ANTALYA 2050

CLIMATE CHANGE, CLIMATE LAW AND GREEN TRANSITION: SECTORAL IMPACT ASSESSMENT OF THE ANTALYA ECONOMY



A STRATEGIC ASSESSMENT REPORT THAT PROTECTS ANTALYA'S COMPETITIVENESS, PREPARES ITS SECTORS FOR THE FUTURE AND ACCELERATES THE GREEN TRANSITION

Complementary Report

ANTALYA 2050 CLIMATE-RESILIENT DEVELOPMENT STRATEGY

COP31 Joint Policy and Action Report

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Public Institutions
Local Authorities
Universities
Professional Organisations

Chambers of Commerce and Industry
Organised Industrial Zones
Tourism Sector Representatives
Agriculture and Food Sector

Maritime and Logistics Sector
Finance and Business Community
Private Sector
Civil Society Organisations

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SUSTAINABLE · RESILIENT · COMPETITIVE · ANTALYA

Tourism · Agriculture · Industry · Trade · Maritime · Logistics · Construction · Energy · Finance · Local Authorities

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CONTENTS

CHAPTER 1 GLOBAL TRANSFORMATION AND THE ANTALYA ECONOMY 2

1.1. The Beginning of a New Economic Era 3
1.2. Climate Change Is Now an Economic Risk Factor 3
1.3. The New Climate Law and Regulatory Framework 3
1.4. The Green Transition Is the New Benchmark for Competitiveness 4
1.5. The Strategic Structure of Antalya's Economy 4
Figure 1: The DNA of Antalya's Economy 4
1.6. Purpose and Approach of This Report 5
1.7. Scope of the Report 5

CHAPTER 2 SECTORAL STRUCTURE AND TRANSITION DYNAMICS OF ANTALYA'S ECONOMY 6

2.1. General Overview of Antalya's Economy 7
Figure 2: Antalya's Economic Geography 7
2.2. Key Dynamics of Antalya's Economy 7
2.3. Key Transition Dynamics Affecting Antalya's Economy 8
Figure 3: Key Transition Dynamics Affecting Antalya's Economy 8
2.4. Priority Areas for Antalya's Transition 9
2.5. Sectoral Analysis Methodology 9
2.6. Table 1: Sectoral Risk and Opportunity Assessment System 10
2.7. Antalya Climate Transition Index 10
Figure 4: Antalya Climate Transition Index 11
2.8. Chapter Conclusion and Assessment 11

CHAPTER 3 SECTORAL IMPACT ANALYSES: THE FUTURE OF ANTALYA'S ECONOMY IN THE CONTEXT OF CLIMATE CHANGE, CLIMATE LAW AND THE GREEN TRANSITION 12

3.1. Overview of the Strategic Sectors of Antalya's Economy 13
Figure 5: Antalya's 20 Strategic Sectors 15
3.2. Tourism and Accommodation Sector 16
Figure 6: The Economic Multiplier Effect of Tourism in Antalya 16
3.2.1. Introduction 16
3.2.2. Current Structure of Antalya's Tourism Sector 17
3.2.3. Physical Impacts of Climate Change on the Tourism Sector 17
3.2.4. The New Climate Law and Its Impacts on the Tourism Sector 17
3.2.5. Economic Impacts 18
Figure 7: Sankey Diagram of Economic Impacts 18
3.2.6. Opportunities Offered by the Green Transition to the Tourism Sector 18
3.2.7. Strategic Policy Recommendations for Antalya 19
3.2.8. Table 2: Priority Transformation Areas for the Tourism Sector 19
3.2.9. Chapter Conclusion and Assessment 19
3.3. Agriculture Sector 20
3.3.1. Introduction 20
Figure 8: Agricultural Map of Antalya 20
3.3.2. Current Structure of Agriculture in Antalya 21
3.3.3. Physical Impacts of Climate Change on the Agriculture Sector 21
3.3.4. Water Resources and Agricultural Production 22
Figure 9: Circular Water Economy 22
3.3.5. The European Green Deal, CBAM and Their Impacts on Agricultural Exports 23
3.3.6. Good Agricultural Practices, Organic Farming and Sustainable Production 23
3.3.7. Carbon Management and Agricultural Emissions 24
3.3.8. Economic Impacts, Green Finance and New Investment Models 24
3.3.9. Strategic Policy Recommendations for Agriculture in Antalya 25
3.3.10. Table 3: Priority Transformation Areas for the Agricultural Sector 26
3.3.11. Chapter Conclusion and Assessment 26
3.4. Food Industry 27
3.4.1. Introduction 27
3.4.2. Current Structure of Antalya's Food Industry 27
3.4.3. Impacts of Climate Change on the Food Industry 28
3.4.4. Cold Chain and Energy Management 28
3.4.5. The European Green Deal and Its Impacts on Food Exports 28
3.4.6. Carbon Management and Circular Production 29
3.4.7. Economic Impacts and Green Finance 29
3.4.8. Strategic Policy Recommendations for Antalya's Food Industry 30
3.4.9. Table 4: Priority Transformation Areas for the Food Industry 30
3.4.10. Chapter Conclusion and Assessment 31

CONTENTS

3.5. Greenhouse Cultivation Sector 31
3.5.1. Introduction 31
Figure 10: Smart Greenhouse Diagram 32
3.5.2. Current Structure of Greenhouse Cultivation in Antalya 33
3.5.3. Impacts of Climate Change on Greenhouse Cultivation 33
3.5.4. Water Management and Resource Efficiency 33
3.5.5. Energy Management and Renewable Energy Use 34
3.5.6. Carbon Management and Low-Emission Greenhouse Cultivation 34
3.5.7. Economic Impacts and Green Finance 35
3.5.8. Strategic Policy Recommendations for Greenhouse Cultivation in Antalya 35
3.5.9. Table 5: Priority Transformation Areas for the Greenhouse Farming Sector 36
3.5.10. Chapter Conclusion and Assessment 36
3.6. Industry and Organised Industrial Zones 37
3.6.1. Introduction 37
3.6.2. Current Structure of Antalya's Industry 37
3.6.3. Physical Impacts of Climate Change on Industry 37
3.6.4. Cleaner Production and Resource Efficiency 38
3.6.5. Emissions Trading System (ETS), MRV and Carbon Management 38
3.6.6. Economic Impacts and Green Finance 39
3.6.7. Strategic Policy Recommendations for Antalya's Industry 39
3.6.8. Table 6: Priority Transformation Areas for the Industrial Sector 40
3.6.9. Chapter Conclusion and Assessment 41
Figure 11: Antalya Organised Industrial Zone Transformation Diagram 41
3.7. Marble and Natural Stone Industry 42
3.7.1. Introduction 42
3.7.2. Current Structure of Antalya's Marble and Natural Stone Sector 42
3.7.3. Climate Change and Physical Risks 43
3.7.4. Energy Management and Carbon Emissions 43
3.7.5. European Union Policies and Their Impacts on Exports 43
3.7.6. Economic Impacts and Green Finance 44
3.7.7. Strategic Policy Recommendations for Antalya's Marble and Natural Stone Sector 44
3.7.8. Table 7: Priority Transformation Areas for the Marble and Natural Stone Sector 45
3.7.9. Chapter Conclusion and Assessment 47
3.8. Mining Sector 47
3.8.1. Introduction 47
3.8.2. Current Structure of Antalya's Mining Sector 48
3.8.3. Impacts of Climate Change on Mining Activities 48
3.8.4. Green Mining Approach 48
3.8.5. Rehabilitation, Biodiversity and Nature Restoration 49
3.8.6. Critical Minerals and Raw Material Requirements of the Green Economy 49
3.8.7. Economic Impacts and Green Finance 49
3.8.8. Strategic Policy Recommendations for Antalya's Mining Sector 50
3.8.9. Table 8: Priority Transformation Areas in the Mining Sector 50
3.8.10. Chapter Conclusion and Assessment 51
3.9. Maritime Sector 53
3.9.1. Introduction 53
3.9.2. Current Structure of Antalya's Maritime Sector 53
Figure 12: Antalya Maritime Economy Map 54
3.9.3. Impacts of Climate Change on the Maritime Sector 54
3.9.4. Blue Economy and Sustainable Maritime Activities 54
3.9.5. Maritime Transportation and Strengthening Coastal City Identity 55
3.9.6. Cruise Tourism and the Multi-Destination Antalya Model 55
3.9.7. Green Ports and Sustainable Port Management 56
3.9.8. Marinas, Yacht Tourism and Maritime Services 57
3.9.9. Economic Impacts and Green Finance 58
3.9.10. Strategic Policy Recommendations for Antalya's Maritime Sector 59
3.9.11. Table 9: Priority Transformation Areas for the Maritime Sector 61
3.9.12. Chapter Conclusion and Assessment 62

CONTENTS

3.10. Ports and Logistics Infrastructure 62
3.10.1. Introduction 62
3.10.2. Current Structure of Antalya's Ports 63
3.10.3. Impacts of Climate Change on Port Infrastructure 63
3.10.4. Ports and Regional Development 63
3.10.5. Green Ports and Digital Transformation 64
3.10.6. Logistics Corridors, Hinterland and Multimodal Transportation 64
3.10.7. Economic Impacts and Green Finance 65
3.10.8. Strategic Policy Recommendations for Ports and Logistics Infrastructure 65
3.10.9. Table 10: Priority Transformation Areas for Ports and Logistics Infrastructure 67
3.10.10. Chapter Conclusion and Assessment 67
3.11. Fisheries and Aquaculture 68
3.11.1. Introduction 68
3.11.2. Current Structure of Antalya's Fisheries and Aquaculture Sector 68
3.11.3. Impacts of Climate Change on the Fisheries Sector 68
3.11.4. Sustainable Fisheries and Ecosystem-Based Management 69
3.11.5. Aquaculture and the Green Transition 69
3.11.6. Fisheries from a Blue Economy Perspective 70
3.11.7. Economic Impacts and Green Finance 70
3.11.8. Strategic Policy Recommendations for Antalya's Fisheries Sector 70
3.11.9. Table 11: Priority Transformation Areas in the Fisheries and Aquaculture Sector 71
3.11.10. Chapter Conclusion and Assessment 71
3.12. Water Services and Water Management 72
3.12.1. Introduction 72
3.12.2. Current State of Antalya's Water Resources 72
3.12.3. Impacts of Climate Change on Water Resources 73
3.12.4. Integrated Water Resources Management 73
3.12.5. Wastewater Reuse and the Circular Water Economy 74
3.12.6. Seawater Desalination and Alternative Water Resources 74
3.12.7. Smart Water Management and Digital Transformation 74
3.12.8. Water Efficiency and Demand Management 75
3.12.9. Economic Impacts and Climate Finance 75
3.12.10. Strategic Policy Recommendations for Antalya's Water Security 76
3.12.11. Table 12: Priority Transformation Areas for Water Services and Water Management 77
3.12.12. Chapter Conclusion and Assessment 77
3.13. Waste Management and Circular Economy 77
3.13.1. Introduction 77
3.13.2. Current Structure of Waste Management in Antalya 78
3.13.3. Impacts of Climate Change on Waste Management 78
3.13.4. Circular Economy and Resource Efficiency 78
3.13.5. Organic Waste Recovery and the Biogas Economy 79
3.13.6. Industrial Symbiosis and Resource Efficiency 79
3.13.7. Circular Economy in the Tourism Sector 80
3.13.8. Digital Waste Management and Artificial Intelligence Applications 80
3.13.9. Economic Impacts and Green Finance 80
3.13.10. Strategic Policy Recommendations for Antalya 80
3.13.11. Table 13: Priority Transformation Areas for Waste Management and the Circular Economy 81
3.13.12. Chapter Conclusion and Assessment 82

CHAPTER 4 GREEN FINANCE, CLIMATE FINANCE AND THE SUSTAINABLE INVESTMENT ECOSYSTEM 83

4.1. Introduction 84
4.2. Global Transformation of Green Finance and Climate Finance 85
4.3. Impacts of Climate Law and Sustainable Finance on Investment Decisions 86
4.4. Financing Needs for the Green Transition of Antalya's Economy 88
4.5. International Climate Finance Sources and Antalya's Financing Potential 90
4.6. Green Financing Instruments and Sustainable Capital Markets 91
4.7. Carbon Markets and New Revenue Models 93
4.8. Strategic Green Investment Areas for Antalya 95
4.9. Antalya Green Project Portfolio Approach 96
4.10. Strategic Policy Recommendations 98
4.11. Priority Transformation Areas 99

CONTENTS

CHAPTER 5 ANTALYA'S GREEN TRANSITION ROADMAP 103

5.1. Introduction 104
5.2. Antalya 2050 Green Transition Vision 105
5.3. Strategic Principles of Transformation 107
5.3.1. Sustainable Development and Economic Competitiveness Must Be Managed Together 107
5.3.2. Science-Based and Data-Driven Decision-Making Must Be Adopted 107
5.3.3. Integrated and Cross-Sectoral Planning Must Be Prioritised 108
5.3.4. Natural Capital Conservation Must Be Recognised as the Foundation of Economic Development 108
5.3.5. Resource Efficiency Must Become a Core Development Policy 108
5.3.6. Innovation and Technology Must Be the Main Drivers of Transformation 108
5.3.7. International Financing and Private Sector Participation Must Be Strengthened 108
5.3.8. Participatory and Multi-Stakeholder Governance Must Be Adopted 108
5.3.9. Resilience and Risk Management Must Be Prioritised 109
5.3.10. Measurability, Transparency and Continuous Improvement Must Be Ensured 109
5.4. Priority Strategic Programmes 109
5.4.1. Antalya Water Security and Circular Water Management Programme 109
5.4.2. Carbon-Neutral Tourism and Sustainable Destination Programme 110
5.4.3. Climate-Resilient Agriculture and Food Security Programme 110
5.4.4. Green Industry and Competitiveness Programme 110
5.4.5. Circular Economy and Resource Efficiency Programme 111
5.4.6. Blue Economy and Maritime Transformation Programme 111
5.4.7. Resilient Cities and Smart Infrastructure Programme 112
5.4.8. Green Finance and Climate Investment Programme 112
5.4.9. Green Technology, Digital Transformation and Innovation Programme 112
5.4.10. Cross-Programme Integration Model 113
5.5. Flagship Projects 113
5.5.1. Antalya Water Security and Circular Water Economy Project 114
5.5.2. Antalya Carbon-Neutral Tourism Destination Project 114
5.5.3. Antalya Green Agriculture and Food Valley Project 114
5.5.4. Antalya Green Industry and Cleaner Production Transformation Project 115
5.5.5. Antalya Blue Economy and Maritime Innovation Centre Project 115
5.5.6. Antalya Climate Technologies and Green Innovation Campus Project 116
5.5.7. Antalya Green Finance and Project Development Centre Project 116
5.5.8. Antalya Smart and Resilient City Programme 117
5.5.9. Antalya Green Investment Platform Project 117
5.6. Implementation Model 118
5.7. Institutional Structure and Governance Model 119
5.8. Financing Integration 121
5.9. Monitoring, Evaluation and Performance Management System 123
5.10. 2030–2040–2050 ROADMAP 125
5.10.1. Phase One (2026–2030): Preparation and Rapid Transformation Period 125
5.10.2. Phase Two (2031–2040): Sectoral Transformation and Scaling-Up Period 125
5.10.3. Phase Three (2041–2050): Global Leadership and Advanced Sustainability 126
5.10.4. Conditions for the Success of the Roadmap 126
5.10.5. Transformation Perspective Towards the 2050 Vision 127
Figure 13: Antalya 2050 Grand Vision Poster 129
Figure 14: Antalya 2050 Strategic Transformation and Performance Indicators Dashboard 130

ANNEX 1 ANTALYA 2050 STRATEGIC ACTION PLAN 130

1. Introduction 131
2. Strategic Priorities 131
3. Table 14: First 100 Days Action Programme 132
4. First Year 132
5. First Three Years 132
6. First Five Years 133
7. Table 15: Responsibility Matrix 133
8. Financing Priorities 134
9. Success Indicators 134
10. Strategic Conclusion 134

ANNEX 2 ANTALYA 2050 STRATEGIC PROJECT PORTFOLIO 136

1. Introduction 136
2. Strategic Project Areas 136
3. Priority Projects 136
4. Project Prioritisation 139
5. Financing Approach 140
6. Conclusion 140

CHAPTER 1

GLOBAL TRANSFORMATION AND THE ANTALYA ECONOMY

The Impact of Climate Change, Climate Law and the Green Transition on Antalya's Sectors

"Climate change is no longer merely an environmental issue. It is a process of global transformation that is redefining every aspect of economic life, from production and trade to tourism, agriculture, finance and investment. Antalya's future competitiveness is directly linked to how rapidly it adapts to this new era."

In This Chapter

- New dynamics of global economic transformation
- The impacts of climate change on the economy
- The emergence of a new climate law framework
- The European Green Deal and international trade
- Economic implications of climate legislation in Türkiye
- Overview of Antalya's economy
- Antalya's sector-specific transition needs
- Methodology of the sectoral impact analysis

Purpose of This Chapter

This chapter establishes the conceptual framework for the sectoral analyses that will assess the impacts of climate change, the new climate law framework and the green transition process on Antalya's economy.

The chapter examines the global economy, international trade, financing mechanisms and regulatory transformation together, explaining why Antalya is entering a new economic era and establishing a common methodology for the sectoral analyses to be examined in the subsequent chapters of the report.

In This New Era, Competitive Advantage Will Belong Not to Those Who Wait for Change, but to Those Who Anticipate and Manage It.

1.1. The Beginning of a New Economic Era

The first quarter of the twenty-first century has marked a historic turning point in which the global economy has been shaped not only by technological developments or global trade dynamics, but also by environmental, legal and economic transformations driven by climate change. Climate change is no longer merely an issue of environmental policy; it has become a fundamental development parameter that directly affects production models, investment decisions, international trading systems, financing mechanisms and public policies.

The process initiated by the Paris Agreement, together with the European Green Deal, the Carbon Border Adjustment Mechanism (CBAM), Emissions Trading Systems (ETS), sustainable finance principles, ESG criteria and national climate legislation, has established a new economic order at both global and national levels. Under this new framework, businesses are assessed not only on their economic performance but also on their carbon footprints, energy efficiency, water management, circular economy practices and capacity to adapt to climate risks.

Consequently, competitive advantage today is determined not only by businesses capable of producing high-quality goods or providing low-cost services, but also by organisations capable of managing climate risks and rapidly adapting to changing regulations.

This transformation directly affects Antalya, one of Türkiye's most important centres of tourism, agriculture, trade and services, just as it affects all cities and regions worldwide.

1.2. Climate Change Is Now an Economic Risk Factor

The impacts of climate change are no longer limited to long-term environmental projections. Increasing temperatures, droughts, declining water resources, extreme weather events, forest fires, floods and inundation, and other physical impacts are raising production costs, placing pressure on infrastructure investments and redefining operating conditions across numerous sectors.

In addition, transition risks arising from climate change are becoming increasingly significant. New environmental regulations, carbon pricing systems, green finance criteria and international trade regulations are creating new obligations, particularly for export-oriented sectors.

Businesses are now not merely organisations "affected by climate change"; they have also become actors required to manage the economic consequences of climate policies. Accordingly, climate change must be regarded not only as an environmental issue but also as an economic, legal and financial risk area.

1.3. New Climate Law and Regulatory Framework

In recent years, many countries have begun addressing climate change not only through environmental policies but also through binding legal regulations.

The European Union's European Climate Law, regulations under the Green Deal, the sustainable finance taxonomy, the Corporate Sustainability Reporting Directive (CSRD), the Corporate Sustainability Due Diligence Directive (CSDDD) and the Carbon Border Adjustment Mechanism directly affect business operations. With the entry into force of the Climate Law in Türkiye, a new legal era has begun at the national level concerning emissions management, carbon markets, climate adaptation plans and green transition processes. These regulations directly concern not only public institutions but also industrial facilities, tourism enterprises, agricultural producers, logistics companies, ports, financial institutions and local authorities.

1.4. The Green Transition Is the New Benchmark for Competitiveness

The global economy is rapidly transitioning towards low-carbon production models. Energy efficiency, renewable energy use, resource efficiency, waste management, the circular economy and sustainable finance practices are no longer merely indicators of environmental responsibility; they are also fundamental prerequisites for attracting investment and competing in international markets.

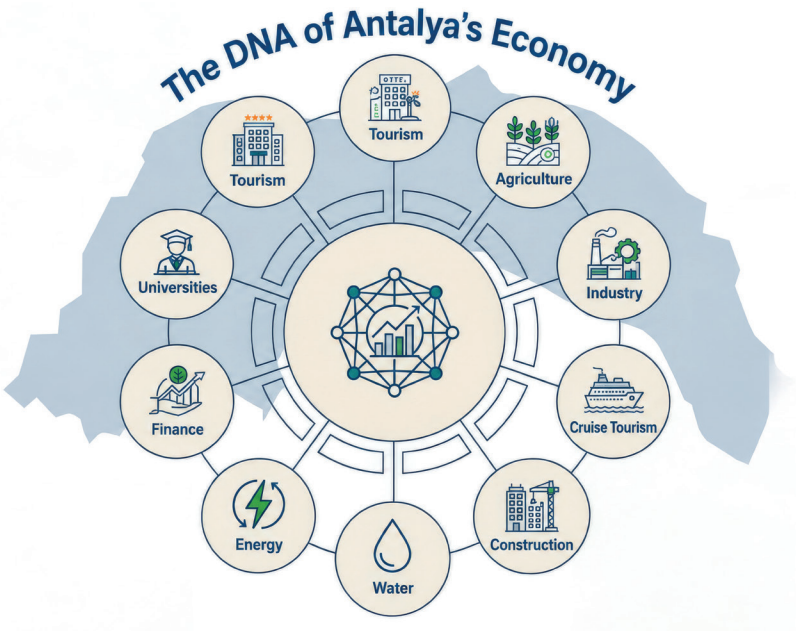
Financial institutions, international investment funds and development banks are increasingly assessing investment decisions against environmental, social and governance criteria. Consequently, the green transition should be regarded not as a cost-generating obligation, but as a strategic competitive advantage that creates new investment opportunities.

1.5. The Strategic Structure of Antalya's Economy

Antalya's economy is one of Türkiye's most dynamic economic centres, owing to its diversified sectoral structure. The tourism, agriculture, trade, logistics, maritime, industry, construction and services sectors play decisive roles in the province's economic development. Although this diversity provides a significant advantage, it also means that different sectors are affected to varying degrees by climate change and new regulatory frameworks.

For example, the tourism sector is directly affected by changes in climatic comfort and sustainable tourism standards; the agricultural sector by changes in water resources and climatic conditions; the industrial sector by carbon regulations and energy costs; the logistics and maritime sectors by international emissions standards; and the construction sector by energy efficiency and green building criteria. Consequently, Antalya's future economic success is closely linked to the extent to which its sectors are prepared for the transition process.

Figure 1: The DNA of Antalya's Economy



Antalya's economic strength is based not on a single sector, but on a diversified, mutually reinforcing economic structure.

1.6. Purpose and Approach of This Report

This assessment report aims to analyse the key sectors of Antalya's economy within the framework of climate change, the new climate law and green transition policies. Each sector has been examined using a common methodology under the headings of current conditions, climate-related physical risks, regulatory risks, economic impacts, emerging opportunities and policy recommendations. The objective is not merely to identify the risks faced by sectors, but also to determine a strategic roadmap that will enable Antalya to transform its green transition process into a competitive advantage.

1.7. Scope of the Report

This report covers the following key sectors:

* Tourism
* Agriculture and Food
* Greenhouse Cultivation
* Industry
* Organised Industrial Zones
* Mining and Natural Stone
* Maritime and Port Operations
* Cruise Tourism
* Fisheries and Aquaculture
* Logistics and Transport
* Construction and Real Estate
* Energy
* Water Management
* Finance and Insurance
* Local Authorities
* Universities and the Research and Development (R&D) Ecosystem

These sectors have been assessed by taking into account their relative significance within Antalya's economic structure, their levels of exposure to climate change and their potential to be affected by new climate legislation.

End-of-Chapter Assessment

Climate change is no longer merely an environmental issue; it is a multidimensional transformation process at the centre of legal, economic, financial and trade policies. For cities with high economic diversity, such as Antalya, this transformation presents both significant risks and new development opportunities. In the subsequent sections of this report, the key sectors of Antalya's economy will be examined individually, and the climate-related impacts, new legal obligations, transition opportunities and strategic policy recommendations faced by each sector will be assessed in detail.

CHAPTER 2

SECTORAL STRUCTURE AND TRANSITION DYNAMICS OF ANTALYA'S ECONOMY

The Current State of Antalya's Economy and the Sectoral Analysis Approach in the Context of Climate Change, Climate Law and the Green Transition

"Antalya's economic diversity provides the city with significant competitive advantages. However, climate change, new climate legislation and the global green transition process necessitate a simultaneous transformation across all sectors to preserve these advantages. The success of this transformation depends on an accurate analysis of the current state of the sectors and the timely implementation of strategic preparations for the future."

In This Chapter

- Antalya's current economic structure
- Economic overview of strategic sectors
- Common impacts of climate change on sectors
- Economic implications of the new climate law
- Antalya's transition dynamics
- Sectoral risk and opportunity assessment framework
- Antalya Climate Transition Index
- Analysis methodology and assessment criteria

Purpose of This Chapter

This chapter establishes an analytical framework that identifies the sectoral structure of Antalya's economy, its vulnerabilities to climate change and the new climate law, and its potential for transition.

All sectoral assessments presented in the subsequent sections of the report have been prepared in accordance with the common methodology defined in this chapter. Physical climate risks, regulatory impacts, economic consequences, green transition opportunities and policy recommendations have been addressed through an integrated approach.

The Competitive Cities of the Future Will Be Those That Prepare Their Sectors Not Merely for Today's Conditions, but for Tomorrow's Climate, Legal and Economic Conditions.

Current Overview, Strategic Priorities and Sectoral Assessment Approach of Antalya's Economy

2.1. General Overview of Antalya's Economy

Antalya is one of Türkiye's most dynamic economic centres, owing to its economic diversity, natural resources, geographical location and international connections. Its economic structure is shaped primarily by tourism, alongside the trade, services, maritime, logistics, industry and construction sectors.

In addition to being Türkiye's leading tourism destination, Antalya is one of the leading centres of protected cultivation, a production centre for export-oriented fruit and vegetables, and a province with rapidly developing organised industrial zones, strong logistics connections and a broad services sector.

Although this diversity provides Antalya with significant advantages, it also means that sectors are affected to varying degrees by climate change and new climate legislation. Therefore, a sector-specific assessment approach is critically important for analysing the province's future economic resilience.

Figure 2: Antalya's Economic Geography



2.2. Key Dynamics of Antalya's Economy

Antalya's economy is built upon strategic sectors such as tourism and accommodation services, agriculture and greenhouse cultivation, the food industry, organised industrial zones and manufacturing, maritime and port operations, cruise tourism and marinas, logistics and transport, construction and real estate development, energy production and energy services, water management and environmental infrastructure, finance and insurance, education, universities and research centres, and local government services.

In addition to their contributions to the province's economic growth, these sectors are also of strategic importance in terms of employment, investment and exports. However, each sector differs in its level of exposure to climate change and the way in which it is affected by the new regulatory framework.

2.3. Key Transition Dynamics Affecting Antalya's Economy

The main areas of transformation that will shape Antalya's economy in the coming years can be summarised as follows:

Physical Climate Risks

- Rising temperatures / Prolonged periods of drought
- Declining water resources / Forest fires
- Extreme rainfall and flooding / Sea-level rise
- Changes in seawater temperature

Regulatory Risks

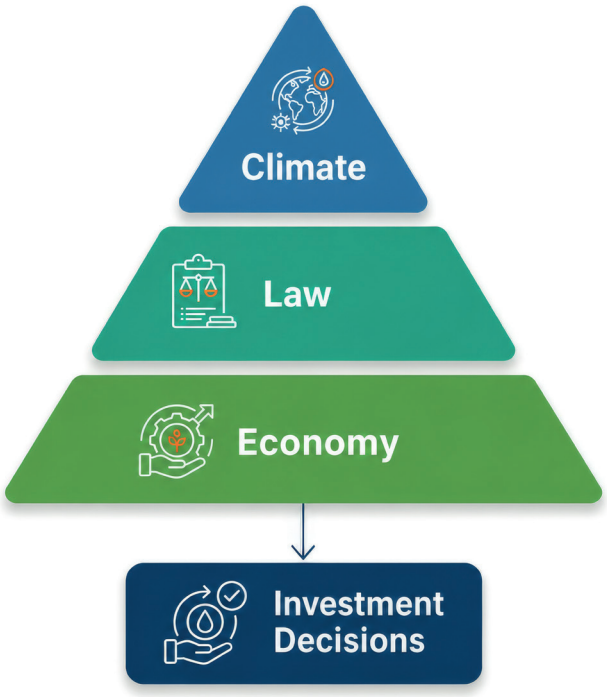
- Türkiye's Climate Law / Emissions Trading System
- European Green Deal / Carbon Border Adjustment Mechanism (CBAM)
- Corporate sustainability reporting obligations
- Energy efficiency standards / Green building and sustainable urban development regulations

Market and Financial Risks

Rising carbon costs, green finance criteria, ESG compliance expectations, supply chain transformation, changes in consumer preferences and international investment standards are among the key factors driving this transition.

When these three dimensions of transformation are considered together, Antalya's economy must adapt not only to climatic conditions but also to changing legal, financial and trading systems.

Figure 3: Key Transition Dynamics Affecting Antalya's Economy



2.4. Priority Areas for Antalya's Transition

Based on the assessments conducted, the key areas of transformation that Antalya should prioritise in the coming period are as follows:

Sustainable management of water resources

Improving energy efficiency

Expanding renewable energy investments

Developing circular economy practices

Adopting low-carbon production models

Climate-resilient infrastructure investments

Expanding smart city applications

Nature-based solutions

Digital transformation

Effective utilisation of green finance mechanisms

These areas will not only provide environmental benefits but also enhance Antalya's national and international competitiveness.

2.5. Sectoral Analysis Methodology

All sectors covered by this report have been analysed using a common assessment methodology. Each sector has been examined under the following headings:

a. Current Situation

The sector's position, size and strategic importance within Antalya's economy.

b. Climate-Related Physical Risks

The direct impacts of climate change on sectoral activities.

c. Legal and Regulatory Impacts

The implications of changes in national and international legislation for the sector.

d. Economic Impacts

Impacts on costs, investment requirements, access to finance and competitiveness.

e. Opportunities

New business models, investment areas and export opportunities that may arise from the green transition.

f. Policy and Strategy Recommendations

Recommendations for public institutions, local authorities, the private sector and civil society.

This standardised framework is intended to enable comparable and integrated assessments across different sectors.

2.6. Table 1: Sectoral Risk and Opportunity Assessment Framework

Each sector has been assessed against the following six main criteria:

	Assessment Criterion	Description
	Physical Climate Risk	Direct impacts of climate change
	Regulatory Risk	New climate laws and regulations
	Economic Impact	Impacts on costs and competitiveness
	Financing Potential	Access to green finance and investment
	Transition Capacity	The sector's capacity to adapt
	Strategic Priority	Critical importance for Antalya's economy

This assessment framework aims to identify not only the existing risks faced by sectors but also their potential for transition.

2.7. Antalya Climate Transition Index

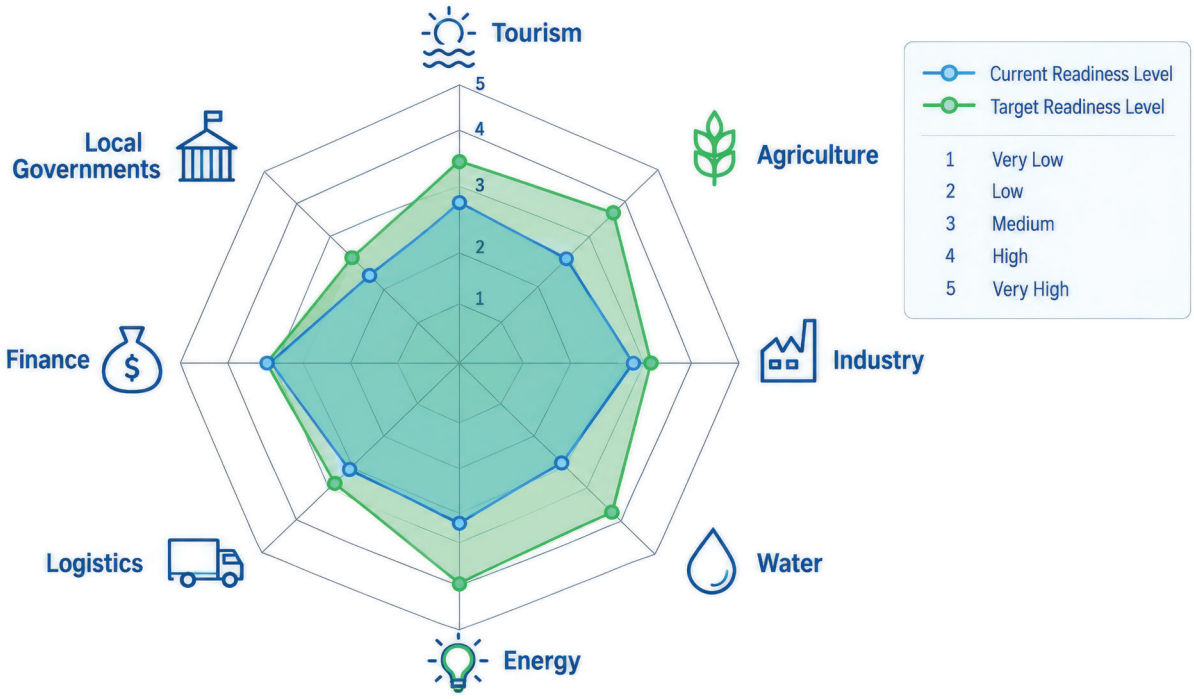
The **Antalya Climate Transition Index,** developed within the scope of this report, has been designed to provide a comparative assessment of sectors in relation to climate change and the new climate law.

The Index is a comprehensive analytical tool that assesses the following dimensions together:

- Sectors' levels of vulnerability,
- The extent to which they are affected by regulatory changes,
- Their investment requirements,
- Their transition capacity,
- Their potential to generate competitive advantages.

This approach will provide decision-makers with guidance on which sectors require priority policy development.

Figure 4: Antalya Climate Transition Index



2.8. End-of-Chapter Assessment

While Antalya's economic diversity offers significant opportunities for the city, climate change and new climate legislation also bring about a comprehensive transition process that will affect all these sectors to varying degrees. Therefore, Antalya's future development model should be shaped by an integrated approach that considers not only economic growth but also climate resilience, resource efficiency, regulatory compliance and international competitiveness. In accordance with the methodological framework established in this chapter, the subsequent sections of the report will assess the key sectors of Antalya's economy individually, examining in detail each sector's current situation, the risks it faces, emerging opportunities and applicable policy recommendations.

CHAPTER 3

SECTORAL IMPACT ANALYSES: THE FUTURE OF ANTALYA'S ECONOMY IN THE CONTEXT OF CLIMATE CHANGE, CLIMATE LAW AND THE GREEN TRANSITION

Assessment of the Impacts of Global Transformation on Antalya's Strategic Sectors

"Climate change will not affect all sectors to the same extent. Some sectors will face greater physical risks, while others will face new legal obligations and international trade rules. Antalya's sustainable development depends on accurately analysing the specific risks faced by each sector, assessing emerging opportunities and implementing integrated policies that strengthen their transition capacities."

In This Chapter



- Tourism
- Agriculture and Greenhouse Cultivation
- Food Industry
- Organised Industrial Zones and Manufacturing Industry
- Maritime, Port Operations and Cruise Tourism
- Logistics and Transport
- Construction and Real Estate
- Energy
- Water Management
- Finance and Insurance
- Local Authorities
- Universities and the Research and Development Ecosystem

Purpose of This Chapter

This chapter assesses the strategic sectors of Antalya's economy from the perspectives of the physical impacts of climate change, the new climate law and regulatory framework, economic consequences, green transition opportunities and competitiveness. Each sector has been examined using a common analytical methodology, considering its current situation, the risks it faces, its transition potential and applicable policy recommendations. Priority action areas that will contribute to Antalya's 2050 vision have been identified.

Analytical Framework Applied in This Chapter

Each sector has been examined under the following common assessment headings:

- Strategic Importance of the Sector to Antalya's Economy
- Physical Impacts of Climate Change
- New Climate Law and Regulatory Impacts
- Economic and Financial Consequences
- Green Transition Opportunities
- Strategic Policy and Action Recommendations
- **Priority Transition Action Recommendations**

Antalya's future economic success will be determined not by the extent to which its sectors are exposed to climate change, but by how rapidly they can adapt to this change.

3.1. Overview of the Strategic Sectors of Antalya's Economy

Common Framework for Sectoral Transition

Antalya is one of Türkiye's most dynamic cities, owing to its economic diversity, natural resources, international connections and high investment potential. Complementary sectors such as tourism, agriculture, industry, maritime activities, logistics, construction, services and finance constitute the fundamental pillars determining the city's economic growth, employment and international competitiveness. However, global climate change, the new climate law, green transition policies and changes in the international trading system are significantly transforming the operating conditions of these sectors. Economic success is now assessed not only in terms of production capacity, investment size or export volume, but also according to sectors' carbon management, resource efficiency, energy transition, capacity to adapt to climate risks and level of compliance with international sustainability standards.This transformation directly affects all components of Antalya's economy. Every institution and sector, from agricultural production in the tourism sector to port operations in organised industrial zones, and from financial institutions to local authorities, faces the economic and legal consequences of changing climate policies. Consequently, Antalya's future competitiveness will depend not only on its current economic performance but also on how well its sectors are prepared for this transition.

Relationship Between Climate Change and Sectoral Transition

The impacts of climate change on sectors are assessed under two main categories. The first is **physical impacts**. Rising temperatures, drought, declining water resources, forest fires, extreme rainfall, sea-level changes and pressures on ecosystems directly affect production processes, service delivery and infrastructure. The second category is **transition impacts.** Regulations such as new climate legislation, carbon pricing mechanisms, the European Green Deal, the Carbon Border Adjustment Mechanism (CBAM), the Emissions Trading System (ETS), sustainable finance criteria and corporate reporting obligations are reshaping sectors' investment decisions and competitive conditions in international markets. When these two impacts are considered together, sectors must be prepared not only for climate-related events but also for the changing economic and legal framework.

Sectors of Strategic Importance to Antalya

The sectors assessed in this report have been identified by taking into account their relative significance within Antalya's economy, contributions to employment, export potential, investment volumes and levels of exposure to climate change and new climate legislation. The following strategic sectors are covered by the assessment:

- Tourism and Accommodation
- Agriculture
- Food Industry
- Greenhouse Cultivation
- Industry and Organised Industrial Zones
- Marble and Natural Stone Industry
- Mining
- Maritime Activities
- Cruise Tourism
- Port Operations
- Fisheries and Aquaculture
- Water Services
- Construction
- Real Estate
- Logistics
- Retail
- Banking and Finance
- Insurance
- Universities and the Research and Deve lopment Ecosystem
- Local Authorities

These sectors are not only fundamental components of Antalya's economic structure but also among the areas expected to undergo the most significant changes during the green transition process.

Sectoral Analysis Approach

In this report, all sectors have been assessed using a common analytical methodology. The aim is to produce comparable results across sectors, identify common risk areas and develop integrated policy recommendations. Each sector has been examined under the following headings:

* Strategic position within Antalya's economy
* Physical impacts of climate change
* New climate law and regulatory framework
* Economic and financial impacts
* International trade and competitiveness dimension
* Green transition opportunities
* Strategic policy recommendations
* Priority transformation areas

This standardised approach enables sectors to be assessed not only in terms of their current circumstances but also in terms of their future transformation capacities.

Fundamental Principles of Sectoral Transition

The assessments conducted indicate that the following common transformation principles need to be adopted across all sectors to ensure the sustainable growth of Antalya's economy:

* Increasing resource efficiency,
* Strengthening water and energy management,
* Reducing carbon emissions,
* Expanding circular economy practices,
* Ensuring the effective use of digital technologies,
* Making greater use of green finance opportunities,
* Ensuring compliance with international sustainability standards,
* Establishing strong cooperation mechanisms between the public sector, private sector and academia.

