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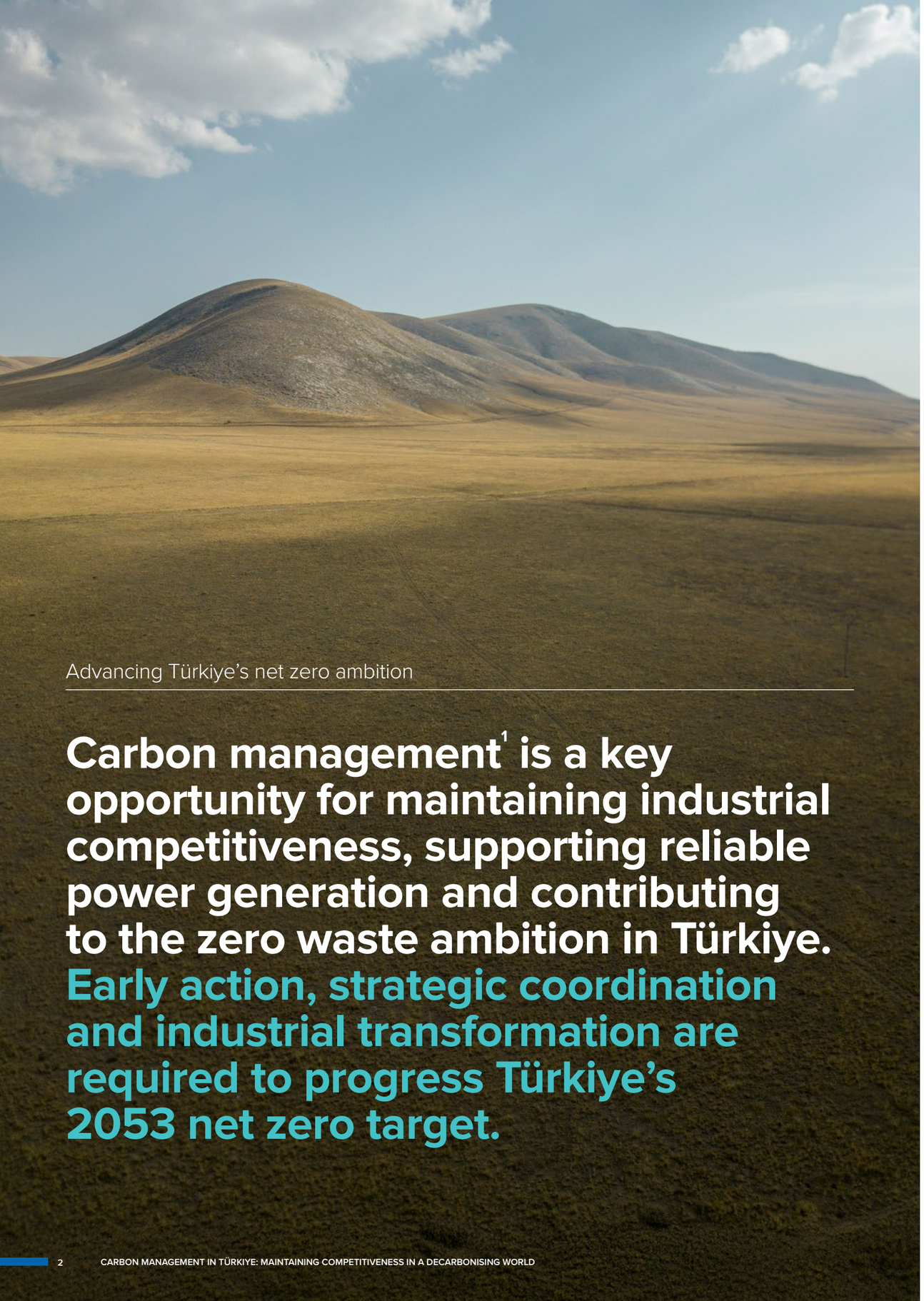
# Carbon Management in Türkiye: Maintaining competitiveness in a decarbonising world

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Advancing Türkiye's net zero ambition

**Carbon management[1] is a key opportunity for maintaining industrial competitiveness, supporting reliable power generation and contributing to the zero waste ambition in Türkiye. Early action, strategic coordination and industrial transformation are required to progress Türkiye's 2053 net zero target.**



# Executive summary

Türkiye's industrial scale and geo-political significance make its climate ambition and greenhouse gas mitigation approach particularly important. Its economy is anchored in manufacturing and trade, both strongly integrated into international supply chains. Türkiye's industrial competitiveness, employment and economic value depend on Turkish products retaining access to carbon-conscious international markets. As such, Türkiye is approaching a transition point where evolving regulatory expectations increasingly shape the conditions for access to key export markets.

In certain international markets, product carbon intensity is no longer simply a voluntary environmental declaration. It is increasingly a production necessity, market-access requirement and therefore key investment criterion for countries supplying the EU, and soon the UK, driven in part by the introduction of carbon border adjustment mechanisms (CBAM).[2]

Carbon management in Türkiye is already acknowledged, with carbon capture, utilisation and storage (CCUS) explicitly referenced in Türkiye's Nationally Determined Contribution (NDC)[3] and in its Climate Change Mitigation Strategy and Action Plan 2024-2030.[4] Türkiye's status as an EU candidate country also provides an important policy context. The European Commission's Action Document for Türkiye[5] identifies CCUS as part of Türkiye's transition to a circular and sustainable economy, including development of a regulatory framework, expansion of technical capacity and transposition of the EU CCS Directive.

