

# Greening Türkiye's Economy

*The Policy Perspective*

## GREET 2023

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TECHNOLOGY DEVELOPMENT FOUNDATION OF TÜRKİYE



[www.ttgiv.org.tr](http://www.ttgiv.org.tr)

**MERKEZ / HEAD OFFICE**

CYBERPARK CYBERPLAZA B Blok Kat: 5-6 06800 Bilkent ANKARA - TÜRKİYE

Tel: +90 (312) 265 0272

Fax: +90 (312) 265 0262

**İSTANBUL/İSTANBUL OFFICE**

ARI TEKNOKENT Arı 2 Binası A Blok Kat: 7 34469 İTÜ Ayazağa Yerleşkesi, Koruyolu

Maslak İSTANBUL - TÜRKİYE

Tel: +90 (212) 276 7560

Fax: +90 (212) 276 7580

**Editorial Design**

İbrahim Semih Akçomak

**Graphic Design**

Özge Egemen / [www.kirmizitasarim.com](http://www.kirmizitasarim.com)

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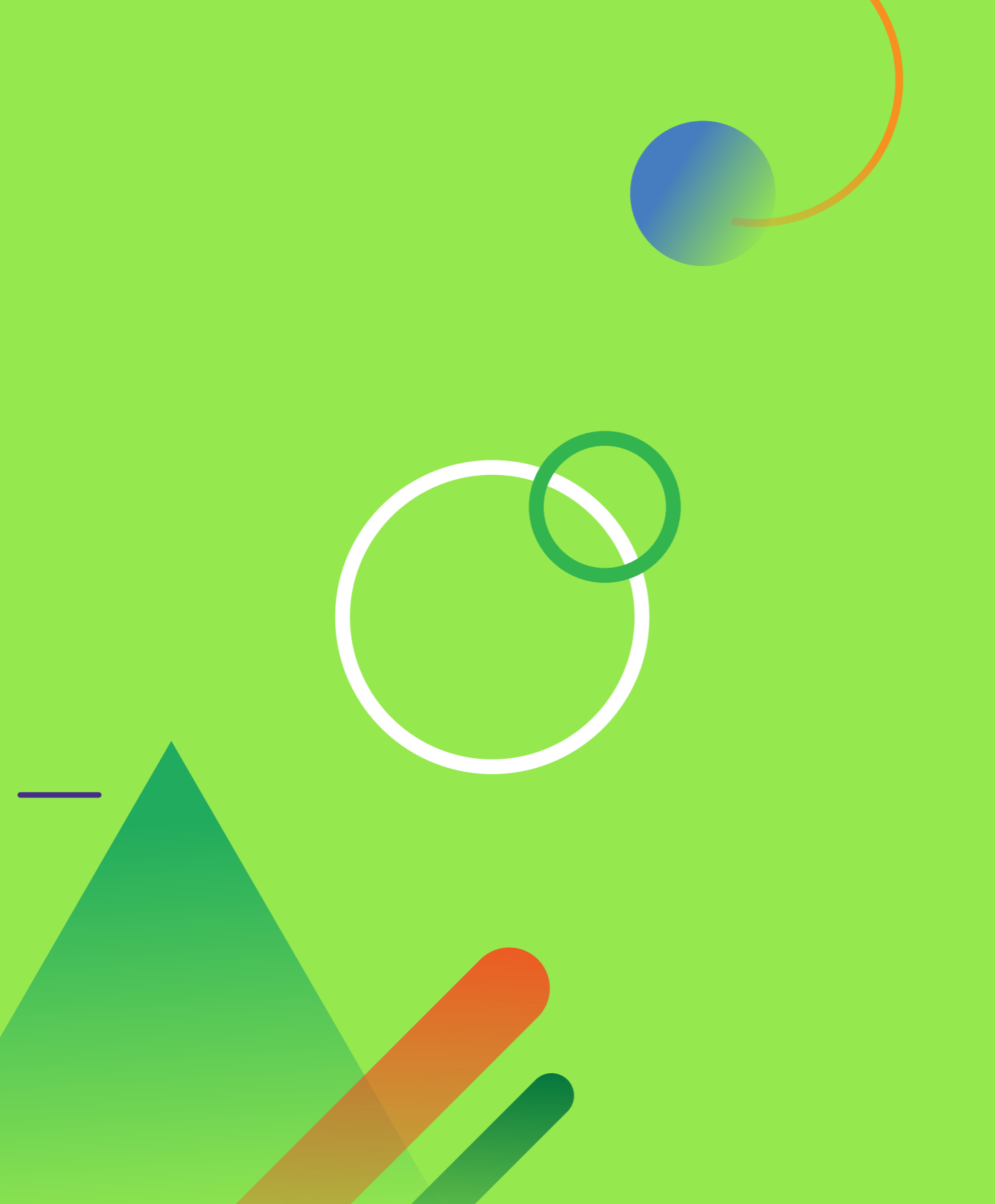
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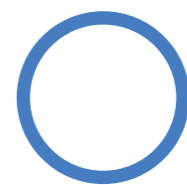
**This report is prepared by:**

İbrahim Semih Akçomak, Beyza Coşkun, Dilara Danacı,  
Haşim Cihan Demirköprülü, Sinem Erdoğdu, Esra Güler,  
İlgın İrem Gündüz, Ayşe Işılak, Seda Kılıçaslan, Mustafa Serdar Köksal,  
İdil Kula, Emel Semiz, Yağmur Şahin, Okan Terzi, Yelda Erden Topal,  
Koray Topçuoğlu, Cem Tüfekci, Ceren Yavuz, Esin Yazıcı.



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## List of commonly used abbreviations

CAP	Common Agricultural Policy
CBAM	Carbon Border Adjustment Mechanism
CSP	Concentrated Solar Power
DAP	Eastern Anatolia Project
DOKAP	Eastern Black Sea Project
EC	European Commission
EIONET	European Environment Information and Observation Network
ESIF	European Structural and Investment Fund
ETAP	Environmental Technologies Action Plan
ETV	European Technology Verification
EU	European Union
GAP	South-eastern Anatolia Project
GCII	Global Cleantech Innovation Index
GCIP	Global Cleantech Innovation Programme
GDP	Gross Domestic Product
GERD	Gross Domestic Expenditures in R&D
GGI	Green Growth Index
GHG	Green House Gas
HDI	Human Development Index
ICT	Information and Communication Technologies
IPA	Instrument for Pre-accession Assistance
KOP	Konya Plain Project
KOSGEB	Small and Medium Enterprises Development Agency
MoAF	Ministry of Agriculture and Forestry
MoENR	Ministry of Energy and Natural Resources
MoEUCC	Ministry of Environment, Urbanization and Climate Change
MoIT	Ministry of Industry and Technology
MoT	Ministry of Trade
MoTF	Ministry of Treasury and Finance
OIZ	Organized Industrial Zones
PV	Photovoltaic

R&D	Research and Development
R&I	Research and Innovation
RD&D	Research, Development & Demonstration
RECAI	Renewable energy country attractiveness index
SDG	Sustainable Development Goals
SET	European Strategic Energy Technology Plan
SME	Small and Medium Sized Enterprises
toe	Tons of oil equivalent
TTGV	Technology Development Foundation of Türkiye
TÜBİTAK	The Scientific and Technological Research Council of Türkiye
UN	United Nations
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization

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# 1

## 1. Introduction

In the last couple of years Türkiye has set a path towards greening its economy. The Green Deal Action Plan in July 2021, the ratification of the Paris Agreement in October 2021, the announcement of net-zero emission target by 2053 in October 2021 are amongst a few important steps. Türkiye has also recently updated the First Nationally Determined Contribution (NDC) declaring to reduce its greenhouse gas (GHG) emissions by 41% through 2030 (695 Mt CO<sub>2</sub> equivalent in year 2030) and intends to peak its emissions at the latest in 2038 which is an ambitious step to reach net-zero target by 2053.<sup>1</sup> How binding will such attempts be? Can the net zero emission target be reached? There are of course no clear answers to such questions but it is clear that Türkiye has entered a greening path.

Türkiye already has a set of policy tools towards clean energy production, protecting the environment and reducing waste. However, such tools are very much dispersed in terms of policy aims and the government body that initiates the action. The European Union (EU) Green Deal approved in 2020 that sets a green transition path towards reaching net-zero emissions and climate neutrality is also a milestone for Türkiye's path towards greening. EU is still an important economic and political anchor for Türkiye. Considering that EU is the largest trade partner of Türkiye both in terms of exports and imports and that Türkiye is a candidate country for full membership to the EU, a green transition path for Türkiye is indispensable. The Green Deal Action Plan of Türkiye that was made public in July 2021 is an important step to coordinate dispersed activities, actions, policy tools and defines net-zero emissions by 2053 as an ultimate policy aim.

This report aims to present a comprehensive account of policy initiatives in Türkiye towards greening its economy. It presents a background of such initiatives and gives details of policy actions. In that sense this report complements Türkiye Climate Resilience Policy Indicator<sup>2</sup> and the Türkiye Energy Policy Review 2021<sup>3</sup> by the International Energy Agency. It also complements two reports from the İstanbul Policy Centre. The first one, "Türkiye's Decarbonization Roadmap: Net Zero by 2050", aims to prepare a roadmap that reveals the economic transformation path Türkiye would

1. [https://unfccc.int/sites/default/files/NDC/2023-04/TÜRKİYE\\_UPDATED%201st%20NDC\\_EN.pdf](https://unfccc.int/sites/default/files/NDC/2023-04/TÜRKİYE_UPDATED%201st%20NDC_EN.pdf)

2. <https://www.iea.org/articles/turkey-climate-resilience-policy-indicator>

3. <https://www.iea.org/reports/turkey-2021>

need to undergo if it ratified the Paris Agreement and adopted the Net Zero target.<sup>4</sup> The second report, “Türkiye’s Decarbonization Roadmap, Sectoral cost-benefit analysis, 2020-2030” aims to analyse the costs and benefits that will arise if the Net Zero Scenario is actually realized in this period.<sup>5</sup> Section 3 of this report provides detailed information on policy changes at the central and local government levels towards greening the economy. Section 4 of this report gives a detailed account of policy activities under six themes that are both common to EU’s Green Deal and Türkiye’s Green Deal Action Plan.

## 1.1. What do the statistics tell?

Türkiye’s per capita CO2 emissions doubled in the last 30 years reaching to about 5 tons. While the CO2 emissions per unit Gross Domestic Product (GDP) ranged from 0.4 to 0.5 for about 20 years since 1990, it has been declining since 2010 which may be taken as rough indication that Türkiye has entered a greening path. Türkiye has reduced sourcing energy from oil and coal remarkably over the years (from about 75% share in total energy supply to about 45% in 2021) thanks to increase investment in the distribution and use of natural gas. But on the other hand, the share of renewables particularly wind, solar etc. has tripled in the past 10 years reaching up to 10% of total energy supply. While in the beginning of the 2000s almost all renewable electricity generation was sourced from hydro energy, in 2021 the share of other sources (solar, wind, biofuels, geothermal) has reached almost to 50% of renewable electricity production.

### 1.1.1. R&D and patent statistics

Gross domestic expenditure on Research and Development (GERD) of Türkiye increased by 26 billion 965 million TL and reached to 81 billion 922 million TL in 2021 (about 11 billion USD). While the share of GERD in GDP was 1.09% in 2020, it was 1.13% in 2021. The Research, Development & Demonstration (RD&D) budget split by low carbon energy technologies for 2021 is 104.7 USD per thousand unit of GDP.<sup>6</sup>

4. <https://ipc.sabanciuniv.edu/Content/Images/CKeditorImages/20211026-23105368.pdf>  
 5. <https://ipc.sabanciuniv.edu/Content/Images/CKeditorImages/20221114-13111703.pdf>  
 6. <https://www.iea.org/countries/turkiye>

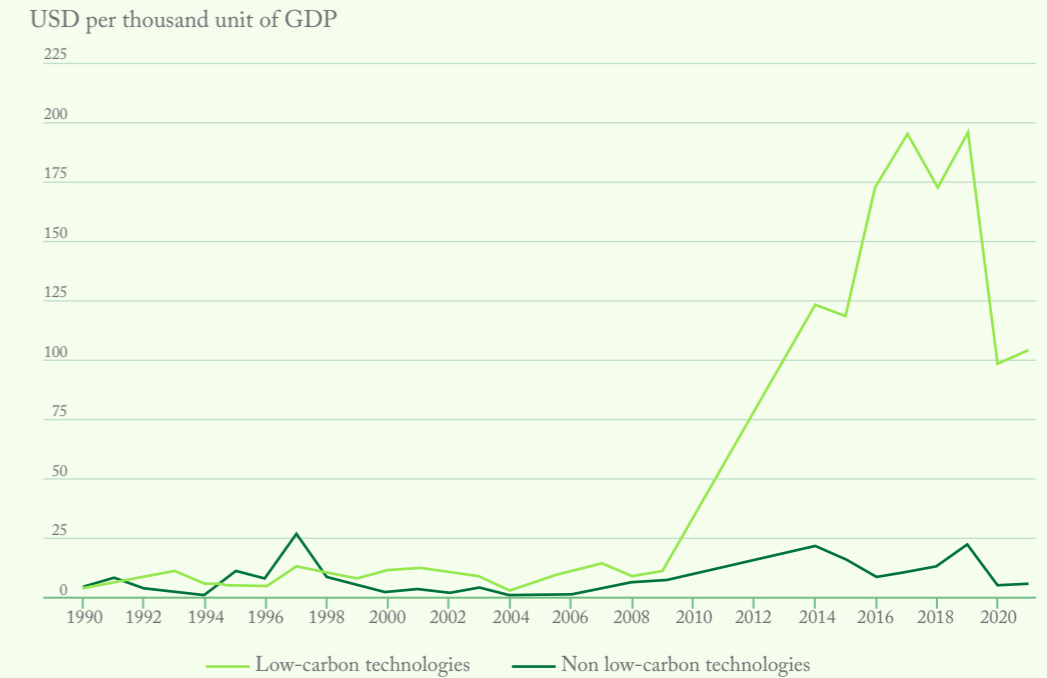


Figure 1. RD&D budget split by renewable (low-carbon) energy technologies, Republic of Türkiye, 1990-2021<sup>7</sup>

According to Organization for Economic Co-operation and Development (OECD) data, the Research and Development (R&D) expenditures of Türkiye on environmental objectives were around 152.3 and 53.29 million TL for 2015 and 2021 respectively.<sup>8</sup> Türkiye ranks 6th among EU-27 countries in 2015 and but lost grounds and currently (2021 numbers) ranks only 19th. Despite its efforts and variety of policy actions there is a significant decrease in R&D expenditures of Türkiye on environmental objectives. Whether the Green Deal Action Plan 2021 will change this trend is a question that needs to be followed.

In 2021, according to data received from the WIPO database, the total number of international patent applications was 1,897 in Türkiye, with an increase of about 9% over the average between 2016 and 2020.<sup>9</sup> According to the data received from OECD

7. <https://www.iea.org/countries/turkiye>  
 8. [https://stats.oecd.org/viewhtml.aspx?datasetcode=GBARD\\_NABS2007&lang=en](https://stats.oecd.org/viewhtml.aspx?datasetcode=GBARD_NABS2007&lang=en)  
 9. <https://www.wipo.int/edocs/statistics-country-profile/en/tr.pdf>



Statistics, the number of patents with country fractional value for environment-related technologies, climate change adaptation technologies and sustainable ocean economy were 107.7, 21.0 and 4.5 respectively in 2019.<sup>10</sup> The changes from 2016 to 2019 in the three subtitles above is very little indicating that Türkiye still needs to put emphasis on environment and climate related technologies (see Table 1).