These principles constitute fundamental policy pillars that support not only environmental sustainability but also economic resilience and international competitiveness.

Purpose of the Chapter

The purpose of this chapter is to assess the strategic sectors of Antalya's economy from the perspectives of climate change and the new climate law, and to present an integrated approach that addresses the risks faced by each sector, transformation requirements and emerging opportunities.

The analyses conducted are not limited to identifying existing problems. They also aim to develop policy recommendations capable of transforming Antalya's green transition process into a strategic advantage in terms of economic development, investment attractiveness and international competitiveness.

End-of-Chapter Assessment

Climate change and the evolving international legal framework associated with it are creating a new operating environment for all sectors of Antalya's economy. In this new era, the sectors that succeed will not be those that wait for change, but those that anticipate it, adapt to it and turn the transformation into a competitive advantage. Accordingly, each sectoral analysis presented in the remainder of this report should be regarded not merely as an assessment of the current situation, but as a strategic transformation guide that will contribute to Antalya's 2050 vision. This approach will enable the development of concrete policy recommendations for each sector, the identification of shared risk areas and the establishment of a roadmap to support the achievement of Antalya's climate-resilient development objectives.

Figure 5: Antalya's 20 Strategic Sectors



3.2 Tourism and Accommodation Sector

"Green transition is not a process that will create winners and losers among sectors. What truly matters is the ability to anticipate change in a timely manner, manage the transition strategically and adapt to the new economic order. Sectors capable of doing so will also stand out in the competitive environment of the future. Antalya's vision for sustainable development should likewise be built upon this shared commitment to transformation."

Figure 6: The Economic Multiplier Effect of Tourism in Antalya



3.2.1 Introduction

Tourism is the fundamental pillar of Antalya's economy. With its accommodation capacity, international air transport links, natural and cultural heritage, coastline, sports tourism, health tourism and alternative tourism opportunities, the city is one of the leading destinations not only in Türkiye but also in the Mediterranean Basin. The economic value generated by the tourism sector is not limited to accommodation establishments alone. Many sectors, including transport, food and beverage, agriculture, trade, construction, culture, entertainment, marina operations and logistics, benefit directly or indirectly from tourism. Therefore, the risks faced by the tourism sector have the potential to affect the entire Antalya economy. Climate change and the new regulatory frameworks associated with it are reshaping the tourism sector not only from an environmental perspective but also in terms of investment decisions, operating costs, destination competitiveness and international marketing.

3.2.2 Current Structure of Tourism in Antalya

With its substantial accommodation capacity, international hotel brands, convention centres, golf facilities, marinas, cruise tourism potential and natural assets that can be utilised throughout all four seasons, Antalya occupies an important position in global tourism. Although tourism activities are largely based on coastal tourism, significant developments have also taken place in recent years in alternative areas such as:

- Health tourism,
- Sports tourism,
- Gastronomy tourism,
- Cultural tourism,
- Nature tourism,
- Rural tourism,
- Yacht and cruise tourism.

Nevertheless, a significant proportion of tourism revenue is concentrated in the summer season, during which energy and water consumption also reach high levels. This makes the sector particularly sensitive to climate change.

3.2.3 Physical Impacts of Climate Change on the Tourism Sector

The impacts of climate change on tourism in Antalya are not limited to rising temperatures. Declining water resources, extreme weather events, coastal erosion, sea-level rise, forest fires and changes in biodiversity may directly affect destination quality.

Particularly during the summer months, increasing high temperatures place pressure on thermal comfort conditions, outdoor use, visitor comfort and energy consumption. Rising demand for air conditioning increases operating costs, while greater water consumption places additional pressure on the water resources of tourism facilities.

Furthermore, potential erosion in coastal areas, reductions in beach widths and changes in marine ecosystems are developments that must be carefully monitored in terms of the sustainability of coastal tourism.

3.2.4 New Climate Law and Its Implications for the Tourism Sector

Global climate policies are establishing new standards that directly affect the tourism sector. In the coming period, carbon footprint calculations, energy efficiency practices, sustainable tourism certifications, water efficiency criteria, waste management obligations, sustainable procurement policies and ESG reporting will become increasingly important.

With the Climate Law entering into force in Türkiye and the secondary legislation to be prepared under it, the environmental performance of tourism establishments is expected to be monitored more systematically.

This process will be decisive not only in terms of legal compliance but also in determining the preferences of international tour operators and investors.

3.2.5 Economic Impacts

Climate change and new regulations are generating both cost-increasing effects and new investment opportunities for the tourism sector.

The principal economic impacts are as follows:

- Increasing energy costs,
- Rising water supply costs,
- Carbon emissions reduction investments,
- The need for building modernisation,
- Sustainability certification costs,
- Transition to digital monitoring and reporting systems.

Conversely, energy efficiency, renewable energy systems, greywater recycling, rainwater harvesting and circular economy practices will reduce operating costs in the long term and provide a competitive advantage.

Figure 7: Sankey Diagram of Economic Impacts



3.2.6. Opportunities Offered by the Green Transition to the Tourism Sector

The green transition represents not only an obligation for tourism in Antalya but also a significant growth opportunity. In the coming period, low-carbon facilities, energy-positive hotels, water-efficient tourism investments, zero-waste practices, smart building technologies, sustainable transport solutions and environmentally friendly marina practices will create significant competitive advantages in international markets.

Particularly considering the preferences of tourists in the European market for sustainable destinations, the marketing competitiveness of facilities with high environmental performance is expected to increase.

3.2.7 Strategic Policy Recommendations for Antalya

To accelerate the tourism sector's adaptation to climate change, the following priority policy areas are considered important:

- Promoting the widespread adoption of water efficiency standards in tourism facilities.
- Encouraging seawater desalination and the use of reclaimed water in suitable areas.
- Supporting investments in energy efficiency.
- Promoting the widespread adoption of rooftop solar energy systems.
- Developing green finance mechanisms for the tourism sector.
- Encouraging smart energy and water management systems.
- Preparing climate adaptation plans for coastal areas.
- Supporting alternative tourism models that extend across all four seasons.
- Developing cruise tourism and marina infrastructure in accordance with green port standards.
- Establishing a "Sustainable Tourism Monitoring Platform" for Antalya.

3.2.8 Table 2: Priority Transformation Areas for the Tourism Sector

Area	Priority
Water Management	Very High
Energy Efficiency	Very High
Renewable Energy	Very High
Waste Management	High
Digital Monitoring	High
Carbon Management	High
Green Finance	Medium-High
Alternative Tourism	High

3.2.9 End-of-Section Assessment

Although tourism in Antalya faces significant challenges arising from climate change and new climate legislation, it also has substantial opportunities for transformation. This transformation should not be regarded merely as the fulfilment of environmental obligations. Practices in energy, water, waste and carbon management are strategic instruments that reduce operating costs, increase investment attractiveness and strengthen competitiveness in international markets.

Antalya's existing tourism infrastructure and international brand value provide significant advantages for managing this transformation. However, preserving these advantages depends on coordinated action by public institutions, local authorities, the tourism sector, financial institutions and civil society. A tourism sector that manages the impacts of climate change, adapts to climate law in a timely manner and transforms the green transition into a competitive advantage will constitute one of the strongest components of Antalya's 2050 vision.

3.3 Agriculture Sector

Climate Change, Climate Law and the Green Transition: The Future of Agriculture in Antalya

3.3.1. Introduction

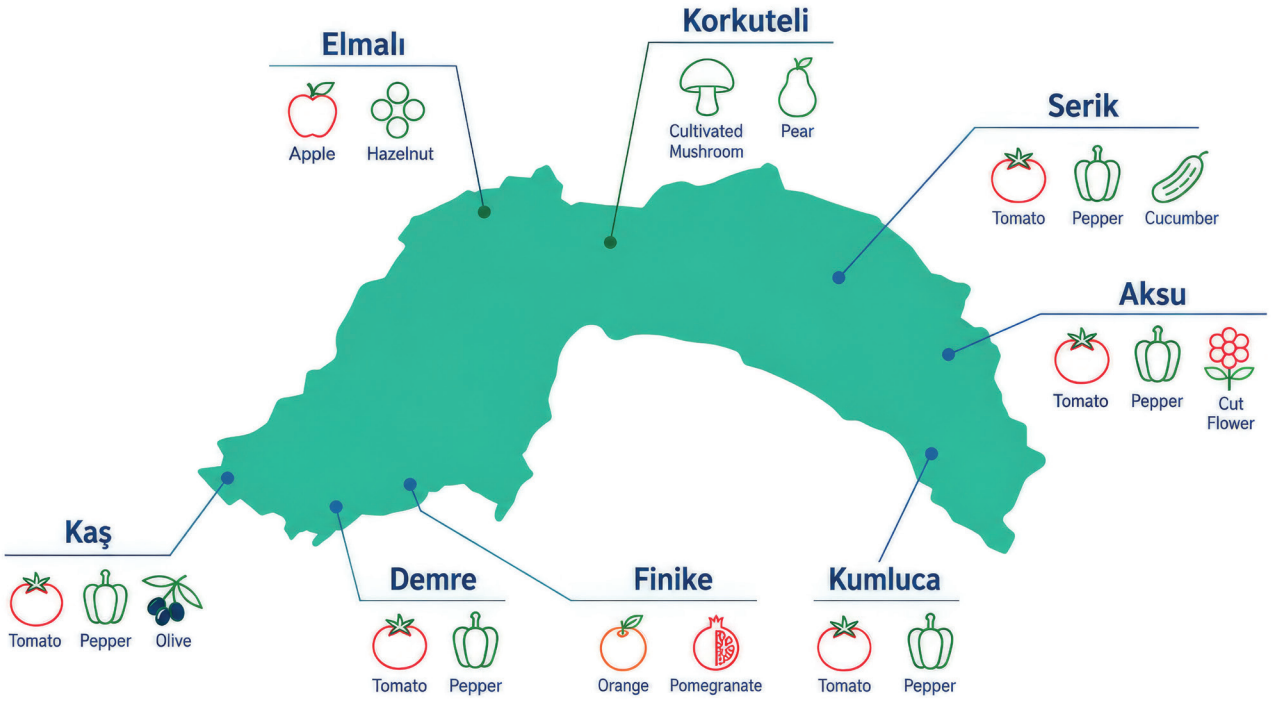
In addition to being one of the fundamental production sectors of Antalya's economy, agriculture holds a strategic position in terms of the province's social structure, rural development, exports and food security. Antalya, one of Türkiye's leading provinces in fruit and vegetable production, also holds a leading position nationally in numerous areas, including protected cultivation, citrus production, tropical fruit cultivation, ornamental plants, greenhouse cultivation and seed production.

However, as agricultural production is directly dependent on climatic conditions, it is among the sectors most vulnerable to the impacts of climate change. Rising temperatures, changes in precipitation patterns, drought, declining water resources, the increasing frequency of extreme weather events and changes in the spread of biological pests directly affect production volumes, product quality and production costs.

Furthermore, the European Union's Green Deal, sustainable agriculture policies, carbon management, environmental reporting obligations and changes in international trade standards are bringing about a new era for the agricultural sector, not only in climatic terms but also from legal and economic perspectives.

Therefore, the future of agriculture in Antalya depends not only on its ability to adapt to changing climatic conditions but also on its ability to maintain competitiveness by adopting new international production standards.

Figure 8: Agricultural Map of Antalya



3.3.2 Current Structure of Agriculture in Antalya

Thanks to its climatic characteristics, fertile plains, developed irrigation infrastructure and strong logistics connections, Antalya is one of Türkiye's leading agricultural centres in terms of added value generated. Agricultural production in the province is primarily concentrated in the following areas:

- Greenhouse cultivation,
- Fresh fruit and vegetable production,
- Citrus fruit production,
- Tropical fruits,
- Olives and olive oil,
- Banana production,
- Avocados and subtropical products,
- Cut flowers and ornamental plants,
- Seed production activities,
- Livestock farming and fodder crop production.

Agricultural production in Antalya not only supplies the domestic market but also provides a significant source of foreign exchange through exports to numerous countries, particularly those in the European Union. In terms of protected cultivation capacity, Antalya is one of Türkiye's leading production centres and possesses a significant competitive advantage in international markets thanks to modern greenhouse technologies, high productivity and the ability to maintain production throughout the year.

However, this production model creates sustainability challenges due to intensive water consumption, energy requirements and sensitivity to climatic conditions.

3.3.3 Physical Impacts of Climate Change on the Agricultural Sector

Climate change is regarded as one of the most significant environmental risks affecting the agricultural sector. Rising temperatures, irregularities in precipitation patterns and prolonged periods of drought observed in Antalya are causing substantial changes in agricultural production processes. Increasing temperatures may alter plant growth periods and lead to shifts in flowering and harvesting times. In particular, high-temperature stress may adversely affect fruit quality and productivity, while quality losses may occur in certain product groups. Changes in precipitation patterns increase irrigation requirements and intensify pressure on groundwater and surface water resources. In addition, sudden and intense rainfall may cause soil erosion, surface runoff and physical damage to agricultural land.

Another significant consequence of climate change is the alteration of the geographical distribution of plant diseases and harmful organisms. Warmer winter months extend the life cycles of certain pest species and increase control costs. Furthermore, extreme weather events such as forest fires, severe windstorms, hail and storms are becoming more frequent. These events may cause substantial economic losses, particularly in high-value agricultural products.

These developments make it necessary to reconsider agricultural production not only in terms of productivity but also in relation to production planning, insurance systems and risk management.

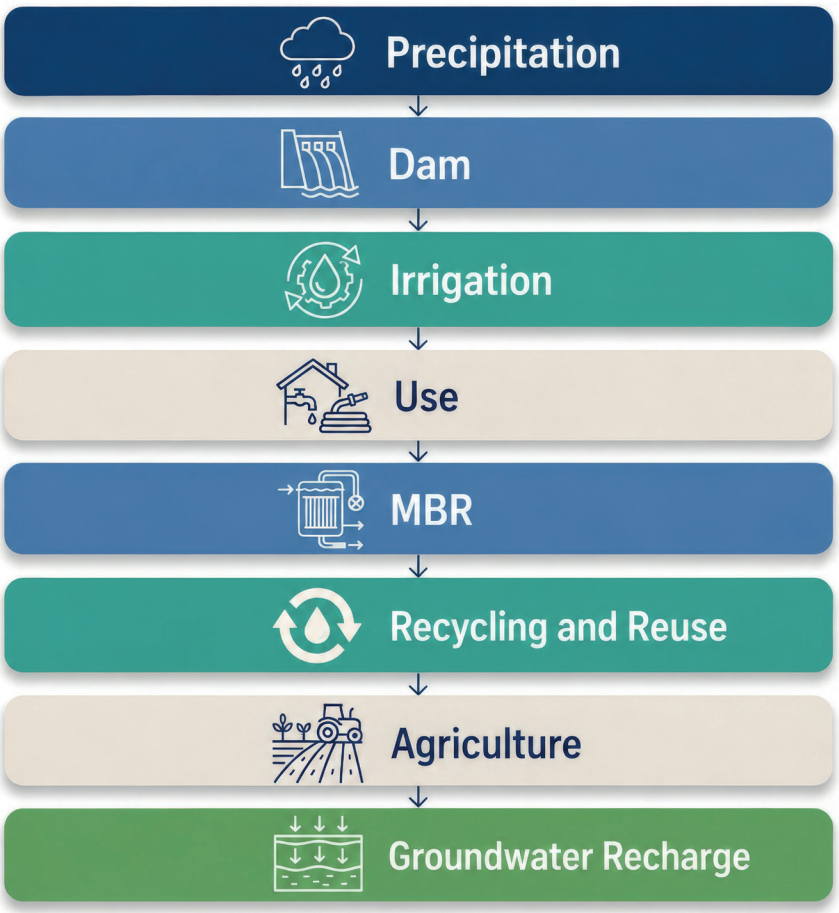
3.3.4 Water Resources and Agricultural Production

The most critical factor determining the future of agriculture in Antalya is the sustainable management of water resources. Agricultural activities account for the largest share of total water consumption in Antalya. Evaporation losses associated with climate change, reduced precipitation and prolonged periods of drought are placing increasing pressure on existing water resources each year. For this reason, future agricultural policies should be based not on the principle of **"producing more by using more water", but on an approach focused on "producing higher added value with the same amount of water".**

Within the scope of this transition, the widespread adoption of pressurised irrigation systems, the use of smart irrigation technologies, irrigation optimisation through soil moisture sensors, the development of rainwater harvesting practices, the establishment of appropriate quality standards for treated wastewater, the assessment of its use in agricultural irrigation, the reduction of water losses, the development of drought-resistant crop varieties and the strengthening of a basin-based water management approach are of strategic importance.

In particular, the safe and controlled use of reclaimed water in agricultural irrigation should be considered a strategic opportunity for Antalya. This approach will both reduce pressure on natural water resources and contribute to the continuity of agricultural production in the face of increasing drought risks. The use of digital technologies in water management, real-time monitoring systems and data-driven decision-making mechanisms are also among the important tools for increasing resource efficiency.

Figure 9: Circular Water Economy



3.3.5 European Green Deal, CBAM and Their Implications for Agricultural Exports

The European Green Deal, introduced by the European Union, is not merely an initiative concerning environmental policies; it is a comprehensive economic transformation programme that restructures production, trade, finance and consumption patterns. The fundamental objective of this transition is to enable the European Union to become a climate-neutral economy by 2050 and, accordingly, to restructure all value chains towards sustainable production models.

For Antalya's agriculture, this process means, in particular, a redefinition of the conditions for accessing export markets. Fresh fruit and vegetables, citrus fruits, cut flowers, tropical fruits and processed agricultural products, which are among Antalya's prominent product groups in foreign trade, are increasingly subject to environmental and sustainability criteria.

As of today, the Carbon Border Adjustment Mechanism (CBAM) does not directly cover all agricultural products. However, considering the European Union's intention to expand its climate policies, it is anticipated that more comprehensive regulations concerning the carbon footprint, water footprint, biodiversity, pesticide use and sustainable production criteria of the agriculture and food sectors may be introduced in the future.

Therefore, the fundamental issue for Antalya's export-oriented agricultural sector is not merely to comply with existing regulations, but also to prepare today for standards that may be implemented in the future. In the coming period, international buyers are expected to assess not only product quality, but also the type of energy used in production, the amount of water consumed, greenhouse gas emissions generated during production, the quantity of fertilisers and pesticides used, waste management practices and the environmental impacts of production.

Although this transition may initially generate additional costs, it also presents significant opportunities for Antalya's agriculture in the long term. Enterprises that improve resource efficiency, reduce carbon emissions and adopt sustainable production standards will be able to gain a stronger competitive advantage in international markets, access green finance and strengthen their position in higher value-added markets. Consequently, the European Green Deal should be regarded not merely as a compliance process for Antalya's agriculture, but also as an opportunity to modernise production models and enhance international competitiveness.

3.3.6 Good Agricultural Practices, Organic Farming and Sustainable Production

The approach to agricultural production is undergoing significant change in line with the objectives of combating climate change and conserving natural resources. Today, agricultural success is measured not only by achieving high yields, but also by adopting production models that reduce environmental impacts, conserve natural resources and safeguard sustainability for future generations. In this context, good agricultural practices, organic farming, integrated pest management, precision farming techniques and digital agriculture solutions are becoming increasingly important.

With its modern greenhouse infrastructure, strong producer profile and export-oriented production culture, Antalya has the potential to become one of the leading areas capable of achieving this transition.

Within the framework of good agricultural practices, the controlled use of plant protection products, optimisation of fertiliser management, efficient water utilisation, ensuring product traceability, safeguarding occupational health and safety, and reducing environmental impacts are becoming fundamental elements of a reliable producer identity in international markets.

Similarly, organic farming practices offer significant opportunities, particularly in high value-added export markets. Although not every product or production area is suitable for organic farming, Antalya's climatic advantages in certain product groups support the growth potential in this field. On the other hand, digital agriculture technologies optimise resource utilisation through satellite imagery, sensor systems, artificial intelligence-supported production planning and data analytics, thereby both reducing costs and improving environmental performance. The competitive agriculture of the future will be based not on using more inputs, but on a production approach that utilises data more effectively.

3.3.7 Carbon Management and Agricultural Emissions

The agricultural sector is not only one of the sectors affected by climate change but also has a significant share in the generation of greenhouse gas emissions. Nitrogen oxide emissions resulting from fertiliser use, fossil fuels used in agricultural machinery, energy consumption, livestock activities and organic waste management are among the main sources of the sector's carbon footprint.

In the coming period, carbon management will become increasingly important in agricultural production. In particular, enterprises engaged in export-oriented production will face growing expectations regarding carbon footprint calculations, emission reduction plans and the reporting of sustainability performance. In this context, the principal strategies that could be implemented in Antalya are as follows:

- Expanding the use of solar energy systems in agricultural irrigation,
- Using energy-efficient pumps and equipment,
- Utilising organic waste for compost and biogas production,
- Supporting practices that increase soil organic matter,
- Expanding the use of precision fertilisation techniques,
- Using low-emission technologies in agricultural mechanisation.

Carbon management should not be regarded solely as an environmental responsibility. Low-carbon production will become a common feature of products demanded in international markets in the future. Therefore, carbon management should also be considered a strategic investment area that enhances the competitiveness of Antalya's agricultural sector.

3.3.8 Economic Impacts, Green Finance and New Investment Models

Climate change and the green transition process bring significant investment requirements for the agricultural sector. The modernisation of irrigation systems, energy efficiency investments, renewable energy applications, digital agriculture technologies, carbon management systems and sustainable production infrastructure require additional financing at the initial stage.

At the same time, financing opportunities provided by international financial institutions and development banks for sustainable agricultural projects are increasing rapidly. Green loans, climate adaptation funds, low-interest investment programmes and financing instruments supporting carbon reduction provide important resources that can accelerate the transformation of the agricultural sector. Considering Antalya's strong production infrastructure and export capacity, the effective utilisation of these financing resources will not only improve environmental performance but also contribute to reducing production costs, enhancing resource efficiency and increasing competitiveness in international markets.

In this context, strengthening cooperation among public institutions, producer associations, cooperatives, financial institutions and the private sector is of great importance. In particular, financing mechanisms that facilitate small and medium-sized enterprises' access to green transition investments will ensure that the transformation process is inclusive and sustainable.

Thanks to its production capacity and ability to adapt to innovation, Antalya's agricultural sector has the potential to regard this transformation not merely as a necessity, but also as an opportunity to transition towards an economic structure that generates higher added value, is more resilient and is more competitive.

3.3.9 Strategic Policy Recommendations for Antalya's Agriculture

Climate change, increasing pressure on natural resources and changes in international trade rules make a new production approach necessary for Antalya's agriculture. The fundamental objective of policies to be developed during this process should be to ensure the sustainable utilisation of natural resources while maintaining production capacity, increase competitiveness in export markets and strengthen the sector's resilience to climate change.

In this regard, priority policy areas are summarised below.

Improving Water Efficiency: Agricultural water management is one of the most critical policy areas for Antalya's future. The modernisation of irrigation infrastructure, expansion of closed irrigation systems, increased use of drip and sprinkler irrigation technologies, support for smart irrigation automation and reduction of water losses and leakage should be among the priority objectives. In addition, the reuse of treated wastewater in agricultural irrigation in accordance with appropriate quality standards, the expansion of rainwater harvesting practices and the strengthening of basin-based water management plans are of great importance.

Expanding Climate-Resilient Production Models: Taking changes in climatic conditions into account, drought-resistant varieties should be developed, cropping patterns should be reassessed according to regional climate projections, and risk management practices in agricultural production should be strengthened. Early warning systems, meteorological decision-support mechanisms and digital agriculture applications should enable producers to be prepared for climate-related risks.

Green Transition and Carbon Management: Technologies that improve energy efficiency in agricultural enterprises should be supported, and the use of renewable energy applications, particularly solar energy, should be expanded. Technical support should be provided for calculating carbon footprints, preparing emission reduction plans and reporting sustainability performance. These efforts will not only improve environmental performance but also create a competitive advantage in export markets.

Digital Agriculture and Technology Utilisation: Satellite-supported monitoring systems, sensor technologies, artificial intelligence-supported decision-making mechanisms, precision farming applications and data-driven production planning will be important instruments for increasing the efficiency of Antalya's agriculture. Digitalisation will make it possible both to reduce production costs and to achieve significant savings in water, energy and fertiliser utilisation.

Strengthening Capacity to Meet International Market Requirements: Training programmes for producers should be developed to ensure compliance with sustainability criteria applicable in export markets, particularly those of the European Union. Technical support mechanisms should be established for good agricultural practices, organic production, traceability systems, carbon management and sustainability certifications.

Financing and Institutional Cooperation: Coordination among public support mechanisms, development agencies, international financial institutions and private sector financing models should be ensured to accelerate green transition investments. In particular, establishing advisory and project development mechanisms that facilitate small and medium-sized producers' access to green finance sources is of critical importance for the success of the transformation process.

3.3.10.Table 3: Priority Transformation Areas for the Agricultural Sector

Based on the assessments conducted in the agricultural sector, the priority transformation areas for Antalya have been identified as follows:

Priority Area	Strategic Priority
Agricultural Water Use Efficiency	Very High
Drought and Climate Adaptation Management	Very High
Digital Agriculture Applications	High
Use of Renewable Energy	High
Good Agricultural Practices and Organic Production	High
Carbon Footprint Management	High
Integration of Agricultural Waste into the Circular Economy	Medium-High
Alignment with Export Sustainability Standards	Very High
Reuse of Treated Wastewater	Very High
Strengthening Agricultural Risk Management and Insurance Systems	High

These priority areas aim not only to improve environmental sustainability but also to reduce production costs, maintain export capacity and strengthen the long-term competitiveness of Antalya's agricultural sector.

3.3.11. End-of-Section Assessment

The agricultural sector is not only one of the strongest production areas of Antalya's economy but also among the sectors that will experience the impacts of climate change most intensely. Rising temperatures, pressure on water resources, drought risks and changing international trade rules necessitate a reassessment of agricultural production models. At the same time, Antalya's strong production infrastructure, modern greenhouse farming experience, export-oriented structure and innovative producer profile offer significant advantages that could transform this process into an important opportunity. Through technologies that improve water efficiency, digital agriculture applications, low-carbon production systems and sustainability-oriented investments, Antalya's agricultural sector has the potential to increase its competitiveness in international markets while reducing its environmental impacts.

The success of this transformation depends on strong cooperation among public institutions, local authorities, universities, producer organisations, financial institutions and the private sector. Policy and investment programmes developed in line with a shared vision could transform Antalya into a model agricultural centre that adapts to climate change, uses natural resources efficiently and generates high added value. Consequently, the green transition of the agricultural sector is not merely an environmental necessity; it is also a strategic development initiative that will strengthen Antalya's economic resilience, maintain its export capacity and support rural development. Therefore, agriculture should be considered one of the priority transformation areas in Antalya's 2050 vision and supported through integrated policies.

3.4 Food Industry

Climate Change, Climate Law and the Future of Antalya's Food Industry in the Green Transition Process

3.4.1 Introduction

The food industry constitutes the most critical link between agricultural production and consumers. Fresh fruit and vegetables, citrus fruits, tropical fruits, dairy products, meat products and other agricultural products grown in Antalya are processed, packaged, stored and delivered to national and international markets through the food industry. In this respect, the food industry is not merely an extension of agricultural production; it is also one of the province's most important economic activities generating added value.

However, climate change and the green transition process are confronting the food industry with a comprehensive transformation, not only in terms of raw material supply but also regarding energy utilisation, water consumption, carbon emissions, supply chain management, packaging technologies, waste management and export standards. In the coming period, the sector's competitiveness will be determined not only by production capacity but also by energy efficiency, effective resource utilisation, low-carbon production technologies and sustainable supply chain management.

3.4.2 Current Structure of Antalya's Food Industry

As one of Türkiye's strongest agricultural production centres, Antalya also has a well-developed food processing industry. Enterprises operating in the province are engaged in a wide range of activities, including:

- Fresh fruit and vegetable processing,
- Fruit juice production,
- Frozen food production,
- Canned food production,
- Milk and dairy products,
- Meat processing,
- Olives and olive oil,
- Flour-based products,
- Beverage production,
- Packaging and packing.

Due to the strong structure of the tourism sector, hotels, restaurants and mass catering establishments also constitute an important domestic market for the food industry. In addition, Antalya Port, air cargo transport and the developed road network provide advantages in terms of rapid access to international markets. However, rising energy costs, the high electricity consumption of cold chains, fluctuations in raw material prices and increasingly stringent sustainability criteria are among the main challenges facing the sector.

3.4.3 Impacts of Climate Change on the Food Industry

As the food industry is directly dependent on agricultural production, the impacts of climate change on agriculture are also indirectly reflected in the industry. Drought, extreme temperatures and irregular precipitation may reduce production volumes for certain products, leading to fluctuations in raw material supply and price increases.

Changes in raw material quality may affect processing operations, reduce production efficiency and complicate product standardisation. In addition, extreme weather events may cause logistical disruptions, increased risks during storage and vulnerabilities in supply chains.

Climate change also creates new risks for food safety. Changes in production and storage conditions may lead to increased microbiological risks and product losses, making it necessary to strengthen quality assurance systems. Consequently, adaptation to climate change in the food industry must not be limited to production facilities but requires an integrated approach encompassing the entire supply chain.

3.4.4 Cold Chain and Energy Management

A significant proportion of energy consumption in the food industry is attributable to refrigeration systems. Particularly in the production of fresh fruit and vegetables, dairy products, meat products and frozen foods, the uninterrupted operation of the cold chain is critically important for product quality and food safety.

However, rising electricity costs and the increasing implementation of carbon reduction policies in the energy sector make it necessary to improve the efficiency of cold chain infrastructure.

In this context:

- The use of high-efficiency refrigeration systems,
- Preference for natural refrigerants or refrigerants with low global warming potential,
- The expansion of digital temperature monitoring systems,
- The development of warehouse automation systems,
- The establishment of solar-powered cold storage facilities,
- The implementation of energy recovery systems

will be among the key investment areas in the coming period.

Energy efficiency is not merely a factor that reduces operating costs; it is also a strategic competitive advantage that reduces carbon emissions and facilitates compliance with international sustainability standards.

3.4.5 European Green Deal and Its Implications for Food Exports

Global food trade has entered a significant transformation process under the influence of climate change and sustainability policies. The policies developed by the European Union under the European Green Deal envisage the assessment of food products not only in terms of quality and price but also in terms of the environmental performance of production processes. In this context, criteria such as carbon footprint, water consumption, energy efficiency, waste management, sustainable packaging utilisation and product traceability are becoming increasingly decisive in international trade.

Although the current Carbon Border Adjustment Mechanism (CBAM) does not directly cover food products, the European Union's regulations concerning sustainable food systems are indirectly but significantly affecting exporting enterprises. Antalya is one of Türkiye's major production centres for fresh fruit and vegetables, processed agricultural products and food industry exports. Therefore, to maintain their competitive advantage in international markets, enterprises must transition towards a production structure that enables them to measure, report and continuously improve their environmental performance. In particular, major retail chains and international purchasing organisations are demanding not only high-quality products from their suppliers but also data documenting sustainable production processes. Accordingly, the future competitiveness of Antalya's food industry is directly linked to its capacity to invest in low-carbon production technologies, improve resource efficiency and comply with international sustainability standards.

3.4.6. Carbon Management and Circular Production

A significant proportion of carbon emissions in the food industry originates from energy consumption, production processes, refrigeration systems, logistics activities and organic waste management. New policies developed to address climate change require enterprises not only to reduce their emissions but also to redesign their production processes in accordance with circular economy principles.

The circular production model is based on the reuse of by-products generated during production, the recovery of organic waste, water reuse, energy recovery and the minimisation of raw material losses. In Antalya, organic waste generated particularly in fruit and vegetable processing facilities offers significant potential for conversion into high-value by-products through biogas production, composting or similar processes. Likewise, in production facilities, practices such as:

- Energy-efficient equipment,
- Process optimisation,
- Waste heat recovery,
- Solar energy systems,
- Water recovery units,
- Sustainable packaging technologies

both reduce operating costs and improve environmental performance.

Effective implementation of carbon management will provide enterprises with significant advantages not only in terms of regulatory compliance but also in terms of investor confidence, brand value and market preference in export markets.

3.4.7. Economic Impacts and Green Finance

The green transition process entails significant investment requirements for the food industry. Investments in energy efficiency projects, modern cold chain infrastructure, digital production systems, water recovery technologies and low-carbon production processes may initially generate additional costs but will increase the competitiveness of enterprises in the long term. Financing mechanisms established by international financial institutions and development banks to support sustainable production investments offer significant opportunities for the sector. Through green loans, sustainability-linked financing models, energy efficiency incentives and climate adaptation funds, enterprises will be able to undertake transformation investments under more favourable financing conditions.

In Antalya, establishing technical advisory mechanisms that facilitate access to these resources, particularly for small and medium-sized enterprises (SMEs) in the food industry, is of significant importance. Increasing project development capacity in order to access financing is also a critical factor in the success of the transformation process.

3.4.8. Strategic Policy Recommendations for Antalya's Food Industry

An integrated approach should be adopted in the following policy areas to enable Antalya's food industry to adapt to climate change and the green transition process.

Expanding Energy Efficiency Programmes: Investments in highly energy-efficient equipment should be supported to reduce energy consumption in production facilities, energy audits should be expanded, and the use of renewable energy applications should be encouraged.

Modernisation of the Cold Chain: The widespread adoption of modern refrigeration technologies, digital monitoring systems and energy-efficient storage infrastructure should be one of the sector's priority investment areas.

Supporting Circular Production Models: Technical and financial support mechanisms should be developed for the recovery of organic waste, the conversion of by-products into economic value and water reuse.

Digitalisation and Traceability: Digital monitoring of production processes, the establishment of systems ensuring traceability from raw materials to finished products, and the strengthening of data-driven quality management should be encouraged.

Expanding International Certification: Support programmes should be implemented to facilitate exporting enterprises' access to international sustainability, food safety and environmental management certifications.

Strengthening Access to Green Finance: Project development and technical advisory centres should be established to increase food enterprises' access to national and international financing sources for green transition investments.

3.4.9. Table 4: Priority Transformation Areas for the Food Industry

Priority Area	Strategic Priority
Energy Efficiency	Very High
Cold Chain Modernization	Very High
Low-Carbon Production	High
Circular Economy Applications	High
Water Use Efficiency	High
Digital Production and Traceability	Very High
Sustainable Packaging Systems	Medium-High
Alignment with Export Sustainability Standards	Very High
Access to Green Finance	High
Recovery of Organic Waste	High

These priorities will contribute to enhancing resource efficiency in Antalya's food industry while enabling it to maintain its competitiveness in international markets and supporting its sustainable growth.

3.4.10. End-of-Section Assessment

The food industry is one of the strategic sectors that transforms agricultural production into added value, generates employment and supports exports in Antalya's economy. In the coming period, the sector's success will be measured not only by production volume but also by production quality, resource efficiency and sustainability performance.

While climate change and green transition policies introduce new obligations for the sector, they also present significant opportunities. Investments in energy efficiency, low-carbon production, the circular economy, digitalisation and traceability will reduce operating costs while increasing competitiveness in international markets.

Considering Antalya's strong agricultural production capacity, advanced logistics infrastructure and market advantages arising from tourism, the sustainable transformation of the food industry is not merely a sectoral requirement but also a strategic priority for the city's future economic resilience. Therefore, public institutions, universities, producer organisations, financial institutions and the private sector should act together to develop integrated policies that will enable Antalya's food industry to become one of the sectors benefiting from the green transition process.

3.5. Greenhouse Farming Sector

The Future of Greenhouse Farming in Antalya in the Context of Climate Change, Climate Law and the Green Transition

3.5.1. Introduction

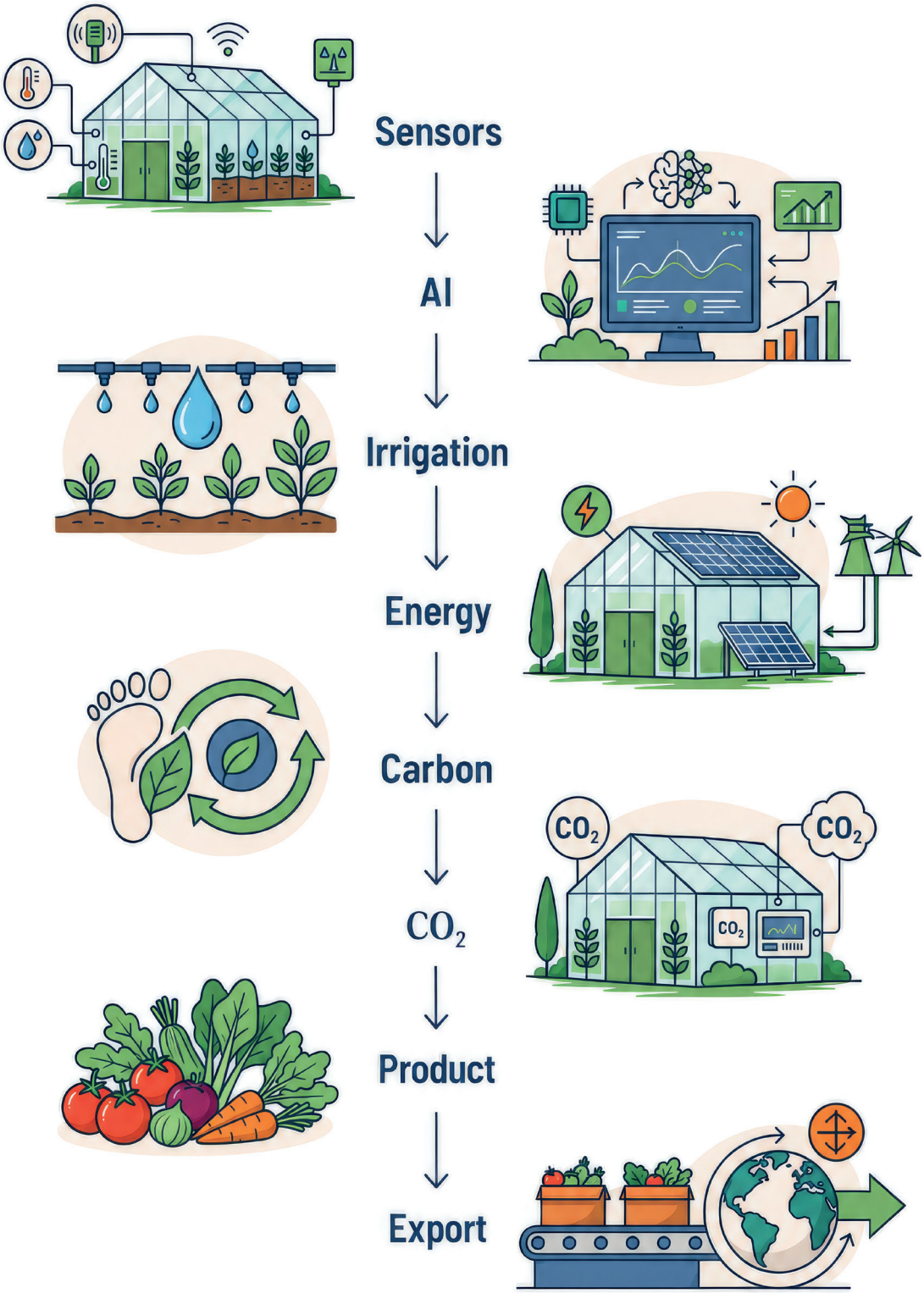
With its favourable climatic conditions, modern production infrastructure and high-technology greenhouse investments, Antalya is Türkiye's leading centre for greenhouse cultivation. Tomatoes, peppers, cucumbers, aubergines, cut flowers, bananas, strawberries, ornamental plants and numerous other high-value products are produced largely under controlled conditions, providing the sector with a significant advantage in terms of year-round production.

Greenhouse farming is a strategic production model that enables high yields per unit area, supports rural employment and facilitates export-oriented production. It also accounts for a significant proportion of Antalya's agricultural added value.

