coordinated action among industrial companies, energy suppliers, infrastructure providers, public authorities and potential off-takers. Financing frameworks should therefore be developed at sector, cluster and platform level rather than only as isolated facility-level projects.

5.1.3.3 Role of Private Capital

Private capital should provide most of the financing for investments with established technologies, measurable cost savings and sufficiently predictable revenue, savings or compliance benefits. This includes company equity, commercial bank lending, leasing, project finance, corporate bonds, green bonds, sustainability-linked loans, infrastructure funds and institutional investment.

Domestic banks are expected to remain the main external financing source for many industrial companies, especially for mature investments such as energy efficiency, renewable electricity, waste heat recovery, equipment replacement and process optimisation. To scale this market, banks will need standardised eligibility criteria, credible emissions and energy data, clear transition plans, sector benchmarks and tools to assess how decarbonisation investments affect borrower competitiveness, CBAM exposure and credit risk.

Ring-fenced and bankable financing structures supported by predictable revenue streams will become more relevant where assets have distinct and contractable revenue streams, such as renewable generation, hydrogen production, CO2 transport, storage, shared utilities and industrial logistics systems. However, private capital will generally require predictable regulation, credible long-term offtake commitments, regulated tariff frameworks, government-backed purchase agreements, public-sector coordination and/or risk-sharing arrangements before entering at scale.

Corporate equity and strategic investors will remain essential for emerging industrial technologies. Sponsors should retain a meaningful share of technology and execution risk, while technology providers, energy companies, industrial users and off-takers may form joint ventures to share risk across hydrogen, green ammonia and CCUS value chains.

5.1.3.4 Türkiye's Specific Design Priorities

The financing strategy for industrial decarbonisation should be designed to reflect Türkiye's market structure, industrial base and financing realities.

Türkiye has a well-developed banking sector with experience in corporate lending, project finance and sustainability-linked finance. However, the scale, tenor and currency structure required for deep industrial transformation may exceed what can be provided through conventional domestic finance alone. For this reason, instruments such as MDB-supported credit lines, guarantees, concessional co-financing and blended-finance structures will be important to extend maturities, reduce financing costs and improve the bankability of industrial decarbonisation projects.

Financing structures should also consider the currency profile of industrial investments. Many decarbonisation technologies and equipment packages are likely to involve imported components, while the revenues of industrial companies may be generated through a combination of domestic and export sales. This creates potential foreign-exchange and repayment risks. Where relevant, financing packages should therefore consider currency matching, hedging arrangements, export-credit agency support, and long-tenor Euro- or Dollar-denominated facilities, particularly for export-oriented companies with foreign-currency revenue streams.

Türkiye's export-oriented industrial sectors are increasingly exposed to external market pressures, including carbon-related trade measures such as CBAM, customer and broader supply chain decarbonisation requirements. These dynamics create a clear competitiveness rationale for transition investments, even before domestic carbon pricing and regulatory incentives are fully developed. At the same time, the emerging national climate policy and carbon market framework should be used to provide clearer and more predictable investment signals. These signals should be introduced in a balanced way, encouraging companies without exposing them to abrupt cost pressures before the necessary technologies, infrastructure and financing mechanisms are in place.

A Türkiye-specific financing approach should also prioritise industrial-cluster planning. Key enabling systems such as hydrogen supply, CCUS infrastructure, renewable electricity access, grid reinforcement, port and logistics capacity, waste management systems, scrap supply chains and alternative raw material networks should be assessed at regional and cluster level rather than only at individual facility level. This would help reduce duplicated investments, improve infrastructure utilisation and efficiency allowing smaller or less capital-intensive industrial users to benefit from shared systems that they may not be able to develop independently.

Finally, the financing strategy should recognise that mobilising capital on the supply side will not be sufficient unless demand for low-carbon industrial products also develops. Green public procurement, low-carbon product standards, certification mechanisms and reliable emissions-data systems can help create markets for lower-carbon cement, iron and steel, aluminium, fertiliser and other industrial products. In the absence of such demand-side signals, many investments may remain technically viable but commercially difficult to justify, particularly where low-carbon products involve higher upfront costs or uncertain green premiums.

5.1.3.5 TIDIP

TIDIP Secretariat recognizes the fact that no single financing instrument will be appropriate across all sectors, technologies and phases. Mature efficiency and renewable energy investments should be moved rapidly towards commercial financing, supported where necessary by standardised eligibility criteria, technical assistance and credit enhancement. Emerging industrial technologies will require dedicated blended-finance mechanisms that help

manage the higher technology, construction and market risks associated with the early stages of development. Shared infrastructure should be planned and financed at platform or cluster level rather than separately by individual companies.

The TIDIP platform will accordingly perform four complementary functions. First, it will aggregate sector projects into a visible and regularly updated investment pipeline. Second, it will cluster projects according to technology maturity, investment size, emissions-reduction potential and financing readiness. Third, it will match projects with appropriate financing institutions and instruments, including, where relevant and potentially available, domestic financial institutions, development finance institutions, climate funds, export credit agencies and private investors. Fourth, it will identify where policy support, guarantees, grants or public infrastructure commitments are required to convert technically viable projects into bankable investments.

A coordinated, platform-level approach will be especially important for hydrogen and CCUS, as individual industrial facilities are unlikely to be able to address infrastructure, supply and market risks. Coordinated investment planning can help avoid unnecessary duplication, improve the use of shared infrastructure and allow industrial clusters to benefit from common renewable electricity, hydrogen, CO_2 transport, storage and logistics assets. Public and private investment should therefore be carefully sequenced so that enabling infrastructure is developed before, or in parallel with, major technology upgrades at facility level.

Over time, the investment focus is expected to move from company-led efficiency improvements during the 2020s towards larger, more capital-intensive transformation projects that depend on shared infrastructure, particularly after 2035. The successful implementation of LCPs will therefore depend not only on the amount of capital mobilised, but also on whether the financing mechanisms, public support and enabling infrastructure are introduced in a manner consistent with the technology deployment timetable.



Figure 5-2: TIDIP as the Bridge from Pathways to Bankable Projects

5.1.4 Capacity Development and Market Support

Capacity development is treated as a foundational strategic enabler within TIDIP, of equal importance to policy reform and finance mobilisation (Section 2.4). Project preparation support constitutes the platform's core near-term capacity instrument: TIDIP's Technical Assistance programme is designed to support larger facilities in developing techno-economic analyses, carbon footprint baselines to CBAM and TR ETS standards, and bankable company-level transition plans, while TÜBİTAK's 1831 programme addresses the equivalent gap for SMEs. Together, these instruments are intended to convert the LCPs from strategic documents into a credible pipeline of financeable investments.

Stakeholder engagement is delivered principally through Türkiye's sector association network, which already provides much of the technical, governance, and market-intelligence infrastructure: Türkçimento's TÜRKÇİMENTO AKADEMİ delivers sector training on ETS, EU

Taxonomy, and sustainability governance; TÇÜD and the Steel LCP's Monitoring and Evaluation Committee, with YİSAD and SOGAD, coordinate steel-sector engagement; and ALUTEAM provides technical testing and R&D support for the aluminium cluster. The OECD Global Matchmaking Platform, under the Climate Club Work Programme, provides an additional channel for targeted technical and financial support for specific sector investment challenges.

5.2 Strategic Recommendations

Türkiye's industrial decarbonisation agenda cannot be delivered through technology deployment alone, it will require coordinated action across industry, public policy and finance. The LCPs provide a useful indication of the scale, timing and technology priorities of the transition; however, the implementation strategy should also reflect Türkiye's industrial structure, export orientation, infrastructure constraints, financing conditions and institutional readiness. Strategic recommendations should therefore focus not only on mobilising capital, but also on improving project bankability, strengthening enabling infrastructure, creating demand for low-carbon products and reducing implementation risks.

5.2.1 Industry Recommendations

Industrial companies should translate sectoral LCPs into company-level transition plans that identify priority investments, expected emissions-reduction impacts, financing needs and implementation timelines. These plans should distinguish between mature measures that can be implemented immediately, such as energy efficiency, waste heat recovery, process optimisation, renewable electricity procurement and material efficiency, and more transformative investments such as hydrogen, CCUS, electrification and low-carbon feedstock substitution. This distinction is important because different technologies require different financing structures, risk-sharing mechanisms, and policy support.

In the near term, companies should prioritise investments that are technically proven, commercially available, and capable of generating operational savings or compliance benefits. These include energy audits, BAT assessments, digital energy-management systems,

process control improvements, renewable electricity procurement, on-site renewable generation, waste heat recovery and alternative material use. Such investments can help reduce emissions intensity while improving competitiveness, reducing exposure to energy-price volatility and preparing companies for future carbon-related trade and regulatory requirements.

Companies should also improve the quality of project preparation. Many decarbonisation projects fail to reach financing stage not because they are technically unattractive, but because feasibility studies, emissions baselines, cost-benefit analysis, permitting assessments, technology selection and risk allocation are insufficiently developed. Industrial companies should therefore prepare bankable project documents that clearly define capital expenditure, operating expenditure, emissions-reduction potential, revenue or savings assumptions, implementation risks and financing requirements. TIDIP will provide a technical assistance facility to support the companies to justify their investment decisions. Eligible companies for such technical assistance will be selected on a case-by-case basis.

For emerging technologies, industry should pursue phased deployment and partnerships. Hydrogen-based processes, CCUS, green ammonia, advanced electrification and novel production technologies should initially be developed through pilots, demonstration projects and cluster-based initiatives rather than isolated facility-level investments. Companies should consider partnerships with technology providers, energy companies, logistics operators, infrastructure developers and public institutions in order to share technology, construction, supply and market risks.

Industrial companies should also strengthen emissions-data systems, facility/product-level carbon accounting and traceability. Reliable data will be critical for accessing green finance, responding to CBAM and buyer requirements, developing low-carbon product claims and participating in future carbon markets. Companies should therefore invest in MRV systems, life-cycle assessment capabilities, product carbon footprint calculations, certification systems and digital traceability tools. Digital monitoring and CBAM-aligned MRV should be treated as standard components of company-level decarbonisation programmes and of the investment packages facilitated through TIDIP, rather than as stand-alone compliance activities, so that emissions-reduction performance can be verified from project preparation through operation.

5.2.2 Policy Recommendations

Public policy should provide a predictable, coordinated, and phased framework for industrial decarbonisation. Decarbonisation investments depend on policy certainty, infrastructure availability and demand-side signals. Policy should therefore aim to reduce uncertainty, support early investment and ensure that the transition strengthens rather than weakens industrial competitiveness.

The first priority should be to establish clear sectoral implementation roadmaps. These roadmaps should translate the LCPs into actionable milestones for technology deployment, infrastructure development, regulatory reforms, financing instruments and demand-creation measures. Roadmaps should be regularly updated to reflect technology costs, carbon-pricing developments, EU regulatory changes, domestic industrial priorities and financing availability.