Türkiye will need to move at a pace comparable to the markets it serves and competes with to maintain industrial competitiveness. However, Türkiye currently lacks a comprehensive carbon management framework including carbon dioxide ($CO_2$) storage characterisation, $CO_2$ transport regulation, permitting processes, monitoring, reporting and verification (MRV) and long-term stewardship provisions to facilitate public and private sector investment and confidence. While the government has initiated a CCUS technology roadmap process and the European Bank for Reconstruction and Development (EBRD) has launched a supporting technical-assistance programme,[6] a comprehensive carbon management strategy will be needed to accelerate progress from the current pre-feasibility studies, through to project commissioning.

Key phases for a carbon management deployment strategy in Türkiye could include:

- **Preparation phase:** Quantify ambitions, identify gaps, and prioritise national and sectoral actions.
- **Characterisation phase:** Increase knowledge of emissions sources, $CO_2$ storage resource and existing infrastructure assets.
- **Validation phase:** Validate priority value chains' technical, economic, environmental and commercial viability.
- **Development phase:** Establish legal, regulatory, institutional and infrastructure foundations necessary to scale, including public consultation.
- **Deployment phase:** Scale projects, mobilise investment, and build a self-sustaining market and carbon management ecosystem.

In summary, whilst Türkiye's 2053 decarbonisation ambition is clear, the role of carbon management in delivering it is broadly undefined. An early and proactive approach could strengthen Türkiye's ability to shape future carbon management expectations and maintain industrial competitiveness, rather than adapt to rules, standards and pricing mechanisms developed elsewhere. As such, carbon management can be a strategic opportunity for maintaining and growing industrial competitiveness whilst simultaneously supporting net zero and zero waste. Near-term action, strategic coordination and the scale of industrial transformation will determine carbon management's contribution to Türkiye's 2053 net zero target.

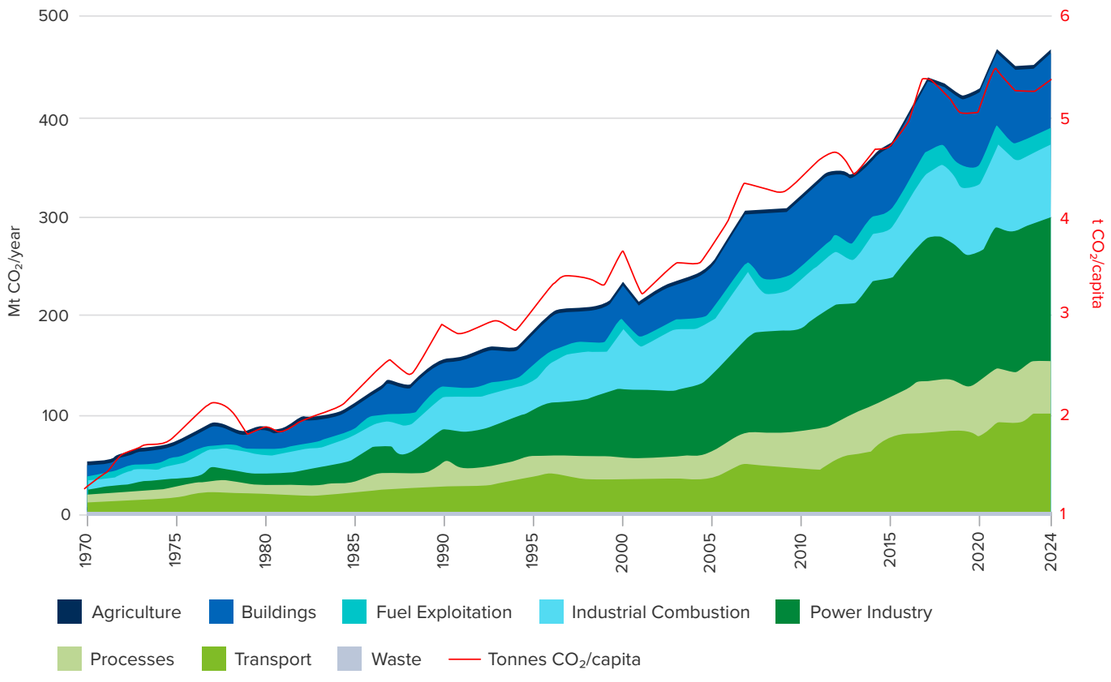
# Context

Türkiye is one of the fastest-growing economies in the Organisation for Economic Co-operation and Development (OECD), supported by both the scale of its domestic market and its strategic geographic position bridging Europe, Asia, and the Middle East. Gross Domestic Product (GDP) grew by 3.6% in 2025, building on two decades of substantial growth. Today, Türkiye is the world's 17th largest economy with a GDP of approximately $1.6 trillion and further growth is projected in the coming years.[7]