However, greenhouse enterprises are production systems that rely heavily on resources in terms of water, energy, heating, fertilisation and logistics. This makes the sector directly vulnerable to climate change, rising energy costs and green transition policies.

In the coming period, the competitiveness of greenhouse farming in Antalya will depend on production volume as well as resource efficiency, low-carbon production technologies and sustainable greenhouse management practices.

Figure 10: Smart Greenhouse Diagram



3.5.2. Current Structure of Greenhouse Farming in Antalya

Antalya is one of Türkiye's most developed provinces in terms of greenhouse cultivation area. Glass and plastic greenhouses, high tunnels and modern controlled production facilities are concentrated in various districts of the province. The main characteristics of the sector are as follows:

- Year-round production capacity
- High productivity
- Quality standards suitable for export
- Widespread use of modern irrigation systems
- Controlled plant nutrition practices
- Advanced seedling and seed technologies
- Rapid access to markets through strong logistics infrastructure

Districts such as Kumluca, Finike, Demre, Kaş, Aksu and Serik are among the main centres of greenhouse production. However, energy costs, water consumption and environmental impacts associated with plastic use are becoming increasingly significant risks for the sector.

3.5.3. Impacts of Climate Change on Greenhouse Farming

Although greenhouse production allows a certain degree of control over external environmental conditions, the impacts of climate change are also being felt in the greenhouse farming sector. Rising ambient temperatures make it more difficult to control greenhouse temperatures and increase cooling requirements, particularly during the summer months. This leads to significant increases in energy consumption. Drought and declining water resources increase irrigation costs and necessitate more precise water management. Increasing extreme rainfall, hailstorms, storms and strong wind events also raise the risk of physical damage to greenhouse structures. Extreme meteorological events experienced in recent years demonstrate the need to strengthen the climate resilience of greenhouse infrastructure. In addition, temperature changes affect plant development and may alter the prevalence of harmful organisms and plant diseases. Therefore, the future of greenhouse farming will be shaped not only by production technologies but also by engineering solutions that manage climate risks.

3.5.4. Water Management and Resource Efficiency

Effective water management is the most critical factor for the sustainability of the greenhouse farming sector. Although a significant proportion of greenhouse production in Antalya is carried out using modern irrigation systems, increasing drought risks and pressure on water resources necessitate the adoption of more advanced technologies.

In this context, priority practices include the optimisation of drip irrigation systems, sensor-supported irrigation automation, real-time monitoring of plant water consumption, rainwater harvesting systems, closed-loop irrigation practices and the reuse of drainage water following appropriate treatment. The use of digital technologies in water management will not only reduce water consumption but also optimise fertiliser use, thereby reducing both costs and environmental impacts.

In particular, regarding water not merely as a production input but as a strategic natural resource that must be conserved should constitute a fundamental approach to ensuring the long-term sustainability of greenhouse farming in Antalya.

3.5.5. Energy Management and Renewable Energy Utilisation

Energy consumption in greenhouse farming activities constitutes a significant cost component due to irrigation systems, heating, ventilation, lighting and automation equipment. Rising energy prices directly affect production costs, while international policies aimed at reducing carbon emissions necessitate a reassessment of the sector's energy infrastructure. In this context, the following practices are recommended:

- Installation of solar energy systems on greenhouse roofs
- Use of energy-efficient motors and pump systems
- Widespread adoption of automated climate control software
- Reduction of energy losses through thermal screens and insulation systems
- Utilisation of geothermal energy potential in suitable areas
- Such practices both reduce costs and decrease the carbon footprint of greenhouse enterprises.

The energy transition is not merely a practice that provides environmental benefits; it is a strategic investment that reduces production costs and creates a competitive advantage in international markets.

3.5.6. Carbon Management and Low-Emission Greenhouse Farming

Reducing carbon emissions from agricultural production is becoming increasingly important in the context of combating climate change. Although the greenhouse farming sector produces less greenhouse gas emissions than open-field agriculture, it has a distinct carbon footprint due to energy consumption, fertiliser use, plastic covering systems, irrigation infrastructure and logistics activities.

In the coming period, producers operating in international markets are expected to be assessed not only on product quality but also on the environmental performance of their production processes. Therefore, it is strategically important for greenhouse enterprises to adopt management systems capable of measuring, monitoring and reducing their carbon footprints. The following practices are particularly important within the scope of carbon management:

- Widespread adoption of renewable energy utilisation
- Installation of energy-efficient climate control systems
- Optimisation of energy consumption through smart automation systems
- Utilisation of organic waste for compost or biogas production
- Optimisation of fertiliser use through precision farming techniques
- Development of low-carbon logistics solutions
- Preference for recyclable greenhouse covering and packaging materials

In addition, the preparation of voluntary carbon reports and sustainability declarations by greenhouse enterprises will be an important factor in increasing their credibility among international buyers. Low-carbon production is not merely an environmental objective; it is also a strategic investment area that strengthens brand value in export markets and provides enterprises with a long-term competitive advantage.

3.5.7. Economic Impacts and Green Finance

The green transition of the greenhouse farming sector entails significant investment requirements. Although modern irrigation systems, automation technologies, energy efficiency investments, renewable energy systems and digital production infrastructure require initial capital investment, they increase the economic resilience of enterprises by reducing production costs in the long term.

International financial institutions, development banks and climate finance mechanisms are increasingly supporting agricultural investments that improve resource efficiency and reduce carbon emissions. In this context, the following financing opportunities are becoming important for greenhouse enterprises in Antalya:

- Green loans for renewable energy investments
- Energy efficiency support programmes
- Investment incentives for digital agriculture technologies
- International funds for climate adaptation projects
- Development finance for sustainable agriculture investments
- Financing models for carbon emission reduction projects

In particular, developing technical advisory mechanisms that facilitate access to these resources for small and medium-sized producers will help make the transformation process more inclusive. Green finance should be regarded not merely as an instrument for covering investment costs but also as a strategic development component that will increase the international competitiveness of Antalya's greenhouse farming sector.

3.5.8. Strategic Policy Recommendations for Greenhouse Farming in Antalya

The following policy priorities are recommended to maintain Antalya's national leadership in greenhouse cultivation and enhance its competitiveness in international markets.

Maximising Water Efficiency: Smart irrigation systems, sensor-supported automation and digital water management platforms should be expanded, and water use efficiency should become one of the fundamental indicators of production planning.

Accelerating the Energy Transition: The proportion of renewable energy applications, particularly solar energy, used in greenhouse enterprises should be increased, and energy storage systems and highly energy-efficient equipment investments should be supported.

Expanding Digital Greenhouse Farming: Climate control systems, artificial intelligence-supported production management, remote monitoring technologies and data analytics applications should be integrated into production processes.

Transitioning to a Low-Carbon Production Model: Guidance and training programmes should be established for carbon footprint calculations, sustainability reporting and low-emission production techniques.

Strengthening Circular Resource Management: Regional implementation programmes should be developed for the utilisation of organic waste, recycling of plastic greenhouse coverings, water reuse and biological waste management.

Enhancing International Competitiveness: Export-oriented greenhouse enterprises should be supported in accessing sustainability certifications, and technical infrastructure should be strengthened to enable them to document their environmental performance in international markets.

3.5.9. Table 5: Priority Transformation Areas for the Greenhouse Farming Sector

Priority Area	Strategic Priority
Smart Irrigation and Water Use Efficiency	Very High
Use of Renewable Energy	Very High
Digital Greenhouse Cultivation	Very High
Energy Efficiency	High
Carbon Footprint Management	High
Circular Resource Use	High
Recovery of Plastic Waste	Medium-High
International Sustainability Certifications	Very High
Access to Green Finance	High
Climate Risk Management	Very High

These priorities will enable Antalya's greenhouse farming sector to optimise resource utilisation, reduce production costs, limit its environmental impacts and maintain its competitiveness in export markets.

3.5.10.End-of-Section Assessment

Greenhouse farming is one of the strategic sectors that transforms Antalya's agricultural production capacity into a high-value-added economic activity that can be sustained throughout the year. However, climate change, pressure on water resources, rising energy costs and the increasing prevalence of international sustainability standards make it necessary to reassess the sector's traditional production approach.

Nevertheless, Antalya's modern production experience, strong technical infrastructure and export-oriented structure offer significant advantages that could transform this transition process into an important opportunity. Through smart irrigation systems, renewable energy applications, digital agriculture technologies and low-carbon production models, greenhouse enterprises will be able both to reduce their costs and to achieve a stronger position in international markets.

The success of this transformation depends on strong cooperation among public institutions, producer organisations, universities, technology providers and financial institutions. The combined use of scientific knowledge, technological innovation and sustainable financing instruments could make Antalya's greenhouse farming sector one of the most competitive and climate-resilient production models not only in Türkiye but also in the Mediterranean Basin.

In conclusion, the green transition of the greenhouse farming sector should be regarded not merely as a means of fulfilling environmental obligations but also as a strategic investment area that will strengthen Antalya's agricultural exports, increase resource efficiency and support rural development.

3.6. Industry and Organised Industrial Zones

The Future of Antalya's Industry in the Context of Climate Change, Climate Law and the Green Transition

3.6.1. Introduction

Although the industrial sector is not as prominent as tourism and agriculture in Antalya's economy, it is strategically important in terms of production capacity, employment, exports, technological development and value-added creation. Enterprises operating particularly in organised industrial zones engage in production activities across various manufacturing sectors, including food processing, machinery manufacturing, plastics, metals, chemicals, construction materials, agricultural equipment, packaging, marble processing and other manufacturing industries.

The green transition process, which is gaining momentum globally, is reshaping the industrial sector not only in terms of environmental obligations but also in relation to production technologies, energy utilisation, exports, access to finance and international competitiveness.

New regulations such as the European Green Deal, the Carbon Border Adjustment Mechanism (CBAM), the Emissions Trading System (ETS), sustainable finance criteria and corporate sustainability reporting are significantly transforming the production approach of Antalya's industry. The future of this sector will be assessed not merely by production volume but also by its capacity to transition towards a production structure characterised by low carbon intensity, high resource efficiency, energy efficiency and strong environmental performance.

3.6.2. Current Structure of Antalya's Industry

Unlike Türkiye's major industrial cities, Antalya's industry does not have a structure dominated by heavy industry. Rather, it consists of various manufacturing activities that support the agriculture, tourism and service sectors, generate added value and contribute to exports. Organised industrial zones and industrial areas operating in the province are concentrated in sectors such as food processing, agricultural technologies, plastic products, machinery manufacturing, metal processing, chemicals, construction materials, furniture, packaging and natural stone processing.

This production structure not only increases the economic diversity of Antalya but also offers significant advantages in terms of the green transition. The relatively limited presence of heavy industry makes the transition towards low-carbon production more manageable compared with many other provinces. Nevertheless, rising energy costs, pressure on water resources, sustainability expectations in international markets and carbon regulations necessitate a reassessment of existing production models. For Antalya's industry to maintain its competitiveness, a new industrial policy approach is needed that increases energy efficiency in production processes, reduces carbon emissions and adopts circular economy principles.

3.6.3. Physical Impacts of Climate Change on Industry

The industrial sector is affected by climate change not only through regulatory policies but also through direct physical impacts. Rising temperatures increase energy consumption in production facilities, particularly by increasing cooling requirements and operating costs. Drought and declining water resources create significant operational risks for enterprises engaged in water-intensive production. As water becomes a strategic resource in Antalya, water recovery and reuse practices in industry are becoming increasingly important.

Extreme weather events such as heavy rainfall, floods and storms may adversely affect the infrastructure, logistics networks and continuity of production at industrial facilities.

In addition, fluctuations in energy supply, power outages and climate-related infrastructure risks necessitate new approaches to production planning.

Climate change is not merely an environmental issue; it is a strategic risk factor that directly affects production security, continuity of supply and investment planning for industrial enterprises.

3.6.4. Cleaner Production and Resource Efficiency

The fundamental approach to the green transition in the industrial sector is to generate higher added value by consuming fewer resources, rather than increasing production through greater resource consumption.

The cleaner production approach is based on optimising energy, water and raw material use, reducing waste generation and taking environmental impacts into account from the design stage of the production process.

For Antalya's industry, cleaner production practices will provide significant benefits in the following areas:

- Reducing energy consumption,
- Increasing water efficiency,
- Reducing raw material losses,
- Preventing waste generation,
- Reducing production costs,
- Reducing carbon emissions,
- Increasing competitiveness in international markets.

In this context, digital monitoring of production processes, the establishment of energy management systems, process optimisation and industrial symbiosis practices will play an important role in the transformation of Antalya's industry.

The cleaner production approach should be regarded not merely as a means of fulfilling environmental obligations, but as a strategic management model that delivers increased efficiency, cost advantages and sustainable growth for enterprises.

3.6.5. Emissions Trading System (ETS), MRV and Carbon Management

International regulations developed to address climate change are making the systematic monitoring and reduction of carbon emissions mandatory in the industrial sector.

In this process, the **MRV (Monitoring, Reporting and Verification)** system requires enterprises to measure their greenhouse gas emissions using internationally recognised methodologies, report them and subject them to independent verification processes.

Efforts to introduce a national Emissions Trading System in Türkiye are making it increasingly important for industrial enterprises trading with the European Union to be prepared for these processes.

For Antalya's industry, establishing an MRV infrastructure is strategically important not only for ensuring regulatory compliance but also for identifying energy efficiency opportunities, developing carbon reduction projects and facilitating access to sustainable finance.

In the coming period, industrial enterprises are expected to calculate their carbon footprints regularly, establish emission reduction targets and integrate these targets into their corporate management processes. Carbon management is no longer merely a technical activity undertaken under the responsibility of environmental departments; it has become one of the fundamental management elements influencing investment decisions, export strategies and the market value of companies.

3.6.6. Economic Impacts and Green Finance

The adaptation of the industrial sector to climate change and its transition to low-carbon production systems require substantial investment. Energy efficiency projects, renewable energy systems, waste recovery facilities, water reuse infrastructure, digital production technologies and carbon management systems may initially require additional capital, but they stand out as investments that reduce operating costs and increase competitiveness in the medium and long term.

In international financial markets, environmental performance is becoming an increasingly decisive factor in companies' access to finance. Banks, development finance institutions and investment funds are rapidly diversifying their financing instruments for investments in energy efficiency, carbon reduction and the circular economy.

Within this framework, the following financing instruments are gaining importance for Antalya's industry:

- Green investment loans,
- Sustainability-linked loan mechanisms,
- Energy efficiency support programmes,
- Renewable energy investment incentives,
- Circular economy financing models,
- International funds for carbon reduction projects,
- Climate adaptation finance,
- Green transition programmes of development banks.

In particular, establishing technical support mechanisms that facilitate access to these resources for small and medium-sized enterprises will be one of the fundamental elements determining the success of Antalya's industrial transformation. Green finance should be regarded not merely as an instrument for covering investment costs, but as a strategic financing model that enhances enterprises' credibility in international markets, reduces corporate risks and supports long-term competitiveness.

3.6.7. Strategic Policy Recommendations for Antalya's Industry

An integrated approach should be adopted in the following policy areas to enable Antalya's industry to transform the challenges of climate change and the green transition into a competitive advantage.

Energy Efficiency Initiative: Energy audits should be expanded across all production facilities, particularly in organised industrial zones, and support programmes should be implemented to encourage the use of high-efficiency motors, pump systems, compressors and process equipment.

Green Transition Programmes in Organised Industrial Zones: Shared energy management systems, centralised waste recovery facilities, rainwater management, the reuse of treated wastewater and renewable energy applications should be planned through an integrated approach in organised industrial zones (OIZs). Industrial zones should be transformed not merely into production areas, but into integrated sustainability centres where resource efficiency is managed.

Strengthening MRV and Carbon Management Infrastructure: Industrial enterprises, particularly those engaged in exports, should be supported in preparing greenhouse gas inventories, calculating carbon footprints and establishing MRV systems.

In addition, training, guidance and technical consultancy mechanisms should be established to support enterprises in preparing for the national Emissions Trading System.

Expanding Industrial Symbiosis: Industrial symbiosis practices that transform the waste of one enterprise into raw materials for another should be encouraged.

This approach will both reduce waste volumes and increase resource-use efficiency.

Digital Industry and Smart Manufacturing: Digital automation systems enabling real-time monitoring of production processes, artificial intelligence-supported process optimisation and data analytics applications should be expanded. This transformation will reduce energy and raw material consumption while improving production quality and efficiency.

Strengthening Access to Green Finance Mechanisms: Regional centres providing project development, financial consultancy and investment readiness support should be established to enable industrial enterprises to make more effective use of national and international green finance resources.

3.6.8. Table 6: Priority Transformation Areas for the Industrial Sector

Priority Area	Strategic Priority
Energy Efficiency	Very High
Establishment of MRV Infrastructure	Very High
Preparation for the Emissions Trading System	Very High
Clean Production Technologies	Very High
Renewable Energy Use	High
Industrial Symbiosis	High
Water Reuse	High
Digital Production Systems	Very High
Circular Economy Applications	High
Access to Green Finance	Very High

These priorities will contribute to reducing production costs, strengthening Antalya's industry's position in export markets and ensuring compliance with international regulations, while improving its environmental performance.

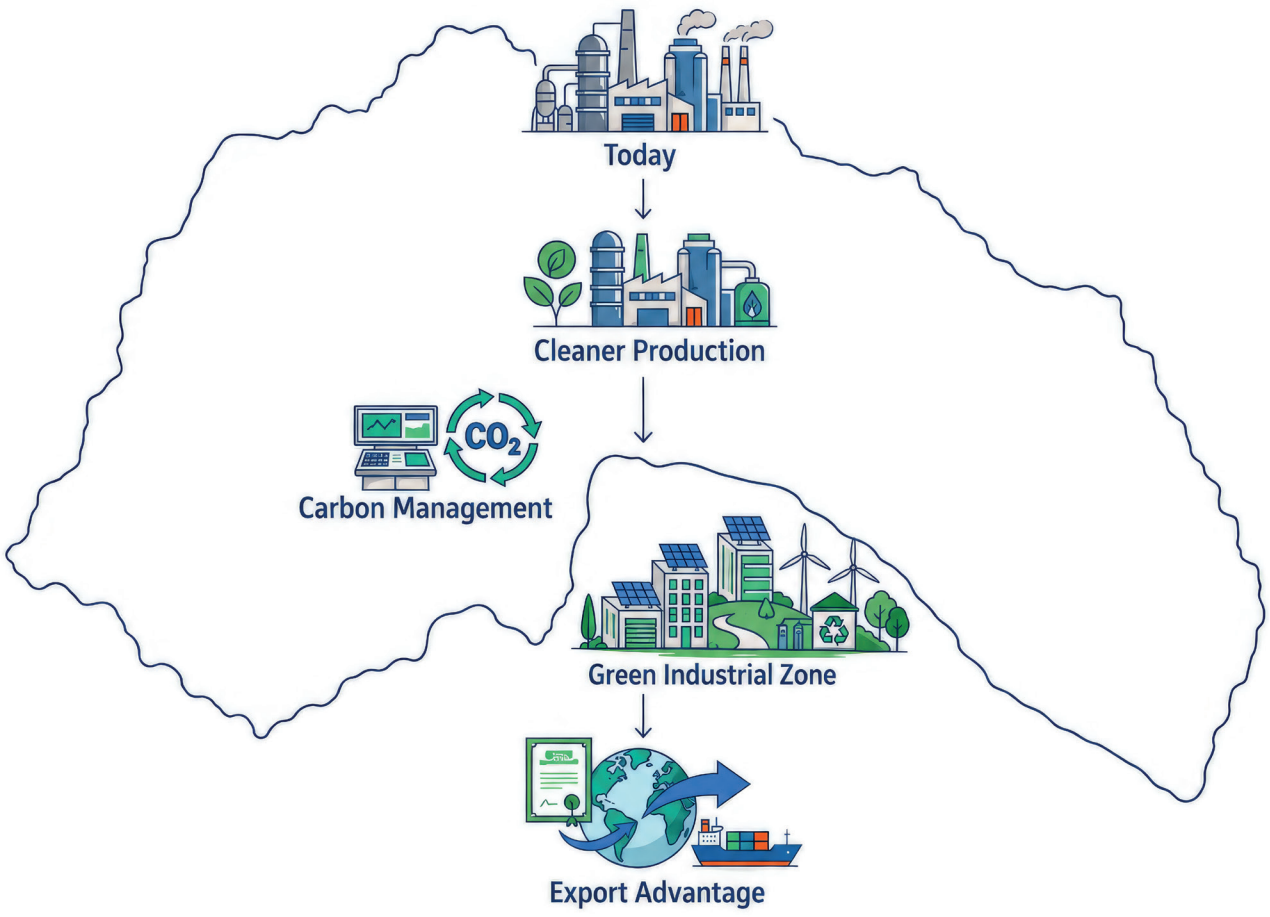
3.6.9. End-of-Section Assessment

The industrial sector is one of the fundamental sectors that increase the production capacity of Antalya's economy, support technological development and generate high added value. Climate policies and the green transition process, which are gaining momentum globally, are fundamentally transforming industrial production practices. In the coming years, the competitiveness of industrial enterprises will be assessed not only in terms of production volumes or export volumes, but also on the basis of energy efficiency, carbon intensity, resource-use efficiency and sustainability performance.

Antalya's production structure, which does not rely on heavy industry, offers a significant advantage in this transformation. The transition to cleaner production technologies, digitalisation, circular economy practices and renewable energy investments can enable the industrial sector to reduce its environmental impacts while lowering production costs and increasing its competitiveness in international markets.

The success of this transformation depends on strong cooperation among industrial organisations, organised industrial zones, public institutions, universities and financial institutions. The integrated use of scientific knowledge, technological innovation and financing instruments could transform Antalya's industry into a regional centre that serves as a model for low-carbon production. Consequently, the green transition of the industrial sector is not merely a requirement of environmental policies; it is a strategic development initiative that will increase Antalya's economic resilience, strengthen its export capacity and enhance its potential to attract international investment.

Figure 11: Antalya Organised Industrial Zone Transformation Diagram



3.7 Marble and Natural Stone Industry

Climate Change, Climate Law and the Green Transition: The Future of Antalya's Marble and Natural Stone Sector

3.7.1. Introduction

The marble and natural stone sector occupies an important position within Antalya's mining and industrial activities. In particular, marble block production, natural stone processing facilities and export-oriented activities are among the strategic production areas that generate added value for the province's industrial structure.

Natural stone products maintain their importance in terms of sustainability due to their long service life, recyclability and low maintenance requirements in the construction sector. Nevertheless, the sector is directly affected by climate change and green transition policies because of the energy used in production processes, water consumption, quarrying activities and logistics operations.

The European Union's carbon reduction targets, sustainable production standards and environmental reporting obligations are ushering the natural stone sector into a new era, not only in terms of production technologies but also in relation to export strategies and investment planning. Therefore, the future competitiveness of natural stone enterprises operating in Antalya will be directly linked to their capacity to improve environmental performance and adapt to low-carbon production systems.

3.7.2. Current Structure of Antalya's Marble and Natural Stone Sector

In Antalya, the marble and natural stone sector comprises quarrying, block stone production, cutting and processing facilities, and export-oriented activities. The sector undertakes production for construction, tourism investments, landscaping applications and international construction materials markets.

The natural stone production chain generally consists of the following stages:

- Quarrying,
- Block stone production,
- Cutting and processing,
- Surface treatments,
- Packaging,
- Logistics,
- Export.

Each of these processes generates environmental impacts in terms of energy consumption, water use and waste management. In recent years, purchasing decisions in international markets have increasingly been influenced not only by product quality but also by the environmental impacts of production and sustainability performance.

Consequently, the sector's competitiveness is being reshaped by technological modernisation and investments in resource efficiency.

3.7.3. Climate Change and Physical Risks

The impacts of climate change on the natural stone sector are felt more strongly in operating conditions and infrastructure than in production processes directly. Rising temperatures make working conditions in open-pit quarries more difficult, increasing the importance of occupational health and safety practices.

Heavy rainfall and flash floods may adversely affect production continuity at quarry sites and create new risks in terms of slope stability and site safety. Drought, meanwhile, places pressure on water resources, particularly those used in cutting and processing facilities.

In addition, extreme weather events may affect transport infrastructure, causing delays and increased costs in export operations. In light of these developments, the sector needs to assess climate risk management not merely as an environmental issue, but also in terms of operational continuity and investment security.

3.7.4. Energy Management and Carbon Emissions

Energy consumption in the marble sector represents a significant cost factor due to block cutting, processing machinery, compressor systems, cranes and transport equipment. Rising electricity prices and the expansion of carbon reduction policies are making energy efficiency one of the sector's fundamental competitive factors.

In this context, practices such as:

- The use of high-efficiency electric motors,
- Variable-speed drive systems,
- Solar energy investments,
- Energy monitoring systems,
- Process optimisation,
- Waste heat recovery

contribute to reducing both energy costs and carbon emissions.

The establishment of energy management systems in production processes not only improves environmental performance but also increases the competitiveness of enterprises in international markets. Regular measurement of carbon emissions and the development of emission reduction strategies are becoming increasingly important, particularly for export-oriented enterprises.

3.7.5. European Union Policies and Their Impacts on Exports

The European Union's sustainable production and carbon reduction policies directly affect enterprises operating in the construction materials sector. Although natural stone products offer environmental advantages due to their long service life and recyclability, the energy intensity and carbon emissions of production processes are coming under increasing scrutiny.

Therefore, enterprises operating in the European market are increasingly expected to implement practices such as:

- Carbon footprint calculations,
- Environmental Product Declarations (EPDs),
- Life Cycle Assessments (LCAs),
- Sustainable production certifications,
- Environmental management systems.

Expectations regarding the implementation of such practices are increasing.

Compliance with these standards by natural stone producers in Antalya will provide significant advantages not only in maintaining existing export markets but also in accessing new markets with high added value.

3.7.6. Economic Impacts and Green Finance

The green transition of the marble and natural stone sector requires substantial investment in modernising production processes, improving energy efficiency, using water more effectively, developing digital production infrastructure and enhancing environmental performance. Although initial investment costs may create financing pressures on enterprises in the short term, these investments offer significant economic benefits in the medium and long term through reduced energy consumption, increased production efficiency, lower operating costs and enhanced competitiveness in international markets.

The increasing influence of environmental, social and governance (ESG) criteria on investment decisions in global financial markets is enabling the natural stone sector to make greater use of sustainable financing instruments. In this context, the principal financing opportunities for the sector include:

- Green loans for energy efficiency investments,
- Investment support for renewable energy projects,
- Financing mechanisms for water recovery and closed-loop production systems,
- International climate funds for carbon reduction projects,
- Investment incentives for digital production technologies,
- Support programmes for Environmental Product Declarations (EPDs), Life Cycle Assessments (LCAs) and sustainability certification processes.

Particularly for export-oriented enterprises, investments that improve environmental performance are increasingly becoming strategic instruments that facilitate access to finance and reduce commercial risks.

3.7.7. Strategic Policy Recommendations for Antalya's Marble and Natural Stone Sector

Integrated practices should be developed in the following strategic policy areas to increase the international competitiveness of natural stone producers operating in Antalya.

Energy Efficiency and Renewable Energy Utilisation: Energy consumption in quarries and processing facilities should be monitored regularly, and the use of high-efficiency equipment, electric motors and renewable energy systems should be encouraged.

Water Management and Recovery: Closed-loop water utilisation systems should be expanded in cutting and processing facilities, and pressure on water resources should be reduced by increasing the recovery rate of process water.

Valorisation of Waste: Industrial cooperation should be supported to facilitate the utilisation of stone dust, fragments and other by-products generated during cutting processes in the production of cement, ceramics, construction chemicals, road construction materials and composite materials.

This approach will contribute to the development of a circular economy model that transforms waste management from a cost factor into economic value.

Documentation of Environmental Performance: The adoption of practices such as Environmental Product Declarations (EPDs), ISO 14001 environmental management systems, carbon footprint reporting and life cycle assessment should be promoted among exporting enterprises.

These documents should be regarded as important instruments not only for environmental compliance but also for enhancing brand credibility in international markets.

Digitalisation and Smart Production: Resource losses should be reduced by expanding the use of digital technologies, artificial intelligence-supported analyses and automation systems in quarry planning, block optimisation, production monitoring and maintenance processes.

Access to Green Finance: Technical infrastructure should be established to support project development, carbon consultancy and investment preparation processes, enabling enterprises in the sector to make effective use of national and international financing sources.

3.7.8. Table 7: Priority Transformation Areas for the Marble and Natural Stone Sector

Priority Area	Strategic Priority
Energy Efficiency	Very High
Water Reuse	Very High
Recovery and Utilization of Production Waste	Very High
Use of Renewable Energy	High
Carbon Footprint Management	High
Environmental Product Declaration (EPD)	Very High
Life Cycle Assessment (LCA)	High
Digital Production Technologies	High
Environmental Certification	High
Access to Green Finance	Very High

These transformation areas are regarded as fundamental priorities that will make production processes in Antalya's natural stone sector more efficient, reduce their environmental impacts and enhance their competitiveness in international markets.

The Strategic Role of Marble and Natural Stone in the Green Transition

Within the framework of efforts to combat climate change, the construction sector is recognised as one of the most critical sectors in reducing global carbon emissions. The construction industry accounts for a significant proportion of global greenhouse gas emissions due to the production of building materials, construction processes and energy consumption throughout the life cycle of buildings. Therefore, contemporary approaches to sustainable architecture consider not only the design of energy-efficient buildings but also the use of construction materials with low environmental impacts as a fundamental criterion.

In this context, natural stones, particularly marble, travertine and limestone, stand out as important components of sustainable construction policies due to their durability, long service life, low maintenance requirements and potential for reuse. One of the most significant advantages of natural stone is that its service life can extend over several decades and, in some applications, even hundreds of years. While many industrial building materials require replacement or renewal over time, natural stone can largely retain its aesthetic and technical properties for many years. This reduces the overall environmental impact arising throughout the life cycle of a building.

In addition, natural stone is among the few building materials that largely retain their economic value even after the end of their service life. Its ability to be dismantled and reused, utilised in different projects or employed as a raw material after crushing makes it a strong alternative within the circular economy approach. Thus, natural stone acquires the characteristics of a strategic material that contributes to resource efficiency not only during the production stage but also after use.

Another factor that should be considered in sustainable construction is maintenance requirements. While paint, coatings, synthetic surface materials or composite products require renewal at certain intervals, natural stone has relatively low maintenance requirements. This reduces the consumption of additional materials, energy use and carbon emissions arising from maintenance activities over many years.

When assessed from the perspective of the green transition, another important advantage of natural stone is its potential for local production. Considering the carbon emissions generated during the production and transportation of building materials, constructing buildings using local resources wherever possible is recognised as an important sustainability approach. The use of natural stones produced in Antalya and its surrounding areas in regional projects contributes significantly to the local economy and employment by reducing emissions associated with long-distance transportation.

However, for natural stone to be regarded as a sustainable building material, it is necessary to consider not only the natural characteristics of the product but also the environmental performance of its production processes. Energy efficiency, water management, waste recovery and carbon emission reduction should be among the fundamental priorities throughout the entire production chain, from quarrying to cutting and processing facilities, logistics and the delivery of the final product.

In this context, the wider adoption of practices such as Environmental Product Declarations (EPDs), Life Cycle Assessment (LCA), carbon footprint calculations and sustainability reporting in the natural stone sector will significantly increase the competitiveness of its products in international markets. Particularly within green building certification systems (LEED, BREEAM, DGNB and similar international assessment systems), the importance attached to the environmental performance of building materials is increasing. Therefore, natural stone products that document their environmental performance will become more attractive not only to architects but also to investors and project developers.

From Antalya's perspective, the natural stone sector should not be regarded solely as a mining or industrial activity. It should also be considered an important solution partner in sustainable urbanisation, low-carbon construction and climate-resilient architecture. Increasing the use of local natural stone in public spaces, coastal developments, squares, pedestrian routes, parks, cultural heritage projects and tourism investments that shape the identity of cities will contribute both to aesthetic and cultural continuity and to achieving sustainable urban development objectives.

In the coming period, the sector's success will depend not merely on producing more natural stone, but on establishing a production system that generates lower carbon emissions, consumes less energy and water, and demonstrates higher environmental performance. The green transition process has the potential to transform the natural stone sector from a traditional production activity with environmental impacts into a strategic solution partner for climate-friendly cities and sustainable construction.

For this reason, Antalya's vision for the natural stone sector should not focus solely on increasing export capacity; it should also encompass the objective of becoming **a sustainable construction materials production and design centre for the Mediterranean Basin.** Such an approach will enhance the sector's international competitiveness and make it one of the strong and visible components of Antalya's green transition strategy.

3.7.9. End-of-Chapter Assessment

The marble and natural stone sector is one of the strategic production areas that generate high added value for Antalya's industrial and export structure. The long service life, durability and recyclability of natural stone offer significant opportunities for the sector at a time when sustainable construction practices are becoming increasingly important. Nevertheless, improving the sector's environmental performance in terms of energy consumption, water use, production waste and logistics processes has become essential. The European Union's climate policies and sustainability criteria indicate that, in the future, natural stone products will be assessed not only on their aesthetic and technical characteristics but also on the environmental impacts of their production processes.

Antalya's advantage in this transformation process lies in its production processes, which are more manageable than those of heavy industry, its strong export experience and its business structure that is open to technological modernisation. Through energy efficiency, water recovery, waste valorisation, digital production technologies and environmental certification practices, the sector will be able to reduce costs while competing with higher-value-added products in international markets. Consequently, the green transition of the marble and natural stone sector should be regarded not merely as a means of ensuring compliance with environmental legislation, but as a strategic transformation area that strengthens Antalya's industrial capacity, increases export revenues and contributes to sustainable development objectives.

3.8. Mining Sector

The Future of Antalya's Mining Sector in the Context of Climate Change, Climate Law and the Green Transition

3.8.1. Introduction

Although the mining sector is one of the fundamental building blocks of economic development, it is also among the sectors that have intensive environmental impacts due to the use of natural resources. Mining activities contribute to the economy by supplying many raw materials required for construction, industry, energy, infrastructure and technology production.

In addition to marble and natural stone production, Antalya also possesses significant potential in various industrial raw materials. Mining activities undertaken in the province make strategic contributions to the production of construction materials, the cement industry, infrastructure investments and regional economic development. However, climate change, biodiversity conservation, sustainable management of water resources and expectations regarding land use necessitate the assessment of mining activities not only from an economic perspective but also in terms of their environmental and social dimensions. The fundamental objective for the mining sector in the green transition process is to establish a production model that preserves the economic value of natural resources while minimising environmental impacts, prioritising rehabilitation and strengthening social acceptance.

3.8.2. Current Structure of Antalya's Mining Sector

Mining activities in Antalya are predominantly based on the extraction of natural stone, limestone, aggregates, clay, industrial raw materials and various minerals intended for the construction sector. These activities meet the raw material requirements of the construction sector, support infrastructure investments, supply inputs to industrial enterprises and generate regional employment.

Mining activities are predominantly carried out in rural areas, where transport infrastructure, energy supply and environmental management practices directly affect the sector's efficiency. In recent years, the sector has begun to move away from the traditional approach focused solely on production volumes and to restructure itself around environmental performance, rehabilitation practices and sustainable resource management. This transformation presents significant opportunities for Antalya. In regions characterised by high environmental sensitivity, sustainable mining practices have become one of the fundamental elements of competitive advantage for enterprises.

3.8.3. Impacts of Climate Change on Mining Activities

Climate change affects the mining sector through both direct and indirect pathways. Rising temperatures make working conditions in open-pit operations more difficult and increase the importance of occupational health and safety practices.

Heavy rainfall and flash floods can damage quarry access roads, drainage systems, slope stability and stockpile areas, adversely affecting production continuity.

Drought places pressure on the amount of water used, particularly in dust suppression systems and ore-processing operations. Increasing forest fire risks associated with climate change also pose a significant threat that may cause the temporary suspension of production activities at certain mining sites. Consequently, climate risks are no longer merely an environmental issue but have become a strategic management area in terms of operational continuity and investment security.

3.8.4. Green Mining Approach

Green mining is a new approach to mining that aims to minimise environmental impacts while preserving the economic value of natural resources. This approach is based on energy efficiency, water management, rehabilitation, biodiversity conservation, carbon emission reduction, waste management and circular economy principles.

For mining enterprises operating in regions with high natural and tourism value, such as Antalya, green mining is not merely an environmental responsibility but also a strategic management approach that strengthens the social acceptance of their activities. Systematically managing environmental impacts at every stage, from the beginning of the production process to the completion of rehabilitation, will be one of the fundamental priorities for the long-term sustainability of the sector.

3.8.5. Rehabilitation, Biodiversity and Nature Restoration

One of the most important environmental responsibilities of mining activities is the restoration of disturbed areas following the completion of production. In the modern approach to mining, rehabilitation is no longer regarded as an activity undertaken at the end of operations; it has become an integral part of the production process.

Considering Antalya's rich biodiversity, rehabilitation practices should not be limited to afforestation but should also encompass the restoration of natural habitats, the use of native plant species, the conservation of surface waters and the strengthening of ecological connectivity. Furthermore, former mining sites with suitable conditions may be repurposed for various functions, such as recreational areas, solar power plants, water storage facilities, nature education centres, geoparks and biodiversity corridors. This approach will reduce the environmental impacts of mining activities while also making new contributions to regional development.

3.8.6. Critical Minerals and Raw Material Requirements of the Green Economy

The global transition towards a low-carbon economy has not diminished the importance of the mining sector; on the contrary, it has given the sector a new dimension. Renewable energy systems, electric vehicles, energy storage technologies, digital infrastructure and smart city applications are rapidly increasing demand for numerous minerals and industrial raw materials. Although Antalya is not one of Türkiye's principal production centres in terms of critical mineral reserves, its existing industrial raw material resources and natural stone potential place it in a position to make significant contributions to the construction materials and infrastructure investments required by the green transition.

In the coming period, the fundamental objective of mining policies should not be limited to the economic utilisation of new resources; it should also encompass more efficient use of existing resources, the reduction of losses arising during production and the recovery of secondary raw materials for economic use. In line with this approach, the development of the recycling sector and the increased utilisation of secondary raw materials will contribute to circular economy objectives while reducing pressure on natural resources. Recognising the mining and recycling sectors as complementary strategic production areas should be regarded as one of the fundamental principles of the green economy.

3.8.7. Economic Impacts and Green Finance

The mining sector's transition towards sustainable production entails significant investment requirements in areas such as environmental monitoring systems, energy efficiency investments, water management infrastructure, rehabilitation practices and digital monitoring technologies. Although these investments may initially be regarded as a cost factor, in the long term they increase production efficiency, reduce environmental risks and strengthen the sector's credibility among international investors.

As sustainability criteria become increasingly widespread in global financial markets, enterprises with strong environmental performance are gaining greater access to financing opportunities. In this context, the principal financing instruments for the mining sector include green loans for energy efficiency investments, financing for water recovery and environmental infrastructure projects, rehabilitation and nature restoration funds, carbon emission reduction projects, digital environmental monitoring systems, ESG-focused investment funds and sustainable mining certification programmes.

In particular, recognising rehabilitation activities as an integral component of investment will strengthen the sector's social acceptance and financial sustainability.

3.8.8. Strategic Policy Recommendations for Antalya's Mining Sector

To sustain the economic contribution of mining activities while minimising their environmental impacts, the following policy priorities are recommended.

Mainstreaming Green Mining Standards: Environmental performance criteria covering energy efficiency, water management, waste reduction and carbon management in mining activities should be mainstreamed throughout the sector.

Integrating Rehabilitation into the Production Process: Rehabilitation should be planned not merely as an activity undertaken after production has been completed, but as a dynamic management approach implemented concurrently with the production process.

Biodiversity Conservation: Ecological corridors, sensitive habitats, surface and groundwater systems, and protected areas should be assessed through an integrated approach when planning mining activities.

Digital Environmental Monitoring Systems: The use of digital systems enabling real-time monitoring of air quality, dust emissions, vibration, noise, water quality and rehabilitation performance should be encouraged.