Policies should also support the creation of investable project pipelines. Public institutions, sector associations and the TIDIP platform should help identify, screen and prioritise projects according to emissions-reduction potential, technology maturity, investment size, financing readiness and strategic importance. This would allow public finance, MDB support and private capital to be directed towards projects with the highest implementation potential and systemic value.

A second priority should be the development of enabling infrastructure. Hydrogen supply, CO_2 transport and storage, renewable electricity access, grid reinforcement, industrial waste systems, scrap collection, port infrastructure and logistics networks should be planned at regional and cluster level. Public authorities should identify priority industrial clusters and coordinate infrastructure planning with industrial users, energy suppliers, municipalities, grid operators and potential investors. This is particularly important for technologies such as hydrogen and CCUS, where individual companies cannot independently resolve infrastructure and utilisation risks.

Policy should also create demand for low-carbon industrial products. Green public procurement, low-carbon product standards, certification mechanisms, public construction requirements and product-level emissions disclosure can help create markets for low-carbon cement, steel, aluminium, fertiliser and other industrial goods. Demand-side measures are

essential because many low-carbon products may initially carry higher production costs and uncertain green premiums.

The emerging national carbon-pricing and climate governance framework should be designed to provide credible long-term investment signals. However, carbon-pricing implementation should be phased and accompanied by financing tools, technical assistance and competitiveness safeguards. This would help avoid abrupt cost increases before companies have access to viable abatement options, enabling infrastructure and appropriate financing instruments.

A number of narrower but binding regulatory gaps identified in Section 2.1 should be prioritised alongside these broader directions, since each currently constrains a specific, identifiable set of industry decarbonisation investments: aligning Investment Incentive Decree No. 9903 to explicitly categorise CCUS, DRI, and green hydrogen as Targeted or Strategic investments; ensuring that the Green Taxonomy's technical screening criteria provide pathways for the taxonomy-aligned classification of the same technologies, as distinct from their eligibility for green capital market instruments under the CMB Guidelines, which do not preclude them (Section 2.3.2); establishing site-selection, permitting, liability, and long-term stewardship rules for CO_2 geological storage — likely requiring coordination between MAPEG, MoEUCC, and the Climate Change Presidency — as a prerequisite for commercial CCUS deployment; modernising RDF regulation to unlock cement's near-term alternative-fuel switching; reforming industrial PPA rules to enable bankable Scope 2 renewable procurement for EAF steel producers and aluminium remelters; issuing CBAM reporting guidance for goods produced under the DİR; reviewing ECSC Agreement investment limitations that constrain certain steel transformation structures; and establishing a recognised low-carbon fertiliser product category to enable premium pricing for green-ammonia-based output. Individually, each of these is a narrow, well-defined reform; collectively, they remove binding constraints across all four sectors' highest-priority investments.

5.2.3 Finance Recommendations

The financing strategy should move from a general funding approach to a differentiated investment-mobilisation model. Different categories of investment require different financing

structures. Mature efficiency and renewable electricity investments should be financed primarily through corporate capital expenditure, commercial lending, leasing, green loans, sustainability-linked loans and standardised credit lines. These projects should be scaled quickly because they are commercially available and can generate cost savings or risk-reduction benefits.

For emerging technologies and first-of-a-kind projects, blended finance will be essential. Projects involving hydrogen, green ammonia, CCUS, inert anodes, hydrogen calciners, advanced DRI and other early-stage technologies are unlikely to be financed solely through conventional commercial debt during the early deployment phase. These investments will require concessional loans, guarantees, capital grants, first-loss mechanisms, viability-gap funding, CCfDs and carbon-price-linked support.

MDBs and DFIs should play a catalytic role by providing long-term finance, concessional funding, technical assistance, guarantees and risk-sharing instruments. Their involvement can help reduce perceived risk, extend tenors, lower financing costs and mobilise additional private capital. MDBs can also support local financial institutions through dedicated credit lines and capacity-building programmes, enabling domestic banks to finance smaller-scale energy efficiency, renewable energy, electrification and process-improvement projects.

Domestic financial institutions should develop sector-specific green industrial finance products. Banks will need standardised eligibility criteria, emissions-reduction methodologies, sector benchmarks and project appraisal tools to assess industrial decarbonisation investments. Sustainability-linked loans should be tied to credible, measurable and sector-relevant KPIs, while green loans should be supported by clear use-of-proceeds definitions and verification systems.

For shared infrastructure, financing should be structured at platform or cluster level rather than only at company level. Infrastructure funds, institutional investors, MDBs, DFIs and public authorities may participate once demand, tariff structures, utilisation rates and risk allocation are sufficiently clear. Public-private partnerships, regulated asset models, availability payments and long-term offtake contracts may be required for infrastructure with high capital costs and uncertain early utilisation.

Finally, finance should be linked to project preparation. A dedicated project preparation and technical assistance window should support feasibility studies, engineering assessments,

environmental and social studies, emissions baselining, permitting, financial modelling and procurement structuring. This would help convert the LCPs and gap analysis from strategic documents into a credible pipeline of financeable investments.

5.2.4 Cross-Cutting Recommendations and TIDIP

TIDIP will be positioned to serve as a coordination mechanism between industry, policy and finance. Based on the investment needs identified through the LCPs, TIDIP will help translate these needs into prioritised, bankable and implementation-ready projects. To achieve this, TIDIP would aggregate project pipelines, classify investments according to technology maturity and financing readiness, provide technical assistance to project developers, identify required policy and infrastructure support, and match projects with suitable financing instruments and institutions.

The platform will also enable standardisation. Common templates for project appraisal, emissions-reduction assessment, financing-readiness screening and monitoring can reduce transaction costs and improve investor confidence. This would be particularly valuable for smaller companies and for projects that may be too small to attract direct MDB or institutional investor participation on a standalone basis.

Overall, Türkiye's industrial decarbonisation agenda should be treated as a coordinated investment transformation rather than a collection of separate company-level projects. Industry should prepare credible and financeable transition investments; policy should provide predictable signals, enabling infrastructure and demand-side support; and finance should offer differentiated instruments that reflect technology maturity, risk profile and Türkiye's market realities. This integrated approach will be critical for turning Türkiye's industrial decarbonisation ambition into implementable, bankable and competitive transition pathways.

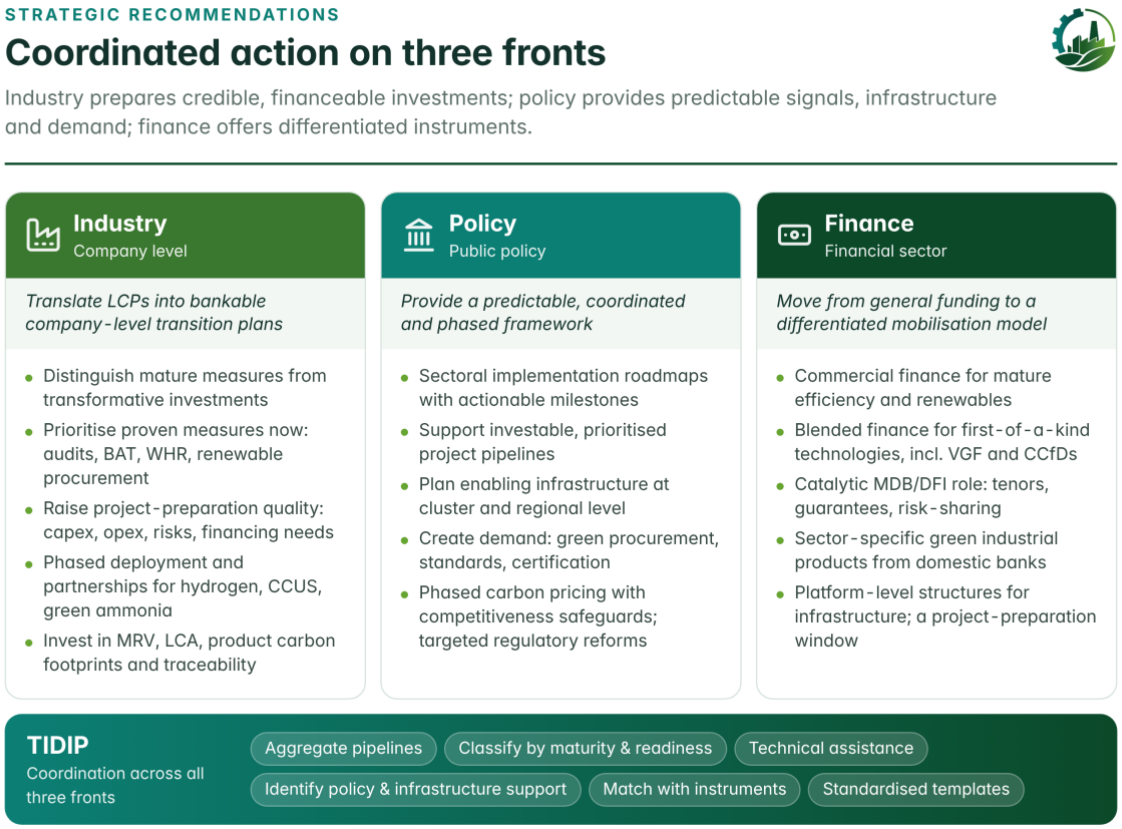


Figure 5-3: Strategic Recommendations on Three Fronts

5.3 Risks and Opportunities

The consolidated LCPs offer a significant opportunity to modernise Türkiye's industrial base, improve energy and resource efficiency, strengthen export competitiveness, and attract new sources of climate finance. However, their implementation will also involve a range of technology, infrastructure, financing, market and policy challenges. These challenges are closely linked: delays in enabling infrastructure or policy reform can undermine project economics, discourage private investment and slow the adoption of critical technologies. Successful implementation will therefore require well-coordinated investment planning and a policy framework that reduces uncertainty over time while supporting industrial competitiveness.

5.3.1 Key Implementation Risks

The following risk categories have been identified as relevant to the implementation of TIDIP across one or more of the four priority sectors. Each category is presented together with an indicative assessment of its significance and the main measures that may help address it.

RISKS AND OPPORTUNITIES

Implementation risks and transition opportunities

Risks are closely linked: delays in infrastructure or policy reform can undermine project economics and slow adoption of critical technologies.