**Table 1.** Number of environment related patent applications filed under the PCT<sup>11</sup>

Technology domains & IPC	Year				
	2015	2016	2017	2018	2019
Environment	98.0	121.3	127.0	129.7	123.7
Environment-related technologies	92.6	109.3	120.0	116.6	107.7
Environmental management	31.7	33.5	40.2	34.6	42.6
Climate change mitigation	65.1	86.8	97.8	90.9	82.6
Climate change mitigation in information and communication technologies (ICT)	0.3	2.0	3.0	2.0	1.0
Climate change mitigation technologies related to energy generation, transmission or distribution	30.2	33.0	39.6	29.1	34.8
Climate change mitigation technologies related to wastewater treatment or waste management	3.5	6.0	17.0	7.0	15.8
Capture, storage, sequestration or disposal of greenhouse gases	0.0	0.0	0.0	0.0	0.0
Climate change mitigation technologies related to transportation	12.2	8.0	9.4	15.0	11.0
Climate change mitigation technologies related to buildings	16.0	29.0	20.0	30.0	14.0
Climate change mitigation technologies in the production or processing of goods	12.0	18.8	19.5	18.8	25.6
Climate change adaptation technologies	9.3	16.8	13.0	19.1	21.0
Sustainable ocean economy	7.0	2.8	7.0	3.0	4.5

10. [https://stats.oecd.org/Index.aspx?DataSetCode=PAT\\_DEV#](https://stats.oecd.org/Index.aspx?DataSetCode=PAT_DEV#)

11. [https://stats.oecd.org/Index.aspx?DataSetCode=PAT\\_DEV#](https://stats.oecd.org/Index.aspx?DataSetCode=PAT_DEV#)

In 2021, the share of renewables, low-carbon sources and fossil fuels in power generation was 33.9% and RD&D budget for renewable energy sources was 103.5 million TL. The share of renewable sources in final energy consumption of Türkiye was 14.1% in 2019.<sup>12</sup> The economic size of investments in Türkiye's renewable energy sector, which has reached a capacity of 52,353 megawatts, has reached 66 billion USD.<sup>13</sup> Together with the incentives of the Ministry of Energy and Natural Resources (MoENR) for electricity generation, it is planned to increase the total capacity in renewable energy to 61,000 MW by 2023. While the share of renewable energy in Türkiye's electricity production was approximately 25% in 2000 and 32.03% in 2015, it was 41.21% in 2020. It is expected that the share of renewable energy in electricity generation will be approximately 45% in 2045 and 52.43% in 2050.<sup>14</sup>

### 1.1.2. The Green Growth Index

The Green Growth Index (GGI) released by the Global Green Growth Institute assists countries in achieving green growth and sustainable development targets conveyed through Sustainable Development Goals (SDGs), Paris Agreement, and Aichi Biodiversity.<sup>15</sup> GGI has four main pillars: (i) efficient and sustainable resource use cover efficient energy, water, land, and material usage, (ii) the pillar on natural capital protection looks at biodiversity and ecosystem protection, cultural and social value, environmental quality, and reduced Green House Gas (GHG) emissions, (iii) green economic opportunities focuses on the green environment, innovation, trade, and investments, (iv) the social inclusion dimension addresses access to basic services and resources, gender balance, and social protection and equity.<sup>16</sup> GGI assess how countries are close to the target level and use a traffic light system to classify countries based on their distance to the target. GGI reports also provide an analysis of the regions and look at the progress of countries in specific sub-dimensions.

When we investigate Türkiye's performance in the 2021 report, Türkiye's index score is 56,67/100 with moderate GGI performance. It is ranked 10<sup>th</sup> (out of 35 countries), 9<sup>th</sup> (out of 34 countries) and 47<sup>th</sup> (out of 58 countries) in the

12. <https://www.iea.org/countries/turkiye>

13. <https://bit.ly/3X0Sqj>

14. <https://dergipark.org.tr/download/article-file/2372403>

15. [https://greengrowthindex.gggi.org/wp-content/uploads/2019/12/Green-Growth-Index-Summary-Report\\_20191216.pdf](https://greengrowthindex.gggi.org/wp-content/uploads/2019/12/Green-Growth-Index-Summary-Report_20191216.pdf)

16. All these pillars have several sub-pillars, which are all attributed equal weights in the Index. The data is normalized, and geometric aggregation is used to calculate the Index. [https://greengrowthindex.gggi.org/?page\\_id=1243](https://greengrowthindex.gggi.org/?page_id=1243)

Western Asia region, upper-middle income, and very high Human Development Index (HDI) groups, respectively. In all the above three sub-groups, index value average shows an increasing trend from 2010 onwards. But Türkiye's general index score is very stable over the years and shows a slight decrease from 2018 onwards. Türkiye has outperformed and is way beyond its peers in Asia, while it is way below the very high HDI group's average. Türkiye needs to strengthen almost all its pillars. Türkiye performs below the 40% distance in 10 of 39 sub-indicators.<sup>17</sup> In general Türkiye's performance in social inclusion is high (except gender balance indicators) and low or very low in green economic opportunities, especially in green innovation and green trade. In efficient and sustainable resource use Türkiye's performance is good only in the case of material use efficiency. In natural capital protection Türkiye's performance is good in GHG emissions reduction and environmental quality.

### 1.1.3. Renewable energy country attractiveness index

Renewable energy country attractiveness index (RECAI) has been compiled and published by Ernst & Young since 2003 biannually. The index ranks the world's top 40 markets in terms of attractiveness of their renewable energy investment and deployment opportunities. The index and ranking are based on EY assessment. The methodology is based on assessment in five pillars.<sup>18</sup> (i) long – term need for additional or replacement energy supply and any plan for renewable energy resources commissioning, (ii) policy and its impact on renewables energy opportunities, (iii) project deliverables, (iv) natural resource strength and, (v) enabling macro stability and investment ecosystem.

When the last four years of RECAI data since 2019 is analysed to see Türkiye's position it is observed that there is no continuous progress in the ranking. The ranking of Türkiye has changed up and down and fluctuated between 22 and 34 among 40 countries. The last ranking based on RECAI November 2022 is 30 with a total score of 56. The top country is US with the score of 73.3. Türkiye's highest technology specific competencies are onshore wind, solar photovoltaic (PV), biomass, geothermal and hydro. Although there is a slight decrease in last

17. <https://greengrowthindex.gggi.org/wp-content/uploads/2022/10/Country-Factsheets-2021-Green-Growth-Index.pdf>

18. [https://assets.ey.com/content/dam/ey-sites/ey-com/en\\_gl/topics/power-and-utilities/ey-recai60-top40-ranking-v2.pdf](https://assets.ey.com/content/dam/ey-sites/ey-com/en_gl/topics/power-and-utilities/ey-recai60-top40-ranking-v2.pdf)

RECAI report, it observed that there is a progress in onshore wind and solar PV over the years. The offshore wind and Concentrated Solar Power (CSP) score are consistently low over the years. Turkish renewable energy market has competitiveness issues due to devaluation in Turkish Lira in 2021 and 2022. This has a negative impact on feed-in tariff which is a policy mechanism to support the investment in renewable energy by applying long-term contract with promising prices (unfortunately in TL) to the energy producers.

### 1.1.4. Global Cleantech Index

The Global Cleantech Innovation Index is an outcome of the United Nations Industrial Development Organization (UNIDO) Global Cleantech Innovation Programme (GCIP)<sup>19</sup> to share information about innovation ecosystems in countries where GCIP has been implemented. The Global Cleantech Innovation Index provides comparative data and insights on best practices. GCII 2017 identifies 15 indicators for the creation, commercialization, and growth of cleantech initiatives and analyses these indicators in 40 countries. Türkiye ranks 34<sup>th</sup> out of 40 countries. Though Türkiye ranks 22<sup>nd</sup> in general innovation drivers, it ranks only 36<sup>th</sup> in cleantech specific innovation drivers, 38<sup>th</sup> in emerging cleantech innovation and 32<sup>nd</sup> in commercialized clean tech innovation areas.<sup>20</sup> On a similar note, there are no Turkish companies in the annual Global Cleantech 100 where 100 companies that operate in 40 countries are ranked.<sup>21</sup>

### 1.1.5. Summarizing Türkiye's position

Table 2 summarizes Türkiye's position among different country groups looking at basic indicators and indices. In R&D and patents related to renewable energy, environmental related technologies and climate adaptation Türkiye is below the EU average and the growth rates of various indicators are below the EU's average growth rates. In a similar manner in the GGI while Türkiye outperforms many countries in Asia it is below the average of countries with very high HDI. RECAI ranks Türkiye somewhere between 22<sup>nd</sup> and 34<sup>th</sup> position over the years where the last ranking in 2022 was 30<sup>th</sup> amongst 40 countries. In GCII (though the last update was in 2017) the picture doesn't change. Türkiye ranks 34<sup>th</sup>

19. <https://www.unido.org/GCIP>

20. [https://www.unido.org/sites/default/files/files/2017-11/GCII\\_GCIP\\_report\\_2017.pdf](https://www.unido.org/sites/default/files/files/2017-11/GCII_GCIP_report_2017.pdf)

21. <https://www.cleantech.com/2021-global-cleantech-100/>

among 40 countries. This account show that Türkiye is a middle-ranked country in green growth and technology related indicators. Its performance is below the average of developed countries (EU 27, OECD, High HDI countries) but what is more worrying is that its relative position among other countries is rather stable and do not get better over the years though absolute numbers increase.

Table 2. Summary of statistics and indices

	Türkiye's position	Strengths	Weaknesses
<b>R&amp;D</b>	The RD&D expenditures for renewable energy sources in million USD are 27.5 and 39.7 for 2015 and 2021 respectively. In EU, the RD&D expenditures for renewable energy sources in million USD are 551.6 and 604.6 for 2015 and 2021 respectively. <sup>22</sup> In terms of environmental R&D expenditures, Türkiye ranked 6 <sup>th</sup> and 19 <sup>th</sup> in 2015 and 2021 respectively within EU 27 countries. <sup>23</sup>	The RD&D expenditures for renewable energy sources are increased from 2015 to 2021.	Growth rate of RD&D expenditures for renewable energy in Türkiye is 9.1% which is slightly lower than EU's growth rate of 9.6%. There is a significant decrease in environmental R&D expenditures of Türkiye from 2015 to 2021.
<b>Patents</b>	In terms of the number of patents with country fractional value for climate adaption technologies, Türkiye holds 11 <sup>th</sup> place among the EU-27 countries (average from 2015 to 2019). It was 12 <sup>th</sup> and 10 <sup>th</sup> in 2015 and 2019 respectively. In terms of the number of patents with country fractional value for environment related technologies, Türkiye holds 12 <sup>th</sup> place among the EU-27 countries (average from 2015 to 2019). Türkiye ranked 12 <sup>th</sup> in both 2015 and 2019.	In climate adaption technologies, Türkiye' number of patents with country fractional value increased from 2015 to 2019. In environment related technologies, Türkiye's number of patents with country fractional value increased from 2015 to 2019.	In both climate adaption technologies and environment related technologies, the number of patents with country fractional value of the Türkiye is below the EU-27 average and its position within EU-27 is rather stable over the years.

22. <https://www.iea.org/data-and-statistics/data-tools/energy-technology-rdd-budgets-data-explorer>

23. [https://stats.oecd.org/viewhtml.aspx?datasetcode=GBARD\\_NABS2007&lang=en](https://stats.oecd.org/viewhtml.aspx?datasetcode=GBARD_NABS2007&lang=en)

<b>Green Growth Index</b>	Overall index value is 56.67/100 which coincides to moderate performance. Türkiye ranks 10 <sup>th</sup> in the Western Asia region and 9 <sup>th</sup> in the upper-middle income and 47 <sup>th</sup> in the very high HDI categories.	Türkiye outperformed beyond its peers in Asia in terms of regional average.	Türkiye is below the very high HDI group's average. Initial speed of progress was not sustained through time. Türkiye performs below the 40% distance in 10 of 39 sub-indicators (nearly 25% of indicators).
<b>RECAI</b>	Since 2019 there is no continuous progress in the ranking, and it fluctuates between 22 and 34 among 40 countries. The last ranking based on RECAI November 2022 is 30 with a total score of 56.	Highest technology specific competencies are onshore wind, solar PV, biomass, geothermal and hydro	The offshore wind and CSP are the weakest competencies
<b>Global Cleantech Innovation Index</b>	Türkiye ranks 34 <sup>th</sup> out of 40 countries. No Turkish companies in the annual Global Cleantech 100.	Ranks 22nd in general innovation drivers	Ranks 36 <sup>th</sup> in clean-tech specific innovation drivers, 38th in emerging cleantech innovation.

### 1.1.6. The organization of the report

This report is composed of five sections. Section 1 introduces the report by providing statistics and indicators on green technologies, R&D and patent statistics on environment in general and several indices that give comparable data for Türkiye.

Section 2 highlights the background of a greening economy. It starts with the efforts of United Nations (UN) and its specific programs, summarizes the green growth strategy of the OECD and ties the discussion to EU's Green Deal. The themes of EU's Green Deal, relevant policy attempts and specific relation to technological development and innovation are reviewed.

Section 3 summarizes the policy framework of Türkiye by first looking at the attempts of the central government. Development plans and topic specific

strategic plans of the government presents a good account of state's approach to green transition path of Türkiye. This section also includes a detailed discussion of local government actions under three subtitles: the regional development administrations, regional development agencies and municipalities.

Section 4 gives a full account of policy tools towards a green transition path by differentiating between regulations, economic benefits and soft policy tools under six themes that are both common to EU's Green Deal and Türkiye's Green Deal Action Plan.

Section 5 concludes by highlighting some issues that Türkiye may struggle on the green transition path. First of all, Türkiye was late in ratifying the Paris Agreement. There is about a five-year delay between signing the agreement in 2016 and finally ratification in October 2021. Türkiye's main objection was that the agreement considers Türkiye as a developed country which asks for more responsibilities in a shorter time for reducing greenhouse gas emissions. Though Türkiye has gained grounds on this objection, the ratification delay was also taken as a negative signal which to a certain degree delayed action of the central and local government, NGOs and more importantly the firms. Second, EU's Green Deal has so to say "forced" Türkiye to act. Both the ratification of the Paris Agreement and Green Deal Action Plan was after the EU's Green Deal strategy. Thirdly, publicizing the green transition path is rather weak in Türkiye, it is not clear whether the public supports greening in general given its short-term cost. Besides, most industrial firms are caught up in between digital transformation and green transition and what EU's Green Deal may bring is not fully understood by the firms. Fourthly, green transition and climate change is highly associated with environmental protection in Türkiye. When the government wanted to signal the importance of climate change the title of the Ministry of Environment and Urbanization was changed to Ministry of Environment, Urbanization and Climate Change (MoEUCC). On the contrary climate change is increasingly viewed as an economic issue in the EU as reflected by the titles of ministries in the Netherlands (Ministry of Economic Affairs and Climate Policy) and Germany (Ministry of Economic Affairs and Climate Action). Fifth, there is strong research and innovation focus of EU's Green Deal arguing that grand societal challenges can only be addressed by advancements in science and technology. EU's Research and Innovation Strategy is very much integrated to EU's Green Deal. This link between green transition and technological advancement is weak in Türkiye. Finally, it may

be too early to consider but though the Green Deal Action Plan provides a coordinated set of actions towards an ultimate policy aim, the effective governance model is not definitive and clear.



# 2

## 2. Sustainable Development and Greening the Economy

The past 200 years, starting with the Industrial Revolution, has been an important and defining period in the history of mankind, hosting technological and economic paradigm shifts. Along with developments in technology and mechanized systems, increased use of fossil fuels like coal and oil, along with other human-related activities including deforestation, soil erosion and animal husbandry caused a 40% increase of CO<sub>2</sub> concentration, the major greenhouse gas, in the atmosphere.<sup>24</sup> If greenhouse gas emissions are not controlled, and continue to increase at their current pace, they will have irreversible harm on biodiversity, ecosystems and human life.

After witnessing two big world wars and significant destruction in less than a century, the increase of industrial production to rebuild the demolished infrastructures, caused development concept to become more and more relevant with global agenda, through notions of science, technology and, of course, progress. Attempts to increase the agricultural output and productivity through playing with seeds and soil, during 'green revolution', and commodification of natural resources like land, water and seed deepened the destruction on global resources while bringing the world to a point of no return and intensifying the danger of surviving a well-balanced ecosystem. Is it a coincidence that the word 'ecology' comes from the Greek word 'Oikos' meaning 'household'? When did we start realizing that we were not taking care of our home well enough?