Strengthening the Circular Economy Approach: Waste rock materials, excavated materials and production waste should be reused wherever possible, and cooperation with different sectors should be developed to minimise waste generation.

Stakeholder Participation and Transparency: Transparent communication mechanisms should be established to ensure the participation of local authorities, professional chambers, universities and civil society organisations in mining projects. This approach will contribute to reducing environmental concerns and strengthening the social acceptance of investments.

3.8.9. Table 8: Priority Transformation Areas in the Mining Sector

Priority Area	Strategic Priority
Green Mining Applications	Very High
Rehabilitation and Ecological Restoration	Very High
Water Management	Very High
Energy Efficiency	High
Digital Environmental Monitoring	Very High
Conservation of Biodiversity	Very High
Circular Economy Applications	High
ESG and Sustainability Reporting	High
Access to Green Finance	High
Stakeholder Participation and Transparent Governance	Very High

These transformation areas will support Antalya's mining sector in reducing its environmental impacts while generating economic value, strengthening social acceptance and ensuring compliance with international sustainability standards.

3.8.10. End-of-Section Assessment

Responsible Mining and Resource Management in Harmony with Nature

The mining sector makes significant contributions to industry, infrastructure and regional development by bringing natural resources into the economy. However, climate change, biodiversity conservation and increasing societal expectations regarding the sustainable management of natural resources necessitate a fundamental transformation in the sector's approach to production. Considering Antalya's natural and cultural assets, tourism potential and sensitive ecosystems, environmental responsibility must be given greater importance in the planning and implementation of mining activities. In this context, the green mining approach offers an integrated model encompassing energy efficiency, efficient water use, rehabilitation, nature restoration and transparent environmental management practices.

The future success of the sector will be measured not only by production volumes but also by its capacity to reduce environmental impacts, restore degraded areas and establish relationships with local communities based on trust. This transformation will move mining activities beyond being merely an economic sector and position the industry as one of the responsible stakeholders in sustainable development. For Antalya, the objective should be to develop a model mining approach that preserves the economic value of natural resources while respecting ecological integrity and societal expectations. In this way, the mining sector can be positioned as a strategic sector that not only complies with the green transition process but also develops pioneering practices in environmental responsibility.

A New Mining Vision for Antalya in the Green Transition Process

Natural resources are not only the common heritage of humanity but also indispensable elements of economic development. Aggregates, raw materials for cement, natural stone, industrial minerals, materials required for infrastructure investments and the essential inputs of green energy technologies used by modern society are brought into the economy through mining activities. The roads, ports, hospitals, schools, housing, energy facilities and industrial infrastructure we use today are built upon these resources, which are obtained responsibly from nature.

However, in the 21st century, the success of mining is no longer measured solely by the tonnage produced. Climate change, biodiversity loss, declining water resources and rising societal environmental expectations are reshaping the mining sector's management approach. Today, the principal measure of success is the ability to protect ecosystems while converting natural resources into economic value, rehabilitate areas of operation, reduce the carbon footprint and establish relationships with local communities based on trust.

This new approach is defined as **responsible mining.** Responsible mining does not regard the environment as an obstacle to production; on the contrary, it recognises the conservation of natural capital as a fundamental condition for the sustainability of production. This is because the unplanned use of natural resources leads not only to environmental losses but also to economic losses. Degraded ecosystems, polluted water resources, increasing social conflicts and declining public trust adversely affect the sector's development in the long term.

In a city such as Antalya, characterised by high biodiversity, a strong agricultural and tourism economy, and natural and cultural heritage of international significance, mining activities must be undertaken through a much more sensitive planning approach. This does not mean that mining should be entirely excluded; rather, it necessitates that mining be carried out in the right locations, using the right methods and appropriate technologies, supported by robust environmental monitoring mechanisms.

In this context, environmental impact assessment processes should be regarded not merely as a legal requirement but as one of the fundamental instruments of scientific planning. Investments undertaken without jointly assessing geological structures, hydrogeological systems, surface water and groundwater resources, biodiversity, landscape integrity and socioeconomic impacts cannot be sustainable in the long term. **"The future of mining lies not in extracting more resources, but in conserving natural capital, strengthening public trust and generating greater environmental and economic value from every tonne of raw material produced."**

The green transition process is moving the mining sector away from the **"take–make–dispose"** approach. Instead, integrated management models that ensure energy efficiency at every stage of production, recover water, reduce emissions, recover production waste and rehabilitate operational areas gradually are coming to the fore. This approach not only reduces environmental impacts but also facilitates enterprises' access to finance, strengthens their reputation in international markets and reduces investment risks. One of the key elements of responsible mining is recognising **rehabilitation as an integral part of investment.** Whereas rehabilitation was previously regarded as an obligation fulfilled after production had been completed, international best practice today is based on undertaking rehabilitation activities simultaneously with production. In this way, degraded areas are not left unused for many years; their ecological functions are gradually restored.

This approach is particularly important for Antalya. Mining sites that have reached the end of their operational life should not merely be planted with trees and abandoned; instead, they should be planned as new spaces for social and environmental functions. Suitable sites can be repurposed as recreational areas, urban forests, biodiversity corridors, rainwater storage areas, solar power plants, open-air education centres, geoparks or ecotourism destinations. In this way, mining activities can continue to generate value for society even after production has ceased.

One of the fundamental principles of responsible mining is also **transparent and participatory governance.** Local authorities, universities, professional organisations, civil society organisations and local communities should not merely be passive stakeholders who are informed about investment processes; they should be stakeholders who contribute to decision-making processes. Transparent environmental monitoring systems, publicly accessible performance reports and independent auditing mechanisms will contribute to strengthening public trust. Digital technologies are also among the important components of this transformation. Today, the impacts of mining activities can be continuously monitored through unmanned aerial vehicles, remote sensing systems, real-time air and water quality sensors, artificial intelligence-supported environmental analyses and digital environmental monitoring platforms. In this way, environmental risks can be addressed at an early stage, and management decisions can be based on scientific data.

In the era of climate change and the green transition, the mining sector should be redefined not as an area of activity that conflicts with the environment, but as **a strategic sector that generates economic value while conserving natural capital.** This transformation requires the shared responsibility not only of enterprises but also of public institutions, local authorities, universities and society.

Antalya's objective should be to develop **a model of responsible mining that sets an example for the Mediterranean,** which sustains economic development while conserving natural resources, manages environmental impacts through scientific methods, makes rehabilitation an integral part of its production culture and adopts a transparent governance approach. Such a vision will lay the foundations for a strategic transformation that strengthens not only the future of the mining sector but also Antalya's sustainable development, climate adaptation and green economy objectives.

3.9 Maritime Sector

Climate Change, Climate Law and the Green Transition: The Future of Antalya's Maritime Sector

3.9.1. Introduction

The maritime sector is one of the fundamental drivers of Antalya's economic, social and cultural development. Despite being one of Türkiye's most important coastal cities, with a coastline of approximately 640 kilometres, natural harbours, marinas, fishing harbours, tourism infrastructure and international maritime tourism potential, Antalya has not yet been able to realise its maritime potential through an integrated approach. Although Antalya's economy is currently closely associated with the sea, the added value generated from its economic potential remains below its full capacity in areas such as tourism, yachting, cruise tourism, maritime transport, water sports, coastal trade, maintenance and repair services, and blue technologies.

Meanwhile, climate change, sea-level rise, coastal erosion, increasing sea surface temperatures, extreme meteorological events and changes in marine ecosystems are directly affecting the future of coastal cities. Therefore, the maritime sector should be considered not merely an area of economic activity but also a fundamental component of climate adaptation, disaster resilience and sustainable development.

Antalya's future depends on its ability to embrace a **Blue Economy** approach that does not turn its back on the sea but instead protects it while transforming its potential into economic value.

3.9.2. Current Structure of Antalya's Maritime Sector

Antalya's maritime sector comprises numerous subsectors, including commercial port operations, marinas, yacht tourism, daily excursion boats, water sports enterprises, fisheries, coastal transport, maintenance and repair services, and activities related to marine tourism.

Although marinas and fishing harbours of various sizes are located along the province's coastline, these facilities have developed independently of one another, and an integrated maritime strategy at the regional level has not yet been fully established.

While the Port of Antalya plays an important role in freight transport, significant opportunities for development exist in cruise tourism, yacht berthing capacity, inter-coastal maritime transport and new investments focused on the blue economy.

Assessing the maritime sector in conjunction with tourism, logistics, trade, environmental management and urban planning represents a strategic approach that could substantially increase the economic value Antalya derives from the sea.

Figure 12: Antalya Maritime Economy Map



3.9.3. Impacts of Climate Change on the Maritime Sector

Climate change directly affects the maritime sector in terms of both physical infrastructure and economic activities.

Sea-level rise necessitates new engineering solutions for marinas, ports, coastal structures and shoreline infrastructure. Increasing sea surface temperatures and changes in marine ecosystems affect fishing activities and biodiversity, while also accelerating the spread of invasive species.

Severe storms, sudden meteorological events and changes in wave regimes create new safety risks for marina operators, small boat users and coastal structures.

Furthermore, coastal erosion and beach loss are among the long-term threats that could directly affect Antalya's tourism economy. For these reasons, coastal infrastructure must be planned in accordance with climate change, and climate risk assessments must become standard practice in maritime investments.

3.9.4. Blue Economy and Sustainable Maritime Activities

The **Blue Economy** approach, which has gained prominence internationally in recent years, is based on protecting marine ecosystems while deriving economic benefits from the seas. This approach encompasses not only fisheries or marine tourism but also: Port operations, cruise tourism, yacht tourism, maritime transport, marine biotechnology, renewable marine energy, coastal conservation practices and marine ecosystem services, all of which are considered as an integrated whole.

Considering Antalya's extensive coastline and international tourism identity, the Blue Economy approach should become one of the fundamental components of the province's development strategy. Accordingly, coastal areas should be assessed not merely from the perspective of construction pressure; instead, an integrated coastal zone management approach that considers economic, ecological and social values together should be adopted.

3.9.5. Strengthening Maritime Transport and Coastal Urban Identity

Transport between Antalya's coastal settlements is largely dependent on road networks. However, maritime transport is an important component of sustainable transport systems in coastal cities. The development of maritime transport within the gulf and between coastal areas will contribute to:

- Reducing road traffic,
- Reducing carbon emissions,
- Diversifying tourism destinations,
- Increasing economic interaction between coastal settlements.

In this context, a new coastal transport model should be developed, supported by passenger piers, waterbus routes, electric or low-emission vessels and smart transport systems. Maritime transport should be regarded not merely as an alternative mode of transport but as a strategic investment area that strengthens Antalya's coastal urban identity, improves quality of life and contributes to climate-friendly mobility.

3.9.6. Cruise Tourism and Antalya's Multi-Destination Model

Cruise tourism is currently regarded as one of the highest value-added activities within the maritime sector. Extending beyond port operations, this sector is a multidimensional development instrument that simultaneously stimulates tourism, trade, culture, gastronomy, transport, accommodation and the local economy. A cruise ship arriving at a city not only generates passenger activity but also increases economic vitality in urban centres, provides direct income to local businesses and strengthens the destination's international visibility. The Mediterranean Basin is one of the regions where global cruise tourism activity is most concentrated. Despite its marinas, natural beauty and strong tourism infrastructure, Antalya has not been able to secure a share of the cruise market commensurate with its potential. One of the main reasons for this is that cruise tourism has long been regarded solely as a port investment rather than being supported by the development of an integrated destination management approach at the urban level. However, success in cruise tourism cannot be measured solely by the number of ships calling at a port. The principal measure of success should be the time passengers spend in the city, the income they generate for the local economy, their interaction with cultural assets and the capacity for spending across different destinations. Therefore, cruise investments should be addressed through an integrated approach encompassing not only port infrastructure but also urban planning, transport, cultural heritage conservation, visitor management and local trade strategies.

The model proposed for Antalya is to establish a complementary multi-destination cruise network, rather than adopting the conventional approach based on a single cruise port. Under this model, Kaleiçi, Demre, Side and Alanya should be planned as complementary destinations offering different experiences along the same route, rather than as alternatives to one another. With its historic urban fabric, marina, cultural heritage and direct access to the city centre, Kaleiçi could serve as a distinctive port of call for boutique and medium-sized cruise vessels. Demre could become an important stop on cultural tourism-oriented cruise routes through its Lycian civilisation heritage, the Church of St Nicholas and ancient cities in its surroundings. Side, with its ancient harbour, archaeological heritage and strong tourism infrastructure, could be positioned as a destination integrating historical and maritime tourism. Alanya, with its castle, harbour and developed tourism capacity, has the potential to become a major hub within the Eastern Mediterranean cruise network. This polycentric approach will enable cruise passenger movements to spread across Antalya's different regions, ensuring a more balanced distribution of economic benefits. At the same time, taking into account the carrying capacity of each destination will contribute to managing visitor density and reducing pressure on cultural heritage.

The environmental performance of ports is also becoming increasingly decisive for the sustainability of cruise tourism. In line with international maritime policies, shore power systems, alternative fuel infrastructure, waste reception facilities, energy efficiency practices and digital port management systems are becoming more widespread. Developing all ports serving cruise activities in Antalya in accordance with these standards will enhance the city's international competitiveness. Cruise tourism cannot be developed solely through investment in ports. Pedestrian-friendly urban centres that encourage passengers to spend more time in the city, high-quality public transport connections, cultural and gastronomic routes, local producer markets, museums, art events and digital visitor guidance systems are also integral components of this ecosystem. Therefore, cruise tourism policies should be addressed in an integrated manner with coastal planning and tourism management.

Considering climate change and the green transition process, Antalya's cruise tourism vision should aim not merely to attract more ships but to establish a destination network that reduces environmental impacts, protects cultural heritage, strengthens the local economy and complies with international sustainability standards. Such an approach will enhance Antalya's competitiveness in cruise tourism while also contributing to its position as **one of the leading cities in the Mediterranean's sustainable blue economy vision.**

3.9.7. Green Ports and Sustainable Port Management

In addition to serving as economic centres of the maritime sector, ports are critical infrastructure in the context of combating climate change and the green transition process. As a substantial proportion of international trade is conducted by sea, the energy consumption, carbon emissions, waste management, water use and environmental impacts of ports are at the centre of sustainability policies. Consequently, the success of ports today is assessed not only in terms of cargo and passenger capacity but also in terms of environmental performance, energy efficiency and climate adaptation capacity. The green port approach is an integrated management model aimed at increasing operational efficiency while reducing the environmental impacts of port activities. Within this model, the use of renewable energy in ports, shore power systems, electric equipment, smart energy management, rainwater harvesting, waste recovery and digital operational systems come to the fore. At the same time, the continuous monitoring of air quality, noise levels and seawater quality around ports is among the fundamental elements of sustainable port management.

For Antalya, green port practices should not be considered limited to commercial ports. Cruise terminals, marinas, fishing harbours and passenger piers should also be assessed in accordance with the same sustainability principles. In this respect, common environmental standards should be established across the entire coastal infrastructure, bringing Antalya's maritime activities into alignment with international best practices. The impacts of climate change also necessitate a new approach to port planning. Port infrastructure must be designed to be climate-resilient, taking into account sea-level rise, storm surges, coastal erosion and extreme meteorological events. Alongside new investments, strengthening existing facilities against these risks should be an important component of Antalya's long-term maritime strategy. Digitalisation is also an integral element of sustainable port management. Through artificial intelligence-supported traffic management, real-time environmental monitoring systems, digital cargo planning and smart maintenance applications, operational efficiency can be increased while energy consumption and emissions are reduced. The widespread adoption of these technologies in Antalya's port infrastructure should be regarded as an important area of transformation that will enhance international competitiveness. The expansion of green port practices will not only generate environmental benefits but will also increase Antalya's attractiveness to international shipping companies, cruise operators and investors. Therefore, sustainable port management should be regarded as one of the fundamental building blocks of Antalya's blue economy vision.

3.9.8. Marinas, Yacht Tourism and Maritime Services

Marinas are not merely boat berthing facilities within the modern maritime sector; they are multifunctional economic centres that bring together tourism, trade, maintenance and repair, technical services, education, logistics and social life. Leading marina destinations worldwide are distinguished not only by their berthing capacity but also by the economic ecosystems they create and the diversity of services they offer. Antalya possesses significant advantages for yacht tourism owing to its climate, natural bays, international tourism identity and strategic location along important maritime routes in the Mediterranean. Nevertheless, its existing marina infrastructure and maritime services have not yet developed sufficiently to realise this potential fully. In particular, the growing demand for high-income yacht tourism presents significant development opportunities in maintenance and repair services, technical service infrastructure and maritime-related ancillary industries.

Yacht tourism is one of the types of tourism that enables visitors to stay longer at a destination and has a high level of expenditure per person. Therefore, marina investments should not aim solely to increase berthing capacity; they should be planned through an integrated service approach encompassing technical maintenance services, fuel supply systems, waste reception facilities, safety infrastructure, logistical support, gastronomy, shopping and social amenities.

To enhance international competitiveness, the environmental performance of marinas in Antalya must also be improved. Waste management, bilge and wastewater reception systems, energy efficiency, renewable energy use, water conservation and environmentally friendly operating practices should become fundamental elements of marina management. Increasing the number of marinas holding international environmental certifications will strengthen Antalya's position as a sustainable yacht tourism destination.

Maritime services developing around marinas are also important components of economic diversification. Activities such as boat maintenance and repair, refit services, electronic systems, composite manufacturing, painting applications, engine servicing, maritime equipment, insurance, brokerage and charter operations generate high added value and skilled employment. Antalya's specialisation in these areas will reduce the maritime sector's dependence on the tourism season and provide economic activity throughout the year.

At the same time, investment in maritime education is critically important for the sustainable development of the sector. Through cooperation among vocational education institutions, universities and the private sector, a skilled workforce should be trained in areas such as maritime technologies, marina management, yacht captaincy, maintenance and repair expertise, and maritime safety. In this way, Antalya could become not merely a destination visited by yachts but also a regional centre where maritime knowledge and services are produced.

When planning marina investments, the conservation of the natural coastal environment, the sustainab lity of marine ecosystems and the balance of coastal use must be taken into account. New investments should be undertaken in accordance with environmental carrying capacity, coastal areas should be managed through a planning approach that safeguards the public interest, and appropriate measures should be adopted to protect natural heritage in the long term.

Antalya's marina and yacht tourism strategy should be shaped around quality, sustainability and high added value rather than growth focused on quantity. Through this approach, the city could become not merely an important port of call in the Mediterranean but also a leading centre in maritime services, technical expertise and environmentally friendly marina operations.

3.9.9. Economic Impacts and Green Finance

The maritime sector is one of the strategic areas that interact strongly with the tourism, trade, transport and service sectors of Antalya's economy. Ports, marinas, cruise tourism, yacht tourism, maritime transport and maritime services play an important role in regional development not only through their direct economic contributions but also through the supply chains, employment and investment effects they generate.

The blue economy approach does not assess maritime activities solely from the perspective of transport or tourism; rather, it addresses all marine-based economic activities in line with sustainable development objectives. This approach demonstrates that the maritime sector represents an important area of transformation capable of delivering economic growth and environmental protection simultaneously.

Considering Antalya's extensive coastline, international tourism infrastructure and strategic location in the Mediterranean, investments in the maritime sector are expected to generate significant multiplier effects on the city's economy. The development of maritime transport, modernisation of marinas, strengthening of cruise infrastructure, wider adoption of green port practices and diversification of maritime services will create new investment and employment opportunities in tourism, trade, logistics and service sectors, alongside direct economic revenues. The maritime sector has significant investment needs in line with climate change mitigation and green transition objectives. Making port and marina infrastructure climate-resilient, improving energy efficiency, establishing renewable energy systems, developing shore-side electricity supply infrastructure, expanding the use of electric marine vessels, and investing in digital port technologies and the conservation of marine ecosystems are among the priority investment areas for the coming period.

Financing this transformation requires more effective utilisation of international climate and development finance mechanisms alongside national resources. In particular, European Union programmes, international development banks, climate adaptation funds and sustainable infrastructure financing instruments have the potential to make significant contributions to the maritime sector's green transition.

It is important that financing models for the maritime sector are not limited solely to large-scale port investments. Environmental improvements to marinas, modernisation of small passenger piers, development of coastal transport systems, maritime technology initiatives, digitalisation projects and practices aimed at protecting marine ecosystems should also be considered investment areas within the scope of green and blue finance.

Antalya's international visibility and strong tourism brand provide a significant advantage in accessing these financing sources. However, to capitalise on this advantage, the city needs to move beyond project-based approaches and develop long-term investment programmes that address the maritime sector in an integrated manner. In particular, the international climate finance ecosystem that will emerge after COP31 may offer significant opportunities for Antalya's blue economy projects. Green port practices, low-carbon maritime transport, coastal resilience, restoration of marine ecosystems and digital maritime infrastructure are among the priority investment areas of international financial institutions. Antalya's development of a well-prepared project portfolio that is technically and financially eligible during this process will enable it to secure a greater share of global funding.

Sustainable growth in the maritime sector will be possible not only through new investments but also through strong cooperation among public institutions, the private sector, universities and civil society organisations. Therefore, financing models should be supported by participatory governance approaches and performance-oriented project management.

3.9.10. Strategic Policy Recommendations for Antalya's Maritime Sector

The utilisation of Antalya's maritime potential in line with sustainable development principles requires not only the implementation of new investments but also the development of planning, governance, financing and institutional capacity. In this context, it is recommended that the following policy recommendations be implemented within an integrated strategic framework.

An Antalya Blue Economy Master Plan Should Be Prepared

Rather than fragmented practices undertaken by different institutions, Antalya's maritime policies should be addressed within the framework of an integrated **Blue Economy Master Plan** that establishes long-term objectives.

This plan should bring together:

- Ports,
- Marinas,
- Cruise tourism,
- Maritime transport,
- Fisheries,
- Coastal protection activities,
- The maritime industry,
- Blue technology investments,
- Climate adaptation projects

under a shared development vision.

Integrated Coastal Zone Management Should Be Strengthened

Antalya's coastlines should be managed not only in terms of construction or tourism investments but also by taking into account the balance between natural ecosystems, cultural heritage, disaster risk, economic use and public access.

In coastal planning:

- Natural carrying capacity,
- Climate change scenarios,
- Biodiversity,
- Coastal erosion,
- Sea-level rise,
- Disaster resilience

should be established as fundamental components of planning processes.

Maritime Transport Should Be Integrated into Antalya's Public Transport System

New transport models should be developed to strengthen maritime transport between Antalya's eastern and western coastlines. Regular maritime transport services supported by electric or low-emission marine vessels will reduce traffic congestion, lower carbon emissions, diversify tourism destinations and increase economic interaction between coastal settlements.

A Green Port and Green Marina Transformation Programme Should Be Launched

Common environmental performance criteria should be established for ports and marinas in Antalya. Within the scope of the programme, the following practices should be promoted:

- Renewable Energy,
- Shore Power Infrastructure,
- Energy Efficiency,
- Zero Waste Practices,
- Rainwater Harvesting,
- Digital Environmental Monitoring,
- Carbon Footprint Management.

A Multi-Destination Cruise Strategy Should Be Adopted

Antalya's cruise policy should not be structured around a single port. **Kaleiçi, Demre, Side and Alanya** should be planned as complementary cruise destinations, each with its own distinct identity. These centres should be presented to the international market through a shared itinerary and destination management approach. This model will balance visitor density, increase the added value generated by the local economy and strengthen Antalya's competitiveness in cruise tourism.

The Marina and Maritime Services Ecosystem Should Be Developed

Marinas should not be assessed solely in terms of their berthing capacity. A maritime services ecosystem should be established to support the development of high-value-added activities such as vessel maintenance and repair, refit services, maritime technologies, equipment manufacturing, training, insurance, brokerage and charter operations.

Blue Technologies and Digital Maritime Development Should Be Supported

Through cooperation among universities, technology parks and the private sector, innovative applications such as smart port systems, digital marina management, marine environmental monitoring technologies, artificial intelligence-assisted maritime traffic management, autonomous marine vessels and coastal observation systems should be encouraged.

Climate-Resilient Coastal Infrastructure Should Be Established

New coastal investments and existing port and marina infrastructure should be designed and strengthened by taking into account climate risks such as sea-level rise, coastal erosion, storm surges and extreme weather events. This approach will enhance long-term investment security and reduce the economic losses caused by disasters.

Blue Finance Mechanisms Should Be Developed

For Antalya's maritime projects, climate finance, green bonds, blue bonds, sustainable infrastructure funds, international development banks, European Union programmes and public–private partnership models should be utilised effectively.

In particular, **the international financing opportunities that will emerge after COP31** should be regarded as a strategic lever for Antalya's maritime investments.

Institutional Coordination and Maritime Governance Should Be Strengthened

Decision-making processes concerning the maritime sector should be conducted through coordination mechanisms established with the participation of central government, local authorities, port operators, universities, professional chambers, the private sector and civil society organisations. A participatory governance approach will both accelerate investment processes and contribute to establishing a sustainable balance between the protection of coastal areas and economic development objectives.

3.9.11. Table 9: Priority Transformation Areas for the Maritime Sector

To enable Antalya's maritime sector to develop in line with climate change, climate law and green transition objectives, it is recommended that the following transformation areas be implemented as priorities.

Priority Transformation Area	Priority Level
Antalya Blue Economy Master Plan	Very High
Integrated Coastal Zone Management	Very High
Development of Intercoastal Maritime Transport	Very High
Multi-Destination Cruise Tourism Model	Very High
Green Port Transformation Programme	Very High
Green Marina Certification Programme	High
Marina and Maritime Services Ecosystem	High
Blue Technology and Maritime Innovation	High
Digital Port and Marina Management	High
Electric and Low-Emission Marine Vessels	High
Enhancing the Climate Resilience of Coastal Infrastructure	Very High
Marine Ecosystem Conservation and Restoration	Very High
Establishment of Blue Finance Mechanisms	Very High
Strengthening Maritime Education and Human Resources	Medium
Institutional Coordination and Blue Economy Governance	Very High

The simultaneous implementation of these transformation areas will transform Antalya's maritime sector from an activity focused solely on tourism into a blue economy ecosystem that adapts to climate change, generates high added value and possesses strong international competitiveness.

3.9.12. End-of-Section Assessment

The maritime sector is one of the most strategic sectors capable of transforming Antalya's natural geographical advantages into economic value. However, fully realising this potential depends on moving beyond the perception of the sea merely as an area for tourism activities and adopting an integrated development model encompassing transport, trade, cruise tourism, marinas, maritime services, technology, environmental management and coastal planning.

Climate change is reshaping the maritime sector not only environmentally but also economically and spatially. Sea-level rise, coastal erosion, extreme weather events and changes in marine ecosystems make it necessary to enhance the resilience of coastal infrastructure. At the same time, international regulations aimed at reducing carbon emissions in the maritime sector require improvements in the environmental performance of all infrastructure, from ports to marinas.

This transformation process also presents a significant opportunity for Antalya. Through green port practices, sustainable marina operations, low-emission maritime transport, a multi-destination cruise network, blue technology initiatives and the diversification of maritime services, the city could become a leading blue economy centre in the Mediterranean Basin.

Achieving this requires investment decisions to be based on scientific planning principles, the implementation of integrated management models that protect the natural and cultural values of coastal areas, and the establishment of a strong governance structure based on the participation of all stakeholders. The maritime sector should be regarded as a strategic sector that brings together climate change mitigation and adaptation, economic diversification and sustainable development objectives.

Antalya's future depends on recognising the sea not merely as a natural asset to be admired, but as strategic capital that is protected, managed and sustainably transformed into economic value. Policies developed in accordance with this approach will enhance the city's international competitiveness while contributing to the creation of a more resilient and liveable coastal city for future generations.

3.10. Ports and Logistics Infrastructure

The Strategic Future of Antalya's Ports in the Context of Climate Change, Climate Law and the Green Transition

3.10.1. Introduction

Ports are among the most critical infrastructures of global trade, with a substantial proportion of international goods flows transported by sea. However, modern ports have evolved beyond facilities used solely for loading and unloading into strategic economic centres integrating logistics, storage, customs, industry, energy and transport systems.

Climate change, the restructuring of international trade, the transformation of supply chains and global policies aimed at reducing carbon emissions directly affect the ports of the future. Therefore, port investments should be planned not only in terms of capacity expansion but also in accordance with the principles of digitalisation, energy efficiency, climate resilience and environmental sustainability.

Despite its strategic location in the Eastern Mediterranean, Antalya has not yet fully established an integrated logistics vision that would enable its ports to become a driving force for regional development. However, when the potential of tourism, agriculture, industry and foreign trade is considered together, the economic role of ports is expected to increase further in the coming years. In this context, Antalya's ports should be regarded not only in terms of maritime transport but also as a fundamental component of the regional logistics system, foreign trade and sustainable economic growth.

3.10.2.Current Structure of Antalya's Ports

Antalya's port infrastructure has a multi-layered structure comprising commercial ports, cargo terminals, private piers, fishing harbours and ports serving tourism purposes. However, Antalya Port is the most important centre for commercial freight transport.

Antalya Port is one of the region's major logistics centres for handling import and export cargo, bulk cargo transport, container services and project cargo. In addition to serving Antalya's industrial enterprises and agricultural production, the port constitutes a strategic gateway for economic activities in the Western Mediterranean hinterland.

Nevertheless, Antalya's port infrastructure has significant areas for improvement when compared with its economic potential. There is a need to develop the integration of ports with road, rail and logistics centres, their storage capacity, intermodal transport opportunities and digital logistics infrastructure.

Particularly in a period characterised by increasing foreign trade volumes, diversification of regional production and the restructuring of global supply chains, investments aimed at enhancing the competitiveness of Antalya's ports are of great importance.

3.10.3. Impacts of Climate Change on Port Infrastructure

Climate change creates both physical and operational risks for port infrastructure. Sea-level rise, coastal erosion, storm surges and extreme meteorological events have direct impacts on the safety of port facilities, operational continuity and investment costs. In addition, rising temperatures increase energy consumption, while heavy rainfall and flooding may cause disruptions in storage areas and transport connections. This makes it necessary to plan ports by taking into account not only current conditions but also future climate scenarios.

International regulations aimed at reducing carbon emissions in the maritime sector are also directing port operators towards new investments. The ability of vessels to receive shore-side electricity while berthed, the use of low-carbon equipment, the installation of renewable energy systems and digital energy management practices are becoming fundamental components of sustainable port operations.

To maintain the long-term competitiveness of Antalya's ports, priority should be given to resilient infrastructure investments that take climate risks into account and to technologies that improve environmental performance.

3.10.4. Ports and Regional Development

Ports are not merely infrastructure facilities for transporting cargo; they are economic centres of attraction that directly influence production, trade and investment decisions. Regions with strong port infrastructure gain significant competitive advantages in attracting industrial investments, logistics centres, storage facilities and export-oriented production.

Considering tourism, agriculture, natural stone, the food industry and manufacturing, which are the main sectors of Antalya's economy, the efficiency of ports directly affects these sectors' costs of accessing international markets and their competitiveness. In particular, the ability to transport fresh fruit and vegetables, processed agricultural products and high-value-added industrial products on time and at low cost depends on the efficiency of logistics infrastructure.

Ports also generate an effect that accelerates regional development when they operate in an integrated manner with free zones, organised industrial zones and logistics centres. Therefore, the simultaneous planning of port investments alongside production and logistics infrastructure in Antalya is of strategic importance for regional economic development.

3.10.5. Green Ports and Digital Transformation

Today, as global trade is being restructured around sustainability, ports are assessed not only in terms of cargo-handling capacity but also according to their environmental performance, digital infrastructure and operational efficiency. International targets for reducing carbon emissions in the maritime sector are directing port operators towards new operating models characterised by lower carbon emissions, greater energy efficiency and the integration of digital technologies.

The green port approach is an integrated transformation model encompassing the reduction of energy consumption in port operations, increased use of renewable energy, the provision of shore-side electricity to vessels while berthed (shore power), wider adoption of electric equipment, improved water efficiency and enhanced waste management.

In addition, continuous monitoring of air quality, noise, seawater quality and carbon emissions is becoming an integral component of environmental performance.

Digital transformation is also one of the fundamental tools for improving efficiency in port operations. Artificial intelligence-assisted cargo planning, digital customs applications, real-time terminal management, smart traffic systems, blockchain-based cargo tracking and automated equipment management shorten operational processes, reduce costs and optimise resource use.

To enhance the international competitiveness of Antalya Port, green port and digital port practices should be considered together. This transformation will not only ensure compliance with environmental obligations but also support the objective of becoming a port preferred within international logistics networks.

3.10.6. Logistics Corridors, Hinterland and Multimodal Transport

The economic success of a port is not determined solely by the length of its quays or its cargo-handling capacity. The production centres, transport connections, logistics infrastructure and hinterland serving the port are at least as important as the port's physical capacity.

In addition to having a strong tourism economy, Antalya possesses significant production potential in agriculture, natural stone, the food industry and manufacturing. However, strengthening the integration between the port and inland logistics is necessary to ensure that this production potential can reach international markets under competitive conditions.

In this context, organised industrial zones, free zones, logistics storage areas, road connections and railway connections that could be developed in the future should be considered together. Planning the regional logistics system in an integrated manner, rather than expanding ports independently, will both reduce costs and enhance the competitiveness of foreign trade.

Multimodal transport is also an important component of this transformation. The integrated operation of maritime, road and, in the future, rail transport will contribute to faster, safer and lower-carbon cargo movements. Accordingly, Antalya's logistics planning should be addressed from a long-term perspective that takes into account not only current needs but also the trade volumes and climate policies anticipated up to 2050.

3.10.7. Economic Impacts and Green Finance

Port investments are among the infrastructure investments with a high multiplier effect. Strong port infrastructure contributes to increased exports, reduced logistics costs, the attraction of new industrial investments and improved access to international trade networks. Considering Antalya's economic structure, the development of ports will directly affect not only the maritime sector but also the agriculture, industry, tourism and services sectors.

The modernisation of ports during the green transition creates significant financing needs. Renewable energy systems, shore power infrastructure, electric equipment, digital management systems, energy efficiency projects and climate-resilient coastal structures will be among the principal investment areas in the coming period.

International development banks, European Union programmes, climate finance mechanisms, green bonds and sustainable infrastructure funds offer significant opportunities for financing these investments. To make effective use of these resources, Antalya needs to develop project portfolios prepared in accordance with international standards and align port investments with climate policies.

The green transition of ports will not only improve environmental performance but also increase their attractiveness to international shipping companies, reduce operating costs and provide long-term competitive advantages.

3.10.8. Strategic Policy Recommendations for Ports and Logistics Infrastructure

The development of Antalya's port infrastructure in line with climate change, the transformation of global trade and green economy objectives depends not only on increasing physical capacity but also on long-term spatial planning, logistics integration and a sustainable governance approach. Accordingly, the following strategic policy recommendations are proposed for implementation.

An Antalya Port Master Plan Should Be Prepared

Commercial ports, private piers, free zone connections, logistics centres and potential future port investments in Antalya should be assessed within the framework of a common Antalya Port Master Plan.

This plan should consider the following together:

- Cargo projections,
- Foreign trade objectives,
- Developments in industrial and agricultural production,
- Climate change scenarios,
- Transport corridors,
- Coastal zone conservation.

Port Development Should Be Considered Together with Urban and Coastal Planning

Decisions concerning port expansion should not be shaped solely by operational requirements; their impacts on urbanisation, tourism, environmental values, public use and natural coastal systems should also be taken into account.

In this context, when planning capacity expansion or new infrastructure investments, the following should be subject to a comprehensive assessment process: Surrounding land uses,

- Property ownership structure,
- Transport connections,
- Social impacts,
- Natural and cultural heritage values.

Long-Term Spatial Scenario Studies Should Be Conducted for the Antalya Port Area

Decisions concerning the future of Antalya Port should be assessed not only on the basis of current needs but also through alternative development scenarios prepared with a 2050 perspective.

These studies should compare increased efficiency at the port's existing site, the reorganisation of logistics functions, the strengthening of operations associated with the free zone, compatibility with surrounding public uses, and the economic, environmental and legal impacts of potential expansion alternatives using multi-criteria analysis methods. This will enable investment decisions to be shaped by long-term regional development objectives rather than short-term needs.

Antalya Port Should Be Positioned as a Logistics Hub for the Western Mediterranean

Antalya Port should be developed not only as the city's import and export gateway but also as one of the logistics hubs of the Western Mediterranean Region. In line with this objective, logistics village initiatives, storage infrastructure, value-added logistics services, digitalisation of customs processes and export-oriented logistics solutions should be considered priority investment areas.

Logistics Integration with the Free Zone Should Be Strengthened

Logistics connections between Antalya Free Zone and the port should be developed to accelerate production, storage and foreign trade processes. This integration will reduce transport costs, accelerate export processes, increase investment attractiveness and contribute to the development of high-value-added production.

Rail Connectivity Should Form Part of the Long-Term Transport Strategy

Today, Antalya's port transport relies largely on road transport. In the long term, establishing a rail connection will reduce carbon emissions, lower logistics costs, facilitate heavy freight transport and strengthen integration with national transport corridors. Therefore, rail connectivity should be considered one of the priority components of long-term transport planning.

Green Port Certification Should Be Promoted

Compliance with international environmental standards among port operators in Antalya should be supported, and green port certification processes covering energy efficiency, carbon management, waste management and environmental monitoring practices should be encouraged. This approach will enhance the international competitiveness of ports while strengthening compliance with the European Union's carbon regulations and sustainable trade policies.

Digital Transformation in Logistics Should Be Accelerated

AI-supported planning, digital customs systems, electronic cargo documents, real-time cargo tracking, smart warehouse management and data-sharing platforms should be widely adopted in port and logistics operations. Digitalisation will increase operational efficiency, reduce waiting times and strengthen supply chain resilience.

Climate-Resilient Port Infrastructure Should Be Developed

During the development of new port investments and the modernisation of existing facilities, climate risks such as sea-level rise, extreme meteorological events, coastal flooding, temperature increases and energy supply security should be made an integral part of investment planning. This approach will safeguard the operational continuity of ports while also enhancing the long-term security of public and private sector investments.

3.10.9. Table 10: Priority Transformation Areas for Ports and Logistics Infrastructure

Priority Transformation Area	Priority Level
Antalya Port Master Plan	Very High
Port-City-Coast Integrated Planning Model	Very High
2050 Development Scenarios for the Port of Antalya	Very High
Free Zone–Port Logistics Integration	Very High
Digital Port Transformation	High
Green Port Certification	Very High
Climate-Resilient Port Infrastructure	Very High
Logistics Villages and Storage Centres	High
Integration of Railways and Ports	High
Use of International Green Finance Programmes	Very High
AI-Supported Logistics Management	Medium

3.10.10. End-of-Chapter Assessment

Antalya's port infrastructure is one of the strategic elements that will shape the city's economic future. However, the success of its ports depends not only on increasing physical capacity but also on addressing production, logistics, foreign trade, transport and environmental sustainability policies together. Global trade systems are being restructured around reducing carbon emissions, diversifying supply chains and digitalisation. This transformation creates both significant obligations and new opportunities for Antalya. The green transition of ports, the modernisation of logistics infrastructure and the development of multimodal transport systems are among the fundamental steps that will increase the city's international competitiveness. At the same time, it is insufficient to assess decisions concerning the future of Antalya Port solely in terms of capacity expansion. The relationship between the port and surrounding urban areas, the free zone, coastal uses, tourism activities and environmental values must be addressed through an integrated planning approach. Analyses based on long-term development scenarios will contribute to the formulation of balanced solutions between economic growth and environmental and social sustainability. Antalya's objective should not merely be to have a larger port, but to become **one of the Mediterranean's sustainable, digital and climate-resilient logistics hubs.** Investments and policies developed in line with this vision will strengthen the city's foreign trade capacity, create new investment opportunities and make a long-term contribution to regional development.

3.11. Fisheries and Aquaculture

Climate Change, Climate Law and the Green Transition: Transformation of Antalya's Fisheries Sector

3.11.1. Introduction

The fisheries and aquaculture sector is a strategically important economic activity for Antalya, not only as one of the traditional components of its coastal economy but also in terms of food security, rural development, tourism and biodiversity. The distinctive ecological characteristics of the Mediterranean Basin, Antalya's extensive coastline and its rich marine habitats provide the city with significant potential for fisheries and aquaculture production.