In parallel, Türkiye has strengthened its climate ambitions. Following ratification of the Paris Agreement in 2021, it committed to achieving net zero emissions by 2053. Delivering on this target will require deep reductions across industry, power and waste management. While renewable energy deployment, electrification and energy-efficiency measures will be central to this effort, they are unlikely to eliminate all emissions sources. As a result, carbon management is expected to play an important role in Türkiye's long-term decarbonisation pathway and as such is increasingly referenced in Türkiye's climate policy. CCUS is explicitly mentioned in Türkiye's Nationally Determined Contribution (NDC)[3], identified as a priority technology in the Climate Change Mitigation Strategy and Action Plan 2024-2030[4] and recognised in the European Commission's Action Document for Türkiye.[5]

Like many nations, Türkiye faces challenges in achieving its climate ambitions without implementing carbon management. Total $CO_2$ emissions in Türkiye reached 460 million tonnes (Mt) $CO_2$ in 2024, more than double those in 2000. The largest sources of $CO_2$ emissions were electricity generation and heat production (30%) alongside process[8] and combustion emissions from industry (28%).[9] In addition, Türkiye's zero waste agenda aims to transform the landfill-dominated system into one that better supports the circular economy. Together these sectors are likely to benefit significantly from widespread deployment of carbon management infrastructure to support continued economic growth, while aligning with Türkiye's climate ambitions. Each sector is discussed in more detail below.

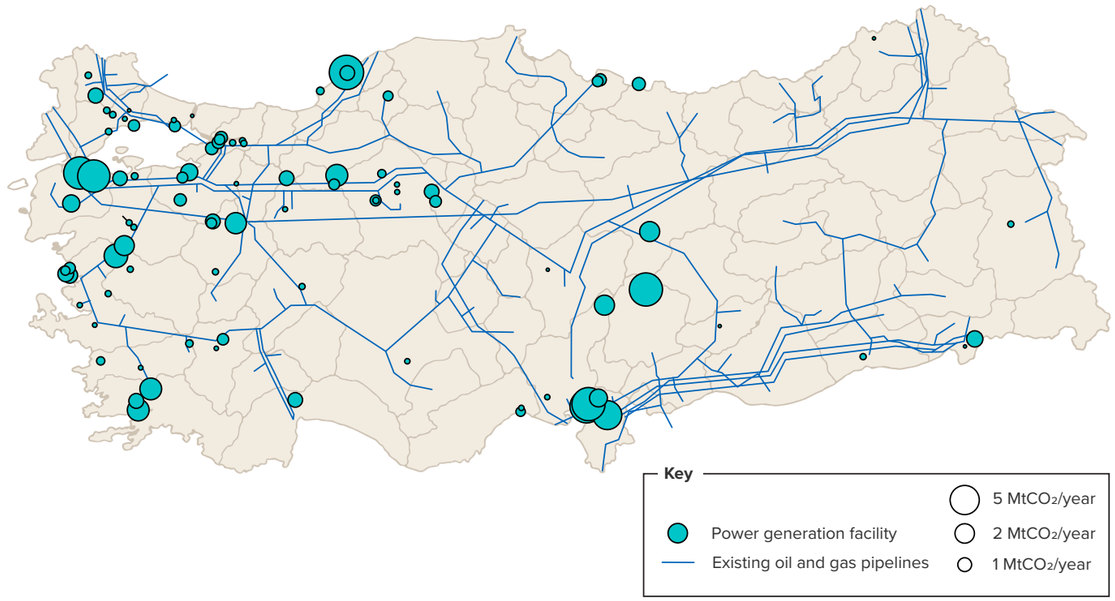
**Figure 1: Carbon dioxide emissions by sector in Türkiye, from the European Commission's Emissions Database for Global Atmospheric Research**




## Electricity generation and heat production

Türkiye remains heavily reliant on fossil fuels[10] at the primary-energy level, although its electricity mix is gradually diversifying. Coal and gas account for around half of electricity generation, with renewables providing the remainder. As a result, the grid emission factor remains relatively high at 0.43 $tCO_2/MWh$.[11] Figure 2 illustrates the distribution of major power generation facilities and associated energy infrastructure.

**Figure 2: Estimated carbon dioxide emissions (2025) from power generation facilities and existing energy infrastructure.[12]**




Carbon management has the capability to play an important role in the transition to a lower-carbon energy system. While the share of renewable generation is expected to increase, a significant portion of Türkiye's existing thermal power fleet is likely to remain in operation for years to come, both to meet growing electricity demand and to provide system reliability and flexibility.[13]

Reflecting this, Türkiye's Climate Change Mitigation Strategy and Action Plan[4] recognises that $CO_2$ capture could be required for fossil-fired power plants, particularly those that have not yet reached the end of their operating life. Carbon management technologies could therefore reduce emissions from existing generating assets while avoiding the energy security challenges associated with their premature retirement.

## Heavy industry

Türkiye has a large and diverse industrial base, including cement, lime, iron and steel, refining, chemicals and fertilisers. These industries are central to Türkiye's economic growth, making significant contributions to GDP, trade and employment. However, these industries also generate around 128 $MtCO_2$/year from both process-related and combustion emissions.[9]

A significant share of these emissions are inherent to industrial production when $CO_2$ is released as a direct result of chemical reactions rather than energy combustion. In cement production, for example, around two-thirds of emissions arise from calcination.[14] In Türkiye, industrial process emissions represent ~42% of total industrial emissions, with cement contributing around one-third of the total.[9]

Since these process emissions cannot be eliminated through renewable energy or electrification alone, carbon management is one of the few scalable pathways to near-zero industrial production. It can therefore support industrial decarbonisation while preserving economic value, competitiveness and employment in key industrial sectors.