The US was the first country to establish some form of control over emission of greenhouse gases, through Clean Air Act, that came to life in 1955 as Air Pollution Control Act and has been updated into its current form in 1990 with amendments concerning acid rain, ozone depletion and toxic air pollution. In 1962, Rachel Carson, an American ecologist, wrote a book named 'Silent Spring' talking about the increased use of pesticides and its damages, and has defined a milestone in bringing 'environment' to the table as a core subject in global arena, along with concepts of modernization, development, and progress. In 1972, a very controversial book 'Limits to Growth' by Meadows, Meadows, Randers, and Behrens, was published by the 'Club of Rome', made up of a group of researchers from the Massachusetts Institute

24. [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en)

of Technology. By using a computer simulation named 'World 3', the team defined possible different roadmaps until year 2100, with the industrialisation, population, food, resource, and pollution data that was available until 1970. According to the outputs created, if the world did not take the necessary precautions with regards to protection of the environment, resources and the economy, the system would collapse by 2070. This book has been significant in terms of being among the first to raise these concerns regarding population and resources and using the term 'sustainability' to emphasize the importance of continuity.

Scientists started to talk about the greenhouse effect and its influence on the planet's temperature in the 19th century, but the real concentration on global warming and developing relevant global regulations has been a focus point for the latter half of the 20th century. Supranational organizations like the UN, that were established after World War II, have been working on streamlining global frameworks for the past decades.

## 2.1. United Nations efforts for a sustainable development

In 1972, United Nations Conference on the Human Environment was held in Stockholm, as the first international conference where environment versus development conflicts were acknowledged. This was also the first conference where sustainability concept has been acknowledged globally. The organization resulted in establishment of United Nations Environment Programme (UNEP), where Türkiye was among the participating countries.

In 1979 North American, European, Russia and former East Bloc countries signed the Convention on Long-Range Transboundary Air Pollution (CLRTAP). This has been the world's first legally binding instrument to address regional air quality. The CLRTAP is the first step of countries to work together to combat air pollution and its regional consequences. In 1980 World Conservation Strategy of the International Union for the Conservation of Nature (IUCN), an umbrella organization for ecologists, emphasized that "conservation is a means for development and specifically for sustainable development of species and ecosystems". In 1983, World Commission on Environment and Development (WCED), was initiated by the General Assembly of the UN. In 1987, this commission published its report, "Our Common Future" (named by

the Norwegian prime minister Brundtland, leading the team), which would serve as a backbone for the following environmental initiatives, while introducing the concept of sustainable development with its most acknowledged and widespread definition:

*"Meeting the needs of the present without compromising the ability of future generations to meet their own needs".*

(WCED, 1987)

United Nations Conference on Environment and Development, also known as the Rio de Janeiro Earth Summit, was held in 1992 for global cooperation on development issues after the Cold War. This organization has been a turning point regarding recognition of climate change as a legitimate issue on global agenda, while resulting in three reports including, Rio Declaration on Environment and Development, Agenda 21, and Forest Principles, along with the below organizations.

The United Nations Framework Convention on Climate Change (UNFCCC) came into force on 21 March 1994 as a 'Rio Convention', along with UN Convention on Biological Diversity and the Convention to Combat Desertification, which means they were established based on the decisions finalized in Rio Earth Summit, 1992. 'The main goal of this convention was stabilization of greenhouse concentrations in the atmosphere at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system' (UNFCCC, 2018). 197 countries have ratified the convention, which represented wide global approval. UNFCCC also opened the path for the Kyoto Protocol (1997) and Paris Agreement (2015), which defined binding emission reduction targets, to mitigate related destruction on the ecosystem. With Paris Agreement, all nations who agreed to sign, committed to making their contribution for climate change mitigation, in order to keep the global temperature, increase below 2°C, even around 1.5°C.

*"The Paris Agreement seeks to accelerate and intensify the actions and investment needed for a sustainable low carbon future. Its central aim is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius. The Agreement also aims to strengthen the ability of countries to deal with the impacts of climate change"*

(UNFCCC, 2018).

Paris Agreement is significant because for the first time Türkiye committed to tangible targets for emission reductions by 2030 and presented Nationally Determined Contributions on September 30 of 2015. In this letter Türkiye stated ambition to reduce the greenhouse gas emissions coming from energy (which constitutes 70% of the total), industry, transportation, agriculture, and other relevant sectors. Türkiye signed the agreement on 22 April 2016, but the agreement was not ratified in Turkish Grand National Assembly, due to unresolved financial issues related with Türkiye’s ‘special circumstance’ condition in the UN until 2021. Paris Agreement was ratified and published in the Official Gazette on 7 October 2021.

The first global framework that was introduced by the UN to support Sustainable Development agenda, was the Millennium Development Goals (MDGs), covering eight major work topics, followed by UN’s SDGs that were introduced in 2015, with targets in seventeen work topics to be fulfilled by the year 2030. While there were significant improvements with regards to decreasing global poverty and increasing primary education globally, along with setting the ground for developing global partnerships, MDGs have mostly been criticized for not revealing valid improvements in the remaining goals, besides failing to utilize the complementarity among individual targets, especially concerning public health. To enhance global capabilities and focus areas, the UN developed a new framework of 17 goals and 169 action points to be completed by 2030, based on the experiences of implementing MDGs. There is complementarity in all these seventeen goals, and they are not mutually exclusive, therefore they need to be evaluated and executed in alignment with each other.

## 2.2. OECD Green Growth Strategy

As a leading international organization in the field of policy making, OECD regarded the green growth strategy as a way to build a greener and more resilient economy after the financial crisis of 2007-2008. According to a survey conducted with the participation of ten OECD countries—one of which was Türkiye, this vision was well-supported on the government level with an increasing number of countries seeing environmental challenges “as a new opportunity for increasing competitiveness” rather than “a barrier to economic growth.”

The Green Growth Declaration has been signed by the Ministers of 34 countries in June 2009. It was included an endorsement to the OECD for development of Green Growth

Strategy to enhance resource management, promote productivity and support long-term economic activity prioritizing sustainable social welfare. The level and type of challenges and opportunities differ in the green growth pathway for the developed, developing, and emerging countries since they have different economic and political conditions. Despite these differences, Green Growth Strategy was prepared that include most common issues by considering the environmental, social, and economic aspects of those countries.<sup>25</sup>

Overview of proposed indicator groups and topics covered

<b>1</b>	<b>The environmental and resource productivity of the economy</b>	<ul style="list-style-type: none"> <li>• Carbon and energy productivity</li> <li>• Resource productivity: materials, nutrients, water</li> <li>• Multi-factor productivity</li> </ul>
<b>2</b>	<b>The natural asset base</b>	<ul style="list-style-type: none"> <li>• Renewable stocks: water, forest, fish resources</li> <li>• Non-renewable stocks: mineral resources</li> <li>• Biodiversity and ecosystems</li> </ul>
<b>3</b>	<b>The environmental dimension of quality of life</b>	<ul style="list-style-type: none"> <li>• Environmental health and risks</li> <li>• Environmental services and amenities</li> </ul>
<b>4</b>	<b>Economic opportunities and policy responses</b>	<ul style="list-style-type: none"> <li>• Technology and innovation</li> <li>• Environmental goods and services</li> <li>• International financial flows</li> <li>• Prices and transfers</li> <li>• Skills and training</li> <li>• Regulations and management approaches</li> </ul>
<b>5</b>	<b>Socio-economic context and characteristics of growth</b>	<ul style="list-style-type: none"> <li>• Economic growth and structure</li> <li>• Productivity and trade</li> <li>• Labour markets, education and income</li> <li>• Socio-demographic patterns</li> </ul>

Figure 2. Proposed indicator groups and topics covered in OECD Green Growth Strategy<sup>26</sup>

25. <https://www.oecd.org/greengrowth/48012345.pdf>

26. <https://www.oecd.org/greengrowth/48012345.pdf>

While observing the economic progress, GDP is not considered as the main indicator in this strategy since it does not reflect the effects of natural assets on wellbeing of the society. Several other indicators are determined to monitor the economic efficiency, quality, environmental, and social effects and sustainability of the growth progress (Figure 2).<sup>27</sup>

Standing on the intersection of business opportunities and environmental improvements, eco-innovation was appreciated as a key enabler for the OECD Green Growth Strategy (OECD, 2010). In this regard, in 2008, the OECD Project on Sustainable Manufacturing and Eco-innovation was initiated. With the objective of promoting eco-innovation, OECD took on the tasks of enhancing understanding of eco-innovation and providing policymakers with the right tools and guidelines. In line with this objective, OECD proposed principles, typologies, and indicators on eco-innovation (OECD, 2010).

The main typology suggested by the OECD identified three dimensions on which eco-innovation can be categorized: *target*, *mechanism*, and *impact*. *Target* refers to the focus area of the innovation; parallel to the definition of the Oslo Manual, an eco-innovation can target *products*, *processes*, *marketing strategies*, *organizational* or *institutional* structures. *Mechanism* is the method through which an eco-innovation can achieve environmental impact in targeted areas; four types of mechanisms are *modification*, *redesign*, *alternatives*, and *creation*. Lastly, *impact* relates to the extent to which the eco-innovation contributed to the company's goal of being more environmentally friendly; it is measured using various indicators (OECD, 2010).

OECD underlined that the definition of sustainability in manufacturing industries has been evolving and six major trends were observed over time (Figure 3). These trends are *pollution control*, *cleaner production*, *eco-efficiency*, *life cycle thinking*, *closed-loop production*, and *industrial ecology*. As the motivation of these trends has shifted from regulatory compliance towards a sense of responsibility and a search for business value, the scope of the corresponding practices has been broadened with an integrated and holistic approach. Eco-innovation is perceived as the key driver of this shift (OECD,2010).

27. <https://www.oecd.org/greengrowth/48012345.pdf>

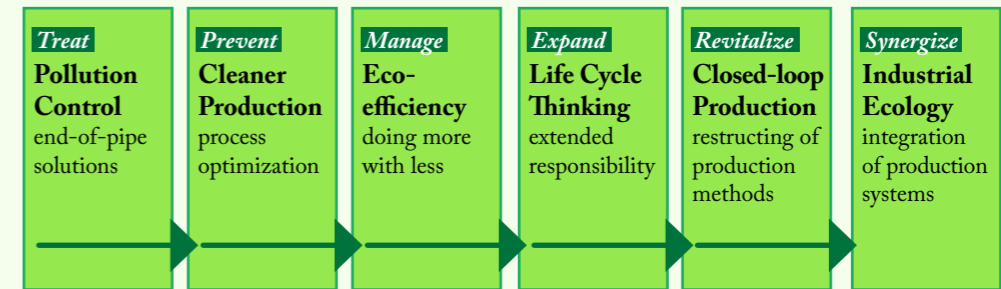


Figure 3. Eco-Innovation in Industry Enabling Green Growth. Zaltbommel, Netherlands: Van Haren Publishing. Figure 1.6, OECD (2010).

The first trend, pollution control, emerged alongside environmental regulations. As a quick reflex, the industry relied on “end-of-pipe” solutions that were added on the existing systems to make pollutants less harmful to the environment. R&D activities mostly targeted products and processes and were technology intensive; systems that treat wastewater or filter air can be characterized as typical examples of eco-innovation in this era (OECD,2010).

In the late 1980s, the efforts of UNEP to promote a more proactive approach to achieve cleaner production were reciprocated by the industry. *Source of pollution* rather than the pollution itself began attracting attention and *operational improvement* became the main motivation as opposed to regulatory compliance. Companies started to look into their production processes and sought for areas where environmental harm could be eliminated (OECD,2010).

As companies were experimenting with the clean production activities, it became clear that ‘going green’ could provide benefits not only from an environmental standpoint but also for cost reduction. In the 1990s, the World Business Council for Sustainable Development used the term “eco-efficiency” to describe the *win-win* nature of environmental management. Sustainability efforts were devoted to the ideal of “*doing more with less*” which meant reduced inputs and eliminated waste. This trend contributed to the development of environmental management systems which in turn facilitated continuous eco-improvement (OECD, 2010).



Following the eco-efficiency initiatives, life cycle thinking emerged as a central concept with a shift in mindset towards searching for improvement “*beyond conventional organization boundaries*”. Life cycle assessment, assessing environmental impact of products throughout the entire *life span* from extraction of resources to disposal, has been widely appreciated as a main tool for eco-design. Life cycle thinking found its ground on the operational level with the name “Green Supply Chains” and on the policy level with the concept of “Extended Producer Responsibility” (OECD,2010).

Closed-loop production succeeded the life cycle thinking trend with an additional focus on a new objective: designing *circular* life cycles so that both material leakage from the production cycle and virgin material extraction from natural resources are minimized. Accomplishment of this objective is reliant not only on recycling but also on reuse and remanufacturing. In accordance with the business strategy, product design plays a central role in closed-loop production to achieve circularity (OECD, 2010).

Industrial ecology can be regarded as an extension of closed-loop production to industries and society. It aims to mimic eco-systems where several organisms constitute a symbiosis in which the output generated by one is the input for another. Reading this analogy from an industry-oriented view, organisms correspond to manufacturers and nutrients correspond to materials. Eco-industrial parks are the major attempts towards realizing industrial symbiosis, a form of industrial ecology in operation; and one of the best-known examples is the Kalundborg Eco-Industrial Park in Denmark (OECD,2010).

The green growth strategies and policies were narrowly focused on the industry sector until the 2010s. But beyond the industrial transformation, a green growth strategy should be implemented in all segments of society and business sectors as a holistic approach to overcome current grand challenges, which happened only very recently. The EU has started to emphasize the importance of all-out fighting against climate change and evolve its strategies in this direction in the last decade. The following section highlights EU Green Deal and its constituents.

## 2.3. Green Growth of the European Union; Strategies, Policies and Tools

The EU policies in the field of sustainable development evolved as a result of the interaction between internal political drivers and the EU’s response to a number of key UN conferences. The common environment policy was first introduced in EU Legislation with the Single European Act of 1987. Environment has become an official EU policy area with the amendment of the Maastricht Treaty in 1993. Protection of the environment was integrated to all EU policies in 1999 with the Treaty of Amsterdam to promote sustainable development. The Sustainable Development Strategy of the EU was amended in 2006. EU’s commitment to sustainable development as a policy objective was ensured by the Lisbon Treaty in 2009 where the specific goal of ‘combating climate change’ has been declared as a target.

The EU political strategy for the term 2020-2024 has been designed to serve six political priorities; (1) A European Green Deal, (2) An economy that works for people, (3) A Europe fit for the digital age, (4) A stronger Europe in the world, (5) Promoting our European way of life, (6) A new push for European Democracy. All policy areas of the EU (there are a total number of 297 policy areas) address this priority set.

The European Green Deal is the major EU priority that aims to combat climate change by turning environmental challenges into opportunities and making the transition just and inclusive. EU policy areas are integrated to the environmental strategies of the EU since the EU Council initiative held in Cardiff in 1998. The integration of the environmental policy has significantly progressed in recent years, particularly in the field of energy policy in harmony with the development of the EU’s climate and energy package or the roadmap for moving to a competitive low-carbon economy by 2050.

In order to meet the EU’s climate and energy targets for 2030 and reach the objectives of the European Green Deal, the EU Taxonomy Regulation was published on 22 June 2020. The EU taxonomy is a classification system establishing a list of environmentally sustainable economic activities. It aims to provide companies, investors and policymakers with appropriate definitions for which economic activities can be considered environmentally sustainable. In this way, it creates security for investors, protects private investors from greenwashing, helps companies to become more climate-friendly, mitigates market fragmentation and helps shift investments where they are most needed.<sup>28</sup>

28. [https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities\\_en](https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities_en)

The Taxonomy Regulation establishes six environmental objectives.<sup>29</sup>

1. Climate change mitigation
2. Climate change adaptation
3. The sustainable use and protection of water and marine resources
4. The transition to a circular economy
5. Pollution prevention and control
6. The protection and restoration of biodiversity and ecosystems

The total list of EU policies<sup>30</sup> were reviewed to identify the integration between the EU Green Deal priority and the EU policy framework. A set of 54 policies of the EU were found to have a direct linkage to the environmental innovation ecosystem of the EU. The European Green Deal is a vision of the EU that summons all policies relevant to the environment. All the policies in the screened set give direct reference to the EU Green Deal ambition. The refined set of policies were reviewed once and for all for their direct reference to innovation for sustainability. Relevant policies, policy tools to support eco-innovation are summarized in this section with regards to their linkage to the European Green Deal thematic clusters.