Nevertheless, the sector stands out as one of the economic activities most vulnerable to the impacts of climate change. Rising sea temperatures, changes in marine ecosystems, the proliferation of invasive species, changes in oxygen levels and the degradation of coastal habitats directly affect fish stocks, fishing productivity and the economic sustainability of the sector.

Climate law and green transition policies present not only new obligations for the sector but also significant opportunities in terms of sustainable production, traceability, ecosystem-based management and access to international markets.

Within this framework, Antalya's fisheries policies need to be reconsidered through an integrated approach that simultaneously takes into account the conservation of natural resources, economic efficiency, climate adaptation and blue economy principles.

3.11.2. Current Structure of Antalya's Fisheries and Aquaculture Sector

The fisheries sector in Antalya has a multifaceted structure comprising small-scale coastal fishing, commercial fishing, aquaculture and processing activities.

Coastal fishing has cultural as well as economic value for many settlements. Traditional fishing methods, local knowledge and family businesses are among the important components of the social fabric of coastal communities.

Aquaculture, meanwhile, has shifted towards more controlled production models in recent years as a result of technological developments, and its export-oriented production capacity has begun to increase. However, the sustainability of production is directly linked to water quality, environmental carrying capacity and ecosystem balance. The economic structure of the sector is not limited to fishing activities. Through its connections with the cold chain, processing facilities, packaging, logistics, exports, gastronomy and the tourism sector, it constitutes an important value chain. Considering Antalya's tourism identity, high-quality and sustainable seafood production is of strategic importance not only for exports but also for hotels, restaurants and gastronomic tourism.

3.11.3. Impacts of Climate Change on the Fisheries Sector

Climate change directly affects fisheries activities by altering the physical and biological characteristics of marine ecosystems. Rising sea temperatures in the Mediterranean are changing the migration routes and habitats of many commercial species, causing declines in the populations of some native species and leading to the proliferation of invasive species that can adapt to warmer waters. Marine acidification, changes in dissolved oxygen levels and shifts in the composition of plankton communities affect every level of the food chain, placing pressure on the long-term sustainability of fish stocks.

The increasing frequency of extreme weather events also adversely affects small-scale fishing activities. Storms, sudden changes in weather conditions and uncertainties in marine conditions lead to both a reduction in fishing days and increased risks to life and property at sea.

The degradation of coastal habitats, the decline of seagrass meadows, and the pressure on sensitive ecosystems such as lagoons and deltas also adversely affect the breeding and feeding grounds of many species.

These developments demonstrate that fisheries management cannot be sustained through conventional approaches focusing solely on catch volumes; instead, adaptive ecosystem-based management models that take climate change into account are required.

3.11.4. Sustainable Fisheries and Ecosystem-Based Management

The future of the fisheries sector depends on balancing the conservation of marine resources with economic production. Therefore, the concept of sustainable fisheries should not be limited to fishing bans or quota practices; a management approach based on the integrity of marine ecosystems should be adopted.

Ecosystem-based fisheries management encompasses the monitoring of fish stocks, habitat conservation, science-based fisheries planning and the integration of climate change scenarios into management processes.

The conservation of ecologically critical areas along Antalya's coastline, such as seagrass meadows, reef systems, breeding grounds and coastal wetlands, is important not only for the continuation of biodiversity but also for the long-term economic sustainability of the fisheries sector.

The widespread adoption of sustainable fishing practices should be supported through the prevention of illegal fishing, the promotion of selective fishing gear, regular stock monitoring and the effective management of marine protected areas.

In addition, the development of certification and traceability systems that encourage consumers to choose seafood obtained from sustainable sources will enhance the sector's competitiveness in national and international markets.

3.11.5. Aquaculture and the Green Transition

Increasing pressure on natural fish stocks worldwide has made aquaculture one of the fastest-growing areas within the global food system. Antalya also offers significant development opportunities in this field due to its climatic conditions, seawater quality and coastal production potential.

However, the sustainability of aquaculture activities depends not only on increasing production volumes but also on reducing environmental impacts and adopting production models compatible with natural ecosystems. In particular, feed management, water quality, waste control, disease management and energy use are fundamental factors determining the sector's environmental performance.

Within the framework of the green transition, low-carbon production technologies, energy-efficient facilities, renewable energy use, circular water management and digital monitoring systems are emerging as priority investment areas in aquaculture. Planning modern aquaculture facilities to be established in Antalya in accordance with international sustainability standards will provide a competitive advantage in both export potential and access to markets with high standards, particularly those of the European Union.

3.11.6. Fisheries from a Blue Economy Perspective

The fisheries sector is not merely a subcomponent of the blue economy; it is one of the fundamental areas of activity that balance the conservation of marine ecosystems with economic development. In Antalya, fisheries are directly linked to gastronomic tourism, rural development, cultural heritage, local employment and sustainable food systems. In this context, the future of the sector should be assessed not only in terms of production volumes but also in terms of the total economic and social value it generates. In line with the blue economy approach, the following should be considered complementary areas of activity:

- Fisheries,
- Aquaculture,
- Marine biotechnology,
- Restoration of marine ecosystems,
- Ecotourism,
- Coastal conservation practices.

This integrated approach will contribute to the diversification of the coastal economy and the creation of new investment areas while ensuring the conservation of natural capital.

3.11.7. Economic Impacts and Green Finance

The fisheries and aquaculture sector occupies an important position in Antalya's economy due to the economic impacts it generates beyond its direct production value. Capture fisheries and aquaculture activities, together with the processing industry, cold-chain logistics, packaging, exports, restaurant operations and the tourism sector, create an extensive economic value chain.

International financing mechanisms need to be utilised more effectively to reduce the risks arising from climate change and accelerate the sector's transformation. Priority investment areas include low-carbon aquaculture systems, energy efficiency practices, renewable energy investments, digital stock monitoring systems, marine habitat restoration and sustainable fisheries certification programmes. International climate funds, blue economy finance, European Union programmes and support mechanisms provided by development banks offer important resources that could accelerate the transformation of Antalya's fisheries sector. In particular, blue finance instruments expected to develop following COP31 could create new opportunities for Antalya's sustainable fisheries and aquaculture projects.

3.11.8. Strategic Policy Recommendations for Antalya's Fisheries Sector

The future of the fisheries and aquaculture sector cannot be secured solely through policies aimed at increasing production volumes. It is recommended that the following strategic measures be implemented by considering the impacts of climate change, the conservation of marine ecosystems and international sustainability standards together.

An Antalya Sustainable Fisheries Master Plan Should Be Prepared

Fisheries, aquaculture, marine protected areas, coastal planning and blue economy policies should be integrated under a common strategy.

A Scientific Fish Stock Monitoring System Should Be Established

Fish stocks, invasive species, seawater temperatures and habitat changes should be regularly monitored, and fisheries management decisions should be based on scientific data.

Small-Scale Fisheries Should Be Supported

The economic resilience of small-scale fishers should be strengthened through cooperative development, digital marketing, cold-chain infrastructure and value-added product development programmes.

Sustainable Aquaculture Should Be Encouraged

Enterprises producing in accordance with international environmental standards should be supported through financial incentives, and the use of advanced technologies with high water and energy efficiency should be promoted.

Marine Protected Areas Should Be Strengthened

Breeding grounds, seagrass meadows and sensitive ecosystems should be effectively protected, and restoration projects should be expanded.

Traceability and Certification Systems Should Be Developed

A digital traceability system covering the entire process from production to consumption should be established, and sustainable production certification schemes should be promoted in a manner that provides a competitive advantage in international markets.

Blue Finance Mechanisms Should Be Utilised Effectively

Project development capacity should be strengthened to facilitate access to climate finance, blue bonds and international funding sources for the fisheries sector.

3.11.9. Table 11: Priority Transformation Areas in the Fisheries and Aquaculture Sector

Priority Transformation Area	Priority Level
Antalya Sustainable Fisheries Master Plan	Very High
Scientific Fish Stock Monitoring System	Very High
Strengthening Marine Protected Areas	Very High
Sustainable Aquaculture Production	Very High
Low-Carbon Production Technologies	High
Traceability and Certification Systems	High
Strengthening the Cold Chain and Logistics Infrastructure	High
Support for Small-Scale Fisheries	High
Development of Blue Finance Programmes	Very High
Restoration of Marine Ecosystems	Very High

3.11.10. End-of-Chapter Assessment

Beyond being a traditional component of Antalya's coastal economy, the fisheries and aquaculture sector is one of the fundamental pillars of food security, biodiversity, rural development and the blue economy. The impacts of climate change on marine ecosystems are reshaping the sector's production models and management approach. For Antalya to manage this transformation successfully, it must adopt an approach that regards the conservation of natural resources as an integral component of economic development. Scientific stock management, sustainable aquaculture, low-carbon production technologies and ecosystem-based planning will be the fundamental elements determining the sector's long-term competitiveness. The green transition and climate law process presents not only new rules requiring compliance for the fisheries sector, but also significant opportunities in terms of high-value-added production, access to international markets and blue finance. Antalya's ability to capitalise on these opportunities depends on establishing strong cooperation among public institutions, universities, cooperatives, the private sector and civil society organisations. By protecting its natural capital while generating economic value, Antalya will have the potential to become not only a centre for sustainable fisheries but also one of the leading cities implementing climate-resilient blue economy practices in the Mediterranean Basin.

3.12. Water Services and Water Management

Water Security in Antalya in the Context of Climate Change, Climate Law and the Green Transition

3.12.1. Introduction

Water is among the natural resources most directly affected by climate change. Rising temperatures, irregular precipitation patterns, more frequent droughts, population growth and the expansion of economic activities are increasing pressure on water resources. Located in the Mediterranean Basin, Antalya is among the cities expected to be significantly affected by this process. Water management in Antalya is not limited to the provision of drinking and domestic water. Agriculture, tourism, industry, energy production, ecosystem conservation and urbanisation policies are directly dependent on the sustainable management of water resources. Therefore, water should be regarded not merely as an infrastructure service, but as one of the fundamental determinants of economic growth, social welfare and environmental sustainability. Climate law and green transition policies make it necessary to replace supply-oriented approaches to water management with the principles of demand management, resource efficiency, water recovery, the circular economy and climate resilience. Antalya's ability to ensure water security in the future also depends on protecting existing water resources, developing alternative water sources and expanding water reuse. In this context, Antalya's water policies need to be reconsidered through an integrated approach based on basin-scale planning, integrated water management, digital infrastructure, climate change adaptation and the conservation of natural ecosystems.

3.12.2.Current Status of Antalya's Water Resources

Although Antalya is one of Türkiye's relatively water-rich provinces in terms of surface water, groundwater, springs and karst systems, it is a region where water demand is increasing due to population growth, tourism activities and agricultural irrigation. The city's water demand is largely met through groundwater reserves and natural springs. In addition, dams, reservoirs and surface water systems are used for drinking water supply and irrigation. However, changes in precipitation patterns associated with climate change and the prolongation of dry periods create significant uncertainties regarding the future security of these resources.

The substantial increase in population during the tourism season, the intensification of agricultural irrigation during the summer months and the expansion of industrial activities further increase water demand, particularly during dry periods. This makes the efficient use of existing resources and the mobilisation of alternative water sources a strategic necessity.

Furthermore, issues such as water losses, distribution network efficiency, unauthorised water use and ageing infrastructure are among the significant factors limiting the effective utilisation of existing water resources. Therefore, Antalya's water management policies should focus not only on developing new water sources but also on protecting existing resources and using them more efficiently.

3.12.3. Impacts of Climate Change on Water Resources

Climate change affects Antalya's water resources in terms of both quantity and quality. Changes in precipitation patterns, prolonged drought periods and rising temperatures lead to reductions in surface water resources, weakened groundwater recharge and increased evaporation.

The increasing risk of drought is regarded as a factor that may intensify competition for water among the drinking water supply, agricultural irrigation and tourism sectors, particularly during the summer months. This situation makes it necessary to reconsider water allocation policies in accordance with climate scenarios.

Climate change may also affect water quality. Increasing pollutant concentrations due to reduced flows, accelerated algal growth resulting from rising temperatures and an increased risk of saltwater intrusion into coastal aquifers are significant environmental risks that must be taken into account in water management.

In addition, the increasing frequency of sudden and intense rainfall raises flood risks, making it necessary to plan drinking water infrastructure and wastewater systems to be more resilient. These developments require Antalya's water management system to be restructured through an adaptive approach that considers not only current needs but also the risks that may arise under different climate scenarios.

3.12.4. Integrated Water Resources Management

Under climate change conditions, the sustainable management of water resources cannot be achieved through conventional approaches that assess the water demands of different sectors independently. The needs of agriculture, tourism, industry, urbanisation, energy production and natural ecosystems should be addressed within a common planning framework.

Integrated Water Resources Management is based on the protection of water in terms of both quantity and quality, basin-based planning, stakeholder participation, data-driven decision-making processes and consideration of ecosystem services. Through this approach, water resources can be managed by taking into account not only current needs but also the requirements of future generations.

For this model to be implemented in Antalya, it is important to prepare water budgets at basin scale, assess groundwater and surface water resources together, allocate water among sectors according to scientific criteria and expand digital monitoring systems.

The integrated management approach will also contribute to strengthening water security by bringing together the reduction of water losses, rainwater management, flood control, ecosystem restoration and the use of reclaimed water within a single policy framework.

3.12.5. Wastewater Reuse and the Circular Water Economy

Climate change makes it necessary not only to protect water resources but also to reuse water to the greatest extent possible. In this context, wastewater should be regarded not as waste requiring disposal, but as a strategic resource that can be reused following appropriate treatment processes. The circular water economy approach aims to extend the useful life of water and enable the same water to be safely reused for different purposes. The use of treated wastewater for agricultural irrigation, landscape irrigation, industrial processes, firefighting water reserves, groundwater recharge and certain industrial applications will make a significant contribution to reducing pressure on freshwater resources.

In Antalya, tourism facilities, organised industrial zones, large-scale settlements and municipal service areas have considerable potential for expanding the use of reclaimed water. In this context, the areas in which high-quality reclaimed water obtained through advanced biological treatment, membrane technologies, ultraviolet disinfection, ozonation and other advanced treatment methods can be safely used should be expanded. Expanding the use of reclaimed water will not only increase water supply security but also contribute to the protection of receiving environments by reducing wastewater discharges, optimising energy and chemical consumption, and achieving circular economy objectives.

3.12.6.Seawater Desalination and Alternative Water Sources

Developing alternative water sources is becoming increasingly important in regions where drought risks are rising due to climate change. In this context, seawater desalination has become one of the important components of long-term water security policies, particularly for coastal cities. With its extensive coastline and developed tourism infrastructure, Antalya possesses significant advantages for implementing these technologies. Seawater desalination should be considered as a complementary solution capable of reducing pressure on existing freshwater resources, particularly in tourism facilities, organised industrial zones and settlements with high water consumption.

However, the environmental dimensions of these technologies, including their high energy requirements and the management of concentrated saline water (brine), must be taken into account. These impacts can be significantly reduced through facilities integrated with renewable energy systems, energy-efficient membrane technologies and discharge systems designed according to scientific principles. For Antalya, the fundamental objective is to regard seawater desalination not as a single solution replacing existing water resources, but as a strategic alternative that supports the system during drought periods and strengthens climate change adaptation capacity.

3.12.7.Smart Water Management and Digital Transformation

Digitalisation in water management is one of the fundamental areas of transformation enabling more effective utilisation of resources. Sensor technologies, remote monitoring systems, geographic information systems, artificial intelligence-supported analyses and real-time data management are recognised as indispensable components of smart water infrastructure. Smart water management enables rapid detection of distribution network losses, reduction of unauthorised water use, optimisation of pressure management, reduction of energy consumption and continuous monitoring of water quality.

Expanding digital water management practices in Antalya will strengthen decision-making processes in the face of uncertainties arising from climate change and increase drought management and disaster preparedness capacity. The water management of the future is not merely about investing in additional infrastructure, but about operating existing infrastructure more intelligently, efficiently and resiliently.

3.12.8. Water Efficiency and Demand Management

Water security cannot be achieved solely by developing new water sources. More efficient utilisation of existing resources should be among the fundamental priorities of water management. Water efficiency policies in Antalya should encompass a wide range of measures, including the modernisation of agricultural irrigation systems, the widespread adoption of water-saving technologies in tourism facilities, process water recovery in industry and the reduction of water losses in urban areas. The demand management approach aims to ensure that water consumption is reduced, with the right amount of water of the right quality being used in the right place. Accordingly, economic incentives, educational activities, digital monitoring systems and awareness-raising initiatives should be implemented together. Improving water efficiency should be regarded as an investment area as important as constructing new dams or transmission pipelines, and public and private sector investments should be planned in accordance with this approach.

3.12.9.Economic Impacts and Climate Finance

While water infrastructure investments were largely regarded as public services in the past, they are now considered strategic investments that enhance economic resilience. The increasing risk of drought due to climate change, pressures on water supply security and the need to renew infrastructure systems have made the water sector one of the priority investment areas of the green transition. Tourism, agriculture, industry and services, which constitute the fundamental drivers of Antalya's economy, depend directly on a reliable and sustainable water supply. Therefore, investments in water infrastructure will not only generate environmental benefits but also contribute to ensuring production continuity, increasing investment security and preventing economic losses. Investments such as advanced treatment facilities, reclaimed water distribution networks, smart water management systems, distribution network rehabilitation, rainwater harvesting, the development of alternative water sources and energy-efficient pumping systems should be regarded as investments that reduce operating costs and improve resource-use efficiency in the long term. International climate funds, development banks, European Union financial instruments, green bonds, sustainable finance mechanisms and public–private partnership models offer significant opportunities for financing this transformation. Particularly within the scope of climate change adaptation investments, the following are among the priority areas supported by international financial institutions:

- Reduction of water losses and leakages,
- Reuse of treated wastewater,
- Basin restoration,
- Digital water management,
- Energy efficiency,
- Drought-resilient infrastructure.

For Antalya to utilise these resources effectively, a complementary portfolio of projects should be established under the **"Antalya Water Security Programme",** rather than developing independent infrastructure projects. This will enable the development of scalable and measurable investment programmes with greater impact potential for financing institutions. The new financing mechanisms expected to emerge in the fields of climate change adaptation and water security following COP31 present a significant opportunity for Antalya. The city's advance preparation of projects focusing on water efficiency, the circular water economy and alternative water sources will substantially increase its capacity to access these resources.

3.12.10. Strategic Policy Recommendations for Antalya's Water Security

For Antalya to establish a water management system resilient to climate change, its water policies need to be restructured by moving away from a supply-oriented approach and focusing on resource diversification, efficiency, circularity and climate change adaptation. Accordingly, the following policy recommendations should be implemented.

An Antalya Water Security Master Plan Should Be Prepared.

A long-term, basin-scale plan should be developed, covering drinking water, agricultural irrigation, industrial water use, the tourism sector, ecosystem needs and alternative water sources.

Wastewater Reuse Should Become One of Antalya's Core Water Policies.

New treatment facilities and the modernisation of existing facilities should be planned with reclaimed water production as a fundamental objective. The widespread use of reclaimed water should be promoted for landscape irrigation, agricultural irrigation, industrial use and other areas deemed appropriate.

Alternative Water Sources Should Be Incorporated into Strategic Planning.

Seawater desalination, rainwater harvesting, greywater reuse and artificial groundwater recharge practices should be evaluated in terms of scientific and economic feasibility to support water supply security during drought periods.

Smart Water Management Systems Should Be Widely Implemented.

Real-time monitoring of distribution networks, digital meters, leakage detection systems, artificial intelligence-supported demand forecasting and decision-support mechanisms should be widely implemented.

Water Efficiency Should Become a Fundamental Component of Urban Policies.

The use of water-efficient equipment in new buildings should be encouraged, and sector-specific water efficiency targets should be established for tourism facilities, industrial enterprises and agricultural businesses.

The Water–Energy Nexus Should Be Planned in an Integrated Manner.

The carbon footprint of water services should be reduced by increasing the use of renewable energy in pumping stations, treatment facilities and desalination systems.

Climate-Resilient Water Infrastructure Should Be Developed.

Drinking water, sewerage, stormwater and flood management infrastructure should be designed on the basis of projected future climate scenarios.

Institutional Coordination in Water Management Should Be Strengthened.

Joint governance mechanisms based on data sharing should be established with the participation of central government, local authorities, universities, professional chambers, the private sector and civil society organisations.

3.12.11.Table 12: Priority Transformation Areas for Water Services and Water Management

Priority Transformation Area	Priority Level
Antalya Water Security Master Plan	Very High
Wastewater Recovery Programme	Very High
Circular Water Economy Model	Very High
Smart Water Management System	Very High
Reducing Water Losses and Leakage	Very High
Development of Alternative Water Resources	Very High
Seawater Desalination Strategy	High
Rainwater Harvesting and Greywater Utilisation	High
Water–Energy Integration	High
Digital Basin Monitoring Systems	High
Climate Finance Project Portfolio	Very High

3.12.12. End-of-Chapter Assessment

Water is a fundamental component of Antalya's economic development, social welfare and ecological balance. While the impacts of climate change are increasing pressure on both the quantity and quality of water resources, they also necessitate a reassessment of existing management approaches. Future water policies should move away from the traditional approach focused on securing additional water supplies and towards an integrated water security model that ensures the most efficient use of existing water resources. This model should incorporate water conservation, water reuse, the development of alternative sources and smart management systems supported by digital technologies.

For Antalya, water security is not merely a measure to address drought risks; it is also a strategic development objective in terms of the sustainability of tourism, agriculture, industry and urban life. Investments developed in this direction will enhance climate change adaptation capacity while also supporting economic competitiveness.

From a 2050 perspective, Antalya's success will depend on becoming a city that protects, reuses and manages every drop of water it possesses on the basis of scientific evidence. This approach has the potential to position Antalya as **a leading city in water security and circular water management in the Mediterranean Basin, not only in Türkiye.**

3.13. Waste Management and Circular Economy

Climate Change, Climate Law and the Green Transition:
Transformation of Resource Management in Antalya

3.13.1.Introduction

At a time when natural resources are being rapidly depleted and the impacts of climate change are becoming increasingly evident, waste management is regarded not merely as an environmental protection activity but also as one of the fundamental components of economic development, resource efficiency and climate policies. The traditional linear economy model is based on the extraction, use and disposal of natural resources at the end of their useful life. This model has largely lost its sustainability due to population growth, urbanisation and consumption patterns.

By contrast, the circular economy approach is based on keeping products, materials and resources within the economic system for as long as possible through reuse, repair, recycling and recovery. In this way, it contributes both to reducing natural resource consumption and to lowering greenhouse gas emissions.

In rapidly growing cities such as Antalya, where tourism, agriculture and service-sector activities are concentrated, waste management is not merely an environmental necessity; it is also of strategic importance for economic competitiveness and quality of life.

Therefore, Antalya's waste management policies need to be restructured in accordance with an approach that prioritises resource efficiency, aligns with circular economy principles and establishes a system resilient to climate change.

3.13.2. Current Structure of Waste Management in Antalya

Waste management in Antalya has a multi-layered structure comprising municipal solid waste services, recycling activities, packaging waste management, organic waste, hazardous waste, medical waste, construction and demolition waste, and industrial waste management systems, all administered by municipalities. The increase in population, particularly during the summer months due to tourism activities, significantly raises the amount of waste generated per capita. At the same time, businesses such as hotels, restaurants, marinas and entertainment facilities constitute significant sources of packaging waste and organic waste.

The agricultural sector has a structure requiring specialised management in terms of crop production residues, greenhouse plastics, agricultural packaging and organic waste. Process waste, hazardous waste and recoverable materials generated in industrial facilities, meanwhile, necessitate different management models. Although significant progress has been made in recycling infrastructure in recent years, there remains considerable potential for improvement in reducing waste generation at source, increasing separate collection rates, recovering organic waste and expanding high-quality recycling practices.

3.13.3. Impacts of Climate Change on Waste Management

The relationship between waste management and climate change is bidirectional. On the one hand, methane emissions from uncontrolled disposal sites and waste transportation contribute to greenhouse gas emissions; on the other, climate change can affect the safety and continuity of waste management infrastructure. Heavy rainfall, flooding and heatwaves can create operational risks for sanitary landfill facilities, transfer stations and recycling facilities. Issues such as leachate management, fire risks and infrastructure resilience become even more critical with climate change.

Conversely, effective waste management is an important instrument in combating climate change. Waste prevention, reuse, recycling, biological treatment of organic waste and energy recovery contribute to reducing both natural resource consumption and greenhouse gas emissions. Therefore, waste management should be addressed not merely as a disposal service but as an integral component of climate change mitigation and resource efficiency policies.

3.13.4. Circular Economy and Resource Efficiency

The circular economy is a new-generation development approach that aims to weaken the link between economic growth and natural resource consumption. In this model, the concept of waste is replaced by that of secondary raw materials; the useful life of products is extended, and material cycles are maintained within a closed-loop system wherever possible.

For Antalya, the circular economy approach is not limited to municipal waste management. Practices that enhance resource efficiency should be developed across the tourism, agriculture, industry, construction and service sectors. In this context, the following practices are particularly important:

- Recyclability in product design,
- Industrial symbiosis practices,
- Compost and biogas production from organic waste,
- Recovery of construction and demolition waste,
- High-value recycling of textile and plastic waste,
- Safe recovery of electronic waste.

The circular economy also offers a significant transformation opportunity that could enhance Antalya's economic competitiveness by creating new business models, technology enterprises and green employment opportunities.

3.13.5. Recovery of Organic Waste and the Biogas Economy

Organic waste accounts for a significant proportion of municipal waste generated in Antalya. Tourism facilities, restaurants, fruit and vegetable wholesale markets, marketplaces, agricultural production areas and food industry enterprises constitute the main sources of organic waste generation.

Disposing of this waste in sanitary landfill sites leads to increased methane emissions and the loss of significant economic potential. However, organic waste is an important biological resource that can be converted into value-added products such as biogas, compost, organic fertiliser and biomethane.

The combined organic waste potential of Antalya's agriculture and tourism sectors presents significant opportunities for the development of integrated biogas facilities. These facilities can generate renewable energy, while the resulting organic fertiliser can be utilised in agricultural production, thereby strengthening the circular economy.

The separate collection of biological waste at source, the development of logistics infrastructure and the wider adoption of biological recovery technologies will contribute directly to reducing Antalya's greenhouse gas emissions and supporting its energy transition.

3.13.6. Industrial Symbiosis and Resource Efficiency

One of the fundamental objectives of industrial policies during the green transition is to utilise waste generated in production processes as raw materials for other enterprises. This approach is defined as **industrial symbiosis** and is recognised as one of the most important applications of the circular economy. Through cooperation between organised industrial zones, industrial estates and large-scale production facilities in Antalya, waste heat, process water, packaging materials, metal, plastic and glass waste, and organic by-products can be converted into economic value. This approach will not only reduce the amount of waste but also lower enterprises' raw material costs, improve energy efficiency and contribute to reducing carbon emissions. To develop industrial symbiosis practices, it is recommended that digital material exchange platforms, shared recovery facilities and sectoral cooperation mechanisms be established.

3.13.7. Circular Economy in the Tourism Sector

Considering Antalya's economic structure, the tourism sector is one of the areas in which circular economy practices can generate the greatest impact. Accommodation facilities, food and beverage establishments, marinas, congress centres and entertainment facilities should adopt sustainable tourism practices based on reducing food waste, prioritising locally produced products, reducing single-use products, biologically treating organic waste, improving water and energy efficiency, and expanding the use of recycled materials.

These practices will not only provide environmental benefits but also facilitate access to international sustainable tourism certifications, reduce operating costs and strengthen Antalya's identity as an environmentally responsible, high-quality destination.

3.13.8.Digital Waste Management and Artificial Intelligence Applications

The use of digital technologies in waste management introduces a new management model that enables more effective utilisation of resources. Smart container systems, sensor-based fill-level measurements, route optimisation software, artificial intelligence-assisted sorting systems and digital waste tracking platforms can improve the efficiency of collection and recovery processes.

Furthermore, electronic waste declaration systems, material flow analyses and carbon emission monitoring applications strengthen policy development processes by providing decision-makers with real-time data.

Within the framework of Antalya's digital transformation vision, it is important that waste management infrastructure is also developed in an integrated manner with smart city applications.

3.13.9. Economic Impacts and Green Finance

Waste management should not be regarded merely as a municipal service that generates costs. Properly planned systems can be transformed into strategic investments that create economic value through recovered raw materials, energy production, carbon emission reductions and new employment opportunities. Recycling facilities, biogas investments, compost production, waste sorting technologies and digital management systems are among the significant investment areas within the green economy.

International climate finance mechanisms identify methane emission reductions, circular economy practices, resource efficiency projects and low-carbon production models as priority areas for support. To enable Antalya to benefit from these opportunities, a culture of joint project development among municipalities, organised industrial zones, the tourism sector and the private sector needs to be strengthened. Addressing waste management at a regional scale will increase project size and facilitate access to international finance.

3.13.10. Strategic Policy Recommendations for Antalya

To enable Antalya to achieve its circular economy objectives, the following policy priorities are recommended for implementation:

An Antalya Circular Economy Master Plan Should Be Prepared.

An integrated resource management strategy encompassing waste management, industry, agriculture, tourism and municipal services should be developed.

Organic Waste Should Be Collected Separately at Source.

Logistics and processing infrastructure should be strengthened to support biogas and compost production.

An Industrial Symbiosis Platform Should Be Established.

A digital matching system should be developed to facilitate the exchange of by-products and secondary raw materials between enterprises.

Circular Economy Standards Should Be Established in the Tourism Sector.

Voluntary and incentive-based practices incorporating resource efficiency, waste reduction and recovery performance should be promoted in accommodation facilities.

Smart Waste Management Systems Should Be Widely Adopted.

Management models supported by artificial intelligence, sensor technologies and data analytics should be integrated into municipal services.

The Recycling Industry Should Be Supported.

High-value recycling technologies, innovation centres and green enterprises should be encouraged.

Carbon and Resource Efficiency Should Be Managed Together.

Waste policies should be designed in alignment with Antalya's greenhouse gas reduction targets and climate action plans.

3.13.11. Table 13: Priority Transformation Areas for Waste Management and the Circular Economy

To ensure the successful transition from waste management to resource management in Antalya, it is recommended that the following areas of transformation be prioritised for implementation.

Priority Transformation Area	Priority Level
Antalya Circular Economy Master Plan	Very High
Source Separation of Organic Waste	Very High
Regional Biogas and Composting Facilities	Very High
Industrial Symbiosis Platform	Very High
Circular Economy Programme in Tourism	High
Construction and Demolition Waste Recovery System	High
Smart Waste Management Infrastructure	Very High
Circular Economy Industrial Cluster	High
Carbon and Resource Efficiency Management	Very High
Green Finance Project Pipeline	Very High
Circular Economy Data Centre	Medium

The combined implementation of these transformation areas will make significant contributions to Antalya by reducing waste generation, improving the efficiency of natural resource use, lowering greenhouse gas emissions and developing new economic activities.

3.13.12. End-of-Chapter Assessment

During the green transition, waste management has evolved beyond being a public service aimed solely at reducing environmental burdens and has become one of the fundamental instruments of economic value creation, resource security and climate policies.

In rapidly growing cities such as Antalya, with economies dominated by tourism and agriculture, the circular economy approach offers significant opportunities to enhance economic competitiveness while reducing natural resource consumption. The biological treatment of organic waste, development of the recycling industry, industrial symbiosis practices and digital waste management systems are among the fundamental components of this transformation.

However, the circular economy is not limited to waste recovery. It represents a comprehensive transformation process extending from product design to consumption habits and from industrial production to public procurement. Antalya's adoption of this approach will increase raw material efficiency, reduce dependence on external resources and create new green investment opportunities.

Climate law and international sustainability standards will make the resource-use performance of enterprises more visible in the coming period. Therefore, Antalya's waste management policies should be restructured in alignment with carbon emission reduction, resource efficiency and circular economy objectives.

From a 2050 perspective, Antalya's success will depend not merely on becoming a city that recycles more, but on becoming a city that generates less waste, develops longer-lasting products, adds economic value to secondary raw materials and achieves growth while protecting natural resources.

Policies developed in accordance with this approach have considerable potential to position Antalya as **one of the leading cities in the Mediterranean Region in the fields of circular economy and resource efficiency.**

CHAPTER 4

GREEN FINANCE, CLIMATE FINANCE AND THE SUSTAINABLE INVESTMENT ECOSYSTEM

Climate Change, Climate Law and the Green Transition: Transformation of Financing and Investment in Antalya's Economy

Purpose of This Chapter

Climate change, climate law and the green transition are reshaping not only production models but also capital flows, investment decisions and financing mechanisms. Today, international financial institutions, development banks, investment funds and private-sector capital are increasingly adopting a new investment approach based on environmental, social and governance (ESG) criteria. This transformation brings both significant financing needs and new investment opportunities for the key sectors of Antalya's economy. Transformation investments in strategic areas such as tourism, agriculture, industry, energy, water management, transport, waste management and the blue economy are evolving beyond measures that can be financed solely through public resources. Consequently, international climate finance, green financing instruments and sustainable investment models are becoming the main driving forces behind Antalya's economic transformation. This chapter examines the impacts of climate change and climate law on the investment ecosystem, analyses financing needs across Antalya's economic sectors and presents a strategic financing model that will enable more effective utilisation of national and international capital resources.

Scope of the Chapter

This chapter examines the following from the perspective of economic transformation:

- The global transformation of the green finance system,
- The development of climate finance and international trends,
- Sector-specific financing needs of Antalya's economy,
- Green investment instruments and sustainable capital markets,
- Opportunities offered by development banks and international climate funds,
- The economic impacts of carbon markets and sustainable finance practices,
- Public–private partnership models,
- Policy recommendations for developing Antalya's green investment ecosystem.

Key Questions to Be Addressed in This Chapter

- What is the scale of the investment required for Antalya's green transition?
- Which sectors have the greatest potential to benefit from international climate finance?
- How will climate law and sustainable finance criteria change investment decisions?
- Which financing mechanisms will enhance Antalya's competitiveness in the eyes of international investors?
- How will carbon markets, green bonds, sustainable loans and ESG practices affect Antalya's economy?
- How should an investment portfolio be developed for Antalya's green transition projects?
- How can international financing opportunities that may emerge after COP31 be utilised for Antalya?

Key Message of the Chapter

In the 21st century, the competitiveness of cities will be determined not only by the value they produce but also by the extent to which they can attract international capital for transformation projects. Antalya's sustainable growth in the context of climate change and the green transition depends on developing appropriate projects, structuring these projects in accordance with international standards and bringing them together with global climate finance resources. Green finance is not merely a mechanism for securing financial resources for Antalya; it is a strategic development instrument that will accelerate economic transformation.

4.1 Introduction

Climate change, climate law and the green transition are fundamentally transforming not only production and consumption patterns in the global economy but also capital flows, investment priorities and financing mechanisms. In the past, the main determinants of economic growth were assessed in terms of access to natural resources, labour costs and technological capacity. Today, however, countries', regions' and cities' capacity to finance the green transition in accordance with international standards has become one of the most important determinants of competitiveness.

Rapidly evolving climate policies, carbon neutrality targets, sustainable finance standards and environmental, social and governance (ESG) criteria at the global level are redefining the direction of public- and private-sector investment. International development banks, investment funds, commercial banks and private capital institutions now consider not only financial performance but also climate risk, carbon intensity, resource efficiency, environmental impacts and corporate sustainability indicators as fundamental assessment criteria in their investment decisions. Consequently, the global financial system is evolving towards a new capital framework that supports low-carbon and climate-resilient economic structures. For Antalya's economy, this transformation presents not only new obligations but also significant investment and growth opportunities. As examined in detail in the previous three chapters of the report, all strategic sectors, including agriculture, tourism, industry, water management, transport, ports, maritime activities, fisheries and waste management, will be directly affected by both the physical impacts of climate change and climate law regulations. Their ability to maintain competitiveness and sustain their presence in international markets will depend largely on the green transition investments they undertake.

However, the scale of these investments is far beyond what can be financed solely through public budgets and conventional financing methods. Making water infrastructure climate-resilient, expanding energy efficiency practices, investing in renewable energy, establishing circular economy systems, transitioning to low-carbon production technologies, developing sustainable tourism infrastructure and implementing resilient city practices all require long-term, low-cost and sustainable financing models.

Therefore, **green finance is not merely a financing technique but a strategic development instrument that enables economic transformation.** Today, competition between cities is shaped not only by their capacity to attract investment but also by their ability to access international climate funds, utilise sustainable finance instruments effectively and develop investment projects in accordance with global standards. In this context, Antalya's future competitiveness is directly linked to its success in connecting green transition projects with international financing resources. Antalya's strong tourism economy, developed agricultural sector, expanding industrial infrastructure, strategic ports, blue economy potential and rapidly growing services sector offer significant opportunities in terms of international sustainable investment trends. However, transforming this potential into economic value depends on increasing project development capacity, strengthening institutional coordination, using financial instruments effectively and establishing an investment ecosystem that meets international investor expectations.

In this chapter, the concepts of green finance and climate finance will be examined not only from a theoretical perspective but also within the framework of the sectoral transformation needs of Antalya's economy. The objective is not merely to introduce financing instruments but to analyse how these instruments can transform Antalya's economic structure. Within this scope, international climate finance mechanisms, sustainable capital markets, carbon markets, green bonds, sustainable loans, public–private partnership models and innovative financing instruments will be examined in line with Antalya's investment needs and sectoral priorities.

The ultimate objective of this chapter is to identify the fundamental components of an integrated investment ecosystem capable of financing Antalya's green transition and to develop a strategic financing vision that will enable the city to benefit more effectively from national and international capital flows. This approach aims not only to achieve environmental objectives but also to increase Antalya's capacity to attract investment, strengthen its economic competitiveness, develop high-value-added sectors and establish the financial foundations of sustainable development. In this respect, the fourth chapter provides a fundamental policy framework that integrates the sectoral transformation analyses presented in the preceding chapters of the report with applicable financing models and investment strategies.

4.2 Transformation of Global Green Finance and Climate Finance

Since the Industrial Revolution, global economic growth has largely been based on fossil fuel-based production models, intensive natural resource consumption and linear economic systems. For many years, the main determinants of investment decisions have been economic indicators such as financial returns, market size, labour costs and political stability. However, as the impacts of climate change on the global economy have become increasingly visible, a fundamental paradigm shift has begun to emerge in the investment landscape. Today, capital markets assess not only economic returns but also climate risks, environmental sustainability and long-term resilience as integral components of investment decisions.

The Paris Agreement, the United Nations Sustainable Development Goals, the European Green Deal and numerous national net-zero emissions commitments adopted by the international community in recent years have significantly changed the direction of the global financial system. Alongside public resources, private-sector capital is increasingly being directed towards low-carbon technologies, energy transition, resource efficiency, the circular economy and climate adaptation investments. Consequently, environmental sustainability has become one of the fundamental determinants not only of public policies but also of global capital flows.

One of the most significant characteristics of this transformation is that climate finance has evolved beyond a specialised financing field supporting only environmental projects to become one of the main pillars of economic development. Today, renewable energy, energy efficiency, sustainable transport, green buildings, water management, waste recovery, nature-based solutions and climate-resilient infrastructure are regarded as rapidly expanding strategic investment areas by international investors. Accordingly, financial institutions prioritise projects capable of managing long-term risks more effectively and offering high potential for sustainable growth.

On the other hand, climate change creates not only new investment opportunities for the financial sector but also new areas of risk. Physical risks such as drought, extreme weather events, forest fires, floods, sea-level rise and increasing temperatures directly affect the economic performance of numerous sectors, from agriculture and tourism to industry and transport. In addition, transition risks, including carbon pricing, emissions regulations, sustainability reporting obligations and international trade rules, are changing the conditions under which businesses can access finance. For this reason, financial institutions assess not only current financial performance but also the climate risks that businesses may face in the future when making credit and investment decisions.