**Table 1: An overview of key manufacturing sectors and their relevant carbon management characteristics**

| Sector | Number of facilities/ companies | Production capacity | Strategic characteristics | Carbon management opportunity |
|---|---|---|---|---|
| **Cement**[15,16] | 56 integrated plants | 147.2 Mt/year cement and 96.6 Mt/year clinker capacity | Geographically dispersed and export-orientated. | Largest source of industrial process $CO_2$ emissions. |
| **Iron and steel**[17,18] | 41 plants (3 using the Blast Furnace - Basic Oxygen Furnace route) | 59.6 Mt/year steel[19] | Highly electric arc furnace (EAF) dominant (72.2% in 2025[20]). | Opportunity concentrated in the 3 BF-BOF sites. |
| **Aluminium**[21] | 1 primary producer | 0.4 Mt/year aluminium hydroxide and 0.26 Mt/year alumina | Limited primary smelting, only meeting 10% of national demand. | Process emissions when carbon anodes are consumed during the primary smelting process. |
| **Fertilisers**[22] | 3 ammonia plants and 7 fertiliser manufacturing companies | 0.83 Mt/year ammonia capacity; 7.3 Mt/year fertiliser capacity | Domestic fertiliser consumption exceeds production. Strong dependence on imported natural gas. | High concentration $CO_2$ produced during ammonia production. |
| **Refining and petrochemicals**[23] | 6 major refineries and 2 petrochemical complexes | Over 830,000 barrels per day of refining capacity[24] | Facilities supply the domestic fuel and industrial feedstock markets. Strong reliance on imported crude oil. | Potential capture sources include steam-cracker furnaces, boilers and other large combustion units. |
| **Other non-metallic minerals** | Glass production is dominated by flat and container glass sites. There are also 198 brick and tile manufacturing companies[25] as well as 3 soda ash production sites (1 synthetic, 2 natural). | Annual flat glass production capacity of 200 million $m^2$,[26] alongside 21 million $m^3$ of construction bricks produced in 2024[27] and ~6.5 Mtpa of soda ash and sodium bicarbonate.[28,29] | Mostly serves the domestic construction market, with export-oriented ceramics and soda ash sectors. Kilns and furnaces rely on natural gas. | Potential capture opportunities include lime kilns (high proportion of process emissions) and glass furnaces notably where oxy-fuel firing is used. Some soda ash facilities are planning capture and liquefaction for $CO_2$ utilisation.[30] |

**Figure 3: Estimated carbon dioxide emissions (2025) from major industrial sites in Türkiye with potential future carbon management clusters highlighted in the Marmara, Aegean and Mediterranean regions.[31]**

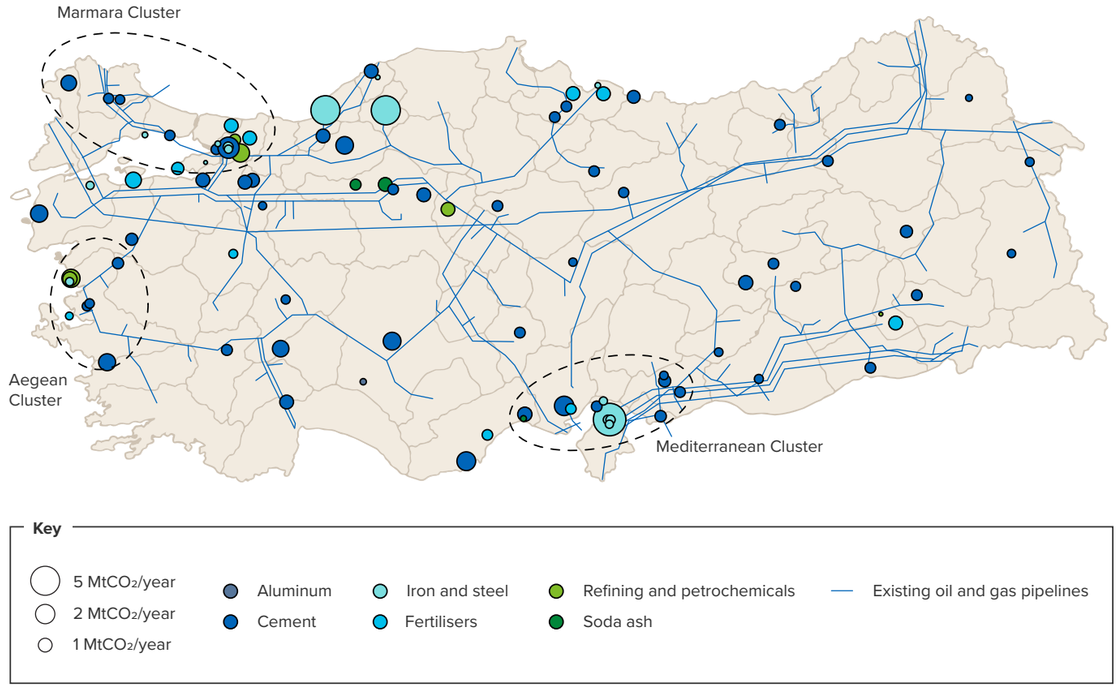



Table 1 and Figure 3 show the composition and spatial distribution of industrial sites in Türkiye. The Marmara cluster serves as the country's primary industrial hub, hosting automotive, steel, and chemical production. The Aegean cluster, particularly İzmir, combines refining, petrochemicals, and manufacturing, while the Mediterranean cluster around İskenderun is a centre for steel production. Cement producers are widely dispersed across the country, due to the location of raw material sources.