### 2.3.1. The European Green Deal

The environmental, economic and societal transition of the EU to fight against climate change is shaped around the European Green Deal vision as of 2019. As a part of the European Green Deal, the EU aims to be climate neutral in 2050.<sup>31</sup> It consists of nine thematic clusters:<sup>32</sup> (i) Biodiversity; (ii) From farm to fork; (iii) Sustainable agriculture; (iv) Climate action; (v) Clean energy; (vi) Sustainable industry; (vii) Building and renovation; (viii) Sustainable mobility; (ix) Eliminating pollution. The European Green Deal and its affiliated thematic clusters involve investment in innovation and research, redesigning the economy, and updating the EU industrial policy for the climate neutral Europe in 2050 ambition. Main goals and tools of the European Green Deal are illustrated in Figure 4.

29. [https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities\\_en](https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities_en)

30. [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en)

31. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52019DC0640>

32. [https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal\\_en](https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en)

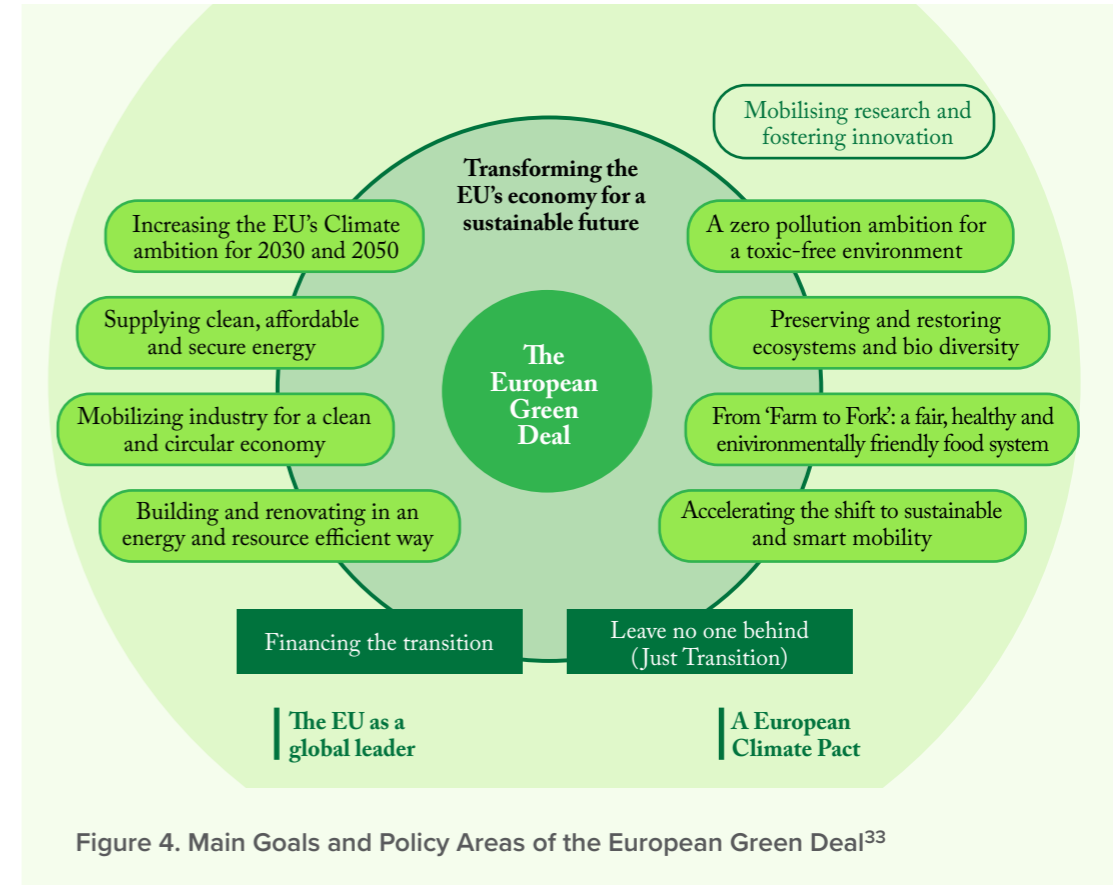


Figure 4. Main Goals and Policy Areas of the European Green Deal<sup>33</sup>

The participation of local and regional governments in the Green Deal action plays a vital role in maintaining the Green Deal aims locally within Europe. Therefore, The European Committee of the Regions launched the Green Deal Going Local working group, which consists of 13 local and regional elected representatives. The working group has three specific targets.<sup>34</sup>

- To maintain an intersecting view on several policy areas within the Green Deal and ensure policy coherence and consistency between files and related views,
- Strengthen the institutional access of the European Committee of Regions

33. <https://www.escarus.com/what-is-european-green-deal>

34. [https://ec.europa.eu/commission/presscorner/detail/en/qanda\\_20\\_24](https://ec.europa.eu/commission/presscorner/detail/en/qanda_20_24)

on the Green Deal as to place cities and regions at the centre of the path towards climate neutrality,

- To channel the challenges local and regional authorities face in implementing the green transition locally and communicating their achievements.

Some of the plans and mechanisms that guide the actors during the transformation targeted under the EGD are:<sup>35</sup>

- *The European Green Deal Investment Plan* serves as a framework for managing the investments required for the Green Deal.
- *The Just Transition Mechanism* is built to prevent the negative impact of the Green Deal on regions and communities at risk of socioeconomic damage. It aims for a fair and just green transition.
- *The European Climate Law* aims to eliminate national implementation differences that might interfere with Europe's climate-neutral target by 2050.
- *The European Industry Strategy* aims at supporting industries and SMEs through green and digital transformation.
- *The Circular Economy Action Plan* purposes the adaptation of sustainable production and consumption practices within the EU.

The European Green Deal Investment Plan will mobilize at least 1 trillion euros in sustainable investments over the next decade. The Just Transition Mechanism will mobilize at least 100 billion euros in 2021-2027 to support the European Region's workers and citizens most affected by the transition.<sup>36</sup>

Mobilizing research and fostering innovation is a key concept to realize the goals of the Green Deal. Research and Innovation (R&I) are driving forces of transformative change. 35% of the Horizon Europe budget will be allocated to address mitigation of climate related problems. In a similar manner, 5 out of the 4 EU missions in Horizon Europe is directly related to the Green Deal.<sup>37</sup> The linkages of EU policies to thematic clusters of the Green Deal within the context of innovation towards sustainability are briefly explained in sub-sections below.

35. <https://ec.europa.eu/info/food-farming-fisheries/sustainability/environmental-sustainability/cap-and-environment>

36. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2021:82:FIN>

37. [https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/environment-and-climate/european-green-deal\\_en](https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/environment-and-climate/european-green-deal_en)

The nine thematic clusters of the Green Deal have been re-grouped under five titles to produce a crosswalk between European Green Deal and Green Deal Action Plan of Türkiye which has been publicized in July 2021.<sup>38</sup> This crosswalk is also used in section 4 when specific policy actions in Türkiye are discussed.

### 2.3.1.1 Sustainable Agriculture, Biodiversity and Farm to Fork

The main policy that supports sustainability innovations for Sustainable Agriculture, Biodiversity and Farm to Fork clusters of the Green Deal is the Common Agricultural Policy (CAP). The CAP has three environmental goals: tackling climate change, protecting natural resources and enhancing biodiversity.

- *The Agricultural European Innovation Partnership (EIP-AGRI)* works to foster innovative ideas which support sustainable farming and forestry in the EU.
- *The Farm Advisory System* keeps farmers informed about new research methods and technologies for environmentally friendly farming.
- *The CAP fund* has mobilized an estimated total of 104 billion euros (25% of the total CAP funding) for climate change. The scope of the fund includes (but not limited to) reducing GHG emissions by improved livestock and manure management. Agricultural emissions have declined by 21% between 1990-2017 without reducing production.<sup>39</sup>

### 2.3.1.2 Climate Action and Sustainable Mobility

The EU policy on climate action is based on the EU Strategy on Adaptation to Climate Change which is accepted in February 2021. With the Climate Change Adaptation Strategy, the EU ensures that all its policies and actions work towards increasing Europe's resilience to the impacts of climate change. The strategy aims to improve the current adaptation innovation one step further than the present basis formed

38. <https://ticaret.gov.tr/data/60f1200013b876eb28421b23/MUTABAKAT%20YEŞİL.pdf>

39. [https://ec.europa.eu/clima/policies/ets\\_en](https://ec.europa.eu/clima/policies/ets_en)

through the EU Framework Programme (FP) and the Climate Knowledge and Innovation Community.

- *Horizon Europe* mission on “Adaptation to Climate Change, including Societal Transformation” works with the Climate Adaptation Strategy. This mission aims to support 200 communities to develop solutions for transformative adoption to scale up to 100 deep demonstrations of climate-resilience. The other missions of the Horizon Europe, such as missions on soil health, climate-neutral cities, oceans are also directly relevant to adaptation.<sup>40</sup>
- *The Emissions Trading System (ETS)* is the major tool of the EU to regulate the GHG emissions. The ‘cap and trade’ ETS in the EU allows free trade of the emission allowances between the GHG emitting industry. Each year, an installation must meet the allowance limit to cover its emissions. If an installation is able to reduce its emissions, it can sell the extra allowances to another facility or keep it for further needs. With this principle, the ‘cap and trade’ mechanism also promotes investment in innovative, low-carbon technologies. The installations covered by the ETS are reportedly reduced emissions by about 35% between 2005-2019. The European Commission (EC) sets new targets to increase and extent the scope of the EU ETS under the Green Deal.<sup>41</sup> *The ETS* is also used to support the sustainable mobility thematic cluster to internalize the negative environmental and health externalities in the maritime sector.
- *Carbon Border Adjustment Mechanism (CBAM)* aims to prevent carbon leakage and promote climate mitigation ambition of the EU. The domestic companies in EU are already paying for their carbon emissions sourced from their production processes due to on-going ETS but imported products are not subjected to such obligation due to less ambitious policies of the non-EU countries. This situation also causes the relocation of the production of EU companies to non-EU countries which results in carbon leakages. Together with CBAM, the companies importing their products to EU will buy carbon certificates ensuring their products complying with the EU’s climate objectives so the imported and domestic product will be equalized in terms

40. <https://www.eea.europa.eu/policy-documents/a-european-strategy-for-low>

41. <https://www.eea.europa.eu/policy-documents/a-european-strategy-for-low>

of carbon price. This mechanism will be actualized gradually for most carbon intensive and high-risk carbon leakage sectors (steel, cement, fertiliser, aluminium, and electricity generation). To ensure smooth implementation and facilitate dialogue with third countries, a reporting system will be implemented for these products from 2023 onwards and importers will start paying financial adjustment in 2026.<sup>42</sup>

- *The Fluorinated Green House Gas Policy (F-GHG)* aims to decrease the EU’s fluorinated greenhouse gases emissions by two-thirds by 2030 compared with the 2014 level. The current regulation (Regulation (EU) 517/2014) on F-GHG has entered into force in January 2015. The legislation stimulates innovation and green growth by encouraging the use of green technologies based on less climate-harmful activities.

Transport emissions contribute to almost one third of total GHG emissions of the EU-28 countries. The Green Deal seeks 90% reduction in transport emissions by 2050. The Commission has adopted the low-emission mobility strategy in 2016. The aim of the strategy is to provide, cleaner and cheaper mobility for everyone. The Low-Emission mobility supports transition to a low-carbon economy through investment, growth and innovation. There are three priority areas for action: (1) zero-emission vehicles, (2) lower emission transportation models, (3) speeding up utilization of alternative energy sources for transport.

*The Innovation Fund for Low Carbon Technologies* is the instrument to fund activities under the Green Deal Investment Plan. The budget of the fund comes from the ETS. The innovation fund will provide 10 billion euros for the period 2020-2030 to support commercialization of innovative low-carbon technologies. The large and small-scale funds are available for innovative processes in energy-intensive industries, carbon capture and utilization technologies, implementation of carbon capture and storage technologies, innovative renewable energy generation, and energy storage. The Innovation Fund grants can be combined with other support programmes such as InnovFin Energy Demo Projects, Connecting Europe Facility, Horizon 2020 and Horizon Europe, InvestEU Programme, the Modernisation Fund, Just Transition Fund, Enhanced European Innovation Council pilot, and private capital.<sup>43</sup>

42. [https://ec.europa.eu/commission/presscorner/detail/en/qanda\\_21\\_3661](https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_3661)

43. <https://www.eea.europa.eu/ims/greenhouse-gas-emissions-from-transport>

*The EC Investment Plan for Europe (EC IPE)* is a support program for sustainable investments under the Low Emission Mobility Strategy of the EU. The EC IPE (also known as the Juncker Plan) is an infrastructure investment program announced in 2014, it covered the fiscal period of three years 2014-2017. The EC IPE fund has mobilized 284 billion euros, 22% of which amount was allocated for research, development, and innovation. An additional 22% was mobilized for energy-related projects.<sup>44</sup>

*European Fund for Strategic Investment (EFSI)* is the central pillar of the Investment Plan for Europe. The European Investment Bank (EIB) works together with the Commission as a strategic partner for the EFSI. The EFSI supports strategic investments in key areas including energy efficiency, renewable energy, research and innovation, environment, and agriculture. The budget of the first EFSI was 315 billion euros, and it was extended to 500 billion euros in the version EFSI 2.0. 40% of the EFSI infrastructure and innovation projects aim to contribute to the climate action. EFSI 2.0 also targets sectors such as sustainable agriculture, forestry, fisheries, and aquaculture.

Some other mechanisms under this theme are:

- *The Connection Europe Facility (CEF)* supports transition to a sustainable mobility. The CEF mobilizes 60% of its budget to infrastructure projects with a link to sustainability.
- *The European Structural and Investment Fund (ESIF)* mobilises 39 billion euros of its total 70 billion euro budget to boost low-emission mobility. 12 billion euros of the allocated 39 billion euros is spared solely for the low-carbon and sustainable urban mobility investments.
- *The Horizon 2020 Programme* mobilizes 6.4 billion euros for low carbon mobility projects.

### 2.3.1.3 Clean Energy

It is estimated that an additional 275 billion euros per year will be necessary over the period 2021-2030 to reach the EU's energy and climate objectives for 2030. The EC has established a new EU Financing

mechanism to encourage greater implementation of renewable energy sources.

*The Governance Regulation* (EU 2018/1999) has been in force since September 2020. Individual and collection renewable energy projects are enabled through collective action. The system is supported through the *Regulation on the EU renewable energy financing mechanism* (EU-2020/1294). The countries pay a voluntary share to contribute to the system. The host countries allow building renewable energy systems in their soil. This “geographically free” approach allows implementation of renewable energy projects in financially optimum areas and reduces dependency on energy imports. There is no state aid in this mechanism. The projects are run together with the European Climate, Infrastructure and Environment Executive Agency. The private investors may also pay into the mechanism and they can benefit not through a financial return but by increasing their decarbonization portfolio and diversification of their investment agenda. Private investors may also develop projects and get grants for renewable energy investments across the EU.

The permitting barriers to renewable energy investments, wind energy in particular, are simplified in the EU by the *Renewable Energy Directive* (2018/2001/EU).

*The Strategic Energy Technology Plan* is another tool where member states and the private sector invested in research and pilot projects specifically on the ocean energy. In the last ten years, more than 4 billion euros was mobilized in ocean energy projects through this mechanism.

Electrical batteries have a key role in the *EU Energy Policy*. The EC has identified batteries as a strategic value chain to step up investment and innovation in the *Strategic Energy Technology (SET) Plan* and the *Strategic Transport Research and Innovation Agenda*. *Batteries Europe* is the technology and innovation platform of the European Battery Alliance established in 2019 to implement the battery related research and innovation actions.

44. <https://www.eea.europa.eu/ims/greenhouse-gas-emissions-from-transport>

Relatedly, the energy efficient-buildings strategy (see also section 2.3.1.5) is supported through the,

- *Horizon 2020* and the *Horizon Europe* Programs.
- *The Smart Finance for Smart Buildings Initiative* has been developed to increase the amount of public funds available for energy efficiency investments. The initiative is built upon the *Investment Plan for Europe*. The ESIF will allocate 18 billion euros to energy efficiency between 2014-2020 to boost investment in sustainable energy projects. In addition to the ESIF resources, the Commission developed a flexible model with the EIB to guarantee strategic investments. The model allows commercial banks to develop attractive financial products for the energy renovation of buildings. There is also the *Energy Performance Contracts* in the public sector to support efficiency investments in public buildings and infrastructure. The initial investment is covered by a private partner and maintenance are paid through energy savings.<sup>45</sup>

### 2.3.1.4 Sustainable Industry and Eliminating Pollution

The aim of the EU industry policy is to maintain European Industry's global competitiveness while reaching climate neutrality by 2050. Industrial alliances within the EU play a key role in achieving EU policy objectives through joint participation of all interested parties. The Batteries Europe and Circular Plastics platforms are examples for such alliances. EU has also launched European Clean Energy Alliance and European Raw Materials Alliance in 2020. The annual EU Industry Days helps the industry representatives gather for further discussion and dialogue. Innovation in industry is also supported through policies and FPs such as Horizon 2020. The European innovation scoreboard and the regional innovation scoreboard are two tools to measure EU countries' innovation performance. The business innovation observatory is a complementary tool to innovation scoreboards where evidence on the latest innovative trends in business and industry are provided.