This transformation in the global financial system is also redefining how cities and regions approach economic competitiveness. In the past, low-cost production, tax advantages and logistical opportunities were prominent in investment-attraction competition. Today, however, cities with sustainable infrastructure, the capacity to manage climate risks and compliance with international sustainability standards have a stronger capacity to attract investment. In other words, future competition will take place not only between companies but also between cities in terms of investment attractiveness.

These developments are of strategic significance for Antalya. In addition to being Türkiye's most important tourism centre, Antalya offers substantial opportunities for green transition investments through its strong agricultural production, developing industrial infrastructure, logistics potential, ports and blue economy capacities. However, translating these opportunities into economic value requires investment projects to be prepared in accordance with international financing criteria, their environmental and social impacts to be made measurable, and their implementation to be supported by long-term financing models.

On the other hand, global financing trends do not merely signify the emergence of new resources. They also have consequences for sectors that fail to comply with sustainability criteria, including increased financing costs, more difficult access to credit and reduced interest from international investors. Consequently, the green transition is no longer merely an environmental preference; it has become one of the fundamental conditions for attracting investment, accessing finance and maintaining international competitiveness. From the perspective of Antalya's economic future, climate finance should not be regarded solely as an instrument for financing large-scale infrastructure projects. A wide range of investments, from water efficiency investments in agriculture and sustainable tourism projects to low-carbon production technologies in industry, circular economy practices, the green transition of ports and smart city infrastructure, fall within the priority support areas of international financial institutions. This situation has the potential to create a significant economic advantage for Antalya.

In conclusion, the global green finance and climate finance system represents more than a transformation of the financial sector. It is one of the fundamental components of a new economic order that is reshaping production patterns, trade relations, investment strategies, the competitiveness of cities and economic development models. Antalya's ability to establish a strong economic position in this new era depends on recognising the green transition not merely as an environmental obligation but as a strategic development opportunity capable of attracting international capital, accelerating new investments and increasing the competitiveness of its sectors. Therefore, correctly interpreting developments in the global green finance system and restructuring Antalya's investment strategies in alignment with this transformation are among the most important economic priorities for the coming period.

4.3 The Impact of Climate Law and Sustainable Finance on Investment Decisions

International regulations introduced in recent years to combat climate change have moved beyond the scope of environmental policies, establishing a new economic and legal framework that directly affects the global investment system. In particular, sustainable finance policies developed under the leadership of the European Union, carbon regulations, corporate sustainability reporting standards and environmental performance criteria are reshaping not only businesses' production processes but also their conditions for accessing finance, investment costs and international competitiveness. Consequently, climate law has evolved beyond regulations aimed at environmental protection to become one of the fundamental economic instruments guiding global capital flows.

Whereas financial performance, profitability and growth potential have traditionally been regarded as the principal assessment criteria in investment decisions, investors today also consider how companies manage climate risks, the extent to which they reduce carbon emissions, how efficiently they use natural resources and the degree to which they integrate sustainability principles into their corporate governance structures. This transformation facilitates access to financing at more favourable costs for businesses with strong environmental performance, while making access to finance increasingly difficult for businesses that fail to adapt to the transition.

In this process, regulations developed by the European Union, including the **Carbon Border Adjustment Mechanism (CBAM), Emissions Trading System (ETS), Corporate Sustainability Reporting Directive (CSRD), EU Taxonomy, Corporate Sustainability Due Diligence Directive (CSDDD)** and international sustainability reporting standards, directly affect not only companies operating in European Union countries but also all businesses exporting to the European market or seeking access to international finance. Therefore, these regulations are of strategic importance for sectors of Antalya's economy that are integrated into international markets.

Antalya's agriculture, food industry, marble, natural stone, mining, manufacturing, logistics and tourism sectors will be directly affected by this transformation due to their export connections, international investment relationships and foreign capital structures. For businesses supplying products or services to the European market, carbon footprint, energy efficiency, water consumption, waste management, circular economy practices and sustainability reporting are no longer merely indicators of environmental responsibility; they have become fundamental conditions for market access, investment attractiveness and maintaining competitiveness.

The impact of climate law on investment decisions is not limited to international trade. Banks, development finance institutions, investment funds and private equity firms are increasingly taking climate risks into account in their credit assessment processes. Particularly in large-scale infrastructure investments, tourism projects, energy facilities, industrial investments and real estate development projects, environmental and social risk assessments have become an integral part of investment decisions. This enables projects that meet sustainability criteria to access more favourable financing conditions, while increasing financing costs for projects with high carbon intensity or an inability to manage climate risks.

From Antalya's perspective, this transformation will have significant consequences that change the nature of the investment environment. In the tourism sector, energy efficiency, water management and sustainable destination practices are increasingly becoming assessment criteria for international tour operators and investors. In the agricultural sector, water efficiency, good agricultural practices and low-carbon production methods will provide a competitive advantage in export markets. In the industrial sector, investments in energy transition, resource efficiency and carbon management will emerge not only as measures to ensure legal compliance but also as strategic investments that facilitate access to international finance. Similarly, climate law necessitates a new approach to investment for municipalities and local administrations. Smart transport systems, low-carbon public transport, green infrastructure, water and waste management projects, and climate-resilient urban practices are among the priority investment areas of international development banks and climate funds. Antalya's ability to benefit more effectively from these resources will depend on preparing its projects in accordance with international environmental and financial standards.

During this transformation, sustainable finance principles will directly affect not only large-scale companies but also small and medium-sized enterprises (SMEs). Small and medium-sized enterprises operating within the supply chains of large businesses may face the risk of exclusion from international value chains if they fail to comply with sustainability criteria. Therefore, accelerating the green transition of SMEs, which constitute a significant part of Antalya's economy, is of critical importance not only for environmental compliance but also for economic sustainability. In the coming period, the fundamental factor determining investment decisions will not merely be the volume of capital but also the conditions under which capital is directed and the types of projects to which it is allocated. Green finance and sustainable investment principles are redefining the concept of bankability. Projects capable of managing environmental risks, adapting to climate change, reducing carbon intensity and increasing resource efficiency are regarded by international investors as more reliable and lower-risk investment opportunities.

Within this framework, Antalya's fundamental task is to regard climate law not merely as an obligation to be fulfilled, but as an investment strategy that will accelerate economic transformation. Ensuring that projects developed in the city comply with international sustainability finance criteria, strengthening institutional capacity and supporting the green transition investments of different sectors will enable Antalya to secure a greater share of global capital flows. Thus, climate law and sustainable finance practices will become strategic instruments of economic transformation, contributing not only to the achievement of environmental objectives but also to increasing Antalya's capacity to attract investment, strengthening its economic competitiveness and achieving its long-term development goals.

4.4 Financing Needs of Antalya's Economy for the Green Transition

Climate change and the green transition are creating substantial investment needs across almost every sector of Antalya's economy. The sectoral analyses examined in detail in the third chapter of the report reveal that existing production and service models will undergo significant changes in numerous areas, from agriculture and tourism to industry and transport, and from water management to waste management. Achieving this transformation will require not only technical capacity but also a strong and sustainable financing infrastructure.

In the coming years, Antalya's investment needs will extend beyond conventional infrastructure investments to encompass multidimensional transformation investments that facilitate climate change adaptation, reduce carbon emissions, use natural resources more efficiently and increase economic resilience. As a significant proportion of these investments have long payback periods, conventional commercial financing methods alone will be insufficient. Therefore, the effective use of innovative financing instruments, including international climate finance, development banks, sustainable credit mechanisms, green bonds, carbon markets and public–private partnerships, is of strategic importance. Antalya's financing needs arise not only from the scale of the investments required. At the same time, sectors must restructure their production processes to comply with climate law, maintain their international competitiveness and meet sustainable finance criteria. This situation necessitates the modernisation of existing investments while also creating new investment areas.

From the perspective of the agricultural sector, irrigation systems that increase water efficiency, digital agriculture practices, climate-resilient production techniques, agricultural infrastructure supported by renewable energy and low-carbon production models are emerging as important investment areas. Antalya's position as one of Türkiye's most important agricultural production centres demonstrates that these investments are strategically significant not only for the environment but also for food security, exports and rural development. Compliance with international sustainability standards in the agricultural sector is also becoming a critical requirement for maintaining access to export markets.

The tourism sector occupies a determining position in Antalya's economic structure and is one of the areas in which the financing needs of the green transition will be felt most intensively. Energy efficiency practices in accommodation facilities, renewable energy systems, water recovery facilities, waste management infrastructure, carbon management systems and sustainable destination investments will directly affect the sector's international competitiveness. Particularly when considering the sustainability criteria adopted by international tour operators, investment funds and hotel chains, these investments will become one of the fundamental conditions for maintaining a presence in the market in the future.

For the industrial sector, green transition investments encompass a broad range of areas, including energy efficiency, process modernisation, low-carbon production technologies, electrification systems, renewable energy use, waste heat recovery, water recovery and circular economy practices.

Considering the European Union's climate policies and sustainable finance criteria, these investments will not only ensure environmental compliance but also provide significant economic benefits in terms of export sustainability, reducing production costs and facilitating access to international finance.

In the field of water management, investment needs are expected to increase progressively due to the impacts of climate change. Strengthening drinking water infrastructure, reducing losses and leakages, expanding wastewater recovery systems, developing alternative water resources, implementing digital water management practices and establishing climate-resilient infrastructure are among the priority investment areas for Antalya's long-term water security. Water investments are among the fundamental elements of economic growth, not only in terms of environmental sustainability but also in ensuring the continuity of agricultural, tourism and industrial activities.

Investments in waste management and the circular economy also have the potential to become one of the new growth areas of Antalya's economy. Developing recycling infrastructure, transforming organic waste into economic value, implementing industrial symbiosis practices, establishing biogas and biomethane facilities, investing in resource efficiency and introducing digital waste management systems will both deliver environmental benefits and create new employment and investment opportunities. The utilisation of waste as an economic resource is among the strategic investments that will strengthen Antalya's circular economy capacity.

For the maritime, port and logistics sectors, green port practices, shore power, alternative fuel infrastructure, energy-efficient port operations, digital logistics systems and low-carbon transport solutions are becoming increasingly prominent. Considering the accelerating carbon reduction policies in the international maritime sector, the adaptation of Antalya's port infrastructure and logistics systems to this transformation will be a determining factor in regional competitiveness.

The investment needs of local administrations will also increase significantly during this process. Investments such as resilient urban infrastructure, sustainable transport systems, the expansion of green spaces, rainwater management, smart city applications, infrastructure that reduces disaster risks and energy-efficient public buildings are among the priority support areas of international financial institutions, while also improving the quality of urban life.

However, the most important challenge facing Antalya is not merely finding financing resources. The primary need is to develop implementable project portfolios that meet the expectations of international investors, have reached technical maturity, have undergone economic feasibility assessments and have had their environmental and social impacts analysed. Today, international climate funds and development finance institutions indicate that they face a shortage of investment-ready projects rather than a shortage of resources capable of providing finance. Therefore, increasing Antalya's project development capacity should be regarded as a strategic priority as important as securing financing. Within this framework, Antalya's financing needs for the green transition are not limited to the investment requirements of particular sectors. These needs necessitate the establishment of an integrated investment ecosystem that will maintain the city's economic competitiveness, increase its capacity to attract international investment, strengthen its resilience to climate change and support its sustainable development. Accordingly, rather than producing independent financing solutions for individual sectors, financing strategies should be addressed through an integrated investment planning approach encompassing Antalya's entire economic structure.

In conclusion, while Antalya's green transition process will generate substantial new investment needs, it will also offer significant opportunities in terms of access to international capital. Transforming these opportunities into economic value will depend on developing the right projects, using appropriate financing instruments and establishing an effective cooperation mechanism between the public and private sectors.

A successful financing strategy will not only ensure the implementation of transformation projects but will also make a significant contribution to Antalya's achievement of its sustainable growth and high-value-added economic development objectives by increasing its capacity to attract investment.

4.5 International Climate Finance Sources and Antalya's Financing Potential

Efforts to combat climate change and adapt to its impacts are among the most important priorities of global development policies today. Accordingly, over the past twenty years, the international financial system has undergone a major transformation, not only through the expansion of funds established to combat climate change but also through the growth of sustainable investment mechanisms. Development banks, multilateral financial institutions, climate funds, international investment banks and private sector investment funds are rapidly expanding financing models that support low-carbon development and climate-resilient investments.

For Antalya, this development does not merely signify the emergence of new financing sources. It also presents an important opportunity to align the city's long-term investment strategy with international capital flows. Antalya's strong tourism infrastructure, developed agricultural sector, growing industrial capacity, water management projects, blue economy potential and local government investments largely correspond to the priority investment areas supported by international climate finance institutions.

International climate finance sources are generally structured in the form of grants, long-term low-interest loans, guarantee mechanisms, blended finance, technical assistance programmes and private sector investment partnerships. The primary objective of these mechanisms is to accelerate investment decisions by reducing the financing costs of projects that support climate change adaptation and reduce carbon emissions. Particularly for cities in developing countries, these resources play a critical role in implementing transformation investments of a scale that public budgets alone cannot finance.

From Antalya's perspective, a significant proportion of the investment areas prioritised by international financial institutions are directly related to the sectors analysed in detail in the third chapter of this report. Investments that improve water efficiency in agriculture, climate-resilient production systems and sustainable agricultural infrastructure; energy efficiency, water recovery and sustainable destination practices in tourism; low-carbon production technologies and resource efficiency projects in industry; recovery systems, alternative water resources and smart infrastructure in water management; circular economy practices and biogas investments in waste management; and green port practices and low-carbon logistics solutions in maritime transport and port operations are among the priority areas supported by international financial institutions.

However, international financial institutions now finance not merely good ideas, but investment-ready projects. For a project to secure financing, its technical feasibility must have been established, its economic analyses completed, its environmental and social impacts assessed in accordance with international standards, its institutional governance structure established and its implementation capacity demonstrated. Therefore, the most important issue for Antalya is to strengthen its capacity to develop projects that meet international investment criteria, as well as to seek financing sources.

In particular, the World Bank Group, European Investment Bank (EIB), European Bank for Reconstruction and Development (EBRD), French Development Agency (AFD), German Development Bank (KfW), Green Climate Fund (GCF), Global Environment Facility (GEF), Climate Investment Funds (CIF) and similar institutions provide long-term financing for climate adaptation projects developed at the city level and low-carbon development investments.

In addition, the United Nations system, European Union financial programmes and various international cooperation mechanisms make significant contributions to technical assistance, capacity building and project preparation processes. For Antalya to benefit more effectively from these resources, relying solely on individual project applications will not be sufficient. Instead, an integrated investment portfolio covering multiple sectors needs to be developed. For example, when water management investments are considered together with agricultural productivity projects, renewable energy applications with the transformation of tourism facilities, waste management with circular economy investments, or port modernisation with low-carbon logistics projects, integrated programmes with greater potential impact for international investors can be developed. At this point, one of Antalya's most important advantages is its potential for simultaneous transformation across different sectors. While many cities around the world focus primarily on a particular sector, Antalya possesses the economic diversity required to transform tourism, agriculture, industry, maritime activities, water management and the service economy simultaneously. This characteristic provides Antalya with a significant competitive advantage in relation to "multi-sectoral transformation programmes", which are receiving increasing attention from international financial institutions.

However, strengthening institutional coordination is essential for translating this advantage into economic value. Establishing a culture of joint project development among local governments, central government, universities, development agencies, professional organisations, the private sector and financial institutions is one of the fundamental prerequisites for accessing international finance. At the same time, developing technical capacity in project preparation, financial modelling, environmental and social impact assessment, sustainability reporting and international tendering procedures is of considerable importance. In the coming period, competition between cities will not be limited to attracting investment. Cities capable of securing a greater share of international climate finance will also be able to complete their economic transformation processes more rapidly and strengthen their global competitiveness. Therefore, Antalya's objective should not merely be to benefit from existing funds, but to establish a model investment ecosystem that is trusted by international investors, possesses strong project development capacity and integrates sustainable finance principles into its institutional structure.

In conclusion, international climate finance represents not merely an additional source of financing for Antalya, but also a strategic lever for accelerating economic transformation, increasing sectoral competitiveness and achieving the city's long-term development objectives. Antalya's success will depend less on the volume of these resources than on its capacity to match appropriate projects with appropriate financing instruments. The integrated financing approach developed in this direction will support the city's green transition while simultaneously strengthening its capacity to attract international investment and establishing the financial foundations for sustainable economic growth.

4.6 Green Finance Instruments and Sustainable Capital Markets

The transformation taking place in the global financial system is changing not only investment priorities but also the way investments are financed. Alongside traditional models based on loans and equity financing, new financing instruments that take environmental and social impacts into account are rapidly becoming more widespread. Instruments such as green bonds, sustainability bonds, sustainability-linked loans, blended finance models, sustainable investment funds and impact investments have become fundamental financing mechanisms for combating climate change and financing green transition investments. The common characteristic of these financing instruments is that they do not focus solely on economic returns; they also consider environmental performance, carbon emission reductions, resource efficiency, climate adaptation and contributions to sustainable development objectives as integral components of investment decisions.

Thus, a direct relationship is established between financing costs and sustainability performance. Projects with strong environmental performance, effective climate risk management and compliance with international sustainability standards are considered lower-risk investments by investors and can access more favourable financing conditions. This development presents a significant opportunity for Antalya's economy. Investments in energy transition, sustainable tourism, water management, waste recovery, the circular economy, low-carbon industry, green transport and climate-resilient infrastructure to be implemented in the city in the coming years can be supported not only through traditional financing methods but also through innovative instruments offered by sustainable capital markets. This will reduce financing pressures on public resources while enabling private sector investments to be implemented more rapidly. Green bonds, in particular, have become one of the fastest-growing capital market instruments for financing projects that deliver environmental benefits in recent years. This financing model, used in areas such as renewable energy investments, energy efficiency projects, sustainable transport systems, water and waste infrastructure, and green building applications, offers significant advantages for cities with long-term investment needs. In Antalya, this mechanism should be regarded as an important option for financing long-lived infrastructure projects, particularly those undertaken by municipalities, infrastructure organisations and large-scale private sector investors.

Similarly, sustainability-linked loans are becoming increasingly widespread as a new generation of lending models that enable businesses to access more favourable financing conditions in return for improving their environmental performance. Businesses that reduce energy consumption, lower carbon emissions, increase water efficiency or improve circular economy practices can reduce their financing costs to the extent that they achieve their specified sustainability targets. This approach will make green transition investments more economically attractive for industrial enterprises, tourism facilities and agricultural businesses operating in Antalya. The development of sustainable capital markets creates new financing opportunities not only for large companies but also for small and medium-sized enterprises (SMEs). Particularly as supply chains are increasingly being restructured according to sustainability criteria, improving the environmental performance of SMEs working with large enterprises is becoming increasingly important for access to finance.

Preparing small and medium-sized enterprises, which constitute a significant part of Antalya's economy, for this transformation is of strategic importance for maintaining regional economic competitiveness. Another important dimension of green financing instruments is the development of new cooperation models between public and private sector investments. In particular, the blended finance approach enables larger-scale investments to be undertaken by combining public resources with financing from international financial institutions and private sector capital. This model could provide an important financing alternative for Antalya in areas requiring high investment costs, such as water infrastructure, waste management systems, energy transition, port modernisation and resilient urban infrastructure. In addition, sustainable investment funds and impact investments have become rapidly growing areas of finance in recent years. These funds invest not only to generate financial returns but also in projects that aim to deliver measurable environmental and social benefits. Projects to be developed by Antalya in sustainable tourism, the blue economy, nature-based solutions, renewable energy and the circular economy have significant potential within this investment approach.

However, the availability of suitable financing instruments alone is insufficient to benefit effectively from sustainable capital markets. Projects developed in Antalya must be structured in accordance with the expectations of international investors, supported by financial feasibility studies, accompanied by measurable indicators of environmental and social impacts, and underpinned by strong corporate governance principles. Today, investors attach considerable importance not only to a project's economic returns but also to its risk management, transparency, accountability and sustainability performance.

Therefore, the investment ecosystem that Antalya develops in the coming period should move beyond the conventional approach to project financing. Investment projects prepared in the city should be designed to comply with international sustainable finance standards, have measurable performance, demonstrate verifiable environmental and social impacts, and generate long-term economic value. Such an approach will not only facilitate access to financing but also strengthen Antalya's credibility and investment readiness in the eyes of international investors.

In conclusion, green financing instruments and sustainable capital markets are not merely alternative sources of finance for Antalya; they are strategic development instruments that will accelerate economic transformation. Success in the coming period will depend less on which financing instruments are available than on how effectively the appropriate investment models can be applied in different sectors. Antalya's ability to enhance its competitiveness during the green transition will depend on matching sustainable finance instruments with appropriate projects on a sectoral basis, directing international capital towards the city's priority investment areas, and making a sustainable investment culture an integral part of its institutional structure. This approach will make a significant contribution not only to Antalya's achievement of its climate objectives but also to the development of an economic structure that generates higher added value, is more resilient and is more competitive.

4.7 Carbon Markets and New Revenue Models

Policies developed to combat climate change have transformed the reduction of carbon emissions from a purely environmental objective into a new market mechanism with economic value. Today, carbon is no longer merely an emission that needs to be reduced from the perspective of many sectors; it has also become a strategic economic factor with financial value, capable of being traded and directly influencing investment decisions. This development is enabling the rapid growth of carbon markets within the global financial system and allowing low-carbon investments to generate new revenue models. The primary objective of carbon markets is to make greenhouse gas emissions an economic cost factor and to encourage low-carbon investments. While businesses that reduce their emissions gain a competitive advantage, sectors with high carbon intensity face increasing cost pressures. Consequently, carbon management is becoming one of the fundamental factors determining businesses' financial performance, investment value and competitiveness in international markets.

The European Union Emissions Trading System (ETS), as one of the world's most developed carbon markets, is among the most significant examples of this transformation. At the same time, voluntary carbon markets are also growing rapidly, with private sector companies, investment funds and international organisations increasing their demand for verified carbon credits in line with their carbon offsetting objectives. These developments create new financing and revenue opportunities for cities and businesses capable of developing low-carbon investment projects. Türkiye's climate policies and legislative efforts concerning carbon markets are also gaining momentum in line with this transformation. In the coming period, the development of a national carbon market and the wider adoption of carbon pricing mechanisms will directly influence businesses' investment decisions. Therefore, preparing Antalya's economy for carbon management is of strategic importance not only in terms of regulatory compliance but also for long-term economic competitiveness.

Given Antalya's economic structure, the opportunities that carbon markets could provide are highly diverse. Through energy efficiency measures, renewable energy investments, sustainable transport systems and resource efficiency projects, the tourism sector can reduce its carbon footprint, comply with international sustainability criteria and establish a stronger financial profile in the eyes of investors. In particular, energy transition investments undertaken in large-scale tourism facilities will reduce operating costs while also delivering significant benefits in terms of carbon management.

The agricultural sector is also among the areas that could be significantly affected by the development of carbon markets. Practices that increase soil carbon sequestration, organic matter management, sustainable agricultural techniques, renewable energy use and water efficiency investments are among the measures that could be supported by carbon finance mechanisms in the future. Considering Antalya's strong agricultural production capacity, the wider adoption of low-carbon agricultural practices will both enhance producers' competitiveness and create new financing opportunities.

From the perspective of the industrial sector, carbon management will become an integral part of investment planning in the coming years. Businesses that reduce their emissions through energy efficiency, process optimisation, electrification, renewable energy use, waste heat recovery and circular economy practices will not only reduce their carbon-related costs but also gain a stronger competitive advantage in international markets. This is particularly important for businesses trading with the European Union.

One of the most significant contributions of carbon markets to Antalya is their potential to create new revenue models. Whereas environmental investments were predominantly regarded as a cost factor in the past, projects that achieve carbon emission reductions are now becoming economic assets capable of generating additional financing, investment incentives and carbon revenues. This approach creates new financing opportunities, particularly for municipalities, organised industrial zones, large-scale tourism investments and infrastructure projects.

However, effectively benefiting from carbon markets requires a robust technical infrastructure. The accurate calculation, monitoring, reporting and verification of emissions; the establishment of carbon management systems; the development of data infrastructure compliant with international standards; and the strengthening of institutional capacity are fundamental components of this process. The development of shared technical capacity in these areas by public institutions, private sector organisations and local governments in Antalya will enable the city to secure a greater share of the emerging carbon economy.

On the other hand, carbon markets are not limited to emissions trading. Carbon management also encompasses numerous new investment areas, including green hydrogen, energy storage systems, biomethane production, carbon capture technologies, nature-based solutions, blue carbon practices and climate-resilient infrastructure. Antalya's natural ecosystems, coastlines, forest assets and blue economy potential offer significant advantages for projects to be developed in these areas.

However, the fundamental point to consider is that carbon markets should not be regarded as an objective in themselves. For Antalya, the primary goal is not merely to generate revenue from carbon trading, but to make carbon management part of an integrated transformation strategy that enhances economic competitiveness, attracts investment and supports sustainable development. When properly planned, carbon markets can serve as an important financial lever for accelerating green transition investments.

In conclusion, the carbon economy will become one of the most important components of the global investment system in the coming years. Antalya's ability to establish a strong position within this new economic framework will depend on effectively managing its carbon emissions, developing low-carbon investment projects, establishing institutional capacity to comply with international carbon markets and preparing its sectors for this transformation. This approach will make significant contributions not only to the achievement of environmental objectives but also to the creation of new investment areas, the expansion of international financing opportunities, the enhancement of business competitiveness and the attainment of Antalya's long-term sustainable growth objectives.

4.8 Strategic Green Investment Areas for Antalya

The process of climate change and green transition is not merely a process that requires the renewal of existing infrastructure in Antalya. It also presents an opportunity to transform the city's economic structure into a model that generates higher added value, is technology-oriented and has a strong capacity to attract international investment. Therefore, Antalya's investment strategy should aim not only to address existing challenges but also to shape the economic sectors of the future.

An examination of global investment trends reveals that international capital is increasingly being directed towards environmental sustainability, climate resilience, resource efficiency and low-carbon technologies. This trend creates a significant advantage for cities with highly diversified economies, such as Antalya. The strong representation of tourism, agriculture, industry, water management, the blue economy and the service sector within the same economic structure enables Antalya to develop multi-sectoral transformation projects. In this context, the primary objective of Antalya's green investment strategy should not merely be to increase investment volumes, but to transform the nature of investment. In the future, the key determinant of economic growth will not be making more investments, but implementing investments that generate greater environmental and economic value. The tourism sector is among the areas with the greatest investment potential in Antalya. Investments in the energy efficiency transformation of accommodation facilities, renewable energy systems, water recovery, circular economy practices, carbon-neutral facilities, smart building technologies and sustainable destination management will both reduce operating costs and enhance competitiveness in international markets. In the coming period, destinations that comply with sustainability criteria are expected to be increasingly preferred by international investors and tour operators.

The agricultural sector is both one of Antalya's most vulnerable sectors to climate change and one of those with the greatest transformation potential. Smart irrigation systems, precision agriculture technologies, digital production management, controlled-environment agriculture, renewable energy-powered production facilities, water recovery and climate-resilient production models will both increase productivity and respond to demand for sustainable production in international markets. These investments should also be regarded as strategic investments that support rural development and enhance the competitiveness of agricultural exports. In the industrial sector, investment priorities are concentrated on low-carbon production technologies, energy efficiency, digital production systems, industrial symbiosis practices, recovery technologies, process modernisation and renewable energy integration. The green transition of industry will not only ensure environmental compliance but will also reduce production costs, facilitate access to international markets and increase the capacity to access sustainable financing sources.

Water management will be one of the strategic sectors requiring the greatest investment in Antalya in the future. Considering the pressure of climate change on water resources, advanced wastewater recovery systems, the development of alternative water resources, smart networks, water loss and leakage reduction projects, digital water management and climate-resilient infrastructure stand out as priority investment areas. These investments will not only ensure water security but also support the sustainable growth of the agricultural, tourism and industrial sectors.

Investments in waste management and the circular economy also have the potential to become one of the new growth areas of Antalya's economy. Strengthening recycling infrastructure, producing energy and biomethane from organic waste, implementing industrial symbiosis practices, recovering critical raw materials and adopting technologies that improve resource efficiency will create new investment, employment and entrepreneurship opportunities that deliver environmental benefits. In the coming period, waste management will move beyond its role as a municipal service and evolve into a new industrial and investment ecosystem.

Investments in the maritime, port and blue economy sectors are also of strategic importance in enhancing Antalya's international competitiveness. Green port practices, shore power, alternative fuel infrastructure, low-carbon maritime transport, smart port systems and investments that protect marine ecosystems will both ensure compliance with international maritime standards and support Antalya's objective of becoming a logistics and blue economy hub in the Mediterranean Basin.

Urban infrastructure and local government investments are also among the important components of the green transition process. Smart transport systems, electric public transport, energy-efficient public buildings, stormwater management, green infrastructure, climate-resilient urban transformation projects and digital city applications are among the priority investment areas supported by international financial institutions, while also improving quality of life.

However, Antalya's greatest investment potential lies in its ability to develop integrated transformation programmes rather than treating sectors as independent projects. For example, when sustainable tourism investments are planned together with water recovery, renewable energy, waste management and carbon management practices, both their environmental impact and their capacity to attract investment will increase significantly. Similarly, the joint consideration of agriculture, water management and renewable energy investments will generate higher economic added value. This type of integrated investment programme is precisely the approach that international financial institutions have increasingly prioritised in recent years.

Therefore, Antalya's investment strategy should be based on a programme-oriented rather than a project-oriented approach. Developing programmes that create synergies between sectors, generate measurable economic and environmental outcomes, and comply with international financing criteria will significantly enhance the city's capacity to attract investment. Such an approach will reduce investment risks and financing costs while directing larger volumes of international capital towards Antalya. In conclusion, Antalya's green investment areas are not merely investment categories intended to achieve environmental objectives. These investments are strategic development instruments that accelerate economic growth, generate high added value, create new employment opportunities, strengthen export capacity and enhance international competitiveness. Antalya's future success will be measured not by which sector receives more investment, but by its ability to establish an integrated green transition ecosystem across sectors and connect this ecosystem with international capital. In this way, the green investment strategy will become one of the most important cornerstones of the financial and economic foundation of the city's sustainable development vision.

4.9 Antalya Green Project Portfolio Approach

Success in combating climate change and advancing the green transition depends not only on the scale of available financing resources but also on developing projects capable of utilising these resources. Today, one of the most significant challenges faced by international financial institutions is not a shortage of financing, but a shortage of investment-ready projects. Conversely, many cities and regions cannot access the financing they require, primarily because they lack technically and economically mature project portfolios that comply with international standards. For Antalya, therefore, the priority is not only to seek financing but also to establish a robust project ecosystem capable of attracting it.

Accordingly, Antalya's green transition strategy should move beyond the conventional approach based on developing individual projects and be built upon **a strategic project portfolio management approach.** The project portfolio approach involves the integrated planning of projects that complement one another, serve shared objectives and are developed in accordance with international investment criteria. In this way, investment decisions can be shaped not merely according to the needs of a single institution or sector, but in line with Antalya's long-term economic transformation objectives.

The primary objective of this approach is to identify investment priorities, improve the efficiency of resource utilisation and establish project pipelines capable of benefiting simultaneously from different financing mechanisms. International development banks and climate funds, in particular, are placing increasing emphasis on financing mutually reinforcing, cross-sectoral transformation programmes rather than individual projects. Therefore, Antalya's investment strategy should also be restructured to establish integrated project programmes.

When developing a green project portfolio, Antalya's strategic investment areas should first be identified, and projects to be developed in these areas should be assessed through a common prioritisation system. This assessment should consider not only the scale of investment but also criteria such as climate change adaptation capacity, carbon emission reduction potential, economic added value, employment impact, contribution to exports, resource efficiency, technological transformation capacity and eligibility for international financing. In this way, investment decisions can be directed towards long-term economic transformation objectives rather than short-term needs.

Considering Antalya's sectoral structure, planning the project portfolio as thematic programmes that integrate different sectors will provide significant advantages. For example, a sustainable tourism programme could bring together energy efficiency, water recovery, renewable energy, waste management, carbon management and digital destination applications within a single investment framework. Similarly, agricultural and water management projects could be integrated with climate-resilient production systems and renewable energy investments to generate greater environmental and economic impacts. This approach will both increase investor interest and align with the integrated transformation model prioritised by international financial institutions.

The success of the green project portfolio approach depends on strong project development capacity. Therefore, Antalya needs to establish an institutional structure that not only generates investment ideas but also prepares feasibility studies, develops financial models, conducts environmental and social impact assessments, manages applications to international funds and coordinates project implementation processes.

Such a structure will accelerate investment processes by ensuring coordination among public institutions, local governments, universities, the private sector, professional organisations and financial institutions. At the same time, it is of great importance that the project portfolio to be developed has a dynamic structure. International financing priorities, technological developments and climate policies are constantly changing. Therefore, Antalya's investment portfolio should be updated at regular intervals, revised in line with new investment opportunities and monitored through performance indicators. In this way, investment planning will cease to be a static document and become a living management instrument capable of adapting to changing global conditions.

In this context, establishing a **"Green Project Pipeline"** for Antalya would constitute a strategic step. This pipeline could be designed as an integrated management system that brings together all green transition projects developed by the public and private sectors within a common database, monitors their levels of readiness, assesses their eligibility for financing and facilitates their matching with investors. Through such a structure, investors, financial institutions and public bodies will be able to access priority projects more rapidly, significantly facilitating financing processes. The green project portfolio approach is also an important instrument for increasing Antalya's international visibility. Global investors increasingly favour cities that possess a strong long-term investment vision rather than merely offering individual projects. Therefore, presenting projects developed across Antalya's different sectors within a common investment programme will enhance international investor confidence and support long-term capital inflows towards the city's sustainable development objectives.

In conclusion, one of Antalya's most important competitive advantages in the green transition process will be its capacity to establish a strong project portfolio. Success depends not only on the scale of financing resources but also on developing qualified, feasible and investment-ready projects capable of utilising these resources. Therefore, project portfolio management should be regarded as an integral part of Antalya's green transition strategy, and investment planning, project development, financing management and implementation processes should be conducted within a common institutional framework. Such an approach will enable Antalya to secure a greater share of international climate finance, accelerate its economic transformation and significantly strengthen its position in line with its objective of becoming a sustainable investment hub in the Mediterranean Basin.

4.10 Strategic Policy Recommendations

Antalya's ability to transform the climate change and green transition process into economic growth cannot be achieved merely by increasing financing resources. The fundamental requirement is to establish an institutional financing ecosystem that strengthens investment conditions, enhances project development capacity, ensures coordination between the public and private sectors, and inspires confidence among international investors. Therefore, the policies to be developed should be addressed through an integrated approach that focuses not only on securing resources but also on the investment process as a whole. The first priority within this framework is to establish a shared strategic investment vision for Antalya's green transition investments. Planning projects developed by public institutions, local governments, universities, professional organisations, the private sector and financial institutions in the city in accordance with common objectives will enable more effective utilisation of investment resources. Instead of a fragmented and independent project approach, a programme-based investment model that creates synergies between sectors should be adopted.

Secondly, project development capacity in Antalya must be institutionalised in accordance with international standards. Today, many international financial institutions encounter difficulties in identifying investment-ready projects despite having sufficient resources to provide financing. Therefore, it is of great importance that the technical feasibility, economic analysis, environmental and social impact assessment, financial modelling and implementation planning processes of projects developed in the city are conducted in accordance with international standards. Strengthening project preparation capacity will directly increase Antalya's share of international climate finance. Another important policy area is strengthening public–private sector cooperation. A significant proportion of green transition investments cannot be implemented solely through public resources. In particular, expanding public–private partnership models in areas such as water management, energy transition, waste management, sustainable transport, port modernisation and resilient urban infrastructure will increase investment volumes while also enabling financing risks to be shared. In this process, it is important for local governments to assume a facilitating role in investment and for the private sector to be involved with a long-term investment perspective. Developing Antalya's institutional capacity in sustainable finance is also among the priority policy areas. The knowledge and implementation capacity of local governments, public institutions, organised industrial zones, the tourism sector and private sector representatives regarding international sustainable finance standards, green financing instruments, carbon markets and climate finance mechanisms must be enhanced. In this context, training programmes, technical guidelines and institutional capacity-building activities should be carried out systematically. The development of data management and performance monitoring systems is also of critical importance in the green transition process. International investors and financial institutions attach great importance to reliable, comparable and verifiable data when making investment decisions. Therefore, digital data infrastructures should be established to monitor the carbon emissions, energy consumption, water efficiency, waste recovery, renewable energy use and sustainability performance of Antalya's sectors. This will both increase the transparency of investment processes and facilitate the compliance of developed projects with international financing criteria.

It is also important that financing strategies do not focus exclusively on large-scale investments. Support mechanisms should be developed to facilitate access to green transition investments for small and medium-sized enterprises (SMEs), which constitute a significant proportion of Antalya's economy. Low-interest transition loans, energy efficiency financing, digital transformation support and sustainable production incentives should be among the principal instruments for enhancing the international competitiveness of SMEs. In this way, the green transition will become a shared transformation process encompassing the entire economic structure, rather than being limited to large enterprises. An integrated, cross-sectoral programme approach should be adopted in Antalya's investment strategy. Planning projects to be developed in tourism, agriculture, industry, water management, energy, waste management and the blue economy within joint programmes that complement one another will ensure alignment with the integrated investment model increasingly prioritised by international financial institutions. This will enable simultaneous transformation across different sectors within the same financing programme and significantly increase the economic impact of investments.

Developing strong partnerships with international investors should also be one of the fundamental components of Antalya's long-term financing strategy. Establishing international investment platforms to promote the city's investment potential, organising sustainable investment summits, developing project promotion programmes and establishing regular cooperation mechanisms with international financial institutions will strengthen Antalya's visibility within global investment networks. The success of green transition investments also depends on establishing a strong governance model. In this context, transparency, accountability, participation and evidence-based decision-making principles should form the basis of investment processes. A multi-stakeholder governance model involving universities, professional organisations, civil society organisations, the private sector and public institutions will ensure more inclusive investment decisions and increase the confidence of international investors.

Finally, Antalya must regard climate finance not merely as a project-based resource mobilisation process, but as a fundamental component of a long-term development strategy. Investment policies prepared in accordance with this approach will support the city's economic transformation, enhance its international competitiveness and enable it to achieve its sustainable growth objectives. Beyond the appropriate use of financing instruments, it is also of great importance to determine which sectors, priorities and economic objectives these instruments will serve.

In conclusion, Antalya's success in the green transition process will be measured not only by the volume of investment but also by the quality of the policies developed, institutional capacity and implementation effectiveness. A strong project ecosystem, financing infrastructure aligned with international standards, cross-sectoral coordination and a policy framework supported by a long-term investment vision will enable Antalya to transform the climate change and green transition process into economic growth and an international competitive advantage. Thus, green finance will become not merely a financial resource for the transition, but a strategic development instrument shaping Antalya's future development model.

4.11 Priority Areas for Transformation

The most important issue facing Antalya in the context of climate change, climate law and the green transition is not so much which investments should be undertaken, but rather the accurate identification of which investments should be implemented as priorities. Given that financing resources are limited while investment needs are extensive, it is of great importance to determine investment priorities from a strategic perspective. Therefore, Antalya's green transition process should be built upon priority areas for transformation that, rather than consisting of projects independent of one another, have a high economic impact, possess strong potential for international financing and create synergies between sectors.