The geographic distribution of industry has direct implications for future carbon management. Coastal industrial clusters offer potential for shared $CO_2$ transport and storage infrastructure, but a wider range of $CO_2$ transport solutions will be needed for dispersed emitters, to aggregate and transport $CO_2$ to geological storage.

Industrial carbon management is particularly important given that Turkish industry is strongly export-oriented. For example, the EU was Türkiye's largest steel export market in 2025, accounting for 40.7% of steel exports, while Türkiye also supplied 20.8% of EU cement imports by volume in 2022.[32]

The EU Carbon Border Adjustment Mechanism (CBAM), introduced in 2026, and the UK's planned CBAM from 2027, will increase the importance of low-carbon production for Turkish exporters. EU CBAM-covered sectors represented roughly €19 billion worth of Türkiye's exports to the EU in 2022, nearly 8% of total exports.[33]

As one of the EU's largest suppliers of CBAM-covered goods, Türkiye has a strong incentive to invest in low-carbon production to help industry preserve market access, reduce exposure to future carbon costs, and secure long-term competitiveness. Without intervention, Türkiye risks exposing its industrial base to rising carbon-related trade costs and tightening regulatory requirements in its key export markets. Such risks can be mitigated by addressing the phased approach to carbon management outlined in this paper.



**Türkiye's continued economic growth and commitment to net zero emissions by 2053 create a strong strategic case for deploying carbon management technologies. Carbon management will be particularly important in the power, industrial and waste management sectors, to maintain industrial competitiveness, energy security and economic development.**

## Reducing emissions from waste management

Carbon management can also support the circular economy by helping to transform the waste management sector. Türkiye currently relies heavily on landfill, with 94 sites currently in operation.[34] Landfilling imposes significant environmental and economic costs, including methane emissions and the use of valuable land resources.

This is beginning to shift under the national Zero Waste Project, which has increased the recycling rate from 13% in 2017 to over 37% in 2025, with targets of 60% by 2035.[35] As recycling systems mature, residual waste[36] could also be diverted away from landfills to waste-to-energy (WtE) facilities. Integrating $CO_2$ capture technologies at future WtE plants could support both circular economy objectives and emissions reductions. There is already one WtE facility operating in Türkiye, a plant in Istanbul operated by Veolia.[37]

In addition, Türkiye currently operates 19 biomethane plants and 18 composting facilities for waste management while biomass accounts for around 2% of the country's electricity generation capacity.[34,38] Together, these biogenic $CO_2$ sources could provide an early foundation for bioenergy with carbon capture and storage (BioCCS) projects. Capturing and permanently storing biogenic $CO_2$ emissions from waste and biomass facilities would generate negative emissions, helping to offset harder-to-abate emissions elsewhere in the economy. Over time, expansion of the BioCCS sector could create opportunities for Türkiye to participate in emerging carbon removal markets and international cooperation mechanisms under Article 6 of the Paris Agreement.[39]

# Why carbon management matters for Türkiye

Carbon management will be an important component of Türkiye's strategy to achieve net zero by 2053. The combination of industrial process emissions, trade exposure, industrial competitiveness and zero waste ambitions means carbon management can help address multiple challenges simultaneously while supporting economic growth and decarbonisation. Carbon management matters:

1. **To meet Türkiye's commitments:** Carbon management is expected to be essential in meeting Türkiye's commitment to achieving net zero emissions by 2053.
2. **To address trade exposure:** As carbon intensity increasingly influences market access and competitiveness, carbon management can help Turkish industry reduce exposure to carbon-related trade costs and remain competitive in key export markets (e.g., the EU).
3. **To enhance industrial diversity:** Carbon management offers a common decarbonisation solution across multiple industries, helping support industrial transformation while preserving economic value.
4. **To combat process emissions in industry:** Many of Türkiye's highest-emitting sectors generate emissions that are inherent to those processes, meaning that carbon management is one of the few scalable options available for near-zero industrial production.
5. **To foster reliable power generation:** As recognised in Türkiye's Climate Change Mitigation Strategy and Action Plan,[4] $CO_2$ capture could be installed at fossil-fired power plants that have not completed their operating life, to maintain a reliable electricity supply while supporting emissions reductions across the wider energy system.
6. **To complement the zero waste ambition:** Capturing $CO_2$ from future waste-to-energy plants could support both the Zero Waste initiative's circular economy objectives and emissions reduction.
7. **To future-proof carbon dioxide removal (CDR) solutions:** Developing carbon management infrastructure today could also create future opportunities for Türkiye to participate in carbon removal markets and international Article 6 cooperation mechanisms.