*The Sustainable Industry Action Plan* (SIAP) is the backbone of the Sustainable Industry thematic cluster of the EGD. The policy includes

45. <https://e3p.jrc.ec.europa.eu/articles/energy-performance-contracting>

phasing out products which use excessive energy and natural resources in the first place. Secondly, it promotes resource and energy efficiency. The pro-environmental criterion of a product begins from its design stage.

*The EU Directive on Eco-design of Energy Using Products* has entered in to force in 2005. With this legislation, performance requirements are set specific to products. Products that do not meet these requirements cannot be placed on the European market. Although its main purpose is to reduce energy use, the Directive imposes an obligation to consider the entire life cycle of products. This allows environmental considerations, like materials use, water use, emissions, waste issues and recyclability to be considered. The SIAP extended the content of the directive to include energy-related products. The Ecodesign Directive also includes voluntary environmental performance benchmarks, beyond the minimum requirements. If a technological achievement made for less energy consuming production of a certain product, the standard of these products may set a benchmark for the entire industry.

*The EU Energy Labelling Directive* requires manufacturers and retailers to provide consumers with labels showing the energy consumption of household appliances. With the influence of the SIAP EU Ecolabel coverage has been extended to “cleaning products, appliances, paper products, clothing, home and garden products, lubricants and services such as tourist accommodation”. The revised EU Ecolabel also reduces bureaucracy and simplify criteria for companies applying for the label.

*The Retail Forum*, involves producers, consumers, and other non-governmental organisations (NGOs) to get large individual retailers to commit to a series of ambitious and concrete environmental actions, which will be monitored regularly.<sup>46</sup> *The Europa Diary* for young students is distributed in schools in the EU. *An online education tool* on sustainable consumption is made available in 2009.<sup>47</sup>

*Green Public Procurement* (GPP) can play an important role in stimulating new products, green technologies and innovation. Public authorities spend 16% of the EU's GDP on goods and services. By including environmental considerations in their tendering procedures,

46. [https://ec.europa.eu/environment/industry/retail/index\\_en.htm](https://ec.europa.eu/environment/industry/retail/index_en.htm)

47. [http://ec.europa.eu/consumers/empowerment/cons\\_education\\_en.htm#diary](http://ec.europa.eu/consumers/empowerment/cons_education_en.htm#diary)

public authorities can save energy, water and resources and reduce waste and pollution, while getting best value for money from their contracts. The EC has proposed that half of all tendering procedures in the EU Member States should be green by 2010. This target is linked to a process for setting common criteria for 10 priority product and service groups. The Commission provides a training toolkit and guidance to help public authorities apply the criteria, which have been developed in cooperation with the Member States and stakeholders.

As a part of the GPP *The Energy Star Regulation* sets minimum energy efficiency standards for the purchase of the IT equipment by central governments and EU institutions. The *Directive on the procurement of clean and energy efficient vehicles* obliges public authorities and operators to consider the lifetime costs of energy consumption and gaseous emissions.

Activities in the field of Green Technology are implemented by the EU's *Environmental Technologies Action Plan (ETAP)*. The eco-industries are one of the fastest growing sectors of the EU economy and an area where Europe is a global leader. Europe has roughly one-third of the world market for eco-technologies.<sup>48</sup> These industries provide solutions for measuring, preventing, and correcting environmental damage to water, air and soil, and for problems such as waste, noise and damage to eco-systems. This includes sectors such as waste and waste-water management, renewable energy sources, environmental consulting, air pollution and sustainable construction. One way we can measure innovation levels is by looking at the number of patents awarded. Eco-innovation patents in the EU are on the rise and the best-performing Member States grant 3.5 patents per 1 billion euros of GDP.<sup>49</sup>

The Commission is proposing the creation of an EU-wide environmental technology verification scheme to provide third-party verification of the environmental performance of new technologies. This would be voluntary and partially self-financed, using existing institutions and expertise in the Member States. The scheme is targeted at small and medium sized enterprises (SMEs) lacking the resources or capacity to

48. [https://ec.europa.eu/environment/eussd/pdf/brochure\\_scp/kg006508EN\\_2.pdf](https://ec.europa.eu/environment/eussd/pdf/brochure_scp/kg006508EN_2.pdf)

49. [https://www.eumonitor.eu/9353000/1/j9vvik7m1c3gyxp/vhwnmp3o4jzr?ctx=vg9pjk198axu&v=1&s0e=vhdubxdwqrz&start\\_tab0=6325](https://www.eumonitor.eu/9353000/1/j9vvik7m1c3gyxp/vhwnmp3o4jzr?ctx=vg9pjk198axu&v=1&s0e=vhdubxdwqrz&start_tab0=6325)

demonstrate the performance of new environmental technologies to attract first-time investors and customers. Under the scheme, verification would be based on claims by technology developers, and results would be publicly available.

One way that organisations can improve their efficiency is through environmental management systems such as the *EU's Eco-Management and Audit Scheme*. This is a voluntary system that helps optimize production and working processes and make more effective use of resources. The scheme offers big benefits to those who commit to protecting the environment and are constantly improving the way they work.<sup>50</sup>

The EC supports the SMEs through the *Environmental Compliance Assistance Programme*. This aims to improve the environmental performance of SMEs by helping them adopt easy-to-use environmental management schemes, increasing locally available environmental expertise and providing targeted funding and information.<sup>51</sup> *The Enterprise Europe Network*, are key partners in implementing the programme and are actively encouraging SMEs to adopt environmentally friendly and energy efficient solutions.<sup>52</sup> *Competitiveness and Innovation Programme* supports eco-innovation activities, provides better access to financing and encourages the competitiveness of European businesses.

The EU has six strategies for a better environment; (i) Biodiversity strategy for 2020-concrete actions; (ii) Chemicals Strategy, (iii) Circular economy action plan, (iv) Environment action programme, (v) Plastics strategy, (vi) Zero pollution action plan. *The new Circular Economy Action Plan (CEAP)* issued in 2020, is a major policy of the European Green Deal. The CEAP is connected to the Chemicals Strategy, Industrial Strategy, Plastics Strategy, and the Zero Pollution Action Plan of the EU. Although the CEAP does not directly aim for boosting eco-innovation, its direct relevance to sustainable design of products constitutes a framework for product eco-innovation in materials design and organizational-institutional innovations in the materials market.

50. [http://ec.europa.eu/environment/emas/index\\_en.htm](http://ec.europa.eu/environment/emas/index_en.htm)

51. <http://ec.europa.eu/environment/sme/>

52. [http://www.enterprise-europe-network.ec.europa.eu/index\\_en.htm](http://www.enterprise-europe-network.ec.europa.eu/index_en.htm)

*The Zero Pollution Action Plan (ZPAP)* sets a zero-pollution vision for 2050. It provides a compass to mainstream pollution prevention in all relevant EU policies, to step up implementation of the relevant EU legislation and to identify possible gaps. The ZPAP requires improved air quality (the number of premature deaths caused by air pollution is decreased by 55%); improved waste quality (50% reducing waste, plastic litter at sea), decreased microplastics release in the environment (by 30%); improved soil quality (50% reduced chemical pesticide use); decreased residual municipal waste generation by 50%.

### 2.3.1.5 Building and Renovating

*The European Regional Development Fund (ERDF)* requires member states to allocate a mandatory minimum proportion (20% of national ERDF resources in developed regions, 15% in transition regions, 12% in less developed regions) of the available funding to the low carbon economy.

*The Cohesion Policy* has an important role in transition of EU to a low-carbon economy in line with the Energy-Union Strategy. 40 billion EUR from the ERDF and the Cohesion Fund were made available for the low carbon economy for the period 2014-2020. The fund is available for energy efficient buildings, sustainable urban transport, renewable energy, smart distribution electricity grids and research and innovation in such areas.

The Cohesion Policy Programmes also include 65 billion euros directly allocated for innovation and research for the period 2014-2020. This budget is shared between three priorities of the EU namely, the European Green Deal, A Europe Fit for the Digital Age and Economy That Works for People.

### 2.3.2. Specific policies on climate technologies

The rationale for spurring climate technologies in the EU mainly addresses the market-failure problem (as opposed to the recent attempts of mission-oriented policies). Due to the uncertain process of innovation, firms hesitate to invest on climate technologies. Although this is a generic problem for R&D investments, it is more severe in climate technologies. EU FPs address the R&D investment

part of this problem, now organized under missions, yet there is a room for improvement for SME financing. Specific skills and knowledge for greening the industries is also a matter to intervene. A specific policy framework on climate technologies enables coordination between the Member States and the Union as well as establishing bridges between innovators and investors.

Green industries are rapidly growing, with an estimated annual turnover of about 2.5% of the EU's GDP. This is an emerging area with a growing rate around 8% a year. The main sub-sectors deal with waste management (30%), water supply (21%), wastewater management (13 %), and recycled materials (13 %). The sector directly employs 3.4 million people in Europe.

In order to better coordinate and ensure consistency of environmental technologies, the EC launched the ETAP as a complement to the regulations. The Plan aims to integrate EC objectives in terms of EU competitiveness, economic growth, employment and the environment into research, investment and purchasing decisions, concerning environmental technologies. As such, the plan promotes research, development and deployment, mobilizes funds, helps to drive demand and to remove barriers to market developments for climate technologies in general.

Being the first specific framework in the field, ETAP is adopted in 2004. Built on the fundamentals of ETAP Eco-Innovation Action Plan is adopted in 2011. In order to better appreciate the main differences in these two policies, the following definitions should be visited.

**Eco-innovation:** Eco-innovation is any form of innovation resulting in or aiming at significant and demonstrable progress towards the goal of sustainable development, through reducing impacts on the environment, enhancing resilience to environmental pressures, or achieving a more efficient and responsible use of natural resources.<sup>53</sup>

**Environmental Technologies:** An environmental technology is a technology that advances sustainable development by reducing risk, enhancing cost effectiveness, improving process efficiency, and creating products and processes that are environmentally beneficial.<sup>54</sup>

53. As defined in Community Guidelines on State Aid For Environmental Protection ((2008/C 82/01). <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2008:082:0001:0033:EN:PDF>

54. As defined by National Environmental Technology Strategy developed by the National Science and Technology Council 1995.



**Climate Technologies:** It refers to technologies used to deal with climate change including renewable energies such as wind energy, solar power, and hydropower. These technologies are developed for climate adaptation and mitigation such as drought-resistant crops, warning systems against natural disasters and sea walls. The practices to achieve energy efficiency or training for efficient equipment are referred to as ‘soft’ climate technologies.<sup>55</sup>

In order to sustain the union level collective efforts initiated with ETAP, the plan has not been abolished but continued with the Eco-innovation Action Plan (EcoAP). There is a shift from “environmental technologies” to “eco-innovation” and now to “climate technologies” that comprises both but at the same time enlarges the scope of technologies that are related to mitigating climate problems. The resource efficiency axis in EcoAP is also a vector to combat climate change in line with Europe 2020 initiative.

### 2.3.2.1 Environmental Technologies Action Plan ETAP (2004)

ETAP itself does not accommodate a separate budget, but an overarching scheme to lead and influence other schemes and funding mechanisms to environmental-related technology development, verification, and diffusion. In that sense, ETAP contains 28 actions aiming to improve conditions for leveraging the environmental technologies in the union as well as the national and local levels. Amongst these 28 actions, 11 are mentioned as priority actions and they are grouped under three categories according to the plan: 1) Getting from Research to Markets 2) Improving Markets Conditions and 3) Acting Globally. The brief presentation of the first two are presented below:

#### Getting from Research to Markets

**Increase and Focus Research, Demonstration:** An action to attract private and public investment for environmental technologies with an EU target of 3% of GDP for research.<sup>56</sup>

**European Technology Platforms:** This action is one of the most important

55. <https://unfccc.int/topics/what-is-technology-development-and-transfer#:~:text=What%20are%20climate%20technologies%3Fenergy%2C%20solar%20power%20and%20hydropower.>

56. [https://ec.europa.eu/commission/presscorner/detail/en/IP\\_20\\_1749](https://ec.europa.eu/commission/presscorner/detail/en/IP_20_1749)

actions of ETAP aiming to establish public/private partnerships on a specific research topic. Technology platforms are umbrella structures for all the stakeholders of a particular topic. The most successful platforms in the environmental context are the platforms for hydrogen and fuel cells, photovoltaics, steel, water supply and sanitation.<sup>57</sup>

**Environmental Technology Verification Systems:** This action aims to establish a mechanism to validate objectively the performance of environmental technology related products by means of networks of testing centres, that set common protocols for technology assessment in order to develop common or co-ordinated protocols and practices of technology assessment.

#### Improving Markets Conditions

**Performance Targets:** Based on environmental and economic sustainability measures, performance targets are set for the usage of stakeholders. The EU-Activities related to performance targets are:

- the Integrated Product Policy<sup>58</sup> seeking to minimise environmental degradations of products,
- the directive (Directive 2009/125/EC) aiming at improving the environmental performance of energy-using products,<sup>59</sup>
- the IPPC Directive (Integrated Pollution Prevention Control- (Directive 96/61/EC, codified as Directive 2008/1/EC)<sup>60</sup>
- the EU Eco-Label and national experiences in the field of eco-design.<sup>61</sup>
- the Environmental Management and Auditing Scheme<sup>62</sup>
- Environmental Products Declaration.<sup>63</sup>

**Mobilisation of Financing (grants and loans):** R&I activities are financed through FP, LIFE-Environment<sup>64</sup>, the Structural Funds and the

57. [https://ec.europa.eu/invest-in-research/policy/eu\\_tech\\_platform\\_en.htm](https://ec.europa.eu/invest-in-research/policy/eu_tech_platform_en.htm)

58. <https://ec.europa.eu/environment/ipp/>

59. <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:285:0010:0035:en:PDF>

60. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0001&from=EN>

61. [https://environment.ec.europa.eu/topics/circular-economy/eu-ecolabel-home\\_en](https://environment.ec.europa.eu/topics/circular-economy/eu-ecolabel-home_en)

62. [https://ec.europa.eu/environment/emas/index\\_en.htm](https://ec.europa.eu/environment/emas/index_en.htm)

63. <https://www.environdec.com/home>

64. [https://cinea.ec.europa.eu/programmes/life\\_en](https://cinea.ec.europa.eu/programmes/life_en)

Cohesion Fund<sup>65</sup>. Competitiveness and Innovation Programme (CIP) is also another funding scheme addressing the financing problems of SMEs acting for environmental technologies.

**Market based Instruments:** Various economic incentives such as tradable permits, tax incentives are mobilised to take up environmental technologies.

**Green Public Procurement:** Public purchasing of environmentally friendly goods, services and works which could contribute to sustainable consumption and production.<sup>66</sup>

**Awareness Raising and Training:** Awareness raising activities are promoted via FP and calls for the diffusion of environmental technologies.

**Supporting Eco-technologies in Developing Countries and Promoting Foreign Investment:** International collaboration and diffusion to developing countries is promoted via ETAP.

Among the above-mentioned actions, three of the most important actions are the technology platforms, the Environmental Technologies Verification System and the development of Performance Targets.