The first priority area for transformation should be **water security and the circular water economy**. All the tourism, agriculture and industrial sectors that form the foundation of Antalya's economy depend on reliable water resources. Therefore, advanced wastewater recovery, smart water management, reduction of water losses and leakages, development of alternative water resources and establishment of climate-resilient water infrastructure are fundamental requirements not only for environmental sustainability but also for economic sustainability. Water investments should be regarded as strategic infrastructure investments that ensure the continuity of all other sectors. The second priority area is **sustainable tourism transformation.** Antalya's ability to maintain its international competitiveness depends on accelerating investments in energy efficiency, carbon management, water efficiency, circular economy practices and sustainable destination management. In the future, destinations preferred by international tour operators, investment funds and tourists will be those that not only provide high-quality services but also demonstrate strong sustainability performance. Therefore, the green transition of the tourism sector should be regarded as one of the priority investment areas for the future of Antalya's economy. The third priority is **enhancing the climate resilience of agricultural and food systems.** Maintaining Antalya's agricultural production capacity will be possible through the widespread adoption of water efficiency measures, digital agricultural practices, climate-resilient production systems, renewable energy use and low-carbon agricultural production models. Agricultural transformation directly affects not only the continuity of production but also export capacity, rural employment and food security. The fourth priority area for transformation is **the green and digital transformation of industry.** Considering the European Union's climate policies and global sustainable finance criteria, Antalya's industry needs to accelerate investments in energy efficiency, low-carbon production technologies, resource efficiency, industrial symbiosis and digital production systems. This transformation will not only ensure environmental compliance but also reduce production costs, support the sustainability of exports and increase the capacity to attract international investment. The fifth priority area is **circular economy and resource efficiency investments.** Converting waste into economic value, strengthening recycling infrastructure, producing biogas and biomethane, implementing industrial symbiosis practices and recovering critical raw materials will contribute to the development of new industrial sectors in Antalya. While reducing costs, the resource efficiency approach will also create new opportunities for entrepreneurship and employment. The sixth priority area for transformation is **blue economy and green port investments.** Considering Antalya's identity as a coastal city, its ports, marinas and maritime infrastructure, investments in low-carbon maritime transport, shore power, alternative fuel infrastructure, sustainable fisheries and marine ecosystem conservation will offer significant economic opportunities in the future. Blue economy investments will become one of the important sectors strengthening Antalya's strategic position in the Mediterranean. The seventh priority area is **the development of climate-resilient urban infrastructure.** Smart transport systems, electric public transport, energy-efficient public buildings, green infrastructure, rainwater management, urban solutions that reduce disaster risks and digital city applications will both improve quality of life and constitute priority investment areas supported by international financial institutions. Making urban infrastructure resilient is essential for Antalya's long-term economic sustainability.

However, the success of these priority areas for transformation will depend not only on investment decisions but also on their management within a common strategic framework. Antalya's sectoral transformation programmes should be planned in a mutually supportive structure; water investments should be integrated with agriculture and tourism, energy investments with industry and transport, and circular economy practices with production and consumption systems. In this way, each investment will generate a multiplier effect that creates value not only for its own sector but also for Antalya's economy as a whole.

In this context, the fundamental approach that Antalya should adopt in its green transition process is a shift from project-oriented management to programme-oriented management, from sectoral planning to integrated investment planning, and from resource utilisation to value creation. This approach to transformation will also be compatible with the investment priorities of international financial institutions and will strengthen Antalya's position within global investment networks.

In conclusion, Antalya's priority areas for transformation are not merely investment categories aimed at reducing environmental risks. These areas constitute strategic investment pillars that will enhance the city's economic competitiveness, accelerate international capital inflows, support high-value-added production and strengthen sustainable development. Therefore, the prioritisation process should be shaped by long-term economic objectives that will realise Antalya's 2050 vision, rather than by short-term needs. Such an approach will transform the city's green transition from a process focused solely on climate change adaptation into one that also positions Antalya as one of the Mediterranean Basin's centres for sustainable investment, green finance and innovative development.

End-of-Chapter Assessment

Climate change, climate law and the green transition process are fundamentally transforming the approach to financing in the global economy. Investment decisions are no longer shaped solely by economic returns, but also by environmental performance, carbon management, resource efficiency, climate risks and sustainability criteria. This transformation is redefining not only the financial sector but also production models, trading systems and urban development strategies.

In this new era, Antalya's most important advantage is its diversified economic structure and its strong potential to benefit simultaneously from the opportunities offered by the green transition. With its tourism, agriculture, industry, water management, maritime, logistics and service sectors developing together, Antalya has the potential to become one of the cities that benefit most from international climate finance, provided that appropriate planning is undertaken. However, translating this potential into economic value depends on establishing strong project development capacity, effective investment planning and an institutional structure aligned with international standards.

The assessments presented in this chapter demonstrate that the fundamental challenge facing Antalya is not merely securing financing. The primary requirement is to develop projects capable of attracting financing, establish integrated investment programmes across sectors and manage investment processes in accordance with a shared strategic vision. The priorities of international financial institutions are also changing in this direction; programmes that generate greater economic impact than individual projects, produce measurable outcomes and support long-term transformation are becoming increasingly important.

Green financing instruments, carbon markets and sustainable investment models represent not only new sources of financing for Antalya's economy but also strategic development instruments that will accelerate economic transformation. When used appropriately, these mechanisms will reduce production costs, strengthen the investment environment, enhance export competitiveness, create new employment opportunities and facilitate the flow of international capital into Antalya. In this way, environmental sustainability and economic growth will become two fundamental elements that reinforce one another. Nevertheless, the green transition process should not be regarded solely as a matter of environmental policy or the financial sector. It is a comprehensive structural transformation process encompassing all components of Antalya's economy, from investment planning to industrial policies, from tourism strategies to agricultural production, and from urbanisation to transport. Therefore, the policies to be developed must extend beyond sectoral boundaries and bring economic, social and environmental objectives together within the same strategic framework.

Antalya's future success will be measured not only by its ability to adapt to climate change, but also by its capacity to transform this process into a development strategy that generates new investment areas, new financing models and new economic opportunities. While enhancing the city's international competitiveness, this transformation will also enable the emergence of a more resilient, more efficient and higher-value-added economic structure.

Therefore, the fundamental strategy Antalya should pursue in the coming period is **to move from being a city seeking financing to becoming an investment centre where international investors seek to develop projects.** This approach will not only attract more financing but also enable Antalya to position itself as a reliable, predictable and sustainable partner within the international investment ecosystem.

In conclusion, green finance is one of the most important instruments that will enable Antalya to achieve its 2050 vision. However, the true value of financing lies not solely in the scale of the resources it provides, but in its capacity to accelerate economic transformation, improve investment quality, support technological innovation and make sustainable development enduring. When Antalya's natural, economic and institutional potential is combined with an effective governance approach, a strong project portfolio and investment strategies aligned with international standards, the city has significant potential to become **one of the Mediterranean Basin's leading regional centres for green finance, climate investments and sustainable development, serving as a model not only for Türkiye but also for the wider Mediterranean region.**

CHAPTER 5

ANTALYA'S GREEN TRANSITION ROADMAP

Strategic Programmes, Priority Projects and Implementation Model in Line with the 2050 Vision



5.1 Introduction

Climate change has evolved from an issue concerned solely with managing environmental risks into a comprehensive transformation process that is reshaping investment, production, trade, finance and development policies in the global economy. In this new era, the competitiveness of cities is measured not only by the scale of their natural resources but also by their capacity to adapt to changing global conditions and manage economic transformation. Therefore, climate change adaptation and the green transition have become not merely environmental policy choices for the cities of the future, but fundamental strategic instruments of economic development.

The preceding chapters of this report have examined in detail the current structure of Antalya's economy, the impacts of climate change on its sectors, the new obligations arising from climate law, international financing mechanisms and the fundamental dynamics of the green investment ecosystem. The analyses demonstrate that, alongside having sectors affected by climate change, Antalya also possesses significant advantages that will enable it to benefit from the new economic opportunities presented by the green transition.

However, transforming these advantages into sustainable economic growth cannot be achieved solely through the accurate analysis of existing challenges. The principal determining factor is the ability to translate the findings into implementable strategies, concrete programmes and investment projects. Therefore, this chapter of the report moves from analysis to implementation and presents a strategic roadmap for managing Antalya's green transition process.

The green transition is often associated solely with energy investments or reductions in carbon emissions. However, in a city with a highly diversified economy such as Antalya, the transition is a comprehensive restructuring process encompassing the entire economic structure, from tourism to agriculture, industry to water management, maritime activities to transport, and waste management to urbanisation. Accordingly, the roadmap to be developed should not be a narrowly defined action plan focusing only on specific sectors, but an integrated development model that brings all sectors together around shared objectives. At the heart of this approach is the development of a new growth model that preserves Antalya's existing economic strengths while adapting to future competitive conditions. An economic structure that reduces the risks posed by climate change, uses natural resources more efficiently, supports low-carbon production, accelerates technological transformation and increases the capacity to attract international investment will form the foundation of Antalya's long-term development. Thus, the green transition will be regarded not as an obligation that constrains economic growth, but as a strategic investment policy that accelerates it.

The roadmap proposed in this chapter is not merely a planning document intended for public institutions. It also presents a shared vision for transformation for local authorities, the private sector, organised industrial zones, tourism enterprises, agricultural producer organisations, universities, professional organisations, financial institutions and civil society. This is because combating climate change and achieving the green transition are not processes that can be accomplished by a single institution or sector alone. Success depends on the ability of different stakeholders to act in coordination towards shared objectives. The roadmap developed in this context is built upon three fundamental principles. The first principle is **protecting and enhancing economic competitiveness.** All programmes and projects should be designed to strengthen Antalya's competitive advantage in national and international markets. The second principle is **enhancing climate resilience.** All critical systems, from water resources to coastal areas, agricultural production to urban infrastructure, should be made more resilient to climate risks. The third principle is **strengthening international investment and financing capacity.** Ensuring that the projects developed are aligned with global investment trends and sustainable finance criteria will accelerate Antalya's green transition process.

Nevertheless, this roadmap is not intended to present a conventional list of investments. Its primary objective is to define strategic programmes that will guide Antalya's development process over the next twenty-five years, identify priority investment areas, establish an implementation model and create a strong transformation ecosystem across sectors. Therefore, the programmes proposed throughout this chapter will be considered not as independent projects, but as integrated components of transformation serving shared objectives.

International experience demonstrates that the common characteristics of cities that have succeeded in the green transition are their long-term vision, establishment of strong institutional coordination, enhancement of project development capacity and determination of investment priorities on the basis of scientific evidence. Considering Antalya's economic diversity, entrepreneurial culture, tourism experience, agricultural production capacity and international connections, the city is considered to possess significant potential to achieve this transformation. However, making effective use of this potential requires the implementation of a planned, phased and results-oriented implementation model. The strategic programmes, priority projects and implementation model presented in this chapter have been developed in line with Antalya's objective of **establishing an innovative and resilient economy by 2050 that has adapted to climate change, uses its resources efficiently, has adopted a low-carbon production structure and possesses a strong capacity to attract international investment.** Thus, the green transition will evolve beyond a policy area focused solely on reducing environmental risks into a comprehensive transformation strategy that supports Antalya's sustainable development vision, accelerates economic growth and improves quality of life.

Within this framework, the remainder of this chapter will examine in detail **Antalya's 2050 Green Transition Vision, the strategic transformation principles, priority programmes, flagship projects, implementation model, institutional structure, financing integration and monitoring and evaluation system** that will realise this vision. In this way, the findings presented in the analytical chapters of the report will be translated into an implementable and measurable development roadmap. This approach will ensure that the report is not merely an analytical document assessing the current situation, but also a strategic reference document guiding Antalya's green transition.

5.2 Antalya's 2050 Green Transition Vision

Climate change, climate law and the green transition represent a historic period of transformation that is reshaping the development approaches of cities. Whereas the success of cities was previously assessed through indicators such as population growth, industrial capacity or tourism revenues, today competitiveness, climate resilience, resource efficiency, low-carbon production capacity, technological innovation and access to sustainable finance are evaluated together. Therefore, Antalya's 2050 vision should focus not merely on resolving today's challenges, but on establishing a new development model capable of adapting to the economic and environmental conditions of the future.

Antalya's natural resources, strong tourism infrastructure, agricultural production capacity, developing industry, strategic geographical location and international connections provide significant advantages in the green transition process. However, translating these advantages into sustainable economic value depends on protecting natural capital, accelerating technological transformation, managing climate risks effectively and establishing a development model integrated with the international investment ecosystem. Accordingly, Antalya's 2050 vision should aim not to preserve its existing economic structure, but to transform it into a more resilient, more efficient and more competitive structure. In this context, Antalya's 2050 vision is built upon the following fundamental principle: **"To become a leading green economy centre in the Mediterranean Basin that generates economic value while protecting its natural capital, is resilient to climate change, low-carbon, resource-efficient, technology-oriented and possesses a strong capacity to attract international investment."**

This vision represents a holistic development approach that addresses not only environmental objectives but also economic growth, social welfare and international competitiveness. The aim is to ensure that Antalya protects its natural assets while simultaneously moving towards sectors that generate higher added value, attract sustainable investment and establish a strong position within the global green economy. In this context, the transformation that Antalya aims to achieve by 2050 should be built upon five fundamental strategic pillars. The first pillar is **establishing a climate-resilient economic structure.** The tourism, agriculture, industry and service sectors must become more resilient to the physical and economic risks arising from climate change. Securing water resources, strengthening energy supply security, reducing disaster risks and making critical infrastructure resilient to climate impacts are among the fundamental conditions for economic sustainability.

The second pillar is **transitioning to a resource-efficient production model.** Antalya's growth should be based not on increased consumption of natural resources, but on more efficient use of existing resources. Technologies that improve efficiency in the use of water, energy, raw materials and land, circular economy practices and digital management systems should become fundamental instruments of economic growth.

The third pillar is a **competitive low-carbon economic model.** Considering the European Green Deal, the Carbon Border Adjustment Mechanism and sustainable finance criteria, the international competitiveness of Antalya's economy will depend to a large extent on its success in carbon management. Therefore, energy transition, renewable energy investments, clean production technologies and carbon management systems should be widely adopted across all sectors.

The fourth pillar is **innovation- and technology-driven development**. The green transition requires not only the application of existing technologies but also the development of new technologies. Innovative initiatives in water technologies, climate technologies, smart agricultural practices, digital environmental management, energy storage systems, artificial intelligence-assisted resource management and environmental technologies will support Antalya's high-value-added economic growth. Cooperation between universities, technology parks, research centres and the private sector will constitute one of the fundamental building blocks of this transformation.

The fifth pillar is **the objective of becoming an international investment and finance centre.** Antalya should aim not merely to become a city in which investments are made, but also a regional centre where green finance, climate investments and sustainable development projects are developed. Accordingly, a reliable and predictable investment ecosystem with strong project development capacity should be established for international financial institutions, development banks, investment funds and the private sector. Antalya's 2050 vision also encompasses sectoral transformation objectives. The tourism sector's transition towards a carbon-neutral destination approach, agriculture's transition to climate-resilient production systems, industry's adoption of low-carbon and digital production infrastructure, the restructuring of water management in accordance with circular economy principles, and the management of urbanisation through a climate-resilient planning approach constitute the concrete components of this vision. The success of this transformation cannot be achieved solely through public investment. The investment capacity of the private sector, the knowledge-generation capabilities of universities, the implementation effectiveness of local governments, the technical contributions of professional organisations and the participatory approach of civil society must be integrated towards a common objective. Therefore, Antalya's 2050 vision should be regarded as a development model based on a multi-stakeholder and highly participatory governance approach. Furthermore, the success of this vision depends on its being supported by measurable objectives. Therefore, Antalya's green transition process should be monitored through performance indicators at specified intervals, its economic impacts should be assessed regularly, and it should be updated in accordance with changing global conditions.

Thus, the 2050 vision will cease to be merely an ideal objective for the future and will become a dynamic management instrument guiding implementation processes.

In conclusion, Antalya's 2050 Green Transition Vision regards climate change not merely as a risk to be managed, but as a strategic opportunity to accelerate economic transformation. Through the policies and investments developed in line with this vision, Antalya will acquire an urban identity that protects its natural capital, uses its resources efficiently, adopts a low-carbon production structure, becomes an attractive centre for international investors and integrates a high quality of life with a sustainable development approach.

The implementation of this vision will enable Antalya to become not only one of Türkiye's leading tourism and agricultural centres, but also **one of the Mediterranean Basin's exemplary leading cities in the fields of green economy, climate technologies, sustainable finance and resilient development.** Thus, by 2050, Antalya will be positioned not merely as a city that has adapted to climate change, but as a pioneering city that has transformed the green transition into economic prosperity and established a globally competitive development model.

5.3 Strategic Transformation Principles

The success of Antalya's green transition process depends not only on selecting the right projects or securing sufficient financing. For the transformation to be lasting, inclusive and sustainable, common principles must be adopted to guide all policy, investment and implementation processes. These principles will establish the fundamental reference framework for decision-makers in implementing Antalya's 2050 vision and ensure that public policies, private sector investments and local development programmes are shaped towards the same objective. In this context, it is recommended that Antalya's green transition process be carried out in accordance with the following fundamental strategic principles.

5.3.1 Sustainable Development and Economic Competitiveness Must Be Managed Together

The green transition process should not be regarded as presenting economic growth and environmental protection as two alternative objectives. On the contrary, the protection of natural resources, increased resource efficiency and the development of low-carbon production models should be regarded as fundamental development instruments that enhance Antalya's national and international competitiveness. All investment and policy decisions developed in accordance with this approach should simultaneously support the objectives of economic growth, environmental sustainability and social welfare.

5.3.2 A Science-Based and Data-Driven Decision-Making Approach Must Be Adopted

Climate change is a process characterised by long-term impacts and a high degree of uncertainty. Therefore, investment decisions must be based on up-to-date scientific data, climate projections, economic analyses and performance indicators. Scientific research, the knowledge and expertise of universities, digital data systems, geographic information systems and climate risk analyses should be actively utilised in decision-making processes. A data-driven governance approach will both reduce investment risks and ensure more effective use of public resources.

5.3.3 Integrated and Cross-Sectoral Planning Must Be Adopted

Climate change does not affect any sector in isolation. Water management, tourism, agriculture, industry, energy, urbanisation and ecosystems interact with one another. Therefore, the transformation model to be implemented in Antalya should be based on an integrated planning approach that takes cross-sectoral interactions into account, rather than the conventional approach of planning sectors independently of one another. The economic, social and environmental impacts of each investment across different sectors should be assessed together.

5.3.4 Protection of Natural Capital Must Be Recognised as the Foundation of Economic Development

Antalya's economic strength depends to a large extent on its natural capital. Water resources, forests, agricultural land, coastlines, biodiversity, landscape values and tourism destinations also constitute the productive foundation of Antalya's economy.

Therefore, the protection of natural assets should be regarded not merely as an environmental responsibility, but as one of the fundamental prerequisites for economic sustainability.

5.3.5 Resource Efficiency Must Be a Fundamental Development Policy

One of the fundamental objectives of the green transition is to generate greater economic value from the same resources rather than achieve growth by consuming more resources. In this context, water, energy, raw materials, land, waste, logistics and production processes should be reassessed from a resource efficiency perspective.

Resource efficiency will not only deliver environmental benefits but will also enhance the international competitiveness of businesses by reducing their production costs.

5.3.6 Innovation and Technology Must Be the Main Drivers of Transformation

Antalya's green transition process should not be limited to the application of existing technologies. The city should become an innovation centre that develops new technologies in areas such as environmental technologies, water technologies, climate technologies, renewable energy, artificial intelligence, smart city applications, digital agriculture and carbon management.

To this end, cooperation between universities, technology parks, research centres and the private sector should be strengthened.

5.3.7 International Finance and Private Sector Participation Must Be Strengthened

It is not possible to implement all green transition investments using public resources alone. Therefore, international development banks, climate funds, private investment funds, sustainable finance institutions, public–private partnerships, green bonds and sustainable financing instruments should be integral components of Antalya's investment strategy. The objective is not merely to secure financing, but to make Antalya a reliable and predictable investment centre for international investors.

5.3.8 Participatory and Multi-Stakeholder Governance Must Be Adopted

The green transition is not a policy to be implemented solely by public institutions. For a successful transformation, central government, local governments, the private sector, universities, professional organisations, civil society organisations, financial institutions and producer associations should participate in joint decision-making mechanisms. A participatory governance model will both improve implementation success and strengthen societal ownership.

5.3.9 Resilience and Risk Management Must Be Prioritised

The impacts of climate change cannot be completely eliminated. Therefore, all infrastructure investments and sectoral transformation programmes in Antalya should be planned to establish a structure that reduces climate risks, is prepared for disasters, is flexible and adaptable, and has strong crisis management capacity. A resilience-oriented approach will not only reduce economic losses but also enhance investment security.

5.3.10 Measurability, Transparency and Continuous Improvement Must Be Fundamental Principles

The green transition is a long-term process. Therefore, all policies and projects should be monitored through measurable performance indicators, independent monitoring mechanisms, transparent reporting systems and regular performance assessments. Policies and practices should be continuously updated in accordance with the results obtained, and a dynamic governance approach capable of adapting to changing economic, technological and climatic conditions should be adopted.

Overall Assessment

These strategic transformation principles constitute the fundamental governance philosophy of Antalya's 2050 Green Transition Roadmap. The strategic programmes, flagship projects, implementation model and institutional structuring proposals presented in the remainder of this chapter have been developed in accordance with these principles. Accordingly, Antalya's green transition will move beyond short-term project implementation and evolve into an integrated development model that is long-term, science-based, investment-oriented and capable of enhancing international competitiveness.

5.4 Priority Strategic Programmes

The success of Antalya's green transition depends not merely on implementing individual investment projects, but on establishing complementary strategic programmes that serve common objectives and guide long-term transformation. An examination of international practices reveals that cities which have succeeded in the green transition share a common characteristic: rather than developing individual projects, they establish programme-based governance models that bring different sectors together under a shared vision. The programme-based approach brings together investments serving the same objective within a common planning framework, thereby facilitating financial management, strengthening inter-institutional coordination and creating economies of scale in implementation processes. At the same time, programme-based transformation models carry greater strategic value than individual projects from the perspective of international development banks and climate finance institutions. Accordingly, the strategic programmes proposed for implementation under Antalya's 2050 Green Transition Roadmap are presented below.

5.4.1 Antalya Water Security and Circular Water Management Programme

Water resources will be among the areas facing the greatest pressures from climate change in Antalya. Considering the increasing risk of drought, population growth, tourism demand and agricultural irrigation requirements, water management must be regarded not merely as an infrastructure service but as a fundamental component of economic development. The primary objective of this programme is to manage, in an integrated manner, practices such as the development of alternative water resources, advanced wastewater recovery, rainwater management, smart water networks, reduction of water losses and leakages, seawater desalination, agricultural water reuse and water efficiency in industry. Through this programme, Antalya's water supply security will be strengthened, and climate-related water risks affecting economic sectors will be reduced.

5.4.2 Carbon-Neutral Tourism and Sustainable Destination Programme

The tourism sector is the driving force of Antalya's economy. However, future competitiveness in tourism will be shaped by criteria such as carbon footprint, energy efficiency, water use, waste management, biodiversity and sustainable destination management.

Within the scope of this programme, the following will be developed:

- Carbon-neutral hotels,
- Renewable energy investments,
- Circular tourism practices,
- Sustainable transport,
- Green certification,
- Digital destination management,
- Climate-resilient tourism infrastructure.

The objective is for Antalya to become one of the world's most sustainable tourism destinations.

5.4.3 Climate-Resilient Agriculture and Food Security Programme

Agricultural production is one of the strategic sectors of Antalya's economy. This programme will cover the following areas:

- Water efficiency,
- Digital agriculture,
- Precision agriculture technologies,
- Climate-resilient cropping patterns,
- Agricultural enterprises using renewable energy,
- Sustainable greenhouse systems,
- Low-carbon production,
- Reduction of food losses.

Through this programme, production security will be ensured, while compliance with sustainability standards in exports will also be strengthened.

5.4.4 Green Industry and Competitiveness Programme

The future of Antalya's industry will depend on energy efficiency, digitalisation, cleaner production, resource efficiency, carbon management and industrial symbiosis practices.

Within the scope of this programme, the following will be supported:

- Low-carbon production,
- Process modernisation,

- Renewable energy integration,
- Waste heat recovery,
- Circular production systems,
- Green organised industrial zones.

The programme's primary objective is to enhance the international competitiveness of Antalya's industry.

5.4.5 Circular Economy and Resource Efficiency Programme

In the future, waste management will no longer be merely an environmental service. It will become a sector that generates new economic value. Within the scope of this programme, the following will be supported:

- Advanced recycling,
- Recovery of critical raw materials,
- Biomethane production from organic waste,
- Valorisation of industrial by-products,
- Industrial symbiosis,
- Zero-waste practices,
- Resource efficiency investments.

The programme aims to establish a new production ecosystem that transforms waste into economic value.

5.4.6 Blue Economy and Maritime Transformation Programme

Antalya's coastal identity will become considerably more strategic in the future. The programme encompasses investments in the following areas:

- Green ports,
- Marinas,
- Shore-side electrification,
- Alternative fuel infrastructure,
- Sustainable fisheries,
- Marine ecosystem conservation,
- Cruise tourism sustainability,
- Blue biotechnology.

Through this programme, Antalya's maritime and blue economy capacity in the Mediterranean will be strengthened.

5.4.7 Resilient Cities and Smart Infrastructure Programme

Climate change necessitates the redesign of urban infrastructure.

Within the scope of the programme, the following will constitute priority investment areas:

- Smart transport,
- Electric public transport,
- Energy-efficient public buildings,
- Rainwater management,
- Green infrastructure,
- Climate-resilient urban transformation,
- Digital city management,
- Disaster-resilient infrastructure.

The programme's primary objective is to reduce climate risks while improving quality of life.

5.4.8 Green Finance and Climate Investment Programme

The sustainability of the green transition depends on a strong financing infrastructure.

This programme will comprise the following components:

- International climate funds,
- Development banks,
- Green bonds,
- Sustainable financing instruments,
- Carbon markets,
- Project development offices,
- Investor relations,
- Project preparation capacity.

The objective is to ensure that Antalya becomes not merely a city that receives investment, but one that generates investment.

5.4.9 Green Technology, Digital Transformation and Innovation Programme

The long-term success of the green transition is directly linked to the capacity to develop technologies.

Therefore, in Antalya:

- Environmental technologies,
- Water technologies,

- Energy technologies,
- Artificial intelligence applications,
- Climate technologies,
- Smart agricultural systems,
- Digital environmental management,
- The entrepreneurship ecosystem

should be supported.

The objective should be to establish Antalya as a regional innovation centre in environmental and climate technologies by developing strong partnerships between universities, technoparks, research centres and the private sector.

5.4.10 Integration Model Across Programmes

These strategic programmes should not be regarded as independent areas of investment. On the contrary:

- Water management brings together agriculture,
- Energy brings together tourism,
- The circular economy brings together industry,
- Digitalisation brings together all sectors,
- Financing provides a common framework that brings together all programmes.

Therefore, Antalya's green transition model should be implemented as **an integrated development system in which nine separate programmes advance simultaneously towards the same objective.** This approach will enable the effective use of investment resources, strengthen interinstitutional coordination, increase international financing opportunities and allow Antalya to achieve its 2050 vision in a planned, measurable and sustainable manner. This programme-based governance model also forms the foundation for the **flagship projects, institutional structuring and implementation mechanisms** to be addressed in subsequent sections of the report.

5.5 Flagship Projects

Achieving national and international visibility for Antalya's green transition process depends not merely on implementing numerous investment projects, but on developing flagship projects that generate substantial impact, bring different sectors together around a common objective and can serve as examples at the global level. When successful green transition practices around the world are examined, it becomes evident that the factors enhancing cities' international brand value are not individual investments, but large-scale transformation projects that articulate a vision, accelerate economic transformation and attract the interest of international financial institutions. In this context, the flagship projects proposed below within Antalya's Green Transition Roadmap should be regarded not merely as investment projects, but as strategic development platforms that will guide the city's economic transformation.

5.5.1 Antalya Water Security and Circular Water Economy Project

One of the most significant impacts of climate change on Antalya will be increasing pressure on water resources. Therefore, Antalya's approach to water management must move beyond a focus solely on drinking water supply and wastewater treatment and be transformed into a circular water economy model.

Within the scope of this project:

- Advanced wastewater recovery systems,
- Seawater desalination facilities,
- Rainwater harvesting,
- Alternative water resources,
- Smart water networks,
- Digital water management,
- Agricultural water reuse systems,
- Closed-loop water use in industry

will be integrated into a single strategic programme. The objective is to transform Antalya from a city experiencing water stress into **one of the Mediterranean's leading cities in water management.**

5.5.2 Antalya Carbon-Neutral Tourism Destination Project

Future competitiveness in the tourism sector will be determined not only by service quality but also by carbon footprint, energy management, water efficiency and sustainability performance.

This project comprehensively encompasses practices such as:

- Carbon-neutral tourism zones,
- Green hotels,
- Renewable energy infrastructure,
- Electric transport systems,
- Sustainable destination management,
- Circular tourism practices,
- Carbon monitoring platforms.

The objective is to establish Antalya as an internationally recognised destination and brand it as one of the world's most sustainable tourism destinations.

5.5.3 Antalya Green Agriculture and Food Valley Project

Antalya's ability to maintain its agricultural production capacity depends on the development of climate-resilient production models.

Within the scope of this project:

- Smart greenhouse technologies,
- Precision agriculture,
- Digital agricultural management,
- Agricultural enterprises using renewable energy,
- Water-efficient production systems,
- Sustainable food processing facilities,
- Agricultural research and development centres

will be planned as an integrated whole. The objective is to transform Antalya into not merely an agricultural production centre, but **an international agricultural innovation centre that develops green agricultural technologies.**

5.5.4 Antalya Green Industry and Cleaner Production Transformation Project

The transition to low-carbon production infrastructure is essential for the industrial sector to maintain its international competitiveness. This project will encompass practices such as:

- Green organised industrial zones,
- Carbon management systems,
- Industrial symbiosis,
- Energy efficiency investments,
- Waste heat recovery,
- Renewable energy integration,
- Cleaner production technologies.

This will facilitate access to sustainable financing sources for Antalya's industry while enhancing its competitiveness in international markets.

5.5.5 Antalya Blue Economy and Maritime Innovation Centre Project

Antalya's approximately 640-kilometre coastline and strong tourism potential offer significant opportunities in the blue economy. Within the scope of this project:

- Green port practices,
- Sustainable marinas,
- Shore-side electrification,
- Alternative marine fuels,
- Cruise sustainability,
- Marine biotechnology,

- Protection of marine ecosystems,
- Blue economy entrepreneurship centre

will be developed under a common framework. The project aims to establish Antalya as one of the leading cities in the blue economy in the Eastern Mediterranean.

5.5.6 Antalya Climate Technologies and Green Innovation Campus Project

The sustainability of the green transition will be ensured by cities that not only use technology but also develop it. The campus to be established within this framework will bring together:

- Environmental technologies,
- Water technologies,
- Carbon management,
- Energy storage,
- Artificial intelligence applications,
- Climate technologies,
- Entrepreneurship centres,
- Research laboratories,
- Technology acceleration programmes

and universities and the private sector within a shared innovation ecosystem. This structure will accelerate Antalya's transition towards a knowledge-based economy.

5.5.7 Antalya Green Finance and Project Development Centre Project

One of the most important requirements of the green transition is strong project development capacity. The centre to be established within the scope of this project will serve as Antalya's shared technical centre in the following areas:

- Applications for international funding,
- Project development,
- Financial modelling,
- Feasibility studies,
- Carbon finance,
- Sustainable finance,
- Investor relations,
- Project portfolio management.

The centre's primary objective is to continuously enhance Antalya's capacity to attract international investment.

5.5.8 Antalya Smart and Resilient City Programme

This project will integrate the following components:

- Smart transport systems,
- Energy-efficient public buildings,
- Digital city management,
- Climate-resilient infrastructure,
- Disaster early warning systems,
- Green corridors,
- Urban carbon management,
- Digital environmental monitoring.

In this way, Antalya will establish its identity as an exemplary Mediterranean city that is resilient to climate change and offers a high quality of life.

5.5.9 Antalya Green Investment Platform Project

The long-term success of the green transition cannot be achieved through public investment alone.

Therefore, international investors, development banks, private equity funds, technology companies, universities, entrepreneurs and public institutions should be brought together within a common investment ecosystem.

The Antalya Green Investment Platform should be designed as an institutional structure responsible for managing project development, investment matchmaking, financing management and international partnerships.

General Assessment

These flagship projects constitute the most important implementation instruments through which Antalya's green transition vision will be translated into practice. Although each project has the potential to drive transformation in its respective sector, their principal value lies in creating an integrated investment ecosystem in which they complement one another. Bringing together water security, sustainable tourism, climate-resilient agriculture, green industry, the blue economy, climate technologies, green finance and smart city applications within a common strategic framework, these projects will accelerate Antalya's economic transformation and establish the city as a highly attractive destination for international investors.

Through the phased implementation of these projects, Antalya will make significant progress towards its objective of becoming an exemplary **regional centre in the Mediterranean Basin that not only adapts to climate change but also develops green transition technologies, attracts international investment and leads in sustainable development.**

5.6 Implementation Model

The success of Antalya's green transition process depends not only on the quality of the strategy documents prepared, but also on the capacity to translate these strategies into practice. An examination of successful implementation examples worldwide reveals that cities achieving sustainable development objectives share a common characteristic: they possess not only strong visions but also effective implementation mechanisms. Therefore, Antalya's 2050 Green Transition Roadmap should be supported by a comprehensive implementation model that sets out not only the objectives, but also the methods, institutions and priorities through which these objectives will be achieved. The fundamental aim of this model is to integrate activities undertaken by different institutions within a common governance system, accelerate investment processes, increase efficiency in resource utilisation and ensure that transformation programmes produce measurable outcomes. In this way, the green transition process will evolve from a fragmented structure consisting of independent project implementations into an integrated development programme directed towards common objectives. The implementation model is founded on a **programme-based governance approach.** The strategic programmes defined in the previous section will constitute the main implementation pillars, while the flagship projects and sub-projects developed under these programmes will serve as the instruments for implementing the transition on the ground. Accordingly, investment decisions will be managed not through individual projects, but through programmes with defined performance objectives. This approach will enable more effective prioritisation of investments and facilitate alignment with programme financing models preferred by international financial institutions.

The second fundamental component of the implementation process is the **project portfolio management system.** All green transition projects to be developed in Antalya should be assessed within a common project pool and classified according to their level of readiness, financing requirements, expected economic impacts, climate adaptation capacity and implementation priorities. This system will enable investment decisions to be made on the basis of objective criteria, prevent project duplication and strengthen coordination between different institutions. A **phased transition approach** should be adopted in the implementation model. Antalya's green transition is not a process that can be completed all at once. Therefore, investments should be planned within short-, medium- and long-term implementation periods. In the initial phase, priority should be given to projects that strengthen institutional capacity, deliver rapid results and ensure high visibility. In the medium term, sectoral transformation programmes should be expanded, while in the long term, an integrated transition model encompassing the entire economic structure should be implemented. Such an approach will both allow financing requirements to be distributed over time and enable experience gained during implementation to be transferred to subsequent phases.

A **multi-stakeholder coordination mechanism** should form the basis of the implementation process. Central government, local authorities, universities, the private sector, professional organisations, organised industrial zones, producer associations and civil society organisations should actively contribute to the transition process within their respective responsibilities and areas of authority. A regular cooperation mechanism should be established to facilitate information sharing, joint decision-making and implementation coordination between institutions. In this way, activities undertaken by different institutions will be integrated into a coherent structure aligned with common objectives. One of the important components of the implementation model is the **data management and digital monitoring infrastructure.** Antalya's green transition performance should be monitored regularly through indicators such as energy consumption, water use, carbon emissions, renewable energy generation, waste recovery, investment volume, employment impacts and similar measures. Digital data infrastructure will enable implementation processes to be monitored in real time, performance deviations to be identified at an early stage and decision-making processes to be based on up-to-date data.

In addition, the implementation model should have a **flexible and adaptable structure.** Climate change, technology, international financing mechanisms and economic conditions are constantly evolving. Therefore, the roadmap should be reviewed at regular intervals, and programmes, projects and investment priorities should be updated in line with performance outcomes. In this way, the implementation model will evolve from a static plan into a dynamic governance system capable of adapting to changing conditions. **Local capacity building** is also one of the fundamental factors determining the success of implementation in the green transition process. Local authorities, public institutions, private sector representatives and technical personnel should be supported through continuous training in project development, sustainable finance, carbon management, climate risk analysis, resource efficiency and digital transformation. Without developing strong human resources, even the best strategies will not be able to deliver the desired outcomes. A **performance-oriented management approach** should be adopted to ensure the success of the implementation model. Measurable objectives should be established for each strategic programme and flagship project, and progress towards their achievement should be regularly monitored and shared with the public. This approach will strengthen accountability, increase investor confidence and continuously improve the effectiveness of implementation processes.

Furthermore, the implementation model should be designed with a structure **open to international cooperation.** Partnerships with the European Union, international development banks, United Nations organisations, research centres and international city networks will accelerate technical knowledge transfer, create new financing opportunities and enhance Antalya's global visibility. In this way, the local transition process will benefit from international experience and acquire a structure aligned with global standards. In conclusion, Antalya's green transition implementation model provides a comprehensive implementation framework that integrates strategic programmes, flagship projects, project portfolio management, multi-stakeholder governance, digital monitoring systems and a performance-based management approach. Through this model, the green transition will cease to be a process consisting merely of the implementation of individual projects and will become an institutional governance system that transforms Antalya's economic structure, investment environment and development model over the long term. Thus, Antalya will establish an exemplary city model that not only defines its objectives but also systematically implements them; **not only plans investments but also brings them into operation; and not only develops strategies but also translates those strategies into measurable outcomes.** This approach will be one of the most critical success factors in realising the 2050 Green Transition Vision.

5.7 Institutional Structure and Governance Model

The success of Antalya's green transition process depends not only on the development of strong strategies, adequate financing and high-quality projects. For these elements to produce effective outcomes, a strong institutional structure and an effective governance model capable of directing implementation processes must be established. International experience demonstrates that cities which succeed in sustainable development and climate transition share a common characteristic: they possess governance systems in which powers and responsibilities are clearly defined, interinstitutional coordination is ensured and institutions work towards common objectives.

Although numerous activities relating to climate change mitigation and green transition are undertaken by different institutions in Antalya, a significant proportion of these activities are carried out independently of one another. This situation can occasionally lead to inefficiencies in resource utilisation, project duplication, insufficient institutional coordination and inadequate utilisation of international financing opportunities. Therefore, the priority requirement is to establish an integrated governance model that strengthens existing institutional capacity and enables institutions to work towards common objectives.

The proposed institutional structure should be based on a coordination-oriented model that integrates the duties and responsibilities of existing institutions within a common strategic framework, rather than creating new bureaucratic structures. This will preserve existing institutional expertise while fostering effective communication, joint planning and a culture of collaborative implementation among institutions. Within this framework, the establishment of the **"Antalya Green Transition Coordination Board"** is recommended. This board should serve as the highest-level strategic coordination mechanism responsible for directing the implementation of the green transition roadmap. The board should be established with the participation of representatives of central government, metropolitan and district municipalities, universities, organised industrial zones, chambers of commerce and industry, professional organisations, producer associations, tourism sector representatives, financial institutions and civil society organisations.

The principal responsibilities of the Coordination Board should include determining strategic priorities, evaluating investment programmes, strengthening interinstitutional cooperation, monitoring implementation processes and directing national and international partnerships. In this way, Antalya's green transition process will be supported by a participatory governance model implemented under the shared responsibility of all stakeholders, rather than a single institution. To support the board's technical activities, the establishment of a professional implementation unit in the form of a **Green Transition Programme Management Office (PMO – Project Management Office)** is recommended. This office should function as a technical centre responsible for project development, project portfolio management, investment planning, financing coordination, performance monitoring and reporting. This will establish a strong coordination mechanism between strategic decisions and implementation activities on the ground. The principal responsibilities of the Programme Management Office should include:

- Coordination of strategic programmes,
- Preparation and implementation of flagship projects,
- Management of applications for international funding,
- Management of investor relations,
- Monitoring of project performance,
- Facilitation of information sharing between institutions,
- Preparation of annual progress reports.

The second important component of the institutional structure is **thematic working groups.** Considering Antalya's economic structure, specialised working groups should be established in areas such as water management, tourism, agriculture, industry, energy, the blue economy, the circular economy, finance and climate technologies. These groups should undertake responsibilities for sector-specific project development, preparation of policy recommendations, establishment of technical standards and provision of scientific contributions to implementation processes. Universities and research institutions should be an integral part of this governance model. Scientific knowledge generation, climate projections, economic impact analyses, technology development and performance assessments should be undertaken with the contribution of academic institutions. This will ensure that decision-making processes are grounded in scientific evidence and enhance the effectiveness of policy and investment decisions. The private sector, meanwhile, should be regarded not merely as an investor but as a strategic partner in the transition process. Tourism enterprises, industrial organisations, agricultural producer organisations, financial institutions and technology companies should play an active role in project development and implementation processes.