# Current state of readiness for carbon management in Türkiye

Research activity has generated a useful evidence base, including local assessments of storage potential.[40,41,42,43,44] Existing decarbonisation roadmaps, such as by the EBRD[15,45], provide strategic direction and complement existing practical experience from enhanced oil recovery (EOR) operations. As highlighted by the recent Resource Environment and Climate Association (REC) study on CCS[41], key policy, regulatory and commercial enablers remain at an early stage of development. Consequently, although Türkiye's carbon management landscape is becoming increasingly active, important gaps remain that will need to be addressed to support deployment at scale.

## Practical experience

Türkiye has one commercial carbon capture plant in operation. Since 2015, Linde Gaz has captured around 240 $tCO_2$/day, produced from Zorlu Energy's geothermal power plant which supplies the food and beverage industry.[46]

Türkiye also has practical experience with $CO_2$ transport and injection for EOR. Naturally occurring $CO_2$ from the Dodan and Çamurlu fields has been used for EOR operations for several decades, most notably at the Batı Raman oil field where $CO_2$ injection has been ongoing since 1986. Supporting infrastructure is also in place, including a 90 km $CO_2$ pipeline connecting the Dodan and Batı Raman fields.[47] Non-EOR $CO_2$ injection has also taken place in Türkiye at pilot scale through a 6-month $CO_2$ injection monitoring programme conducted at the Kızıldere geothermal field.[48] While limited in scale, the pilot project provided valuable experience in $CO_2$ measurement, monitoring and verification (MMV) activities, which could help inform the development of future regulatory frameworks.

This early experience alongside existing operations may help in providing the institutional capacity in Türkiye to initiate a widespread carbon management programme.

## Carbon dioxide storage resource analysis

Assessment of Türkiye's geological $CO_2$ storage potential remains limited and largely site-specific, rather than providing a comprehensive national assessment.

A TÜBİTAK-funded pre-feasibility study modelled potential $CO_2$ storage at the Çaylarbaşı field, projecting up to 0.55 $MtCO_2$ could be stored over 12 years following an 8-year EOR phase.[40] The report also highlights other potential $CO_2$ storage locations including the Dodan natural $CO_2$ field, deep saline formations in Thrace, Central Anatolia and South East Türkiye, as well as in soda-mine salt caverns.

A separate study conducted by the METU Petroleum Research Centre identified potential $CO_2$ storage in oil and gas fields in the Batman, Adıyaman and Thrace regions, with a combined estimated storage capacity of 108.7 $MtCO_2$.[41]

Other studies have explored the potential for $CO_2$ storage in coal seams in the Zonguldak/Amasra basin,[42] in the Soma, Tuncbilek, Tekirdag-Saray and Afsin-Elbistan lignite basins[43] and basalt mineralisation in the Kula volcanic field.[44] However, these storage types are currently at an earlier stage of development and are therefore likely to play a limited role in future carbon management compared to deep saline formations and depleted oil and gas fields.

Türkiye's location within a seismically active region may influence $CO_2$ storage development.[49] While seismicity does not preclude geological $CO_2$ storage, it increases the importance of robust site characterisation, risk assessment and long-term monitoring.[50]

Techno-economic analysis has also been undertaken of potential future carbon management supply chains.[51] This analysis linked the potential $CO_2$ storage sites discussed above, with industrial $CO_2$ point sources. Under the study's assumptions, a system combining rail and pipeline transport with domestic geological storage could provide the lowest-cost configuration.



**Türkiye has the opportunity to build on existing practical experience with carbon management, although implementation for climate purposes is currently limited in scope and scale. The policy and regulatory framework for carbon management is at an early stage but provides an increasingly active framework on which to develop.**

However, Türkiye does not yet have a comprehensive national assessment of its $CO_2$ storage resources. As a result, the scale, distribution and characteristics of potential storage resources remain uncertain, making it more difficult to identify priority carbon management hubs, plan transport infrastructure and develop a coordinated long-term deployment strategy. The development of a national $CO_2$ storage atlas is an important step and would provide a stronger evidence base for more detailed techno-economic assessments and storage hub optimisation.

## Legislation

Despite the existing practical experience, the policy and regulatory framework for carbon management remains at an early stage. The 2025 Climate Law provides an important foundation for the country's decarbonisation agenda by establishing a legal basis for emissions reduction and enabling market-based mechanisms, including the creation of a pilot Emissions Trading System (ETS).[52] Existing EBRD roadmaps[15,45] provide useful sector-level direction, and have since been complemented by the €5 billion Industrial Decarbonisation Investment Platform[53] and recent request for technical assistance for CCUS policy and regulatory development.[6] However, at present, there is no carbon management specific regulatory framework or incentive regime to support commercial scale carbon management in Türkiye.



# Steps to widespread carbon management

## Lessons from neighbouring countries

Given Türkiye's strategic position in the Mediterranean-Black Sea region, several lessons can be learnt from neighbouring countries to accelerate carbon management. These learnings can be used to develop a phased approach and support the efficient deployment of carbon management technologies in Türkiye.