### 2.3.2.2 Eco-innovation Action Plan (EcoAP) (2011)

Brought into force in 2011, Eco-AP is a successor programme of ETAP. It mainly sustains the bridging between eco-innovation with EU's Research and Policy Agenda by means of FPs. Both FP6, FP7 and HORIZON 2020 show a 'greening' of sub-themes after 2004, the starting year of ETAP, and it is explicitly mentioned as a driver for some of the sub-themes. From the total EU financial contribution allocated through Horizon 2020: 65% is sustainability related (target: 60%), with 15.7 billion euros, 28% is climate related (target: 35%), representing 6.6 billion euros for the period 2014-2016. For the first five years of HORIZON 2020 45 billion euros of total EU investment for Research & Innovation 31% was spent on investment for climate Research & Innovation.<sup>67</sup>

65. [https://ec.europa.eu/regional\\_policy/funding/cohesion-fund\\_en](https://ec.europa.eu/regional_policy/funding/cohesion-fund_en)

66. [https://ec.europa.eu/environment/gpp/index\\_en.htm](https://ec.europa.eu/environment/gpp/index_en.htm)

67. [https://green-business.ec.europa.eu/eco-innovation\\_en](https://green-business.ec.europa.eu/eco-innovation_en)

There are seven main action axes on the plan which sustain and complement the actions of ETAP in addition with significant emphasis on SME funding and new skills and jobs. The integration with Research and Innovation Policy, international cooperation, intervention on market conditions maintain continuity with ETAP. The seven actions of Eco-AP are:

1. Policy and regulation (i.e., using environmental policy and legislation as a driver to promote eco-innovation),
2. Demonstration projects and partnerships (i.e., supporting demonstration projects and partnering to bring promising, smart and ambitious operational technologies to the market),
3. Standards and performance targets (i.e., developing new standards boosting eco-innovation)
4. Funding and SME support (i.e., mobilising financial instruments and support services for SMEs)
5. International cooperation (i.e., promoting international cooperation.)
6. New skills and jobs (i.e., supporting the development of emerging skills and jobs and related training programmes to match the labour market needs)
7. European Innovation Partnerships (i.e., promoting eco-innovation through the European Innovation Partnerships foreseen under the Innovation Union)<sup>68</sup>

### Implementation Tools

#### The Framework Programmes, Horizon 2020 and the Horizon Europe

The FPs are funding programmes created by the EC to support and foster research and innovation in the European Research Area (ERA).<sup>69</sup>

The implementation of the European environmental research and innovation policy is carried out through the Horizon 2020 programme. The estimated budget made available for activities related to sustainable development during the Horizon 2020 is 6.5 billion euros (i.e. approximately 8.5% of the total program budget). The current European

68. <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0899:FIN:EN:PDF>

69. [https://ec.europa.eu/eurostat/cros/content/research-projects-under-framework-programmes-0\\_en](https://ec.europa.eu/eurostat/cros/content/research-projects-under-framework-programmes-0_en)

environmental research and innovation policy is based on the Europe 2020 strategy for a smart, sustainable, and inclusive economy, and it relies on the ERA and the Innovation Union in the field of environment. Resource efficiency, climate resilience, and protection of the natural environment are often attributed keywords for the environmental research and innovation policy of Europe.<sup>70</sup>

Launched in 2021 Horizon Europe includes priority clusters: (1) Digitalization, (2) Flexibility, (3) Energy systems and smarter grids, (4) Direct current technologies, (5) Energy and Smart Cities, (6) Clean Energy, Competitiveness. 4 out of the 5 missions are directly related to mitigation of climate problems and climate technologies.<sup>71</sup>

The overall support of the low carbon technology development is depicted in the European Strategic Energy Technology Plan (SET). The cooperation platforms of the SET plan include the SET Plan Steering Group, the European Technology and Innovation Platforms (ETIPs), the European Energy Research Alliances (EERA), and the SET plan Information System. The SET Plan Steering Group consists of high-level representatives from EU countries, as well as Iceland, Norway, Switzerland, and Türkiye. The ETIPs were created to support the implementation of the SET Plan by bringing together EU countries, industry, and researchers in key areas (ETIP Wind, ETIP PV, Ocean Energy Europe, European Geothermal Energy Council, Smart Networks for Energy Transition, ETIP on Renewable Heating and Cooling, ETIP Bioenergy, CCS Platform, Sustainable Nuclear Energy Technology Platform).

The EERA accelerates new energy technology development by cooperation on pan-European programmes. The EERA gathers research organisations from 30 countries. It plays an important role in technology transfer to the industry. Research and Innovation topics involved in the integrated SET plan are; (1) integrating renewable technologies in the energy system, (2) reducing cost of technologies, (3) new technologies and services for consumers, (4) resilience and security of energy systems, (5) new materials and technologies for buildings, (6) energy efficiency for industry, (7) competitiveness in global battery sector and

70. [https://www.europarl.europa.eu/RegData/etudes/STUD/2016/572678/IPOL\\_STU\(2016\)572678\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2016/572678/IPOL_STU(2016)572678_EN.pdf)

71. [https://www.eeas.europa.eu/sites/default/files/horizon\\_europe\\_strategic\\_plan\\_2021-2024.pdf](https://www.eeas.europa.eu/sites/default/files/horizon_europe_strategic_plan_2021-2024.pdf)

e-mobility, (8) renewable fuels and bioenergy, (9) carbon capture and storage, (10) nuclear safety.<sup>72</sup>

Energy and Smart Cities are supported through the Strategic Energy Technology Plan of the SET Plan. The data and know-how on smart city developments are shared through the Smart Cities Information Systems. Moreover, the Smart Cities marketplace aims at delivering capacity building opportunities, access to finance and matching partnerships.<sup>73</sup>

The competitiveness of industries is measured through indicators such as technology status, levelized cost of energy, size of the market per value chain, the industry position through trade balance. The first progress report on clean energy competitiveness was published in 2020 and the latest in 2022.<sup>74</sup>

### Sustainable Finance Policy

In the EU's Green Deal policy context, the EU's primary aims to translate to a sustainable, low carbon, and resource-efficient economy. Sustainable finance plays a fundamental role in meeting the policy objectives under the European Green Deal and the EU's international commitments to climate and sustainability goals.

Sustainable finance means the process of considering environmental, social, and governance aspects when making investment decisions in the financial sector. It also leads to longer-term investments in sustainable economic activities and projects. It uses private investment as a complement to public money to translate a climate-neutral, climate-resilient, resource-efficient, and equitable economy.

In the European Green Deal framework, a renewed sustainable finance strategy was announced by the Commission. The strategy aims to easily reach sustainable investments by bringing private investors and the public sector together. A platform on sustainable finance, an advisory body, was created for this purpose. The platform examines and reports on capital flows towards sustainable investments. Then, the platform's

72. <https://www.eera-set.eu/about-us/what-is-eera.html>

73. <https://smart-cities-marketplace.ec.europa.eu/node/3022#:~:text=The%20Smart%20Cities%20Information%20System,an%20energy%2Defficient%20urban%20environment.>

74. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52022DC0643&from=EN>

private and public experts advise the Commission on the development of sustainable finance.

In addition to the platform, The Commission created expert groups on sustainable finance, which are the technical expert group on sustainable finance (TEG), a High-level expert group on sustainable finance (HLEG), and The Member States expert group (MSEG). TEG helps the Commission develop an integrated classification system for sustainable economic activities, an EU green bond standard, and measurement methodologies for low carbon. HLEG advises the Commission on sustainable investments and the creation of a stable financial system. MSEG coordinates sustainable finance initiatives.<sup>75</sup>

*The action plan on financing sustainable growth* defines “what is sustainable” to meet the targets of the European Green Deal through the *EU taxonomy classification system*. *The taxonomy regulation* has entered into force in July 2020. The EU taxonomy is a classification system, establishing a list of environmentally sustainable economic activities. It is a key enabler to scale up sustainable investment and to implement European Green Deal.

The platform on sustainable finance advises the EC on further developing the EU taxonomy. The task of the EU taxonomy regulation is to achieve a technical screening for economic activities that can make substantial contribution to climate change mitigation and adaptation while avoiding harm to; “sustainable use and protection of water and marine resources, transition to a circular economy, pollution prevention control, and protection and restoration of biodiversity and ecosystems”.<sup>76</sup>

The EC is also exploring the possibility of a legislative initiative for an EU Green Bond Standard in the context of the public consultation on the renewed sustainable finance strategy.<sup>77</sup> The European Green Deal Investment plan announced in 2020 that the EC will establish an EU Green Bond Standard (GBS).<sup>78</sup>

75. [https://finance.ec.europa.eu/sustainable-finance/overview-sustainable-finance\\_en](https://finance.ec.europa.eu/sustainable-finance/overview-sustainable-finance_en)

76. [https://finance.ec.europa.eu/sustainable-finance/overview-sustainable-finance/platform-sustainable-finance\\_en](https://finance.ec.europa.eu/sustainable-finance/overview-sustainable-finance/platform-sustainable-finance_en)

77. [https://finance.ec.europa.eu/regulation-and-supervision/consultations/2020-sustainable-finance-strategy\\_en](https://finance.ec.europa.eu/regulation-and-supervision/consultations/2020-sustainable-finance-strategy_en)

78. [https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/european-green-bond-standard\\_en](https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/european-green-bond-standard_en)

### **Environmental Technology Verification (ETV) Initiative**

Due to the lack of technical standards or verification to prove how much the developed innovation benefits the environment, firms, or eco-entrepreneurs face difficulties in penetrating the market. The environmental technology should be feasible for production and the proposed environmental sustainability solutions should also be easily marketed. On the other hand, consumers or investors have barriers to assess the benefit and performance of the proposed solution. ETV scheme is developed under these circumstances to verify the novel environmental technologies in a transparent and trustworthy manner thus help developers, mostly SMEs, provide evidence on the performance of the eco-product presented to the market, for them to convince investors and potential customers about the merits of the product or technology.

ETV is not a certification, but a verification process is conducted by an independent and accredited “Verification Body” and if succeeded a full report of verification process is generated and the developer can obtain a “Statement of Verification”. This verification document has a unique registration number, the ETV logo and the date of issue.

Technologies are being verified on a constant basis. The programme began in 2013 as a pilot programme and has since re-launched as a full programme in 2020. From the beginning, up to now, 278 applications received, 123 Initiated Verifications realised, and 44 technologies are verified in the fields of energy, water, material, waste-resources and environmental technology fields.<sup>79</sup>

### **Eco-Innovation Observatory (EIO)**

The Eco-Innovation Observatory (EIO), established in 2009, is a platform for collecting and analysing comprehensive eco-innovation information from key economic regions across the EU and around the world. The EC’s Directorate-General finances the EIO. The EIO aims to develop eco-innovation capabilities and practices and to stimulate innovation in environmental technologies. The EIO also helps construct a common understanding of eco-innovation, and its policy implementation and access integrated information about eco-innovation<sup>80</sup>. The EIO defines

79. [https://green-business.ec.europa.eu/eu-environmental-technology-verification\\_en](https://green-business.ec.europa.eu/eu-environmental-technology-verification_en)

80. <https://www.eco-innovation.eu/>

eco-innovation as follows: “Eco-innovation is the introduction of any new or significantly improved product (good or service), process, organisational change or marketing solution that reduces the use of natural resources (including materials, energy, water and land) and decreases the release of harmful substances across the whole life-cycle.”<sup>81</sup>

Two major EU initiatives, the ETAP and Europe INNOVA, are directly informed by the EIO.<sup>82</sup> Moreover, the EIO developed the Eco-Innovation Index and The Eco-Innovation Scoreboard to evaluate all EU countries’ eco-innovation profiles and their eco-innovation trends. Furthermore, these indexes illustrate each country’s strengths and weaknesses in eco-innovation.



81. <https://www.eco-innovation.eu/>

82. [https://ec.europa.eu/environment/ecoap/about-eco-innovation/policies-matters/new-eco-innovation-observatory-monitoring-member-states\\_en](https://ec.europa.eu/environment/ecoap/about-eco-innovation/policies-matters/new-eco-innovation-observatory-monitoring-member-states_en)

# 3



## 3. Türkiye's Position in Greening the Economy

### 3.1. Changing Policies: An Overview

The concepts related to green deal are often included in various policy documents and strategic plans. This section focuses on the national development plans, the highest-level national policy document in Türkiye. The institutional changes, Türkiye's participation in international environmental agreements, and the main policy themes are also summarized.

Considering both terminology and key focused areas in development plans, Türkiye's position on environmental issues can be chronologically classified into three stages:

- 1970s and 80s: Environmental protection
- 1990s and 2000s: Sustainable development and climate change
- 2010s and onwards: Green growth and clean technologies

#### 3.1.1. 70s and 80s: Environmental Protection

The environmental issues have been first introduced in a separate chapter in the 3<sup>rd</sup> National Development Plan (1973-1977). Throughout the 70s and 80s, policy tools under the environment chapter were mainly about reducing pollution and environmental protection. During this period, there was concern that international environmental agreements and commitments could affect industrialization adversely.

The institutional structure and the legal infrastructure regarding environmental protection was created in this period. In 1973, the Board of Environment under the Prime Ministry was established as the first institution in charge of the environment. The board had transformed to Undersecretariat of Environment in 1978. This structure would form the Ministry of Environment in the 1990s.

The Environmental Law: 2872, the first and the main national regulation on environmental issues, was adopted in 1983. The primary purpose of the law was to ensure the protection of nature and to reduce environmental pollution.

### 3.1.2. 1990s and 2000s: Sustainable Development and Climate Change

The concept of sustainable development was first introduced in the 7th Development Plan (1996-2000). 9th Development Plan (2007 – 2013) was also prepared in line with the UN SDGs. In 2006, the scope of Environment Law No. 2872 expanded to include sustainable environment and sustainable development principles. Thus, for the first time, environmental policies did not consider solely protection of environment, but also prioritised sustainable development.<sup>83</sup>

In the 8th Development Plan (2001 – 2005), climate change is referred for the first time. The plan included the targets to make regulations for increasing energy efficiency and mitigating the greenhouse gas emissions from transportation, energy, and industry. Türkiye's participation in international agreements and organizations had accelerated in the 1990s and 2000s.

In 1991, Vienna Convention and Montreal Protocol are signed. Türkiye also became a party to the UNFCCC in 2004 and the Kyoto Protocol in 2009, respectively. In line with these agreements, policies against climate change and responsibilities for the protection of the ozone layer have been included in Türkiye's environmental agenda.

In 2003, Türkiye became a member of the European Environment Agency and European Environment Information and Observation Network (EIONET).

In 2009, the Environment Chapter has been opened in Türkiye's EU accession negotiations. In parallel with this, it was aimed to develop an effective environmental management system and harmonize the environmental standards and regulations of the EU to reach Türkiye's long-term environmental targets.

83. The relevant Ministry has been changed in time with the rearrangement of the functioning units in the central government. The details are described in the following section.

#### Box 1. Project for Phase out of Ozone-Depleting Substances (ODS), 1994-2007

Technology Development Foundation of Türkiye (TTGV) implemented the Project for Reducing of Ozone-Depleting Substances (ODS) at Refrigeration Sector in Türkiye between 1994 and 2008 through the Ministry of Environment (current MoEUCC) with approval from the Multilateral Fund (MLF) for the Implementation of the Montreal Protocol and played an active role as the financial agent in the complete elimination of ODS consumption in Türkiye by 2007. Türkiye received an award from the UN as it ranked among the 9 countries that successfully implemented the Montreal Protocol among 49 countries.

With the agreement "Montreal Protocol on Substances that Deplete the Ozone Layer", signed in 1987 and entered into force in 1989, to which also Türkiye is a party, several restrictions were imposed on the production and consumption of ODS, depending on the time and alternative substances and technologies. Within the scope of this agreement, the "Multilateral Fund for the Implementation of the Montreal Protocol" was introduced to provide the developing countries with the necessary technical and financial assistance for transition to alternative materials and technologies. In 1992, the World Bank prepared a country program for Türkiye in an attempt to stop the consumption of ODSs, upon which the studies were initiated to release the funds required.

TTGV was appointed as the "intermediary financial institution" by the Undersecretariat for the Treasury (current MoTF) since the funds to be provided by the World Bank. Therefore, the project was shaped prospectively by also adding the components of "Project Preparation - Demo Projects" and "Capacity Building" as it was intended to cover the entire refrigeration sector in Türkiye.

### 3.1.3. 2010s: Green Growth and Clean Technologies

From 2010 and onwards, environmental pollution and climate change are frequently included in the policy documents. Türkiye's Climate Change Action Plan (2011 - 2023) was prepared in this period. The signing of the Paris Agreement in 2016 is considered as a positive step in Türkiye's fight against climate change.<sup>84</sup>

In both 10th Development Plan (2014 – 2018) and 11th Development Plan (2019 – 2023), it is stated that policies related to environment should be carried out within the framework of sustainable development. Green growth and cleaner production concepts are considered as important accelerators to achieve SDGs. While these concepts are often referred in these plans, key topics related to the circular economy such as low carbon economy, eco-innovation and climate technologies are almost non-existent.