RISK CATEGORY AND NATURE OF RISK	CEMENT	IRON & STEEL	ALUMINIUM	FERTILISERS	KEY MITIGATION LEVER
Technology maturity & deployment (frontier technologies) Cost, performance and commercialisation timelines for hydrogen-based DRI, CCUS, inert anodes and green ammonia remain uncertain, risking premature or stranded investment.	●	●	●	●	Match support to maturity: conventional finance for proven measures; pilots, demonstration funding and concessional finance for first-of-a-kind
Shared infrastructure & coordination Hydrogen-ready or CCUS-ready equipment depends on renewable electricity, hydrogen networks and CO_2 transport/storage that individual companies cannot deliver alone.	●	●	●	●	Cluster, regional or national planning with defined responsibilities and timelines; early public/MDB participation
Financing & bankability (particularly SMEs) Rising capital requirements, long payback periods and macroeconomic conditions (financing costs, FX volatility) constrain bankability, especially for smaller companies.	●	●	●	●	Allocate risk to the best-placed institution; MDB tenors, guarantees, concessional co-financing, project preparation
Policy & regulatory uncertainty Uncertainty over TR ETS design and timing, carbon price levels, free allocation and CBAM/TR ETS interaction could delay investment decisions.	●	●	●	●	Credible long-term direction with transitional flexibility; align pricing, incentives, infrastructure and standards on one timetable
Energy availability & cost Limited renewable capacity, grid congestion or high power prices could weaken electrification and hydrogen economics; continued gas dependence in DRI, process heat and ammonia.	○	●	●	●	Renewable capacity, grid access, industrial PPAs, flexibility; transitional gas use conditioned on hydrogen-readiness
Feedstock, circularity & supply chain Dependence on scrap, alternative fuels, supplementary cementitious materials and imported primary aluminium creates supply and embedded-emissions exposure.	●	●	●	○	Collection and quality certification, traceability, industrial symbiosis, secondary-material incentives
Market demand & competitiveness Low-carbon products may carry higher costs without an equivalent price premium, creating a bankability gap and carbon-leakage exposure under CBAM.	●	●	●	●	Green public procurement, product standards, certification and long-term offtake agreements
Institutional capacity & skills Shortages of qualified personnel and engineering capacity, and weak industry-university-government coordination, may slow deployment and increase reliance on imported expertise.	●	●	●	●	Workforce development, university-industry partnerships, specialist training and certification

● Sector most exposed. Sector attributions and mitigation levers are synthesised from the risk narratives; indicative likelihood/impact scoring pending validation by the TIDIP Steering Committee.

TRANSITION OPPORTUNITIES

- Modernisation & productivity
- Export competitiveness & early-mover advantage
- New industrial value chains
- Circular economy & industrial symbiosis
- Access to green & transition finance
- Innovation, skills & domestic technology

Figure 5-4: Key Implementation Risks and Transition Opportunities across TIDIP Priority Sectors

5.3.1.1 Technology Maturity and Deployment Risk

Several measures included in the LCPs such as energy efficiency, renewable electricity, waste heat recovery, process optimisation and conventional BAT upgrades, are already commercially established and generally involve lower levels of technology risk. Achieving deeper emission reductions will depend on technologies that remain at demonstration, first-of-a-kind or early commercial stage. These include hydrogen-based DRI, green ammonia, inert anodes, hydrogen calciners and large-scale industrial CCUS.

The future performance, cost and deployment timelines of these technologies remain uncertain. Delayed cost reductions in green hydrogen, lower-than-expected capture performance, limited domestic engineering capacity or slower commercialisation of frontier technologies could materially affect both the timing and cost of the consolidated LCPs. There is also a risk of companies investing too early in technologies that later prove to be uncompetitive or incompatible with future infrastructure and regulatory requirements.

Investment support should therefore reflect the maturity of technology. Commercially proven technologies can be supported through conventional finance and standard investment incentives, while less mature technologies will initially require pilot projects, demonstration funding, concessional finance and risk-sharing instruments. Public support should also be linked to clear learning outcomes, the potential for wider replication and consistency with the long-term transition pathway, helping reduce the risk of technology lock-in.

5.3.1.2 Shared Infrastructure and Coordination Risk

LCPs depend heavily on infrastructure that individual industrial companies are unlikely to be able to independently deliver. Renewable electricity generation, grid reinforcement, energy storage, hydrogen production and distribution, CO_2 transport and geological storage, and scrap and waste collection systems all require coordinated planning across multiple sectors, institutions and locations.

Failure to deliver this infrastructure in advance of, or alongside, facility-level investments could strand industrial assets or delay technology conversion. For example, companies may be reluctant to invest in hydrogen-ready equipment without reliable access to competitively priced renewable hydrogen. Similarly, CO_2 capture projects will remain difficult to finance unless

there is sufficient clarity on transport routes, storage capacity, access tariffs and long-term liability arrangements.

Infrastructure planning should therefore be carried out at cluster, regional or national level, with clearly defined responsibilities and indicative development timelines. Shared infrastructure may also require early participation from public institutions or MDBs to manage demand and utilisation risks until enough industrial users are connected.

5.3.1.3 Financing and Bankability Risk

The capital requirements are expected to rise significantly as the LCPs move from incremental efficiency improvements towards large-scale process transformation. Many deep-decarbonisation investments involve high upfront costs, long payback periods and revenues that depend on uncertain future factors, including carbon prices, energy costs, hydrogen prices and low-carbon product premiums.

Broader macroeconomic conditions may create further constraints. High financing costs, inflation, exchange-rate volatility and limited access to long term domestic finance may reduce the ability of industrial companies to undertake major investments, particularly where equipment and technology need to be imported. Smaller companies (mostly SMEs) may face additional challenges related to balance-sheet strength, collateral requirements and limited experience in developing bankable green investment projects.

Financing structures should therefore allocate risks to the institutions best positioned to manage them. Commercially viable investments should continue to rely mainly on private finance. However public institutions and MDBs may need to provide longer tenors, guarantees, concessional co-financing, first-loss protection and project-preparation support where specific risks prevent otherwise viable projects from reaching financial close. Foreign-exchange exposure should also be considered in the design of international financing facilities.

5.3.1.4 Policy and Regulatory Uncertainty

Clear and predictable policy signals are essential for investment in long-lived industrial assets. Uncertainty surrounding the post-pilot design and timing of the TR ETS, future carbon price

levels, free allocation, the interaction between the TR ETS and CBAM, renewable electricity procurement rules, hydrogen standards and CO_2 transport and storage regulation could delay investment decisions.

Poor coordination between policy areas may also result in conflicting signals. For example, investment incentives for low-carbon production may have limited impact if electricity-market arrangements, grid access rules or product standards do not support the underlying business model. Carbon pricing alone may also be insufficient where low-carbon technologies depend on major infrastructure that is not yet available or where customers are unwilling to pay a premium for low-carbon products.

Policy framework should therefore provide a credible long-term direction while allowing sufficient transitional flexibility for trade-exposed sectors. Carbon pricing, industrial incentives, infrastructure planning, product standards, public procurement and finance instruments should be aligned around a common technology and investment timetable.

5.3.1.5 Energy Availability and Cost Risk

The consolidated LCPs require a substantial increase of renewable electricity generation to support direct electrification, electric furnaces, electrolysis and hydrogen-based production. Limited renewable capacity, grid congestion or high electricity prices could weaken the economics of decarbonisation in iron and steel, aluminium and fertiliser sectors and could delay the wider deployment of hydrogen.

The priority sectors will also remain exposed to natural gas price volatility during the transition. Natural gas may continue to play an interim role in DRI, aluminium process heat and conventional ammonia production. This creates a risk that transitional investments become economically unattractive or contribute to prolonged dependence on fossil fuels.

Energy policy should therefore prioritise the expansion of renewable capacity, improved grid access, industrial PPAs and flexibility solutions such as storage and demand side management. Any transitional use of natural gas should be subject to clear compatibility conditions, including readiness for future hydrogen substitution and consistency with long-term decarbonisation of industrial assets.

5.3.1.6 Feedstock, Circularity and Supply-Chain Risk

Several low-carbon solutions depend on greater access to secondary materials and alternative inputs. Steel production requires reliable supplies of high-quality scrap, aluminium production depends on stronger collection and recycling systems, and cement production requires alternative fuels and supplementary cementitious materials. Constraints in collection, sorting, quality certification or logistics could constrain the use of these inputs and increase costs.

The aluminium sector is additionally exposed to supply and embedded emissions risks associated with imported primary aluminium and ingots. Fertiliser production remains sensitive to natural gas prices, raw material availability and developments in agricultural markets. These dependencies may weaken resilience and reduce the impact of decarbonisation measures at facility level.

Circularity and supply chain decarbonisation should therefore be treated as central elements of the investment pathway. Relevant measures include strengthening collection systems, developing quality standards, and traceability systems, supporting industrial symbiosis and creating incentives for secondary material use. Access to reliable supply chain emissions data and wider adoption of low-carbon procurement standards will also become increasingly important for maintaining market access.

5.3.1.7 Market Demand and Competitiveness Risk

Low-carbon products are likely to involve higher production costs during the early stages of market development, without necessarily securing an equivalent price premium. This can create a bankability gap for investments in green steel, low-carbon cement, recycled or low-carbon aluminium and green fertiliser. Where domestic demand remains limited, companies may postpone investment despite growing exposure to CBAM and other international climate-related market requirements.

There is also a risk that poorly designed transition policies increase costs for domestic producers without offering sufficient protection against carbon leakage or unfair competition

from jurisdictions with stronger public support. This is particularly important for international traded sectors that are also exposed to tariffs, quotas and fluctuations in external demand.

Demand-side measures should therefore complement investment support on the supply side. Product standards, certification schemes, green public procurement, long-term purchase agreements and voluntary buyer commitments can help create early markets and provide greater certainty over future revenues. Transitional competitiveness measures should remain targeted, transparent, and linked to credible decarbonisation plans.

5.3.1.8 Institutional Capacity and Skills Risk

The implementation of consolidated LCPs will require new capabilities in areas such as hydrogen, CCUS, digital monitoring, carbon accounting, engineering, finance and infrastructure regulation. A shortage of qualified personnel limited domestic engineering capacity and weak coordination between industry, universities and public institutions may slow deployment and increase reliance on imported expertise.

Capacity-building should therefore be integrated into investment programmes. Public funding and MDB TA can support workforce development, university-industry partnerships, specialist training, certification and the expansion of domestic engineering and technology-service providers.

This risk is already visible in the project-preparation constraints identified in Section 2.4.2: constrained in-house technical capacity for techno-economic analysis is a current, not merely prospective, barrier to deploying the LCPs' frontier technologies.

The sectoral LCPs already set out workforce actions on which TIDIP can build: the Cement LCP calls for training the workforce in new qualifications and skills and for increasing employment opportunities for women and other underrepresented groups; the Iron and Steel LCP calls for determining the new qualifications required, ensuring equal opportunity in sector employment and harmonising higher-education curricula with green steel skill requirements;

and the Aluminium LCP calls for increasing the employment and qualifications of women and other groups requiring special employment policies.[146]

5.3.2 Transition Opportunities

Alongside the risks set out above, Türkiye's industrial transition also presents a set of structural opportunities that TIDIP is positioned to help realise.

5.3.2.1 Modernisation and Productivity Improvement

Many near- and medium-term investments can reduce emissions while improving productivity, energy efficiency, resource use, and operational control. BAT upgrades, digital monitoring, efficient furnaces, waste heat recovery and process optimisation can lower production costs and strengthen resilience against energy-price volatility. These investments provide an entry point for accelerating implementation because they combine environmental benefits with relatively clear commercial returns.