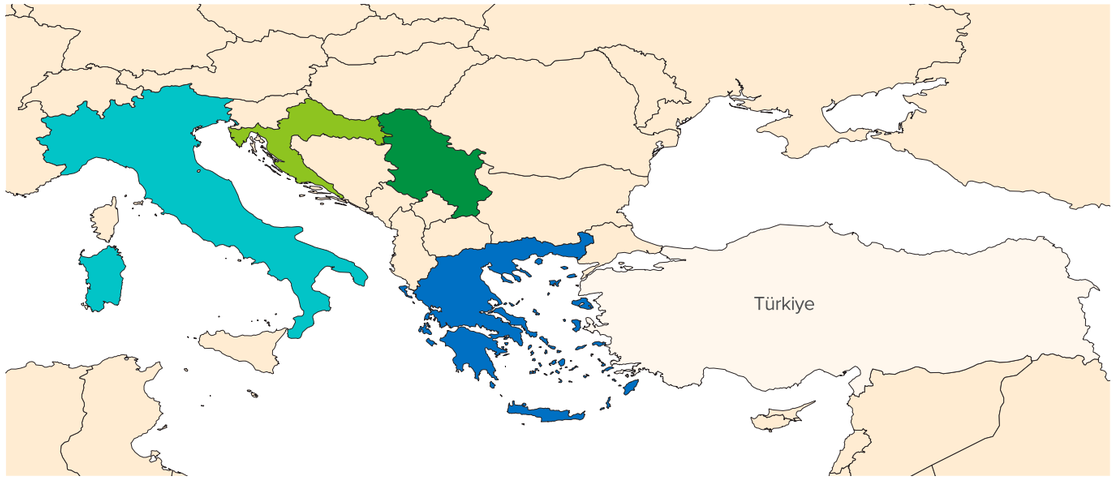
**Figure 4: Key lessons from neighbouring countries to support carbon management deployment**

### Learning point #1
### $CO_2$ storage atlas development (Croatia):

The Croatian Hydrocarbon Agency has led the development of a $CO_2$ storage atlas, exploring the feasibility, scalability and maturity of $CO_2$ storage opportunities in Croatia, both onshore and offshore.[54] This evaluation demonstrated that Croatia possesses technically viable and strategically valuable $CO_2$ storage resources. Importantly, it highlights specific areas as prime candidates for near-term development. Croatia's experience demonstrates the value of undertaking an early assessment of national $CO_2$ storage resources, to help understand the domestic potential of carbon management.

### Learning point #2
### Proactive regulatory development (Serbia):

The Serbian government is proactively developing carbon management-specific legislation, including outlining the storage licensing process.[55] Early development of the legal and regulatory framework for carbon management reflects the recognition as a necessary future decarbonisation tool and should help to reduce future barriers to technical deployment in Serbia.




### Learning point #3
### Infrastructure coordination (Greece):

To accelerate carbon management, Greece is developing a coordinated ecosystem centred around the Prinos storage project.[56] Early characterisation and permitting of this storage complex (a depleted gas field) gives industrial emitters the confidence to develop individual $CO_2$ capture projects.[57] $CO_2$ transport is based on a coastal cluster model, with ship-based transport expected to be the dominant mode. The Greek model which includes parallel regulatory development, demonstrates how early development of shared transport and storage infrastructure can reduce costs, aggregate demand and create confidence for industrial emitters to invest in capture facilities.

### Learning point #4
### Business case development (Italy):

Italy already has one carbon management project operating at a commercial scale (Ravenna CCS Phase 1).[58] To accelerate carbon management, Italy is developing a carbon contract for difference (CCfD) scheme, similar to the UK's CCS Business Models,[59] to support the business case for investing in carbon management infrastructure. In conjunction with the EU ETS carbon price, this targeted support for $CO_2$ capture projects is expected to be supported by a regulated asset base model for $CO_2$ transport and storage in Italy. Together these instruments should help to provide long-term revenue certainty for key components of the carbon management value chain in Italy.

## Phased approach to carbon management

The experience of neighbouring countries demonstrates that successful carbon management requires progress across several interconnected dimensions, including $CO_2$ storage resource characterisation, regulatory development, and commercial support mechanism design. Drawing on these lessons, Türkiye may wish to explore a phased approach that systematically builds the foundations required for a commercially viable carbon management sector, progressing from strategic preparation through to deployment.

**Figure 5: Proposed phased approach to carbon management deployment**

### Preparation phase:

To quantify ambitions, identify gaps, and prioritise national and sectoral actions.

Publish a **national roadmap** aligned to the Climate Change Mitigation Strategy and Action Plan 2024-2030.

- Establish deployment targets aligned with industrial decarbonisation objectives.
- Prioritise national, sub-national and sectoral actions and activities.

**Benchmark against advanced EU and other European frameworks.**

- Enlist expert advisors.
- Establish international cooperation arrangements with leading jurisdictions and organisations.

**Identify priority sectors** for early $CO_2$ capture deployment, e.g. cement, steel, refining and chemicals.

### Characterisation phase:

Increase knowledge of emissions sources, storage resource and existing infrastructure assets.

**Consolidate data** and identify gaps.

- Identify available domestic $CO_2$ storage resource by developing a national $CO_2$ storage atlas covering capacity, injectivity, containment and storage readiness.
- Assess legacy operations and infrastructure from existing oil and gas assets which could be repurposed for $CO_2$ transport and storage.
- Develop an inventory of major $CO_2$ sources and capture opportunities.