In the 10<sup>th</sup> Development Plan, 25 special implementation programs were established for priority areas, which include detailed action plans called "Priority Transformation Programs". Among the programs, those which are related to greening the economy are as follows:

- Program for Enhancing Productivity in Manufacturing
- Energy Efficiency Improvement Program
- Energy Production Program Based on Local Resources
- Program for Enhancing Efficiency of Water Use in Agriculture

The 11<sup>th</sup> Development Plan targets facilitating competitiveness and productivity in all areas, in particular the priority sectors, by referring to cleaner production and green growth. One of the five fundamental pillars in the plan, "*Liveable Cities and Sustainable Environment*" focuses on protection of environment, sustainable use and management of resources, mitigating risks of climate change and reducing regional development disparities in line with sustainable development.

The reorganization of public institutions under the new Presidential Government

84. <https://tbb.gov.tr/en/local-authorities/functions-of-municipalities/> [accessed in May 17, 2021]

System in 2018 and the establishment of the Turkish Environment Agency in 2020 can be considered as major organizational changes in this period.

The eventual ratification of the Paris Agreement by the Parliament in 2021 is a critical step for Türkiye. Following the approval of the Agreement in November 2022, Minister of Environment and Urbanization of Türkiye updated Türkiye's nationally determined commitments within the margins of COP 27. According to an announcement made by the Minister, Türkiye's greenhouse gas emission target for 2030 has increased from 21% to 41% and approximately 500 million tons of emission reduction will be made. 2038 has been determined as the year when total greenhouse gas emissions will reach its peak.<sup>85</sup> Meanwhile, Green Deal Action Plan was published in July, 2021.

## 3.2. Türkiye's Position on Green Deal

Türkiye has recently been attaching greater importance to design policies for sustainable development and combating climate change in line with global developments. Türkiye has ratified the Paris Agreement and publicly announced its European Green Deal Action Plan, the government currently takes additional actions that can support its transformation to a low-carbon economy.

There is merit in providing additional information on the reasons of the delay between the signature of the Paris Agreement and its official approval. Türkiye's transition from the current economic structure to a lower carbon structure will require a significant amount of investment which can only be realized with financial as well as technological support. However, within the framework of the Paris Agreement Türkiye has been included in Annex-1 of the UNFCCC which constitutes risk of not being able to benefit from access to support mechanisms that have been envisaged for other countries at similar economic development level. As a country having almost no historical responsibility for greenhouse gas emissions Türkiye should have been evaluated in a fair term in the global climate regime. In this context, Türkiye aimed to contribute to the global climate trend, on equal terms with countries at similar economic development levels.

Türkiye emphasized its preconditions for the implementation of Paris Agreement as being recognized as a developing country and not encountering a negative impact

85. <https://www.isoyesilblog.com/turkiye-sera-gazi-emisyon-azaltim-hedefini-yuzde-41e-cikartti/>  
<https://m.bianet.org/bianet/iklim-krizi/270023-turkiye-nin-emisyon-azaltim-hedefi-belli-oldu-yuzde-41>



on the economic development of the country due national contribution declarations. Türkiye has gained grounds on its objection and there were steps taken regarding the use of various funds. Though not officially declared Türkiye was provided a 3 billion euro fund before ratifying the Paris Agreement.<sup>86</sup> On the other hand, EU's Green Deal potentially will create additional financial burden on exports to EU countries due to CBAM and thus the economic cost of not ratifying the Paris Agreement may be greater than the cost of ratifying it.

As a candidate country and one of the main export and import partner of EU, Türkiye is not indifferent to recent developments – closely following the changes in EU policies, especially the Green Deal strategy. Therefore, a Working Group for examining European Green Deal strategy has been established with participation of relevant public institutions under the coordination of the Ministry of Trade.

The Working Group held several meetings and workshops (with not only different levels of participation from bureaucratic to technocratic but also participation from various sectoral NGOs, see Table 3) concentrating on the effects of the EU Green Deal on Türkiye's policy agendas.

**Table 3.** List of members of the Working Group and other contributors

EU Green Deal Türkiye Working Group	Other Non-Member NGO Contributors
Ministry of Trade (Coordinator)	Energy intensive sectors
Presidency of Strategy and Budget	Resource intensive sectors
Ministry of Industry and Technology	Textile sector
Ministry of Treasury and Finance	Agriculture sector
Ministry of Environment Urbanization and Climate Change	Logistic sector
Ministry of Energy and Natural Resources	The Union of Chambers and Commodity Exchanges (TOBB)
Ministry of Agriculture and Forestry	Turkish Industrialist and Businessman Association (TUSIAD)
Ministry of Transport and Infrastructure	Türkiye Exporters Assembly (TIM)
Directorate for EU Affairs	

86. [https://www5.tbmm.gov.tr/develop/owa/genel\\_kurul.cl\\_getir?pEid=99969](https://www5.tbmm.gov.tr/develop/owa/genel_kurul.cl_getir?pEid=99969)

Following the meetings of the Working Group finally, in July 2021, a draft of “Türkiye's European Green Deal Action Plan” has been approved by the Presidency which is the main policy document of the country implementing EU Green Deal policies in multiple domains and sectors. The action plan has nine main chapters, which are Finance, Carbon Border Adjustment, Green and Circular Economy, Clean, Economic and Secure Energy Supply, Green and Sustainable Agriculture, Sustainable Smart Transportation, Diplomacy, Combating Climate Change, Awareness Raising Activities in scope of EU Green Deal. Each chapter consists of sub-targets and actions matched with responsible public institutions (Table 4). The first yearly report of the Green Deal Action Plan of Türkiye is just published, presenting comprehensive information on the actions that has been taken in its first year.<sup>87</sup>

**Table 4.** Responsible Institutions on Türkiye's Green Deal Policies

Action Plan	Responsible Institutions
Finance	MoTF, MoIT, MoT, MoENR, Directorate for EU Affairs, SPK, BDDK
Carbon Border Adjustment	MoIT, MoEUCC, MoT, MoTF, PoSB, TSE
Green and Circular Economy	MoIT, MoEUCC, MoAF, MoT, PoSB, TÜBİTAK
Clean, Economic and Secure Energy Supply	MoENR
Green and Sustainable Agriculture	MoAF, MoT
Sustainable Smart Transportation	MoIT, MoTI, MoENR, MoEUCC, Energy Market Regulatory Authority, Local Government
Diplomacy	Relevant Ministries, MoT
Combating Climate Change	MoAF, MoEUCC
Awareness Raising Activities in scope of EU Green Deal	MoT

MoTF: Ministry of Treasury and Finance, MoIT: Ministry of Industry and Technology,

MoT: Ministry of Trade

MoENR: Ministry of Energy and Natural Resources, SPK: Capital Markets Board of Türkiye, BDDK: Banking Regulation and Supervision Agency, MoEUCC: Ministry of Environment, Urbanization and Climate Change, PoSB: Presidency of Strategy and Budget, TSE: Turkish Standards Institute, MoAF: Ministry of Agriculture and Forestry, TÜBİTAK: The Scientific and Technological Research Council of Türkiye, MoTI: Ministry of Transport and Infrastructure

87. <https://ticaret.gov.tr/dis-iliskiler/yesil-mutabakat/yesil-mutabakat-eylem-plani-ve-calisma-grubu/yesil-mutabakat-eylem-plani-yillik-faaliyet-raporu>

Apart from Türkiye's European Green Deal Action Plan, Türkiye has already conducted other policy documents and action plans on sustainable, green, clean, smart energy etc. The main policy document and strategy plans are listed in Table 5. The following subsection, focuses on Türkiye's main policy documents and action plans, unpacking the most relevant activities of the central and local government related to greening the economy.

**Table 5.** Main policy documents

Green Deal Action Plan (2021)
The 11 <sup>th</sup> National Development Plan (2019-2023)
Medium term Programs (2021 – 2023) and (2020 – 2022)
Economic Reform Package (2021)
2023 Türkiye's Industry and Technology Strategy
Climate Change Strategy (2010 – 2023)
Climate Change Action Plan (2011 – 2023)
National Energy Efficiency Action Plan (NEEAP) 2017-2023
Türkiye's National Climate Change Adaptation Strategy and Action Plan
National Renewable Energy Action Plan for Türkiye
National Energy Plan of Türkiye (2035)

## 3.2.1. Central Government

### 3.2.1.1. The 11<sup>th</sup> National Development Plan (2019-2023)

The growing importance of sustainable development for Türkiye that aim long-term economic gains while protecting the environment can be seen in the vision of the 11<sup>th</sup> Development Plan launched by the Presidency of Strategy and Budget for the 2019-2023 period. With the plan, the country prioritizes the prevention of environmental pollution, the fight against climate change, the protection and sustainable use of biological diversity and natural resources. In line with the plan's vision,

the transformation of all sectors, especially the manufacturing industry is targeted. There are approximately 60 relevant measures specific to sectors (transportation, industry, agriculture, energy, etc.) dispersed among five main sections, but mostly under the sections, stable and strong economy, competitive production and productivity and liveable cities, and sustainable environment. Table 6 lists selected indicators from the 11<sup>th</sup> Development Plan, the indicator value in 2018, the 2023 target and current realization where data is available.

Examples of policies and actions regarding greening the economy in the 11<sup>th</sup> Development Plan are as follows.

- Electricity generation from renewable energy sources will be increased. Important developments have been made in this regard in recent years.
- Measures to reduce carbon emissions will be developed with additional measures such as energy efficiency gains and increasing forest assets.
- Buildings that are more efficient and produce their own energy will be expanded.
- R&D and investment activities will be encouraged to domestically produce high value-added and environmentally friendly products.
- Green Port and Green Organized Industrial Zones (OIZ) practices will be expanded.
- Production and export of high value-added, efficient, human health-sensitive and environmentally friendly products will be increased. The activities of companies in the manufacturing sector for optimal technology selection, compliance with legislation to protect environment, energy efficiency and reuse of wastes will be supported.
- Environmentally friendly modes of transportation will be developed and non-motorized transportation modes will be encouraged in urban transportation.
- A program will be initiated to transform the ships used for close-range passenger and vehicle transportation into environmentally and energy-friendly fully electric vessels.
- Within the framework of sustainable tourism efforts will be made to increase the number of environmentally-friendly tourism facilities and to

improve their qualifications. Studies will be conducted to determine the effects of climate change on the tourism sector.

- River basin management plans, sectoral water allocation plans, basin master plans, drought management plans, flood management plans, potable water basin protection action plans will be completed for 25 basins in order to effectively use and protect water resources.
- Zero Waste Project practices will be expanded by making solid waste management more effective.
- In order to minimize disaster damages, emphasis will be placed on activities aimed at improving the institutional structure and response capabilities.
- International climate change negotiations will be carried out within the framework of the Intended National Contribution with the principles of common but differentiated responsibilities and relative capabilities, and climate change will be tackled in sectors that cause greenhouse gas emissions (buildings, energy, industry, transportation, waste, agriculture). The resilience of the economy and society to climate risks will be increased by increasing the capacity for adaptation.
- To take necessary measures, regional and city-scale needs will be identified and solutions will be determined, and Climate Change Action Plans will be prepared for 7 Regions.
- Air quality management practices will be activated in order to prevent air pollution caused by production, heating and traffic; air quality will be improved by controlling emissions.

Implementation of the policies and measures envisaged in the 11th Development Plan is followed through the Annual Presidency Programs the Medium-Term Programs and strategic plans by public institutions. Currently the 12<sup>th</sup> Development Plan specialized commissions are working for the preparation of the next plan, though green deal cuts through many topics the title of the commission on growth (Growth Dynamics and Green Growth) signals that greening the economy will be a central topic in Türkiye's development.

**Table 6.** Targets and realizations of 11. Development Plan

11. Development plan goals	2018	2023 target	Realization
Share of Renewable Resources in Electricity Generation (%)	32.5	38.8	33.5 <sup>88</sup> (2021)
Length of rapid and high-speed train lines (km., cumulative)	1,213	5,595	1.432 <sup>89</sup> (2021)
Electrified line (%)	43	77	47 <sup>90</sup> 2021
Rate of treated wastewater reuse (%)	1.2	5	4.2 <sup>91</sup> (2022)
Number of stations in the air quality monitoring network (cumulative)	339	380	365 <sup>92</sup> (2022)
Domestic material consumption per person (tons/capita)	12,91	11,80	10,6 <sup>93</sup> (2019)
Number of protected areas (cumulative)	1,429	1,595	1.687 <sup>94</sup> (2021)
Ratio of Forest Area to total area (&)	29	30	29,4 <sup>95</sup> (2020)
Number of buildings to which zero waste program implemented (thousands)	13	400	150 <sup>96</sup> (2022)
Drinking water leakage rate (%)	36	25	33.54 <sup>97</sup> (2021)
Recovery rate of waste within the scope of zero waste program (%)	13	35	22.4 <sup>98</sup> (2022)

88. <https://enerji.gov.tr/bilgi-merkezi-enerji-elektrik#:~:text=2022%20y%C4%B1%C4%B1%20Kas%C4%B1m%20ay%C4%B1%20sonu,%C3%BC%20ise%20di%C4%9Fer%20kaynaklar%20%C5%9Feklindedir.>

89. <https://static.tccd.gov.tr/webfiles/userfiles/files/istrapor/ist20172021.pdf>

90. <https://static.tccd.gov.tr/webfiles/userfiles/files/istrapor/ist20172021.pdf>

91. <https://www.csb.gov.tr/aritilmis-atik-sularin-yeniden-kullanim-oraninda-yuzde-4-olan-yil-sonu-hedefi-asildi-bakanlik-faaliyetleri-34168#:~:text=Bakanl%C4%B1k%20taraf%C4%B1ndan%20stratejik%20planlama%20noktas%C4%B1nda,%2C2'ye%20ula%C5%9Ft%C4%B1%C4%9F%C4%B1%20kaydedildi.>

92. <https://sim.csb.gov.tr/Intro/Uhkia>

93. <https://data.oecd.org/materials/material-consumption.htm>

94. <https://www.tarimorman.gov.tr/DKMP/Menu/18/Korunan-Alan-Istatistikleri>

95. <https://www.ogm.gov.tr/tr/ormanlarimiz-sitesi/TurkiyeOrmanVarligi/Yayinlar/2020%20Türkiye%20Orman%20Varligi.pdf>

96. <https://www.aa.com.tr/tr/gundem/sifir-atik-yonetim-sistemine-5-yilda-150-bin-bina-ve-yerleske-gecti/2689386>

97. <https://www.tarimorman.gov.tr/Haber/5382/lcme-Suyu>

98. <https://www.trthaber.com/haber/cevre/sifir-atik-projesi-sinirlari-asti-685485.html>

### 3.2.1.2. Medium Term Plans and Economic Programs

Medium term programs also contribute to Green Deal Action Plan, green and clean growth, and sustainable economy policy tools in the 11<sup>th</sup> Development Plan. In fact, green transformation is one of the pillars of the 11<sup>th</sup> plan and green deal is a central focus in the making of the 12<sup>th</sup> plan.

The measures listed below would be implemented by relevant responsible public institutions via actions and projects aligned with those measures to help bolster green transformation. Some of the actions in the last Medium-Term Plan released for the period of 2023-2025 are presented below.

- Medium-term low-carbon growth strategy on the way to net zero emissions target and the amount of additional investment needs of the sectors for green transformation will be determined and various support mechanisms will be planned to protect their competitiveness.
- Nationally Determined Contributions of Türkiye in line with the 2053 net zero emission target Climate Change Strategy and National Climate Change Action Plan will be completed.
- Necessary measures will be taken to ensure the fair transition of the labour market to green transformation.
- Access to climate finance will be expanded by considering the needs of the private sector. Priority will be given to investments that are productivity-enhancing, transformative, high value-added, and limit the greenhouse gas emission and increase green skills.
- For smooth transition to circular economy that contribute efficiency increase and waste management, National Circular Economy Action Plan will be prepared.
- To protect country's agriculture and farmers from the negative effects of climate change, the scope of agricultural insurance will be expanded considering products and risks.
- By making good use of the transition period of the EU to the Border Carbon Regulation Mechanism (SKDM), policies to back up emission reduction at the lowest cost will be implemented for sectors that will

be rapidly affected by SKDM. The effective National Emissions Trading System will be developed to comply with SKDM. The existing Turkish Tax legislation will be reviewed for the conversion of taxes to carbon tax and the impact of carbon pricing instruments on the development and investment climate and society will be analysed.