5.3.2.2 Export Competitiveness and Early-Mover Advantage

Alignment with EU climate policies, CBAM requirements and emerging low-carbon product standards can help preserve access to Türkiye’s principal export markets. Early movers may benefit from stronger buyer relationships, improved positioning in low-carbon value chains and the ability to supply customers seeking lower embedded emissions.

Türkiye’s relatively large share of EAF-based steelmaking and the comparatively low emissions intensity of its domestic primary aluminium production provide an early competitive advantage. Supported by adequate renewable electricity supply, reliable scrap availability and robust traceability systems, these strengths could enable producers to develop differentiated low-carbon product offerings.

[146] Ministry of Industry and Technology / EBRD (2024). A Low Carbon Pathway for the Cement Sector in the Republic of Türkiye. Section 3.1, A.7 (p. 61); Ministry of Industry and Technology / EBRD (2023). A Low Carbon Pathway for the Steel Sector in the Republic of Türkiye. A.6 (p. 71); Ministry of Industry and Technology / EBRD (2023). A Low Carbon Pathway for the Aluminium Sector in the Republic of Türkiye. Policy area 6 (p. 23).

5.3.2.3 Development of New Industrial Value Chains

The transition creates opportunities beyond existing production facilities. Hydrogen production, electrolyser deployment, renewable energy, CO_2 transport and storage, recycling systems, alternative fuels, advanced materials, digital technologies and environmental services can generate new investment activity and domestic supply chains.

Cluster-based development may create economies of scale and support joint ventures among industrial producers, energy companies, infrastructure developers and technology providers. It may also help Türkiye attract strategic foreign investment and become a regional supplier of low-carbon industrial products and technologies.

5.3.2.4 Circular Economy and Industrial Symbiosis

Greater use of scrap, alternative fuels, supplementary cementitious materials and industrial by-products can support emissions reductions while decreasing reliance on imported inputs and fostering new cross-sector commercial linkages. Industrial symbiosis can further lower waste-management costs and strengthen domestic resource security.

Policy measures that improve collection, sorting, certification and cross-sector material exchange can therefore reduce both the cost and the scale of required deep-decarbonisation investment.

5.3.2.5 Access to Green and Transition Finance

The size and diversity of the consolidated investment pipeline create an opportunity to mobilise domestic and international capital at scale. A transparent pipeline aligned with credible sector pathways can attract MDBs, DFIs, climate funds, export credit agencies, commercial banks, institutional investors and strategic investors.

Standardised project screening, emissions-accounting methodologies and financing templates can reduce transaction costs and support aggregation, particularly for smaller efficiency, renewable energy and equipment-upgrade projects. Larger transformational

projects can be structured through blended-finance and public–private investment platforms.

5.3.2.6 Innovation, Skills and Domestic Technology Capacity

Supporting pilot initiatives and first-of-a-kind commercial projects can facilitate knowledge transfer and strengthen domestic engineering, manufacturing and service capabilities. Targeted investment in research and development, demonstration activities and workforce skills could enable Türkiye to become not only an adopter of low-carbon technologies, but also a competitive supplier of selected components, integrated systems and specialised technical services.

5.3.3 Policy and Design Considerations

Managing implementation risks and realising transition opportunities require an integrated approach to investment and policy design.

First, investment sequencing should follow technology and infrastructure dependencies rather than sector plans in isolation. Renewable electricity, grid reinforcement, hydrogen and CO_2 infrastructure should be planned in parallel with facility-level conversion. Early investment should also prioritise no-regret measures that improve efficiency and maintain compatibility with future deep-decarbonisation technologies.

Second, public support should be additional and risk focused. Grants and concessional resources should target project preparation, demonstration, first-of-a-kind technologies and common infrastructure rather than subsidising investments that are already commercially viable. Support should be time-bound, performance-based and designed to crowd in private capital.

Third, policy instruments should be coordinated. Carbon pricing should be accompanied by product standards, public procurement, modifications in renewable electricity and infrastructure regulation, and strengthened access to finance. The timing and ambition of

these instruments should reflect sector-specific investment cycles and exposure to international competition.

Fourth, policy design should avoid carbon and technology lock-in. Interim investments should be assessed against their compatibility with the 2053 pathway. Natural gas-based technologies, for example, should only be supported where they can be converted to low-carbon hydrogen or otherwise remain consistent with the long-term transition.

Fifth, the platform should apply a portfolio approach to implementation. Projects should be classified according to technology maturity, investment readiness, emissions impact, infrastructure dependency and financing gap. This would allow mature projects to move quickly to commercial finance while more complex projects receive targeted development and risk-mitigation support.

Finally, implementation should be supported by a monitoring and review framework. Technology costs, carbon prices, energy-market conditions, infrastructure progress and project delivery should be reviewed periodically. The consolidated pathway should be updated where assumptions materially change, while maintaining a stable long-term policy direction to preserve investor confidence.

6 Conclusion: Enabling a Coherent Industrial Transition

The transformation of Türkiye's cement, iron and steel, aluminium, and fertiliser industries from carbon-intensive to near-zero production is not a distant aspiration — it is an immediate strategic imperative, driven by legally binding national commitments, escalating trade policy pressures, and the irreversible shift in global capital markets towards low-carbon industrial assets.

The sectoral Low Carbon Pathways are the backbone of this transformation. They have demonstrated, with technical rigour and economic precision, that the transition is both technically feasible and, at the system level, economically rational. The combined investment of minimum USD 70 billion across the four sectors over thirty years is large in absolute terms, but it is modest relative to the economic value at risk if Türkiye's industrial producers lose EU market access under CBAM or fail to secure the competitive position in emerging global low-carbon industrial product markets that their existing strengths in EAF steel, aluminium recycling, and cement export leadership uniquely position them to achieve.

The IPPS has provided the strategic architecture to translate the LCPs into an actionable, investment-ready programme. It has demonstrated that the enabling conditions — Climate Law No. 7552, the TR ETS, Green Taxonomy, CIF Industry Decarbonisation Program, and a portfolio of investment incentives and R&D support programmes — are substantially in place or in development. What remains is the consistent, sequenced, and coordinated implementation of these instruments alongside targeted regulatory reforms, project preparation support, and blended finance structuring.

Four imperatives stand above all others in the near term:

- The TR ETS, in force since 27 August 2026 and now in its 2026-2027 pilot phase, must progress to full implementation with a credible carbon price trajectory. Without a meaningful and predictable carbon price signal once the price mechanism begins in 2027, investment commitments to DRI, CCUS, and hydrogen will be delayed beyond the window required to deliver the LTS sectoral targets. The pilot phase must operate as a genuine step towards full implementation, not a regulatory exercise.
- CCUS feasibility studies and geological storage regulatory development must begin immediately. The first CCUS pilot installations foreseen for 2034-2038 in the cement

roadmap — less than ten years away — and commercial deployment from the early 2040s require sub-surface characterisation studies, cluster mapping, and regulatory framework development that have years-long lead times. Every year of delay in starting this work pushes the first deployment window further into the future.

- The CIF Industry Decarbonisation Program Investment Plan has been submitted to the CTF Trust Fund Committee (September 2026) and should now be operationalised with ambition. This is Türkiye's single most important near-term concessional finance opportunity — and one where the indicative USD 250 million in CIF IDP concessional resources is expected to leverage around USD 2.8 billion in MDB and private co-financing (1:11.2).[147] The Secretariat must work urgently with the MoIT and MDB partners to operationalise this opportunity.
- CBAM equivalence must be pursued as a standing bilateral dialogue track, not a downstream negotiation. Of all the unresolved policy variables set out in this strategy (Section 2.1), the extent to which the EU recognises carbon prices paid under the TR ETS for deduction from CBAM obligations is the one most capable of eroding the competitiveness gains the rest of this programme is designed to deliver, since it determines whether Turkish exporters pay for carbon once or twice. This dialogue should run in parallel with the further development of the TR ETS from the outset, not follow it.

Türkiye's industrial sectors stand at the threshold of a transformation that if executed with the coherence and urgency the analysis demands, can position Türkiye as one of the world's leading examples of industrial decarbonisation in an emerging market context, while creating significant economic value through improved competitiveness, access to growing low-carbon product markets, and the development of new export opportunities in green hydrogen and low-carbon industrial goods.

[147] Climate Investment Funds (2026). Türkiye Industry Decarbonization Program Investment Plan (s-TIP), CTF/TFC.38/3, 14 September 2026. Available at: https://www.cif.org/sites/cif_enc/files/2026-09/ctf_tfc.38_03_turkiye-industry-s-tip_09142026.pdf

7 ANNEX

7.1 Annex I

After receiving general feedback from all relevant partners having role within TIDIP, this section will be structured separately.

7.2 Annex II-Policy and Regulatory Landscape

7.2.1 National Climate Commitments and Policy Framework

Paris Agreement (October 2021)[148]: Ratification triggered binding NDC, LTS, and Enhanced Transparency Framework obligations. TIDIP is the operational mechanism for delivering Türkiye's Paris commitments in the industrial sector.

Updated First NDC (April 2023)[149]: 41% below Business as Usual (BAU) by 2030 (695 Mt CO_2eq); IPPU explicitly covered; peak emissions no later than 2038. Each tonne of CO_2eq reduced through TIDIP-supported investments counts towards the national 2030 target.

Second NDC / NDC 3.0 (COP30, November 2025)[150]: 643 Mt CO_2eq by 2035; legally backed by Climate Law No. 7552. The strengthened 2035 target materially increases urgency of near-term TIDIP investment decisions.

LTS 2053 (November 2024)[151]: 89 strategic titles; explicit 2053 sectoral targets: cement (-93%), iron and steel (-99%), aluminium (-75%). These are the definitive quantitative long-term anchors for the IPPS.

Climate Change Mitigation Strategy and Action Plan[152]: 49 strategies, 260 actions. Industrial sector actions directly complement TIDIP IFAs. TIDIP Secretariat should maintain active mapping between IPPS recommendations and Mitigation Strategy actions.

Climate Change Adaptation Strategy and Action Plan[153]: Addresses physical climate risks — water stress, extreme heat — affecting TIDIP sector operations. All TIDIP investment

[148] Official Gazette, (2021), *op. cit.*
[149] MoEUCC, (2023), *op. cit.*
[150] MoEUCC, (2025a), *op. cit.*
[151] Republic of Türkiye, (2024a), *op. cit.*
[152] MoEUCC, (2024a), *op. cit.*
[153] MoEUCC. (2024c). *Climate Change Adaptation Strategy and Action Plan (2024-2030)*. Available at: https://iklim.gov.tr/db/turkce/icerikler/files/Uyum.pdf

projects should be evaluated for physical climate risk exposure to meet MDB financing requirements.

First Biennial Transparency Report (BTR1, 2024)[154]: Most current structured account of national climate action progress. TIDIP M&E framework should align with BTR reporting cycles to ensure TIDIP's emission reduction contributions are captured in future BTR submissions.