This approach will both accelerate private sector investment and ensure that the projects developed are better aligned with market needs. Local authorities are among the most important actors in the implementation model. The Metropolitan Municipality and district municipalities will be the implementing institutions responsible for the transition in infrastructure investments, sustainable transport, waste management, water services, green space planning and urban policies. Therefore, strengthening the technical capacity of municipalities and enhancing their ability to access international financing mechanisms are of great importance.

One of the fundamental principles of the institutional structure should be **transparency and accountability.** All investment programmes, performance indicators and implementation results should be regularly shared with the public and monitored through independent evaluation mechanisms. This approach will not only increase public confidence but also strengthen the confidence of international investors and financial institutions in Antalya. The establishment of a **digital governance infrastructure** is also important for the success of the institutional model. Project preparation processes, investment implementation, financing utilisation, performance indicators and sustainability data should be managed through a shared digital platform. This will accelerate decision-making processes, facilitate data sharing and significantly improve the effectiveness of implementation processes. The fundamental objective of this governance model is not to establish new institutions, but to **create a coordination system that mobilises Antalya's existing institutional capacity towards common objectives.** In this way, the strengths of different institutions will be brought together around a shared strategic vision, investment processes will be accelerated and significant economies of scale will be achieved in resource utilisation. In conclusion, the proposed institutional structure is built upon strong coordination, participatory governance, science-based decision-making, professional project management and a performance-oriented implementation approach. Through this model, Antalya's green transition process will evolve from fragmented individual initiatives distributed among institutions into an integrated development system guided by a shared vision, supported by sustainable financing and capable of delivering measurable results. Thus, Antalya will be able to attain the position of a regional leader that **not only develops green transition projects but also effectively manages the green transition, brings institutions together around common objectives and sets an example for other cities through its governance model.**

5.8 Financing Integration

One of the most significant challenges facing Antalya's green transition process is the gap between the scale of the investments required and the financing resources currently available. However, considering the transformation taking place in the global financial system, the fundamental problem is not so much a lack of financing as the failure to establish an institutional capacity capable of developing appropriate projects for financing sources. Therefore, within Antalya's green transition strategy, financing should be regarded not merely as an element that covers investment budgets, but as an integrated management system that enables the planning, implementation and sustainability of the transition. The primary objective of the financing integration approach is to bring together public resources, international development financing, private sector investments, sustainable finance instruments and revenues generated from the carbon economy within a common investment model. This will create a structure in which financing from different sources complements one another, ensuring continuity in investment processes and increasing the efficiency of resource utilisation. Within this framework, **a multi-source financing model** should be adopted for Antalya's green transition investments. Central government budgets, local government investment programmes, international development banks, climate funds, European Union financial instruments, private sector investments, public–private partnership models, green bonds, sustainable finance instruments and revenues generated from carbon markets should be regarded not as independent financing channels, but as complementary components of a common investment ecosystem.

For financing integration to be successful, investment needs must first be classified according to sectoral priorities. Appropriate financing models should be determined for each strategic programme, including water management, sustainable tourism, agriculture, industry, the circular economy, the blue economy, transport and urban infrastructure. Depending on the nature of the investment, grant funding, loans, private sector investment or blended financing instruments should be preferred. In this way, each investment can be implemented through the most appropriate, cost-effective and sustainable financing model.

One of the important components of financing integration is the **blended finance approach**. Particularly in infrastructure projects requiring substantial investment, the combined use of public resources, international development financing and private sector capital will reduce investment risks, lower financing costs and facilitate the implementation of larger-scale projects. For Antalya's strategic transformation projects, this model will provide significant advantages in establishing a long-term and sustainable investment structure.

More effective utilisation of the private sector's financing capacity is also of great importance in the green transition process. In particular, enterprises operating in the tourism, industry, energy, water management and environmental technology sectors should be encouraged to undertake sustainable investment projects. This will reduce the burden on public resources while accelerating the transition process. Accordingly, long-term investment incentives, mechanisms facilitating access to finance and arrangements that strengthen the investment environment should be developed.

Enhancing the capacity of local authorities to access international financing sources should also be one of the fundamental objectives of financing integration. Strengthening municipalities' technical capacities in project development, feasibility preparation, financial modelling and the management of international funding applications will enable Antalya to benefit more extensively from global climate finance. In this context, developing long-term cooperation mechanisms between municipalities and international development institutions is of considerable importance.

Financing integration should cover not only the initial investment phase but also **operation and maintenance processes.** One of the most significant challenges in many infrastructure investments is the inability to secure sustainable operational financing after the investment has been completed. Therefore, financing models to be developed should take into account the entire investment life cycle, while operational revenues, performance-based financing mechanisms and principles of financial sustainability should form an integral part of project design. In this process, **the carbon economy and the conversion of environmental performance into economic value** should also be regarded as important financing components. Projects that reduce emissions, improve energy efficiency, enable renewable energy generation and enhance resource efficiency will not only reduce operating costs but also create additional financing opportunities through carbon markets and sustainable finance mechanisms. Consequently, environmental performance will become a strategic investment indicator that generates economic value. To ensure the effective management of financing integration, a **centralised investment and financing coordination system should** be established in Antalya. This system should operate as a common structure that analyses investment needs, identifies appropriate financing sources, manages project preparation processes and brings investors together with project owners. In this way, projects seeking financing will be replaced by a proactive investment model that develops projects ready for investment and provides investors with access to a portfolio of implementable projects. The principles of transparency and accountability should also be among the fundamental priorities of financing processes. Regular performance reports should be prepared on the utilisation of financing resources, and investment outcomes should be monitored through measurable indicators and shared with the public. This approach will both increase public confidence and reduce international investors' perceptions of risk regarding Antalya.

Antalya's financing strategy should not be directed solely towards meeting current investment needs. It should also be designed with a flexible structure capable of adapting to emerging technologies, changing international financing mechanisms and global investment trends. Therefore, the financing model should be reviewed at regular intervals and updated in line with new funding sources and innovative financing instruments. In conclusion, financing integration is more than a technical mechanism for managing the financial dimension of Antalya's green transition process; it is a strategic governance model that brings together investment planning, project development capacity, institutional coordination and international cooperation within a single system. Through this approach, financing will cease to be merely a resource that enables investments to begin and will become a fundamental development instrument that accelerates Antalya's economic transformation, enhances its international competitiveness and supports sustainable development. Thus, by developing a green transition model that integrates different financing sources under a single strategic vision, provides international investors with a predictable and reliable investment environment, and demonstrates strong financial sustainability, Antalya will make significant progress towards its objective of becoming **one of the Mediterranean Region's leading cities in sustainable investment and climate finance.**

5.9 Monitoring, Evaluation and Performance Management System

The success of Antalya's Green Transition Roadmap depends not only on the appropriateness of the objectives established or the quality of the projects developed. Regular monitoring of the implementation process, evaluation of the results achieved against objective criteria, and updating of policies and practices where necessary are also of great importance. Therefore, the monitoring and evaluation system should be regarded not as the final stage of the green transition process, but as an integral component of the planning, implementation and continuous improvement cycle. In the traditional approach to public administration, success is measured by the number of activities undertaken. However, in the green transition process, what matters is measuring the tangible contributions of these activities to Antalya's economy, environment and social welfare. Therefore, performance management should be designed around an outcome- and impact-oriented approach rather than a process-oriented one.

Within this framework, an **Integrated Monitoring, Evaluation and Performance Management System** should be established to monitor Antalya's green transition performance. This system will serve as one of the fundamental management tools for regularly assessing the extent to which strategic programmes, flagship projects and investment activities achieve their established objectives, providing decision-makers with reliable data and supporting policy development processes. The monitoring system should encompass not only environmental indicators but also economic, social and governance indicators. This is because the fundamental objective of the green transition is not merely to reduce carbon emissions, but also to enhance economic competitiveness, encourage new investments, create employment and improve quality of life. Therefore, performance evaluation should be based on a multidimensional indicator system. Within this framework, performance indicators can be assessed under five main categories.

The first category comprises **economic performance indicators.** The total investment volume of green investments, amount of international financing, proportion of private sector investment, utilisation of sustainable finance, green employment, export performance, increases in added value and new entrepreneurial activities should be monitored regularly. These indicators will enable the direct contribution of the transition to Antalya's economy to be measured. The second category comprises **environmental performance indicators.** Indicators such as reductions in carbon emissions, the proportion of renewable energy use, water efficiency, the amount of water recovered, the waste recycling rate, resource efficiency, biodiversity conservation and air quality will constitute the fundamental measures of environmental performance.

The third category comprises **sectoral transformation indicators.** Indicators such as the number of establishments holding sustainability certifications in the tourism sector, water-efficient agricultural production areas, energy efficiency practices in industry, circular economy investments, green port practices and digital transformation projects will enable progress to be assessed on a sectoral basis.

The fourth category comprises **institutional performance indicators**. Indicators such as the number of projects developed, the success rate of international funding applications, investment implementation periods, the level of interinstitutional coordination, technical capacity-building activities and governance performance will demonstrate the effectiveness of the institutional structure. The fifth category comprises **social impact indicators.** Indicators such as the impact of the green transition process on quality of life, employment opportunities, educational activities, the level of public awareness and citizen satisfaction will enable the social dimension of the transition to be assessed. To ensure that these indicators can be monitored effectively, the establishment of a **Green Transition Digital Dashboard** in Antalya is recommended. Through this digital platform, the implementation status of strategic programmes, investment progress, performance indicators and financing utilisation can be monitored in real time, enabling decision-makers to access up-to-date and reliable data rapidly. To ensure the reliability of the monitoring system, data should be collected, verified and reported using methods that comply with national and international standards. To improve data quality, common data-sharing mechanisms should be established among public institutions, local authorities, universities and the private sector, and data generated by different institutions should be integrated into a shared digital infrastructure.

The performance management system should not be limited solely to monitoring activities. An **adaptive management** approach should be adopted, enabling the necessary policy updates to be made when deviations from established objectives occur. In this way, the roadmap can be reviewed at regular intervals and implementation measures updated in response to changing climate conditions, technological developments, economic fluctuations and amendments to international regulations. Within this framework, **annual performance reports** should be prepared on the implementation of Antalya's Green Transition Roadmap, and a comprehensive evaluation should be undertaken every five years to reassess the effectiveness of strategic programmes. These evaluations should cover not only the investments undertaken but also their economic, environmental and social impacts. Thus, performance management will evolve from a mechanism that merely reports activities into a governance mechanism that informs policy development and enables continuous learning.

The use of independent expert opinions in monitoring and evaluation processes is also important. Analyses prepared by universities, research institutions and independent evaluation teams will provide an objective perspective on the implementation process and contribute to more informed decision-making by policymakers. This approach will also strengthen the perceived quality of Antalya's governance among international investors and financial institutions.

In conclusion, the monitoring, evaluation and performance management system is more than a reporting mechanism that measures Antalya's green transition process; it is a strategic governance instrument that guides the success of the transition. Through this system, the effectiveness of investments will be enhanced, efficient utilisation of public resources will be ensured, the confidence of international financial institutions will be strengthened, and progress towards Antalya's 2050 Green Transition Vision will be monitored using tangible data. Thus, Antalya will establish an exemplary sustainable development model that **not only sets objectives but also regularly measures them, transparently evaluates outcomes, learns from experience, continuously improves itself and institutionalises a performance-oriented management approach.** This approach will constitute one of the most important safeguards for the long-term success and international credibility of the green transition process.

5.10 2030–2040–2050 ROADMAP

Antalya's green transition process requires a long-term and phased development perspective that goes beyond the implementation of short-term projects. When climate change, global economic transformation, international trade rules, carbon regulations and technological developments are considered together, Antalya's future competitiveness is directly related not only to the investments made today but also to the strategic timeframe within which these investments are implemented. Therefore, the Green Transition Roadmap should be regarded not as a static plan prepared for a specific period, but as a dynamic development model capable of adapting to changing conditions, being regularly updated and maintaining its long-term vision. Within this framework, Antalya's transition process has been divided into three main implementation periods. Each period has been designed as an integrated development model built upon the institutional, technical and financial capacity established in the preceding phase. Thus, rather than proceeding through disconnected investment periods, the transition process will advance through mutually complementary strategic phases.

5.10.1 First Phase (2026–2030): Preparation and Rapid Transition Period

The first period is the preparation and acceleration phase, during which the institutional infrastructure for Antalya's green transition process is established, priority investments are initiated and strong relationships are developed with international financing mechanisms. The primary objective of this period is to establish the institutional capacity required to manage the transition process and build confidence through high-visibility projects. The activities that should be prioritised during this process are as follows:

- Establishment of the Green Transition Coordination Board and Programme Management Office,
- Establishment of the Antalya Green Project Portfolio,
- Completion of project preparations for international climate finance sources,
- Initiation of pioneering practices in water management, energy efficiency and the circular economy,
- Development of carbon management and sustainability reporting infrastructure,
- Implementation of capacity-building programmes for municipalities and the private sector,
- Establishment of a digital data management and performance monitoring system.

By the end of this period, Antalya is expected to have completed the development of its institutional capacity for green transition at the national level and become a reliable investment centre for international investors.

5.10.2 Second Phase (2031–2040): Sectoral Transformation and Scaling-Up Period

The second phase is the transition period during which the institutional and financial infrastructure established during the preparation phase is extended across economic sectors. The primary objective during this process is to scale up pilot practices, extend them throughout Antalya's economy and enhance the international competitiveness of its sectors. During this period:

- Expansion of water security investments,
- Establishment of carbon-neutral tourism zones,

- Widespread adoption of climate-resilient agricultural production models,
- Transition to low-carbon production in organised industrial zones,
- Completion of green port and sustainable maritime investments,
- Acceleration of renewable energy and energy storage investments,
- Expansion of circular economy practices across all sectors,
- Strengthening of the climate technologies and green innovation ecosystem

will constitute the priority areas of activity. By the end of this period, Antalya's economic growth is expected to be supported to a significant extent by green investments, high-value-added production, sustainable tourism and technology-oriented sectors.

5.10.3 Third Phase (2041–2050): Global Leadership and Advanced Sustainability Period

The third phase aims to make Antalya not merely a city that has completed its green transition, but a centre for sustainable development that is recognised internationally as a reference point for the practices it has developed. During this period:

- Substantial achievement of the carbon-neutral city objective,
- Establishment of circular economy practices as standard across all sectors,
- Development of advanced environmental and climate technologies,
- Management of international climate investments with Antalya as the central hub,
- Strengthening of Antalya's position as a centre for knowledge, technology and finance in the Mediterranean,
- Completion of a resilient city model with a high quality of life,
- Development of the green entrepreneurship and innovation ecosystem to a level at which it can compete globally

are the intended objectives. By the end of this period, Antalya is expected to become one of the cities recognised as a model for sustainable development, climate change adaptation and the green economy, not only in Türkiye but also across the Mediterranean Basin.

5.10.4 Conditions for the Roadmap's Success

The success of the 2030–2040–2050 roadmap does not depend solely on the volume of investment. Success depends on the combined implementation of strong political commitment, institutional continuity, public participation, active involvement of the private sector, capacity to access international finance and evidence-based decision-making processes.

Furthermore, the roadmap must be reviewed at regular intervals, updated in accordance with performance results and managed with sufficient flexibility to adapt to changing international conditions. In this way, the plan will become not a static document with unchanging objectives, but a living strategic document capable of adapting to changing circumstances.

5.10.5 Transformation Perspective Towards the 2050 Vision

The roadmap presented in this report does not aim solely to enable Antalya to achieve its environmental sustainability objectives. The primary objective is to transform the risks posed by climate change into opportunities for economic transformation and to establish a development model that is more competitive, more resilient, more innovative and offers a higher quality of life. By 2050, Antalya aims to become a global city that:

- Is resilient to climate risks,
- Has substantially achieved water security,
- Has a low-carbon production infrastructure,
- Is internationally recognised as a benchmark for sustainable tourism,
- Develops green technologies,
- Can attract international climate finance,
- Generates high added value,
- Sustains economic growth while protecting its natural capital.

The 2030–2040–2050 Roadmap, prepared in line with this perspective, approaches Antalya's green transition not merely as a process of environmental adaptation, but as **a comprehensive development strategy that enhances economic competitiveness, strengthens the investment environment, improves social welfare and redefines the city's global position.** Thus, Antalya will move beyond being a city that adapts to the impacts of climate change and become one of the pioneering cities that make green transformation a fundamental driver of economic growth and sustainable prosperity.

End-of-Chapter Assessment

Climate change is no longer merely a phenomenon requiring the management of environmental risks; it has become a global transformation process that is reshaping economic development models, investment decisions, the international trading system, financing mechanisms and the competitiveness of cities. In this new era, the success of cities will be measured not only by how rapidly they can adapt to change, but also by their ability to transform that change into economic opportunity. With its natural capital, strong tourism infrastructure, developed agricultural sector, dynamic entrepreneurial culture, strategic geographical location and international brand value, Antalya possesses significant advantages that will enable it to manage this transformation process successfully. Nevertheless, considering the impacts of climate change on water resources, agricultural production, coastal areas, tourism activities, energy security and urbanisation, it is evident that the existing development approach cannot remain sustainable in the long term. Therefore, Antalya's future is directly linked not only to taking measures to reduce the impacts of climate change, but also to its ability to reshape its economic structure in accordance with the principles of green transition. The roadmap presented in this chapter has been prepared precisely to address this need. In the preceding chapters, Antalya's current situation, the sectoral impacts of climate change, new responsibilities arising under climate law, green finance opportunities and transformation requirements were examined in detail. This chapter has established the strategic framework required to translate these analyses into practice. Accordingly, the report has not been limited to an assessment of the current situation; it has also developed an actionable development perspective for Antalya's future.

The **2050 Green Transition Vision** defined within this framework, together with the strategic principles, priority programmes, flagship projects, implementation model, institutional structure, financing integration, performance management system and phased roadmap, has been designed as the fundamental components of an integrated transformation system that is independent of individual policy proposals but complementary in its constituent elements. Through this approach, Antalya's green transition will not be limited to individual investment projects; it will evolve into a comprehensive development model that addresses economic, social and environmental dimensions together.

However, the success of this roadmap cannot be achieved solely through the efforts of public institutions. Local authorities, the private sector, universities, professional organisations, the financial sector, civil society and citizens must act with a shared sense of responsibility. Green transition is not a technical programme to be implemented by particular institutions; it is a long-term development mobilisation that requires the participation of all segments of society.

In the coming years, carbon regulations are expected to become more widespread within the international trading system, sustainable finance standards to become mandatory, climate risks to play a determining role in investment decisions, and pressure on natural resources to increase. In response to these developments, cities that act in a timely manner will secure a greater share of new investment opportunities, while cities that delay their transformation processes will face the risk of losing economic competitiveness. For Antalya, this process represents not merely an environmental policy issue, but also a strategic turning point in terms of economic growth, investment attraction capacity and international competitiveness.

The fundamental approach of this report is to regard climate change not merely as a crisis that needs to be managed, but as a strategic opportunity that, when properly planned, can transform Antalya's economic structure into one that is more resilient, more innovative and generates higher added value. Green transition is an important development instrument that will enable the emergence of new sectors, an increase in skilled employment, the acceleration of technological investments, easier access to international finance and the strengthening of Antalya's competitiveness at the global level.

The roadmap prepared within this framework should be regarded not as a finalised and unchangeable plan, but as a living strategic document capable of adapting to emerging technologies, changing climate conditions, new legal regulations and global economic developments. This approach, which will be updated at regular intervals, developed in accordance with performance results and enriched to incorporate new opportunities, will strengthen the sustainability of Antalya's transformation process.

In conclusion, **"Antalya 2050: Sectoral Impact Analysis of Antalya's Economy in the Context of Climate Change, Climate Law and the Green Transition Process"** is not merely an assessment study identifying existing risks. It is also a strategic vision document that defines the development pathway Antalya should follow over the next quarter-century, identifies investment priorities, establishes the foundations of institutional transformation and aims to enhance international competitiveness.

Antalya's future will be shaped by a governance approach that protects its natural assets, builds economic growth upon the principles of sustainability, adapts to climate change and makes green transition a fundamental pillar of development. To the extent that this vision can be realised, Antalya will have the potential to become **one of the pioneering cities recognised as a model not only in Türkiye but also across the Mediterranean Basin in the fields of the green economy, climate change adaptation, sustainable tourism, water management and climate finance.** The fundamental prerequisite for achieving this objective is to unite around a shared vision, make decisions based on scientific evidence, develop strong institutional cooperation and regard green transition not as a cost, but as the most valuable economic and social investment to be made in future generations.

Overall Assessment of the Chapter

The fifth chapter has transformed the analyses presented in the preceding chapters of the report into **an action-oriented transformation programme.** Accordingly, the report addresses the question **"Where are we?"** through an analysis of the current situation, **"Why must we transform?"** through analyses of climate change, climate law and economic risks, and **"How will we transform?"** through the vision, programmes, projects, governance model, financing structure and roadmap presented in this chapter.

Through this integrated approach, the study goes beyond an academic assessment report and becomes **a strategic implementation guide that can serve as a reference** for public institutions, local authorities, investors, international financial institutions and the private sector. In this respect, the report's most significant outcome is the presentation of an integrated development model that addresses Antalya's green transition not only in terms of present-day needs, but also within the framework of **the economic realities and global competitive conditions of 2050.**

Figure 13: Antalya 2050 Grand Vision Poster

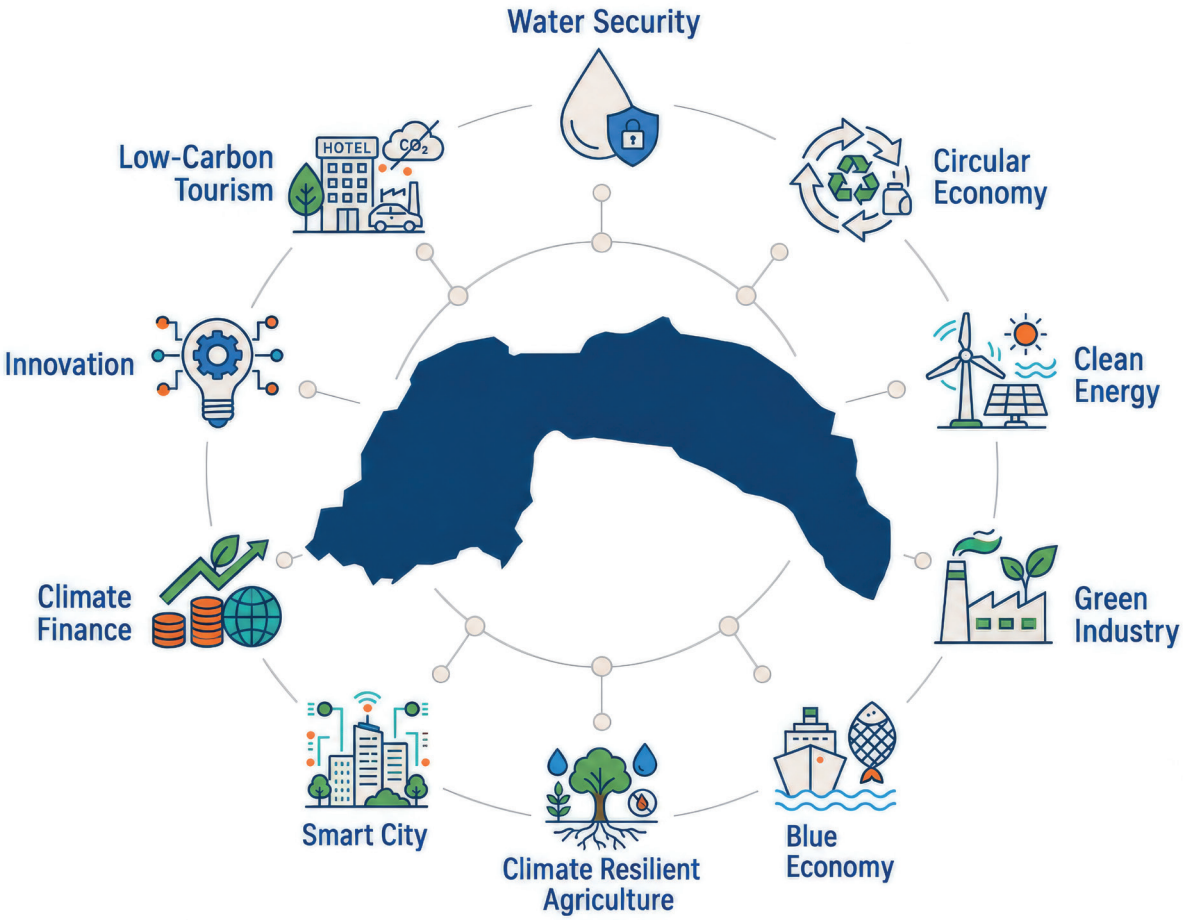
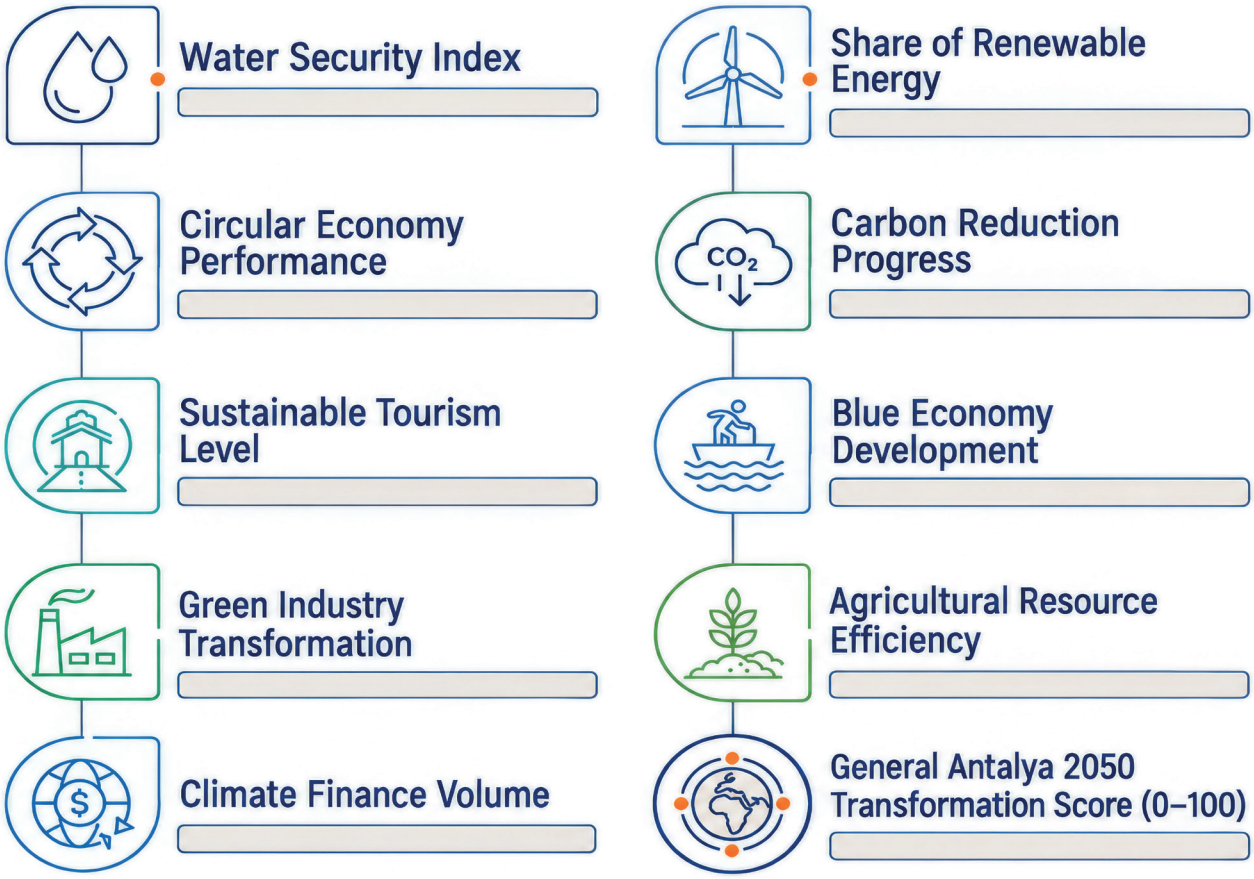


Figure 14: Antalya 2050 Strategic Transformation and Performance Indicators Dashboard



ANNEX-1: ANTALYA 2050 STRATEGIC ACTION PLAN

Climate Change, Climate Law and the Green Transition Process Antalya's Implementation Roadmap

1. Introduction

The analyses, sectoral assessments and policy recommendations presented in this report establish the strategic framework required to prepare Antalya for climate change and the green transition process. However, achieving strategic objectives is only possible by translating these objectives into concrete implementation measures.

This Strategic Action Plan constitutes an implementation-oriented roadmap defining priority activities, responsible stakeholders, implementation timelines and expected outputs.

The main objectives of the Plan are to:

- Strengthen institutional coordination,
- Determine investment priorities,
- Accelerate international financing processes,
- Manage sectoral transformation in a planned manner,
- Support Antalya in achieving its 2050 vision.

2. Strategic Priorities

The following eight strategic priorities should form the basis of Antalya's green transition process.

1. Ensuring Water Security
2. Transition to a Low-Carbon Economy
3. Resource Efficiency and Circular Economy
4. Climate-Resilient Agriculture and Food Systems
5. Sustainable Tourism Transformation
6. Green Industry and Cleaner Production
7. Climate Finance and Investment Capacity
8. Digitalisation and Data-Driven Management

These priorities constitute a common framework for implementing the recommendations developed throughout all chapters of the report.

3. Table 14: First 100 Days Action Programme

This period constitutes the preparatory phase during which the institutional structure is established and the transformation process is formally initiated.

Priority Action	Lead Institution	Supporting Partners	Expected Outcome
Establishment of the Antalya Green Transformation Coordination Board by the Governorship	Governorship	Metropolitan Municipality, Universities	Institutional governance model
Establishment of the Antalya Metropolitan Green Project Pipeline	Metropolitan Municipality	Antalya Chamber of Commerce and Industry (ATSO), BAKA, Civil Society Organisations	A pipeline of bankable projects
Launch of the Antalya Climate Data Platform	Universities	Municipalities	A shared data infrastructure
Identification of priority investment projects	Coordination Board	Public and private sector	Initial list of investment projects
Preparation of an international fund inventory	Project Office	Development Agency	A financing roadmap

4. First Year

The main objective of the first year is to ensure the transition from the planning phase to implementation.

Priorities:

- Completion of feasibility studies for flagship projects,
- Preparation of financing applications,
- Initiation of pilot projects,
- Establishment of the Antalya Green Finance Platform,
- Establishment of the Antalya Resource Efficiency Observatory,
- Publication of the Antalya Climate Transformation Index,
- Launch of training programmes for municipalities and the private sector,
- Provision of carbon management training.

5. First Three Years

The aim is for the transformation in Antalya to become visible by the end of the third year.

Priority activities:

- Expansion of reclaimed water projects,
- Circular tourism pilot zones,
- Green organised industrial zone (OSB) practices,
- Industrial symbiosis projects,

- Smart water management systems,
- Artificial intelligence-supported resource management,
- Active operation of the Antalya Green Finance Centre,
- Access to the first international climate funds.

6. First Five Years

During this period, the economic outcomes of Antalya's green transition are expected to become visible.

Objectives:

- Increase in the volume of international investment,
- Expansion of carbon reduction projects,
- Significant progress in water efficiency,
- Acceleration of the sustainability transition in the tourism sector,
- Expansion of cleaner production practices in industry,
- Integration of circular economy practices into sectors,
- Antalya becoming one of the exemplary cities at the national level.

7. Table 15: Responsibility Matrix

Institution	Main Role
Antalya Governorship	Overall coordination
Antalya Metropolitan Municipality	Local implementation
District Municipalities	Implementation of local projects
Universities	Scientific support
ATSO	Coordination with the business world
Commodity Exchange	Agricultural transformation
Organised Industrial Zones	Industrial transformation
Tourism Representatives	Tourism projects
Maritime Institutions	Blue economy
Financial Institutions	Financing
Civil Society	Participation and monitoring

8. Financing Priorities

The areas recommended for prioritisation in financing during the first five years are:

- Water security investments
- Treated water recovery
- Renewable energy
- Energy efficiency
- Circular economy
- Smart city systems
- Digital infrastructure
- Climate adaptation projects
- Nature-based solutions
- Carbon reduction projects

9. Success Indicators

It is recommended that the following indicators be regularly monitored during the first five years:

- Number of projects developed
- Number of projects securing financing
- Amount of international financing secured
- Volume of green investment
- Volume of reclaimed water
- Renewable energy capacity
- Reduction in carbon emissions
- Number of circular economy projects
- Number of businesses with green certification
- Number of people receiving training
- Number of institutions integrated into the digital monitoring system

10. Strategic Conclusion

Achieving Antalya's 2050 vision will be possible not only by defining long-term objectives but also by systematically integrating these objectives into daily decision-making processes, investment programmes and institutional practices. This Strategic Action Plan constitutes the final component that translates the vision presented in the report into an implementable governance model.

The actions proposed in this document should not be regarded as individual activities to be carried out under the responsibility of specific institutions, but rather as a collective transformation programme to be implemented through strong cooperation mechanisms established among public institutions, local authorities, the private sector, universities and civil society.

If this approach is adopted, Antalya will be able to move beyond being a city that adapts to climate change and make significant progress towards becoming **one of the Mediterranean Basin's exemplary cities that directs green investments, attracts international climate finance, uses its resources efficiently and possesses sustainable competitiveness.** This annex serves as a practical reference for decision-makers, facilitating the translation of the strategic framework presented in the report into implementation.

ANNEX-2: ANTALYA 2050 STRATEGIC PROJECT PORTFOLIO

Priority Investment Projects in the Context of Climate Change, Climate Law and the Green Transition

1. Introduction

This project portfolio has been prepared in line with the sectoral analyses, strategic priorities and green transition objectives presented in the report. The portfolio aims to define priority investment areas that will support Antalya's 2050 vision, guide public and private sector investments, and establish a project development framework for international climate finance. The projects included here are strategic project proposals for which feasibility studies have not yet been completed and investment offers have not yet been made. Each project may be transformed into an investment programme in subsequent phases, following the completion of technical, economic, environmental and financial analyses.

2. Strategic Project Areas

The projects have been classified under the following ten main programmes:

1. Water Security
2. Energy and Decarbonisation
3. Circular Economy and Resource Efficiency
4. Agriculture and Food
5. Tourism
6. Industry
7. Blue Economy and Maritime Activities
8. Resilient Cities
9. Digital Transformation
10. Finance and Governance

3. Priority Projects

A. Water Security Programme

Project 1 – Antalya Integrated Water Security Programme

- Basin-based water management
- Groundwater monitoring
- Drought early warning system

Project 2 – Treated Water Reuse Programme

- Large-scale reuse
- Agricultural irrigation

- Landscape irrigation
- Industrial use

Project 3 – Water-Positive Facilities Programme in Tourism

- Greywater systems
- Rainwater harvesting
- Seawater desalination
- Smart water management

Project 4 – Antalya Digital Water Management Platform

Project 5 – Smart Irrigation Basins

B. Energy and Decarbonisation

Project 6 – Antalya Solar City Programme

Project 7 – Net-Zero Energy Programme in Tourism

Project 8 – Organised Industrial Zone (OSB) Energy Efficiency Programme

Project 9 – Rooftop Solar PV Initiative

Project 10 – Energy Storage Demonstration Programme

C. Circular Economy

Project 11 – Antalya Resource Efficiency Observatory

Project 12 – Industrial Symbiosis Network

Project 13 – Biomethane Production from Organic Waste

Project 14 – Construction Waste Recovery Centre

Project 15 – Circular Tourism Certification

D. Agriculture and Food

Project 16 – Smart Agriculture Valleys

Project 17 – Digital Greenhouse Programme

Project 18 – Agricultural Carbon Management

Project 19 – Regenerative Agriculture Programme

Project 20 – Agricultural Waste Value Chain

E. Tourism

Project 21 – Antalya Carbon-Neutral Destination Programme

Project 22 – Climate-Resilient Tourism Infrastructure

Project 23 – Green Marina Programme

Project 24 – Sustainable Cruise Ports Programme

Project 25 – Four-Season Tourism Transformation

F. Industry

Project 26 – Green Organised Industrial Zone (OSB) Programme

Project 27 – Cleaner Production Centres

Project 28 – Low-Carbon Production Programme

Project 29 – Industrial Digital Transformation Platform

Project 30 – Recovery of Critical Raw Materials

G. Blue Economy

Project 31 – Antalya Blue Economy Centre

Project 32 – Climate Adaptation Programme in Fisheries

Project 33 – Marine Ecosystem Monitoring System

Project 34 – Marine Pollution Early Warning Network

Project 35 – Coastal Resilience Programme

H. Resilient Cities

Project 36 – Sponge City Antalya

Project 37 – Urban Heat Island Mitigation Programme

Project 38 – Climate-Resilient Neighbourhoods

Project 39 – Disaster-Resilient Infrastructure Programme

Project 40 – Green Corridors and Ecological Networks

I. Digital Transformation

Project 41 – Antalya Digital Twin

Project 42 – AI-Supported Urban Management

Project 43 – Climate Data Centre

Project 44 – Antalya Carbon Information System

Project 45 – Antalya Green Dashboard (Green Dashboard)

J. Finance and Governance

Project 46 – Antalya Green Finance Centre

Project 47 – Antalya Project Preparation Office (Project Preparation Facility)

Project 48 – Antalya ESG Transformation Centre

Project 49 – Antalya Climate Academy

Project 50 – Antalya Green Investment Platform

4. Prioritisation of Projects

The following prioritisation approach should be adopted in the implementation of projects:

Group A (2026–2030)

Projects for preparation and high impact:

- Water security
- Reuse of treated water
- Green Finance Centre
- Project Preparation Office
- Resource Efficiency Observatory
- Digital data infrastructure

Group B (2031–2040)

Projects that will accelerate sectoral transformation:

- Carbon-neutral tourism
- Green Organised Industrial Zones (OSBs)
- Industrial symbiosis
- Smart agriculture
- Blue economy

Group C (2041–2050)

Projects for international competitiveness and leadership:

- Antalya Digital Twin
- Carbon Information System
- Mediterranean Climate and Green Transformation Centre
- International Climate Finance Platform
- Antalya Green Technology Valley

5. Financing Approach

It is recommended that the project portfolio be financed through central government investment programmes, local government budgets, public–private partnership (PPP) models, European Union financial instruments, the World Bank and multilateral development banks, climate funds (GCF, Adaptation Fund, etc.), green bonds and sustainability-linked financing, carbon markets, private sector investments and impact investment funds.

For each project, investment readiness should be enhanced through the preparation of technical feasibility studies, environmental and social impact assessments, financing models and implementation schedules.

6. Conclusion

This Strategic Project Portfolio is a dynamic project pipeline designed to translate Antalya's 2050 vision into concrete investments. The projects included in the portfolio are development instruments that not only encompass infrastructure investments but also strengthen institutional capacity, accelerate private sector transformation, facilitate access to international finance and support innovative business models. It is recommended that the portfolio be reviewed at regular intervals, new project ideas be incorporated, and projects with completed feasibility studies be included in investment programmes. Through this approach, Antalya will be able to move beyond being a city that adapts to climate change and implement concrete projects towards becoming **one of the leading cities in the Mediterranean Basin in green investment, climate finance, resource efficiency and sustainable development.**

Note: This annex, together with the existing report, provides a very strong framework. However, I recommend that it be developed into a standalone publication in the future. If a 2–4-page "Project Information Form" (objective, scope, investment size, potential financing sources, expected impacts, implementation schedule and responsible institutions) is prepared for each project, this document could become a genuine **investment project portfolio** for international investors and development banks.