**Characterise industries** in preparation for legislative design.

- Identify industry to storage $CO_2$ transport corridors.
- Quantify the mitigation role of utilisation.

### Validation phase:

Validate priority value chains' technical, economic, environmental and commercial viability.

**Identify candidate industrial clusters** and their source-sink opportunities.

- Complete techno-economic assessments for priority value chains.
- Pilot projects in target sectors.

**Evaluate options for international $CO_2$ transport and storage agreements.**

- Develop the necessary bilateral agreements to enable cross-border subsurface storage access, as required.

**Appraise and qualify** priority storage site studies.

- Validate Measurement, Monitoring and Verification.
- Undertake test drilling (where appropriate) to calibrate dynamic subsurface modelling.
- Quantify seismic hazards and mitigation measures.

**Assess environmental and social baselines** associated with carbon management.

### Development phase:

Establish legal, regulatory, institutional and infrastructure foundations necessary to scale.

**Establish Türkiye's comprehensive carbon management legal and regulatory framework.**

- Define exploration rights and pore space ownership.
- Set third-party $CO_2$ transport and storage access rules.
- Establish common technical specifications.

**Establish carbon management governance structure.**

- Build regulatory and technical expertise within competent authorities.
- Establish a network of specialist technical institutions and advisors.

**Define storage licensing, permitting and regulatory approval processes.**

- Consult stakeholders on potential impact on local communities.
- Establish long-term stewardship arrangements for storage sites, including any financial assurance requirements from operators.

### Deployment phase:

Scale projects, mobilise investment, and build a self-sustaining market and ecosystem.

**Develop commercially viable business models** to attract private investment.

- Introduce targeted support mechanisms such as CCfDs, grants or co-investment.
- Build demand for low-carbon products through targeted public procurement.
- Provide backstop financial security and post-closure stewardship.

**Progress commercial scale** priority industrial clusters.

- Develop shared infrastructure serving multiple industrial facilities.
- Facilitate regional $CO_2$ transport and storage partnerships.

**Establish transparent reporting, monitoring and compliance.**

- Publish performance data for benchmarking and improvement.

Support development of **domestic supply chains and skills.**

- Establish technical training programmes in carbon management.
- Maintain industrial capacity to ensure strong domestic supply chain of products needed.

## Carbon management's role towards Türkiye's 2053 target

Türkiye is at a critical transition point. Türkiye's industrial competitiveness and its manufacturing-centric economy depend significantly on trade integration with increasingly carbon-conscious supply chains. In particular, the EU CBAM makes product emissions intensity a key consideration in trade and investment for industrial products. Turkish producers that cannot demonstrate credible decarbonisation pathways may potentially face competitiveness challenges. In Türkiye's Climate Change Mitigation Strategy and Action Plan 2024-2030, carbon management is already acknowledged as essential, yet Türkiye remains at an early stage of development and has not translated its long-term 2053 ambition into a framework capable of supporting bankable, commercial-scale carbon management projects.

Türkiye's practical experience with EOR and pilot-scale $CO_2$ injection can be leveraged to support widespread carbon management. The EBRD-supported technical-assistance programme is an important initial action, but Türkiye needs an end-to-end plan extending from strategy and pre-feasibility through to project commissioning and widespread deployment. As outlined in Figure 5, key steps could include publishing a national carbon management strategy, taking learnings from neighbouring countries, identifying domestic $CO_2$ storage resources, mapping industrial clusters and source-to-storage opportunities, undertaking pilot projects, establishing legal and governance arrangements, and creating commercially viable business models with appropriate financial and post-closure protections.

Early action would allow Türkiye to shape infrastructure around its own industrial needs, protect its position as a major manufacturer and enhance its export economy. Türkiye's choice on carbon management is to act now or wait, but delaying could present risks to the industrial base that currently underpins Türkiye's economy.



# References


1. Carbon management is widely used as an umbrella term that encompasses both CCS and the engineered approaches to CDR. CCS and CDR often share similar technologies and supporting infrastructure, such as pipelines and ships for transporting the $CO_2$ and injecting in deep underground rock formations for permanent geological storage. Nature-based CDR, such as afforestation and wetland restoration, fall outside of Carbon Management because they do not share as many of the same industrial infrastructure or policy considerations as engineered approaches.
2. The EU Carbon Border Adjustment Mechanism (CBAM) entered its definitive regime and became fully operational on 1.1.2026. The UK CBAM enters into force on 1.1.2027
3. Republic of Türkiye (2025). The Second Nationally Determined Contribution (NDC 3.0) submitted to the UNFCCC. *Link.*
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6. EBRD 2026, Türkiye: Technical Assistance for Establishing an Enabling Environment for CCUS. *Link.*
7. World Bank, Türkiye Country Overview. *Link* for GDP and growth figures.
8. Process emissions are greenhouse gas emissions released as a direct consequence of physical or chemical transformations occurring during industrial production, rather than from the combustion of fuels used to provide energy. Cement is an example where $CO_2$ is released from heating up raw materials (calcium carbonate or limestone) during production.
9. EDGAR (Emissions Database for Global Atmospheric Research), European Commission, Joint Research Centre (JRC), *Link.* GCCSI own calculations
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