7.2.2 Climate Law No. 7552 and Carbon Pricing Framework

Climate Law No. 7552 (July 2025)[155]: Türkiye's first comprehensive climate law (OG No. 32951, 9 July 2025) transforms the policy landscape from voluntary commitments to legally enforceable obligations. For TIDIP, it: (i) legally enshrines the 2053 net-zero target and NDC commitments as binding domestic obligations; (ii) provides the legal basis for the TR ETS, in force since 27 August 2026, as the primary carbon price signal for all four TIDIP sectors; (iii) mandates the Green Taxonomy — the reference framework for classifying environmentally sustainable economic activities; (iv) provides the legal basis for a domestic CBAM on goods imported into the Turkish Customs Territory (Article 8), to be operationalised through secondary legislation; and (v) establishes the legal framework for climate finance instruments, green bonds, guarantees, grants, and risk-sharing mechanisms.

GHG MRV Regulation (2014, as amended; repealed by the TR ETS Regulation of 27 August 2026)[156]: Operative from 2015 until its repeal; covered ~800 industrial installations including all TIDIP sectors. This decade-long verified emissions track record is the most important data asset for TR ETS implementation and provides installation-level emissions baselines essential for LCP modelling, PIN preparation, and bankability analysis. TIDIP's alignment of MRV data with CBAM embedded carbon reporting is an immediate TA priority.

TR ETS Regulation (published 27 August 2026, Official Gazette No. 33353; in force, repeals the 2014 GHG Monitoring Regulation): Intensity-based cap (benchmark method); Category B (50,000-500,000 t CO_2e/yr) and Category C (>500,000 t CO_2e/yr) facilities covered; per Carbon Market Board Decision KPK/2026/1, the 2026-2027 pilot is limited to electricity generation, cement, iron and steel, aluminium, and fertiliser sector facilities, with

[154] Republic of Türkiye. (2024b). *Türkiye Biennial Transparency Report (BTR). (BTR1).* Available at: https://unfccc.int/documents/642617
[155] Official Gazette, (2025a), *op. cit.*
[156] Official Gazette. (2014). *Regulation on the Monitoring of Greenhouse Gas Emissions (No. 29003).* Available at: https://www.resmigazete.gov.tr/eskiler/2014/05/20140517-3.htm

100% free allocation; 2026 is a reporting-only year (no allocation surrender obligation); the price mechanism and surrender obligations begin in 2027; the First Implementation Period (2028-2035, in two sub-periods) is expected but not yet confirmed by primary legislation; GHG emission permits must be obtained by 9 July 2028[157]. The carbon price trajectory is the single most important policy variable for CCUS, DRI-EAF, and green hydrogen project economics in all four TIDIP sectors.

Draft Carbon Crediting and Offsetting Regulation (MoEUCC, 2025)[158]: Establishes the national carbon credit registry, project-based emission reduction methodologies, and rules for domestic offsets eligible for TR ETS surrender obligations (up to 10% post-pilot). Creates a complementary pathway for monetising emission reductions from energy efficiency and fuel switching projects that may not be directly captured under the ETS intensity cap.

EMRA ETS Method Declaration (2025)[159]: Governs the financial mechanics of ETS allowance exchange and registry operations. Relevant to understanding transaction costs for TIDIP sector companies participating in the TR ETS and to the design of the carbon credit market infrastructure.

Türkiye Green Taxonomy Regulation (Official Gazette No. 33380, 24 September 2026)[160]: Mandated by Climate Law No. 7552; in force upon publication; six environmental objectives; technical screening criteria covering 16 sectors and 137 economic activities to be published by the Climate Change Presidency; taxonomy reporting mandatory for regulated financial institutions from 1 January 2029. Critical TIDIP advocacy priority: ensuring that CCUS, DRI-EAF, green hydrogen, and advanced energy efficiency qualify as eligible activities under the Taxonomy's technical screening criteria.

Domestic CBAM Mechanism (Climate Law No. 7552)[161]: Article 8 of Climate Law No. 7552 provides that a CBAM may be established for the embedded greenhouse gas emissions of goods imported into the Turkish Customs Territory, with procedures to be set by secondary legislation. This import-side mechanism is distinct from the deduction of carbon prices paid under the TR ETS from EU CBAM obligations, which is governed by Article 9 of the EU CBAM

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[157] Official Gazette, (2025a), *op. cit.*
[158] MoEUCC. (2025c). *Regulation on Carbon Crediting and Offsetting*.
Available at: *https://iklim.gov.tr/db/turkce/icerikler/files/Carbon_Crediting_Offsetting*
[159] Official Gazette. (2025b). *Method Declaration on Fees and Commissions for Meeting the Revenue Cap of ETS Operations (No.13977)*. pp.16-18. Available at: https://www.resmigazete.gov.tr/eskiler/2025/11/20251129-4.pdf
[160] Official Gazette, (2025a), *op. cit.*
[161] Ibid.

Regulation; to the extent that such deduction applies, carbon revenues accrue to the Turkish budget rather than the EU budget, which strengthens the strategic rationale for accelerating TR ETS operationalisation.

7.2.3 Trade Policy, EU Alignment and Competitiveness Framework

EU CBAM — Regulation (EU) 2023/956: Transitional reporting from 1 October 2023; definitive period from 1 January 2026, with CBAM certificate sales from 1 February 2027 and the first surrender for 2026 imports due by 30 September 2027; EU free allowances phased out 2026-2034. The most immediate and financially material external policy driver for TIDIP sectors. TIDIP's investment pipeline directly reduces CBAM exposure; TIDIP's MRV and LCP capacity development directly supports CBAM reporting compliance.

National Green Deal Action Plan (NGDAP) (2021) and Green Transformation Strategy (2024)[162]: Action 1.1.1 explicitly mandates MoIT to develop decarbonisation roadmaps for CBAM-covered manufacturing sectors — directly fulfilled by the LCPs and the IPPS. The 2024 evolution integrates fiscal, industrial, and trade policy.

EU Customs Union and ECSC Agreement (1996)[163]: Provides tariff-free EU market access for Turkish industrial goods — specifically for iron and steel under the 1996 ECSC Agreement. The Steel LCP Policy Roadmap (B.2) explicitly calls for reviewing investment limitations under the ECSC Agreement and conducting negotiations with the EU to ensure green transformation investments are not constrained by treaty provisions. TIDIP should support the MoIT in this bilateral policy engagement.

Inward Processing Regime (DİR)[164]: The DİR allows temporary duty-free import of raw materials for processing and re-export. For CBAM purposes, goods produced under DİR and exported to the EU require embedded carbon accounting aligned with EU methodology — creating compliance complexity for Turkish steel and aluminium exporters that TIDIP's MRV capacity development programme must specifically address.

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[162] Ministry of Trade, (2021), *op. cit.*
[163] European Union. (1996). *Agreement between the European Coal and Steel Community and the Republic of Turkey on trade in products covered by the Treaty establishing the European Coal and Steel Community - Protocol 1 on rules of origin*.
Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A21996A0907%2801%29&
[164] Ministry of Trade. (n.d.). *Inward processing procedures*.
Available at: https://www.trade.gov.tr/data/603366c413b8760e6479c30b/Inward%20processingregime.pdf

EU Steel Safeguard Measures (2019-2026+):[165] Post-June 2026 quota tightening proposals and increased out-of-quota tariffs represent a compounding trade risk alongside CBAM for Turkish steel exporters. TIDIP must engage on trade policy alongside decarbonisation investment — the two tracks are inseparable for the steel sector.

7.2.4 Energy Policy and Regulatory Framework

MENR 2019-2023 Strategic Plan (since superseded by the MENR 2024-2028 Strategic Plan, November 2024)[166]**:** Presidential strategic framework establishing energy security, diversification, and renewable expansion. Provides the sectoral planning basis for grid infrastructure and energy pricing policy determining enabling conditions for electrification-based industrial decarbonisation.

Renewables Roadmap to 2035 (MENR, October 2024)[167]: 7.5-8 GW/year new wind and solar to 2035; 120 GW total by 2035; USD 28 billion grid investment. Grid decarbonisation directly reduces Scope 2 emissions for EAF steel, aluminium remelters, and other electro-intensive TIDIP processes.

Energy Efficiency Law No. 5627 (2007, as amended May 2024)[168]: Mandatory energy auditing and benchmarking for large industrial consumers. May 2024 amendments: extended eligibility to all sectors; increased support amounts tenfold; added carbon intensity reduction criteria; introduced the ECR programme replacing the Voluntary Agreement scheme.

EEP Programme[169]: Under Law No. 5627; covers up to 30% of eligible investment costs (2026 cap: 27,092,663 TL) for ≥20% energy savings with ISO 50001 certification. Applicable to kiln upgrades, WHR, process optimisation, utility (fans, pumps, compressors, steam, etc.) improvement and high-efficiency motors in TIDIP sector facilities.

ECR Programme[170]: Introduced by May 2024 amendments; replaced the Voluntary Agreement scheme. Provides support for reductions in energy intensity, carbon intensity, and

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[165] TÇÜD. (2026). *Steel at a Turning Point in 2026.* Available at: https://celik.org.tr/en/members/news/steel-at-a-turning-point-in-2026
[166] MENR. (2019). *2019-2023 Strategic Plan.* Available at: https://enerji.mmo.org.tr/wp-content/uploads/2020/05/ETKB-2019-2023_Stratejik_Plan%C4%B1.pdf
[167] MENR. (2024a). *Renewables Roadmap to 2035.* Available at: https://enerji.gov.tr/haber-detay?id=21380&
[168] Official Gazette. (2007). *Energy Efficiency Law (No.5627).*
Available at: https://www.resmigazete.gov.tr/eskiler/2007/05/20070502-2.htm
[169] MENR. (2025b). *Efficiency-Enhancing Project (VAP) Support Program*.
Available at: https://enerji.gov.tr/evced-enerji-verimliligi-destekleri-verimlilik-artirici-proje-destekleri
[170] MENR. (2025c). *Regarding Energy Efficiency Support Payments for 2025.*
Available at: https://enerji.gov.tr/duyuru-detay?id=30506

specific energy consumption (2025 cap: 18,061,775 TL). The first national industrial support programme explicitly rewarding carbon intensity reduction — a direct TIDIP IFA 3 instrument.

2030 Energy Efficiency Strategy and 2nd National EE Action Plan (NEEAP) (MENR, 2024)[171]: 16% consumption reduction below 2023 levels by 2030; USD 20 billion investment. TIDIP's IFA 3 (Energy Efficiency and Circular Economy) directly implements this strategy.

Hydrogen Technology Strategy and Roadmap (MENR, 2023)[172]**:** Green hydrogen as strategic national priority; cement, iron and steel, and fertiliser identified as key industrial end-use sectors. Policy foundation for TIDIP IFA 1 (Green Hydrogen). Key gaps: absence of dedicated hydrogen offtake frameworks, limited CO_2 transport infrastructure, need for demand aggregation mechanisms.

Electricity Market Law No. 6446 (2013) and Generation Regulation[173]**:** PPA regulatory framework governing industrial renewable electricity access. Current constraints — tenor limitations, balancing obligations, metering requirements — represent a significant barrier to bankable Scope 2 decarbonisation for EAF steelmakers and aluminium remelters. TIDIP policy dialogue should specifically target PPA regulatory reform.

Renewable Energy Guarantee of Origin (YEK-G)[174]: YEK-G provides tradeable certificates enabling industrial consumers to certify the renewable source of procured electricity — increasingly important for demonstrating Scope 2 emission reductions under CBAM, TR ETS, and TSRS corporate reporting. TIDIP sector companies should be supported in accessing YEK-G certificates as part of their Scope 2 management strategies.

Natural Gas Market Law No. 4646 (2001, as amended)[175]: BOTAŞ tariff framework and supply contract conditions for industrial consumers are the primary determinant of feedstock cost economics for the fertiliser sector and affect green hydrogen transition economics. BOTAŞ's regulatory position as dominant supplier is a key TIDIP policy engagement point.

TENMAK — Hydrogen and CCUS R&D Support[176]: TENMAK's dedicated R&D grant calls for hydrogen technologies (Hydrogen Technologies and Fuel Cells Call) and CCUS (Carbon Capture, Utilisation and Storage Technologies Call, 2022-2023) provide a direct national R&D

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[171] MENR. (2024b). *Energy Efficiency 2030 Strategy and 2nd National Energy Efficiency Action Plan (2024-2030).* p.4. Available at: https://enerji.gov.tr/Media/Dizin/EVCED/tr/EnerjiVerimliliği.pdf
[172] MENR, (2023), *op. cit.*
[173] Energy Market Regulatory Authority (EMRA). (2013). *Electricity Market Law (No.6446).* Available at: https://www.epdk.gov.tr/detay/icerik/23-2-3/mevzuat
[174] Ibid.
[175] Official Gazette. (2001a). *Natural Gas Market Law (No.4646)*. Available at: https://www.mevzuat.gov.tr/MevzuatMetin/1.5.4646.pdf
[176] TENMAK, (2023), *op. cit.*

funding channel for TIDIP's IFA 1 and IFA 2 technology pathways. TENMAK should be engaged as a TIDIP partner institution.

7.2.5 Industrial Policy, Investment Incentives and Innovation Framework

Twelfth Development Plan (2024-2028)[177]: Integrates green transformation as a core economic priority; provides sectoral investment targets, just transition principles, and institutional coordination mandates. TIDIP's investment pipeline contributes to the Plan's green transformation objectives.

2030 Industry and Technology Strategy (MoIT, 2023)[178]: Strategic framework for technology-intensive industrial development including green transformation; establishes priorities for high-technology manufacturing, industrial R&D, and international technology partnerships.

Presidential Investment Incentive Decree No. 9903 (May 2025)[179]**:** Overhauled the national incentive system. Priority Investment category explicitly includes projects under the Green Transformation Programme: 60% tax reduction, VAT and customs duty exemptions, up to 12-year employer SSP support, plus renewable self-generation facilities. Advocating for explicit inclusion of CCUS, DRI, green hydrogen, and IFA technologies as Targeted or Strategic investments is one of the most impactful near-term TIDIP policy reforms.

HIT-30 Programme[180]: High strategic impact technology investments under the project-based stream of Decree No. 9903. CCUS pilot projects and first-of-kind green hydrogen applications in TIDIP sectors should be assessed for HIT-30 qualification, which would significantly improve project economics.

Technology Tracking Platform (TTP)[181]: Proposed in the Steel LCP Policy Roadmap (B.3) as a MoIT mechanism to monitor and track low-carbon technologies jointly with industry stakeholders, benchmarking against IEA, MPP, and TUBITAK sector roadmaps. TIDIP Secretariat should engage the MoIT on TTP operationalisation and integrate TIDIP project

[177] Presidency of Strategy and Budget, (2023), *op. cit.*
[178] MoIT, (2025a), *op. cit.*
[179] Official Gazette. (2025c). *State Aid for Investments (No. 32915).*
Available at: https://www.resmigazete.gov.tr/eskiler/2025/05/20250530-2.pdf
[180] MoIT. (2025b). *HIT-30 Program*. Available at: https://hit30.sanayi.gov.tr
[181] MoIT, (2023b), *op. cit.*

pipeline data into the platform — creating a shared government-industry intelligence system on decarbonisation technology deployment.

TÜBİTAK Green Growth Technology Roadmap — Cement Sector (2023)[182]: Identifies key R&D priorities for cement sector decarbonisation; directly applicable to TIDIP cement sector IFAs. Equivalent roadmaps for steel, aluminium, and fertilisers provide complementary analytical inputs.

Türkiye Green Industry Project (World Bank/TÜBİTAK/KOSGEB)[183]: The primary national support umbrella for industrial green transformation R&D and innovation, encompassing TÜBİTAK 1831, 1832, 1833 programmes and KOSGEB programmes.

TÜBİTAK 1501 (Industrial R&D)[184]: 75% of R&D costs covered; technology-neutral; directly applicable to CCUS, green hydrogen, novel cement binders, and DRI process R&D. 2026/1 Call published 4 January 2026. TIDIP's TA programme should support TIDIP sector companies in preparing 1501 project proposals.

TÜBİTAK 1831 (Green Innovation Mentoring)[185]: Up to 90% grant for SME green transition consultancy and roadmap development (budget cap: 280,000 TL; 3-6 months). Relevant for smaller producers in TIDIP sectors seeking to develop company-level decarbonisation roadmaps.

TÜBİTAK 1832 (Industrial Green Transformation)[186]: Late-stage R&D, prototyping, scaling and demonstration; up to 50% convertible to grant; 11-32 million TL; 2025/1 Call April 2025. Most directly relevant to IFA 5 pilot projects and technology validation at TIDIP sector facilities.

TÜBİTAK 1833 — SAYEM Platforms[187]: University–industry R&D networks for green technologies; up to 350 million TL per platform. CCUS and green hydrogen SAYEM platforms would accelerate TIDIP IFA 1 and IFA 2 technology pathways.

KOSGEB Green Industry Support Programme and SME Energy Efficiency Programme: Targeted at SMEs in manufacturing; relevant for TIDIP sector supply chain companies and smaller producers seeking green transformation support.

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[182] TÜBİTAK & Ministry of Trade. (2023). *Green Growth Technology Roadmap*.
Available at: https://tubitak.gov.tr/en/kurumsal/politikalar/yesil-buyume
[183] MoIT. (2024c). *Türkiye Green Industry Project (TGIP)*. Available at: https://tgip.sanayi.gov.tr
[184] TÜBİTAK. (2025b). *1501 - Industrial R&D Projects Grant Programme*.
Available at: https://tubitak.gov.tr/en/funds/industrial/national-support-programs/1501-industrial-rd-projects-grant-programme
[185] TÜBİTAK. (2025c). *1831 Climate-Informed and Green Innovation Technology Extension Program*.
Available at: https://tubitak.gov.tr/national-support-programs/1831-climate-informed-and-green-innovation-technology-extension-program
[186] TÜBİTAK, (2025a), *op. cit.*
[187] TÜBİTAK, (2024), *op. cit.*

Green Transformation Support Programme (MoIT)[188]: Targeted financial support for industrial green transformation investments; equipment grants and co-financing for low-carbon technology adoption. Eligible investments under the Priority Investment category align directly with this programme.

R&D Support Law No. 5746 (2008+)[189]: 100% R&D deduction from corporate tax base. Applicable to CCUS pilot development, hydrogen R&D, novel cement binder research, and DRI process adaptation studies at TIDIP sector companies' dedicated R&D centres.

Technology Development Zones Law No. 4691[190]: Income and corporate tax exemptions for Technopark companies. Supports TIDIP's IFA 5 ecosystem: CCUS capture equipment developers, hydrogen technology companies, low-carbon industrial software.

Organised Industrial Zones Law No. 4562[191]: OIZs are strategically important for cluster-level TIDIP enabling infrastructure: CO_2 collection networks, hydrogen supply hubs, shared renewable energy installations. TIDIP should engage OIZ administrations on cluster-level enabling infrastructure planning.

7.2.6 Environmental Regulation

Environment Law No. 2872 (1983, as amended 2020)[192]: Principal environmental framework law amended in December 2020 to introduce circular economy and zero waste principles into primary legislation. Non-compliance with GHG MRV obligations is sanctioned under this law.

Environmental Permit and License Regulation[193]: Integrated environmental permitting framework for all major industrial facilities. Valid environmental permits are prerequisites for investment approval and MDB financing due diligence. Environmental Impact Assessment approval and environmental permit renewal timelines for CCUS retrofits, DRI-EAF, and green hydrogen facilities require attention given their novelty in the Turkish regulatory context.

Environmental Impact Assessment Regulation (OG No. 31907, 29 July 2022)[194]: Mandatory for major new industrial investments. Streamlining Environmental Impact

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[188] MoIT. (2026). *Green Transformation Support Programme*. Available at: https://yesildonusum.sanayi.gov.tr
[189] Official Gazette. (2008a). *Law on the Support of Research, Development and Design Activities (No.5746).* Available at: https://www.mevzuat.gov.tr/mevzuatmetin/1.5.5746.pdf
[190] Official Gazette. (2001b). *Law on Technology Development Zones (No.4691).* Available at: https://www.mevzuat.gov.tr/mevzuatmetin/1.5.4691.pdf
[191] Official Gazette. (2000). *Law on Organized Industrial Zones (No.4562).* Available at: https://www.mevzuat.gov.tr/mevzuatmetin/1.5.4562.pdf
[192] Official Gazette. (1983). *Law on Environment (No.2872)*. Available at: https://www.mevzuat.gov.tr/MevzuatMetin/1.5.2872.pdf
[193] Official Gazette. (2013). *Regulation on the Control of Soil Pollution and Contaminated Sites*. Available at: https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=14026&MevzuatTur=7&MevzuatTertip=5
[194] Official Gazette. (2022a). *Environmental Impact Assessment Regulation.*

Assessment processes for decarbonisation investments — while maintaining safeguards — is a TIDIP enabling reform priority, particularly for CCUS infrastructure and green hydrogen electrolysis facilities.

Industrial Air Pollution Control Regulation (IAPCR, 2009)[195]: Sets emission limit values for cement kilns, steel furnaces, and aluminium smelters. Compliance provides a process improvement floor; fuel switching creates co-benefits for both GHG and conventional air pollutants.

Air Quality Monitoring Regulation[196]: Ambient air quality monitoring requirements. Relevant to community acceptance and social licence for TIDIP investments near residential areas.

Zero Waste Regulation (2019, amended 2023)[197]: Mandates source separation and recycling targets. Directly supports cement sector's alternative fuel scale-up by driving municipal waste processing infrastructure for RDF/SRF supply.

Waste Management and Hazardous Waste Regulations[198,199,200]: Classification of blast furnace slag, fly ash, and industrial scrap as wastes or by-products affects conditions for using them as low-carbon inputs in TIDIP sectors.

RDF and Alternative Fuels Regulation (OG No. 29314, 2014+)[201]: Governs co-processing of waste-derived fuels in cement kilns. Current bottlenecks — inter-municipal waste transfer restrictions, limited approved fuel categories, complex permitting — are among the most important near-term regulatory reform opportunities for cement decarbonisation. Regulatory modernisation, aligned with EU practices, is a specific TIDIP policy programme priority.

National Circular Economy Strategy (NCESAP) 2025-2028 (Presidential Circular 2025/17)[202]: Updated in October 2025; targets a significant increase in Türkiye's ~4.5% circularity rate; mandatory recycled content requirements; EU Circular Economy Action Plan

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Available at: https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=39647&MevzuatTur=7&MevzuatTertip=5
[195] Official Gazette. (2009a). *Industrial Air Pollution Control Regulation.*
Available at: https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=13184&MevzuatTur=7&MevzuatTertip=5
[196] Official Gazette. (2008b). *Regulation on the Assessment and Management of Air Quality.*
Available at: https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=12188&MevzuatTur=7&MevzuatTertip=5
[197] Official Gazette. (2019a). *Zero Waste Regulation.*
Available at: https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=32659&MevzuatTur=7&MevzuatTertip=5
[198] Official Gazette. (2015). *Waste Management Regulation.*
Available at: https://mevzuat.gov.tr/mevzuat?MevzuatNo=20644&MevzuatTur=7&MevzuatTertip=5
[199] Official Gazette. (2021). *Regulation on the Control of Packaging and Packaging Waste.*
Available at: https://mevzuat.gov.tr/mevzuat?MevzuatNo=38745&MevzuatTur=7&MevzuatTertip=5
[200] Official Gazette. (2005). *Regulation on the Control of Hazardous Waste.*
Available at: https://www.resmigazete.gov.tr/eskiler/2005/03/20050314-1.htm
[201] MoEUCC. (2014). *Communiqué on Refuse-Derived Fuel, Supplementary Fuel and Alternative Raw Material*.
Available at: https://cygm.csb.gov.tr/atiktan-turetilmis-yakit-ek-yakit-ve-alternatif-hammadde-tebligi-duyuru-17930
[202] MoEUCC. (2025d). *National Circular Economy Strategy and Action Plan (NCESAP) 2025-2028.*
Available at: https://climate-laws.org/document/national-circular-economy-strategy-and-action-plan_6713

alignment by 2028. National policy driver for TIDIP's IFA 3 (Energy Efficiency and Circular Economy).

Water Pollution Control Regulation[203]: Industrial wastewater discharge standards for all TIDIP sector facilities. Relevant to green hydrogen electrolysis (high-purity water demand), CCUS cooling water systems, and cumulative pollution assessments for TIDIP projects.

Construction and Demolition Waste (CDW) Management Regulation[204]: Governs recovery and recycling of CDW including concrete rubble. CDW availability as secondary raw material (calcium silicate compounds usable as SCMs) is a relevant circular economy lever for the cement sector.

Mining Law No. 3213 (1985+) and MAPEG[205]: Governs quarrying rights critical for cement sector raw materials (limestone, clay, gypsum). MAPEG will also be a central institutional actor in future CCUS geological storage permitting — site characterisation, drilling authorisations, and subsurface liability frameworks do not yet exist in Turkish law and must be developed as a TIDIP medium-term policy priority.

Occupational Health and Safety Law No. 6331 (2012+)[206]: All TIDIP-sector facilities classified as hazardous or very hazardous workplaces. OHS compliance is a prerequisite for investment permit approvals and MDB due diligence. New technology installations (CCUS, hydrogen) require specific OHS risk assessments for novel chemical and pressure hazards.

Noise Control Regulation[207]: Relevant to social licence and community acceptance for TIDIP investments, particularly for new plant extensions and CCUS retrofit installations near residential areas.

[203] Official Gazette. (2004a). *Water Pollution Control Regulation.*
Available at: https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=7221&MevzuatTur=7&MevzuatTertip=5
[204] Official Gazette. (2004b). *Construction and Demolition Waste Management Regulation.*
Available at: https://mevzuat.gov.tr/mevzuat?MevzuatNo=5401&MevzuatTur=7&MevzuatTertip=5
[205] Official Gazette. (1985). *Mining Law (No.3213).*
Available at: https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=3213&MevzuatTur=1&MevzuatTertip=5
[206] Official Gazette. (2012). *Occupational Health and Safety Law (No.6331).*
Available at: https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=6331&MevzuatTur=1&MevzuatTertip=5
[207] Official Gazette. (2022b). *Environmental Noise Control Regulation.*
Available at: https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=39864&MevzuatTur=7&MevzuatTertip=5

7.2.7 Green Finance, Capital Markets and Sustainable Finance Regulations

Republic of Türkiye Sustainable Finance Framework (2021)[208]: Ministry of Treasury and Finance establishes eligibility criteria for sovereign green, social, and sustainability-linked debt instruments. It is not a regulatory requirement for private issuers: corporate green bond issuance by TIDIP-sector companies is governed by CMB legislation and Guidelines, and the Framework may serve only as a non-binding reference.

CMB Guidelines on Green Debt Instruments, Sustainable Debt Instruments, Green Lease Certificates and Sustainable Lease Certificates (2022)[209]: Adopted by CMB Board decision of 24 February 2022 (not accompanied by a Communiqué); replaced on 13 August 2026 by the CMB Guidelines on Green, Sustainable and Social Capital Market Instruments, which add social instruments and redefine eligible project types, including climate change mitigation projects such as hydrogen and carbon capture and storage, and by the Guidelines on Sustainability Linked Capital Market Instruments, a new instrument type whose financing conditions vary with the achievement of KPIs and sustainability strategies. Industrial transition projects are therefore not precluded from capital-market financing, while eligibility under the CMB Guidelines and classification as environmentally sustainable under the Türkiye Green Taxonomy are distinct assessments.[210]

Türkiye Sustainability Reporting Standards (TSRS): Aligned with IFRS S1/S2; mandatory for entities covered by the Board Decisions of the Public Oversight, Accounting and Auditing Standards Authority (POA) that exceed the specified threshold criteria, requiring Scope 1, 2 and 3 GHG disclosure. Creates the corporate reporting baseline for CBAM compliance, TR ETS documentation, and TIDIP M&E data collection.

BRSA Communiqué on Banks' Green Asset Ratio Calculation (2025)[211]: GAR establishes a supervisory framework for measuring Turkish banks' financing of environmentally

[208] MoTF, (2021), *op. cit.*
[209] Capital Markets Board of Türkiye (CMB). (2022). Guidelines on Green Debt Instruments, Sustainable Debt Instruments, Green Lease Certificates and Sustainable Lease Certificates. Available at: https://www.cmb.gov.tr/announcements/guidelines-on-green-debt-instruments-sustainable-debt-instruments-green-lease-certificates-and-sustainable-lease-certificates
[210] Capital Markets Board of Türkiye (CMB). (2026). Guidelines on Green, Sustainable and Social Capital Market Instruments and Guidelines on Sustainability Linked Capital Market Instruments, adopted by CMB Board decision of 13 August 2026; English translations not yet published on the CMB website. Press release available at: https://spk.gov.tr/duyurular/basin-duyurulari/2026/yesil-surdurulebilir-ve-sosyal-sermaye-piyasasi-araclari-rehberi-ve-surdurulebilirlik-baglantili-sermaye-piyasasi-araclari-rehberi-basin-duyurusu
[211] BRSA. (2025). *Communiqué on the Calculation of Banks' Green Asset Ratio.*
Available at: https://www.bddk.org.tr/Mevzuat/DokumanGetir/1297

sustainable economic activities. The Communiqué entered into force upon publication, with GAR reporting commenced using data as of 30 June 2025. Once technical screening criteria under the Türkiye Green Taxonomy (in force since 24 September 2026) are published and applied to TIDIP-related sector investments, the GAR can provide a framework for directing bank financing toward taxonomy-aligned decarbonisation investments in emissions-intensive sectors such as cement, steel, aluminium and fertiliser.

BRSA Guidelines on Credit Granting and Monitoring (2021)[212]**, Sustainable Banking Strategic Plan (2022-2025)**[213]: The Plan established a framework for integrating environmental, social and governance (ESG) considerations into banking supervision, credit allocation and risk assessment, strengthening Turkish banks' institutional readiness to scale up sustainable and climate finance. In 2021, the Guidelines on Credit Granting and Monitoring incorporated ESG factors into the banking regulatory framework, setting expectations for banks to consider ESG factors in credit allocation and monitoring processes and to support environmentally sustainable lending. In 2022, additional checkpoints on ESG risks were incorporated into banks' financial structure audit processes. Together, these measures strengthened the supervisory and institutional foundations for integrating ESG risks into banking practices and expanding climate-related finance.

7.2.8 Sector-Specific Policy and Regulatory Instruments

This section sets out the policy and regulatory instruments that apply specifically to each of the four TIDIP sectors, complementing the cross-cutting instruments described in Sections 7.2.1–7.2.7.

7.2.8.1 Cement

- MoEUCC Green Cement Communiqué (2024)[214]: Makes low-carbon green cement mandatory in public sector construction procurement contracts — the most direct demand-side policy instrument currently in force for low-carbon cement in Türkiye. Establishes maximum clinker-to-cement ratio thresholds and mandatory SCM use in specified public project types. This creates an immediate domestic market for blended cement products. TIDIP advocacy priority: expand scope and ambition levels; extend

[212] The Guidelines on Credit Granting and Monitoring (2021) Available at: https://www.bddk.org.tr/Mevzuat/DokumanGetir/1068
[213] BRSA, (2021), *op. cit.*
[214] MoEUCC, (2024b), *op. cit.*

the approach beyond public procurement under Public Procurement Law No. 4734 to private-sector construction[215] to create a broader market signal.

- TS EN 197-1 / TS EN 197-5 cement product standards[216]: Govern clinker substitution rates — the primary near-term decarbonisation lever. Standard revision to permit higher SCM substitution rates and introduce specific performance standards for low-carbon cement categories is a near-term TIDIP policy reform priority.
- RDF and Alternative Fuels Regulation[217]: Regulatory modernisation — inter-municipal waste transfer, new fuel category approvals, co-processing permit streamlining — is a high-impact near-term cement sector reform. See Section 4.1.4.
- TÜBİTAK Green Growth Technology Roadmap — Cement Sector (2023)[218]: Identifies CCUS, LC3 calcined clay cement, WHR, and novel binder chemistry as priority R&D areas. Directly applicable to TIDIP cement sector IFAs and to company-level R&D support through TÜBİTAK 1501 and 1832 programmes.
- WHR under Unlicensed Generation Regulation[219]: Conditions for WHR electricity self-generation and grid injection directly affect WHR investment economics — a near-term efficiency and Scope 2 reduction lever for cement sector facilities.

7.2.8.2 Iron and Steel

- Technology Tracking Platform (TTP): The Steel LCP Policy Roadmap (B.3) proposes a MoIT-led TTP to monitor and track low-carbon steel technologies jointly with TÇÜD, ÇİB, YİSAD, SOGAD, and other sector stakeholders. TIDIP Secretariat should support the MoIT in operationalising the TTP and integrate TIDIP project pipeline data, providing a shared government-industry technology intelligence system.
- EMRA industrial electricity tariff structure[220]: Industrial electricity pricing — including transmission, distribution, and balancing charges — significantly affects EAF economics and the competitiveness of low-carbon EAF steel. The absence of regulatory steps enabling large consumers committing to renewable PPAs to access reduced non-energy cost components is a key TIDIP policy gap.

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[215] Official Gazette. (2002). *Public Procurement Law (No.4734)*.
Available at: https://www.mevzuat.gov.tr/MevzuatMetin/1.5.4734.pdf
[216] TÜRKÇİMENTO. (2021). *Cement and Mineral Admixture Standards — covers TS EN 197-1 and TS EN 197-5, harmonised with EN 197*. Available at: https://www.turkcimento.org.tr/uploads/pdf/Cimento_ve_Mineral_Katkı.pdf
[217] MoEUCC, (2014), *op. cit.*
[218] TÜBİTAK & Ministry of Trade, (2023), *op. cit.*
[219] Official Gazette. (2019b). *Regulation on Unlicensed Electricity Generation in the Electricity Market*.
Available at: https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=31502&MevzuatTur=7&MevzuatTertip=5
[220] EMRA. (n.d.). *Electricity Market Tariffs*. Available at: https://www.epdk.gov.tr/Detay/Icerik/3-0-1/tarifeler

- Inward Processing Regime (DİR) / CBAM interaction[221]: The DİR's interaction with CBAM embedded carbon accounting creates compliance complexity for Turkish steel exporters. TIDIP should support the Ministry of Trade in developing DİR-specific CBAM reporting guidance to ensure Turkish exporters are not inadvertently penalised for use of this legitimate trade mechanism.
- ECSC Agreement — investment limitation review[222]: The Steel LCP explicitly calls for reviewing limitations on green transformation investments under the ECSC Agreement and conducting negotiations with the EU. This is a bilateral policy action that TIDIP should track and support the MoIT in pursuing alongside CBAM and quota negotiations.
- Scrap metal trade regulations: Import duty structures and export controls on ferrous scrap directly affect EAF input cost competitiveness — a critical variable for investment planning horizons in TIDIP's EAF-dominant steel sector.
- BAT Reference Documents (BREFs) for Iron and Steel[223,224]: EU BAT conclusions define emission intensity benchmarks and best practices for process improvement in steel facilities. As Türkiye's Industrial Air Pollution Control Regulation aligns with the EU Industrial Emissions Directive (IED) under the accession process, BAT requirements set the compliance baseline for TIDIP steel sector investment plans.
- YİSAD, SOGAD and sector association engagement[225,226,227]: The Steel LCP M&E Committee designates YİSAD and SOGAD as participants alongside TÇÜD, ÇİB, TOBB, and TIM. These associations should be engaged in TIDIP governance for flat products and downstream processing policy.

[221] MoIT. (n.d.). *Inward Processing - Frequently Asked Questions, Customs Formalities*.
Available at: https://www.trade.gov.tr/customs-formalities/frequently-asked-questions/inward-processing
[222] European Coal and Steel Community & Republic of Türkiye. (1996). *Agreement on Trade in Products Covered by the Treaty Establishing the European Coal and Steel Community* (signed Brussels, 25 July 1996; Official Journal L 227, 7.9.1996), pp.1-34. Available at: https://eur-lex.europa.eu/eli/dec/1996/528/oj
[223] European Commission, Joint Research Centre. (2013). *Best Available Techniques (BAT) Reference Document for Iron and Steel Production: Industrial Emissions Directive 2010/75/EU: (Integrated Pollution Prevention and Control).* Available at: https://publications.jrc.ec.europa.eu/repository/handle/JRC69967
[224] Official Gazette, (2009a), *op. cit.*
[225] MoIT, (2023b), *op. cit.*
[226] Turkish Flat Steel Exporters and Industrialists Association (YİSAD). (n.d.). *YİSAD Corporate Website.* Available at: https://www.yisad.org.tr
[227] Cold Rolling, Galvanized and Coated Steel Sheet Producers Association (SOGAD). *SOGAD Corporate Website*. (n.d). Available at: https://www.sogad.org

7.2.8.3 Aluminium

- ALUTEAM, EAIBA, and TFA[228]: The Aluminium LCP Steering Committee includes ALUTEAM, EAIBA, and TFA alongside TAIA. These organisations provide technical testing, R&D support, and foundry sector representation — all three should be part of TIDIP's aluminium sector governance and stakeholder engagement.
- Inert anode technology R&D framework[229]: The Aluminium LCP identifies inert anode electrolysis as the primary pathway to eliminate process CO_2 emissions in primary aluminium production, expected commercially available in the 2030s. TENMAK R&D calls and TÜBİTAK 1501 are the primary national funding mechanisms for feasibility and pilot studies. TIDIP should support TENMAK and Eti Alüminyum in preparing an inert anode feasibility programme as an early-stage IFA 5 project.
- PFC emissions regulations (F-Gas Regulation alignment)[230]: Perfluorocarbon (PFC) emissions — CF_4 and C_2F_6 — from aluminium electrolysis have global warming potentials of 6,630 and 11,100 respectively (IPCC AR5, 100-year). For Eti Alüminyum, PFC emissions are reported in the national GHG inventory and may fall within TR ETS scope as coverage expands. Turkish regulations governing F-gas emissions are being aligned with EU F-Gas Regulation (EU) 2024/573 under the accession process; their implementation will affect the emission baseline and MRV requirements for TIDIP's primary aluminium investment assessments.
- Red mud waste management[231]: Bauxite residue (red mud) from Eti Alüminyum's Seydişehir operations is classified as hazardous industrial waste. Environmental permit conditions for red mud impoundments affect the bankability of primary aluminium investment projects. Development of red mud valorisation technologies — precious metal recovery, construction material applications — is a circular economy

[228] ALUTEAM; TFA, EAIBA. All three are Aluminium LCP Steering Committee members alongside TAIA and constitute the TIDIP aluminium sector governance cluster. ALUTEAM also provides technical testing and R&D support for aluminium decarbonisation technologies.
[229] Inert anode technology R&D support framework: LCP for Aluminium (2024) identifies inert anode electrolysis (expected commercially available in the 2030s) as the primary pathway for eliminating process CO_2 emissions in primary aluminium production. TENMRI R&D calls and TÜBİTAK 1501 are the primary national mechanisms for financing feasibility and pilot studies. Regulatory enablement — including appropriate product certification for aluminium produced by inert anode — will be needed as the technology matures. IAI (International Aluminium Institute) and European Aluminium's sector sustainability standards provide the international benchmarking framework.
[230] Regulation on Control of Fluorinated Greenhouse Gases (HFC, PFC, SF_6 aligned with EU F-Gas Regulation (EU) 2024/573. PFC (perfluorocarbon) emissions — primarily CF_4 and C_2F_6 — are generated during aluminium electrolysis and have global warming potentials of 6,630 and 11,100 respectively (IPCC AR5, 100-year). For Eti Aluminium (Seydişehir), PFC emissions are reported in the national GHG inventory under IPPU; as the TR ETS extends to cover all major emission sources, PFC emissions will require dedicated MRV methodology and may fall within ETS scope.
[231] Official Gazette, (2005), *op. cit.*

opportunity aligned with NCESAP 2025–2028 and should be explored within TIDIP's IFA 3.

- ELV and Packaging Waste Regulations[232,233]: Govern collection and processing of end-of-life vehicles and packaging — primary sources of post-consumer aluminium scrap. Enforcement quality directly affects recycled input availability and quality for Türkiye's aluminium remelters, influencing both carbon intensity and production economics.
- International Aluminium Institute (IAI) standards and EU Aluminium Sustainability standards[234]: The Aluminium LCP recommends encouraging voluntary adoption of internationally recognised standards (IAI Aluminium Stewardship Initiative, European Aluminium). These standards are becoming increasingly relevant for CBAM reporting methodology and for demonstrating low-embedded-carbon product quality to EU buyers — creating both compliance and market differentiation benefits for TIDIP-supported investments.

7.2.8.4 Fertiliser

- Natural Gas Market Law No. 4646 and BOTAŞ framework[235]: BOTAŞ supply tariffs and contract structures are the dominant financial variable for the fertiliser sector's green hydrogen transition economics. Regulatory certainty on gas pricing for the existing production base — alongside investment signals for the transition technology — is critical for bankability assessments of TIDIP fertiliser sector projects.
- ADR / Hazardous Materials Transport Regulation[236]: Ammonia (Class 2.3, UN 1005) and ammonium nitrate based fertilisers (Class 5.1, UN 2067) are regulated dangerous goods under Turkish law aligned with ADR. ADR compliance obligations affect logistics costs, facility design requirements, and EPC risk profiles for TIDIP fertiliser sector investments — particularly for new green ammonia production facilities that will initially produce at small scale requiring distribution infrastructure.

[232] Official Gazette. (2009b). *Regulation on the Control of End-of-Life Vehicles*.
Available at: https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=13659&MevzuatTur=7&MevzuatTertip=5
[233] Official Gazette, (2021), *op. cit.*
[234] MoIT, (2023a), *op. cit.*
[235] Official Gazette, (2001a), *op. cit.*
[236] Official Gazette. (2022c). *Regulation on the Transport of Dangerous Goods by Road*.
Available at: https://www.resmigazete.gov.tr/eskiler/2022/06/20220618-8.htm

- REACH Alignment Programme[237]: Türkiye's REACH-aligned KKDİK Regulation is being phased in, with registration deadlines extended in December 2023 to run until 2026, 2028 and 2030 depending on tonnage band and hazard classification[238]. Alongside CBAM embedded-emissions reporting, Turkish fertiliser exporters must meet REACH substance registration and safety data sheet obligations in the EU market. TIDIP's MRV capacity development programme for the fertiliser sector should incorporate REACH-compatible substance reporting.
- Fertiliser Law No. 5553 (2006) and TSE Fertiliser Product Standards: As green ammonia and low-carbon fertiliser products enter the market, their regulatory classification under TSE standards and eventual alignment with the EU Fertilising Products Regulation (EU) 2019/1009 — which already introduces CE-marked categories for bio-based and recovered nutrient products — will determine market acceptance and labelling. Creating a low-carbon fertiliser product category under Turkish regulations is a TIDIP policy advocacy priority for the fertiliser sector.
- Nitrate/Nitrogen Management Regulation[239]: Alignment with the EU Nitrates Directive introduces nitrogen use efficiency requirements in Nitrate Vulnerable Zones, which reduce fertiliser application rates while contributing to water quality objectives. Tightening nitrogen management regulations will affect long-term domestic fertiliser demand forecasts — an important variable for TIDIP's fertiliser sector investment pipeline and production scale projections.

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