- Low-carbon and sustainable transportation projects, particularly railway transportation and urban transportation system will be developed.
- With a view to support multimodal transport reducing the use of conventional fuel in transport, environmentally friendly road projects will be implemented.

### 3.2.1.3. Economic Reform Package 2021

Another important document that includes policies horizontally among public institutions in nine different domains - public finance, price stability, financial sector, current deficit, employment, institutional governance, incentives for investments, easing of domestic trade, competition, market surveillance and inspection – prepared by the Ministry of Finance and Trade is the Economic Reform Package. The main aim of the Package is to create a sustainable, strong, and quality growth that will conform to its post-pandemic economic structure.

Although the package does not specifically focus on greening the economy, actions and measures on green and sustainable growth and eco-innovation mainly under the responsibility of MoIT, MoENR, MoEUCC, are highlighted below.

- Green OIZs that can meet their own energy needs and have high resource efficiency will be implemented.
- A National Circular Economy Action Plan will be prepared.
- R&D activities will be supported to develop and disseminate green technologies.
- Green bond and green 'sukuk' issuances will be encouraged by preparing a guideline in line with international standards in order to finance environmentally sensitive investments.

- With the amendment to the Energy Efficiency Law, buildings, agriculture, and service sectors will be included in the scope of supports for energy efficiency.
- Environmentally friendly (sustainable) and smart transportation infrastructure will be developed.
- Infrastructure for electric vehicle charging will be implemented.
- The ecosystem that will ensure the development of green finance will be strengthened and actions will be taken to increase the share of Türkiye in international green finance.

### 3.2.1.4. 2023 Türkiye's Industry and Technology Strategy

MoIT announced Türkiye's 2023 Industry and Technology Strategy in 2019. The Strategy Document has been prepared with the vision of “*Indigenous Technology, Strong Industry*” by targeting the year 2023 in which the 100th anniversary of the Republic will be celebrated. The emphasis on technology oriented industries and manufacturing high value-added products has been in Türkiye's agenda for the last decade. The notion of National Technology Action and the mottos “*indigenous and national*” and “*technology generating strong Türkiye*” become the core of technology policy. The Strategy Document is similar in scope to other strategy and action plans such as Digital Türkiye Road Map and 11<sup>th</sup> Development Plan. Industry and Technology Strategy Document is made up of four sections: high technology and innovation, digital transformation and industry, entrepreneurship, human resources and infrastructure.

The strategy document does not necessarily focus on green technologies, but the following measures are related:

- The deterministic role of the green production approach in industrial policies and practices will be increased. To reduce the environmental impact of industrial production, technology-intensive modernization of the infrastructure and enterprises in the OIZ's and new investments based on cleaner production will continue to be supported.
- Within the framework of the “*Development of the Green Organized*

*Industrial Zones Framework for Türkiye Project*”, efforts to expand industrial symbiosis areas in Türkiye will continue to be carried out in cooperation with relevant stakeholders such as the MoEUCC, OIZs and Industrial Zones. The project outlines Türkiye's green roadmap for OIZs. Once the proposed changes are introduced in 4 OIZs it would result in 1.5 million MWh of energy and 11.6 million cubic meters of water saving per year, 71,000 tons of solid/hazardous waste reduction and 14,000 tons of chemical consumption reduction through investment of approximately 350 million USD; a total of 100 million USD economic value can be generated annually.

- Current Industrial Registry Information System will be improved for the establishment of “Economically Valuable Waste Monitoring System” under the scope of circular economy policies.
- Support will continue to be provided for the National Energy Strategic Action prepared by the MoENR to achieve its goals. The development of products and services that will provide energy efficiency in the industry will be carried out to increase technological competence.
- To reduce foreign dependency in energy production, using renewable energy resources and alternative materials and development of indigenous technologies are important. In these areas, especially in cooperation with MoENR, joint studies will be carried out with relevant stakeholders.

Moreover, the roadmaps that are underway or just published by MoIT are expected to contribute to climate technologies in general. Artificial Intelligence Roadmap announced in 2021<sup>99</sup>, National Technology Entrepreneurship Strategy Released in 2021<sup>100</sup> and Mobility Tools and Technologies Roadmap<sup>101</sup> announced in 2022 and National Technology Entrepreneurship Strategy<sup>102</sup> released in 2022 are examples of these.

99. <https://www.sanayi.gov.tr/medya/haber/iste-turkiyenin-yapay-zeka-stratejisi>

100. <https://www.sanayi.gov.tr/plan-program-raporlar-ve-yayinlar/strateji-belgeleri>

101. <https://www.sanayi.gov.tr/plan-program-raporlar-ve-yayinlar/strateji-belgeleri/mu0906011618>

102. <https://www.sanayi.gov.tr/plan-program-raporlar-ve-yayinlar/strateji-belgeleri/mu1011011619>

### 3.2.1.5. Climate Change Strategy (2010-2023) and Climate Change Action Plan (2011 – 2023)

Türkiye has developed the “National Climate Change Strategy” to contribute to global efforts to reduce the impacts of climate change, considering its own special circumstances and capacity. The Strategy includes a set of objectives to be implemented in the short term (within one year), the midterm (undertaken or completed within 1 to 3 years), and long term (undertaken over a 10-year period). The Strategy will guide the actions to tackle climate change during the period 2010-2023 and will be updated as necessary, in light of emerging national or international developments. With this strategy, Türkiye sets a goal of contributing to the global efforts against climate change within its own capabilities and in line with the basic principle of the UNFCCC “common but differentiated responsibilities” and presents its national mitigation, adaptation, technology, finance and capacity building policies. The main components of the Strategy focus on “*Greenhouse Gas Emission Control*” in energy, transportation, industry, waste, land use, agriculture and forestry sectors, “*Adaptation on Climate Change*”, “*Technology Development and Technology Transfer*”, “*Finance*”, “*Training, Capacity Development and Institutional Infrastructure*”.

Türkiye's Climate Change Action Plan 2011-2023, which was prepared to comply with the Strategy provides a road map that covers all sectors and identifies country's short, medium and long-term targets for combating climate change. The document covers specific themes under the Energy Sector, Buildings Sector, Industry Sector, Transportation Sector and Waste Sector. MoEUCC has been implementing the Strategy and the action plan from 2010 onwards.

### 3.2.1.6. National Energy Efficiency Action Plan (2017-2023)

The National Energy Efficiency Action Plan (2017-2023) prepared under the coordination of the MoENR and published in the Official Gazette dated 02/01/2018 includes 55 actions in buildings and services, energy, transport, industry and technology, agriculture and cross-cutting

(horizontal) areas. The Plan aims to contribute reducing Türkiye's primary energy consumption by 14% in 2023. Until 2023, a cumulative saving of 23.9 million tons of oil equivalent (toe) and an investment of 10.9 billion USD are projected under the Plan. Cumulative savings to be achieved by 2033 under the Plan are expected to be 30.2 billion USD in 2017 prices, and the impact of savings is expected to continue until 2040.

Covering the technological, economic, social and environmental dimensions, considering innovative and best practices, prioritizing stakeholder management the Action Plan also includes resource efficiency to promote competitiveness. The action plan is strongly connected and dependent to Climate Change Strategy and Energy Efficiency Strategy. The Plan is being supervised by a Coordination Committee chaired by the Deputy Minister of the MoENR. 55 actions are designed to fulfil the policies and measures defined in those strategies.

Under the National Energy Efficiency Action Plan, actions are defined to improve the sustainability of the energy sector and accelerate the transformation into an energy-efficient sector in line with the strategic goals set in various policy papers.

The Energy Efficiency Strategy aims to reduce energy densities at rates not less than 10% to be set by sectoral cooperation in each subsector of the industry. To achieve such objective, various actions are defined such as promoting investment to improve energy efficiency and identifying savings potentials. Under this Action Plan, actions are defined to improve energy efficiency in the industry and technology sector in line with the strategic goals described above.

The Plan proposes solutions on the issue of energy efficiency in the transport sector and actions are defined for the transport sector to ensure sustainability and promote energy efficiency.

The Energy Efficiency Strategy defines actions to “introduce maximum energy requirements for buildings and limits for maximum emissions” and “impose administrative sanctions on those which emit carbon dioxide at quantities above the legally defined limits” under the strategic goal “reduce building energy demand and carbon emissions; scale up sustainable, environment-friendly buildings that use renewable energy

resources.” Under the Action Plan, actions are defined to improve energy efficiency in the buildings and services sector in line with the strategic goals described above.

Figure 5 provides a summary of regulations and strategies that are related with energy efficiency and green deal in general. The full account of regulations under each thematic cluster of EU's green deal are given in Section 4.



Figure 5. Chronological order of Türkiye's regulation on energy efficiency

### 3.2.1.7. Türkiye's National Climate Change Adaptation Strategy and Action Plan

The anticipated impacts of climate change, some of which are already experienced, such as water scarcity, soil losses, erosion, modification of river/basin regimes, diminishing surface waters, floods, degradation of marine systems, forest fires, decreasing agricultural productivity urged Türkiye for undertaking an Adaptation Strategy. The comprehensive National Climate Change Adaptation Strategy and Action Plan prepared by MoEUCC marked the extent of vulnerability of Türkiye in various aspects in addition to outlining concrete steps for tackling them.

Türkiye's National Climate Change Adaptation Strategy and Action Plan provides the government to pursue climate change adaptation. In particular, the Strategy and Action Plan focus on water resources management, agriculture and food security, natural disaster risk management, public health and other crosscutting issues.

Adaptation can generally be defined as the development of institutional and financial structures, plans, programs, policies and more importantly a fundamental strategy that guides the uncertainties related to climate and the risk stemming from them. The framework of the National Climate Change Adaptation Strategy was structured by taking into account the direct and indirect objectives of the "National Climate Change Strategy". Under this framework, the combined effects of climate change on socio-economic sectors would be eliminated or alternatively be turned into opportunities in line with the country's sustainable development policies. The strategic objectives were determined by the identification of national, regional, and local level structural needs and priorities (of varying terms), and by considering the potential barriers related to the legal, institutional and financial infrastructure, the planning processes and participatory mechanisms.

The targets were identified regarding issues such as the improvement of irrigation methods in agricultural production, food security, development of systems for the reuse of water, preparation of drought action plans, conservation of biodiversity; natural disaster risk management and public health are cited in detail in the Adaptation Strategy. For each focused area the document suggests various actions and measures.

### 3.2.1.8. National Renewable Energy Action Plan for Türkiye

The National Renewable Energy Action Plan (NREAP) for Türkiye presented under Directive 2009/28/ EC, prepared by MoENR, is to establish strategies to promote the development of renewable energy in Türkiye. These strategies are set to:

- Ensure that the share of renewable energy in electricity production has increased to 30% of the total demand by 2023, based on the high accessibility of renewable sources in Türkiye,
- Fulfill the level of usage of renewable energies in transportation established in the Directive 2009/28/EC: a 10% share of renewable energy in the transportation sector,
- Ensure technological and industrial development based on the installation of a higher renewable energy capacity by 2023,
- Plan use of renewable energy resources taking into consideration the impact of climate change and sustainability, orienting plans toward the mitigation of climate change etc.

The action plan's priorities on renewable energy is to avoid obstacles in developing renewable energy production, by enabling financial support for projects, removal of barriers linked to the administrative process, develop legal framework for the implementation of new solutions, provide secure access to renewable energy for electricity generation, optimize the usage of any relevant infrastructure, develop support mechanisms, develop an appropriate framework to promote the penetration of distributed generation based on renewable energies and the usage of renewable energy in buildings.

### 3.2.1.9. Other Relevant Policy Documents

#### National Waste Management Action Plan (NWMAP)

The plan (2016-2023) was initiated after alignment with the EU legislation, identifies activities for enhancing effectiveness in solid waste and hazardous waste management by considering the existing situation

in waste management, institutional structure and responsibilities as well as the need for legal regulations. Different from the previous versions, the last NWMAP is built on sustainable development concept and conservation of natural resources and ecosystems. The final revision includes strategy and policies towards waste management at the source, principles of recycling, recovery before disposal and waste management.<sup>103</sup>

#### The Solid Waste Programme

The Program supports solid waste management projects of municipalities with financing difficulties, by funding for construction of integrated waste management facilities, landfills, pre-treatment facilities such as material recovery facilities and transfer stations.

#### Zero Waste Project

The Zero Waste Project has been initiated in 2017. It is a pioneering project to prevent waste, use natural resources efficiently, and minimize waste generation and sort and recycle waste at the source is being expanded. It is of utmost importance to develop policies and strategies that encourages recycling and recovery in urban waste management for economic and environmental benefits.<sup>104</sup> 30<sup>th</sup> of March, the initiation date of the project is celebrated as the World Zero Waste globally with the decision of the UN General Assembly.

#### National Clean Production/Eco-Efficiency Program

In the framework of Program, there were improvements in resource efficiency, reducing the environmental impacts emerging during the life cycle of products, reuse/recycling/recovery of wastes, developing and expanding clean production technologies.

#### Developing a Roadmap for Industrial Symbiosis for Türkiye Project

Industrial Symbiosis (IS) practices are underway, which increase the transition to green OIZs and improve production performance in industry while reducing environmental impact. Under the project Developing a Roadmap for Industrial Symbiosis for Türkiye launched in 2018, a governance model was built for the implementation of industrial

103. <https://cygm.csb.gov.tr/ulusal-atik-yonetimi-ve-eylem-plani-2016-2023-hazirlandi.-haber-221234>

104. <https://sifiratik.gov.tr/>



symbiosis approach on a national scale and recommendations for implementation were submitted as a report to the relevant stakeholders. The MoEUCC has launched the Transition to Circular Economy Project (EuropeAid/140562/IH/SER/TR) in 2022. The project not only performs a circular economy action plan in Türkiye at ministerial scale but also it paves the pathway to transition to European Green Deal. The Circular Economy Project is linked to development of green OIZ certification, supporting R&D to develop technological infrastructure, increasing initiatives for sustainable products, chemicals, improvement of cleaner production in textile and leather sectors, supporting Türkiye for transition to EU integrated pollution prevention legislation, preparing a national sustainable consumption and production action plan, preparing a national master plan for water reuse, calculating water footprint for basins, dissemination of Türkiye Environment Label, support to Development Agencies for implementation of resource efficiency, environment label and waste management, supporting IPA projects for transition of industry to green and circular economy etc.<sup>105</sup>

### Box 2. The First Industrial Symbiosis Applications in Türkiye, 2011-2017

In Türkiye, the studies on industrial symbiosis in parallel with the cleaner production strategy were initiated upon the implementation of the Industrial Symbiosis Project in Iskenderun Bay, supported by the Baku Tbilisi Ceyhan (BTC) Oil Pipeline Company, and conducted by TTGV in 2011. Necessary studies were carried out to establish the infrastructure so that the industrial symbiosis approach could be implemented on a regional and national basis in accordance with the project, which was accomplished between 2011-2014, the applications were carried out on a pilot-scale and examples were created. TTGV received a special award within the scope of 17<sup>th</sup> Environmental Service Awards, organized by Akdeniz University at Industrial Symbiosis Conference.

The feasibility phase of the “Industrial Symbiosis Project for Iskenderun Bay”, which was initiated by BTC Company with an approach of corporate social responsibility, was put into action in 2009 – 2010. In line with the outputs acquired from this process, the implementation phase of the Project was initiated with the contract signed between TTGV and BTC. Mainly funded by BTC Company, the project was managed by TTGV in collaboration with International Synergies Ltd. and METU Environmental Engineering Department. The project was intended to launch the implementation of industrial symbiosis approach in the vicinity of Iskenderun Bay and to take an important step for the development of a national industrial symbiosis program owing to the regional experience gained.

With the project, an Industrial Symbiosis Network was created to realize the industrial symbiosis applications by making regional and sectoral analyses. With “Green Synergy” database created to manage the resource information of the organizations within the network, necessary mapping that will allow for the pilot applications was performed and over 500 symbiosis possibilities were figured out. Within the scope of 10 sample projects selected among those, 27 institutions/organizations came together and worked with 5 universities. Owing to the sample projects that proved once again the significance of R&D and cooperation, it is indicated that 330 thousand tons of waste can be recovered annually to save the resources, there is a potential for 34 million kWh energy saving/production and such investments can pay back 1-2 years or so.

TTGV became one of the founding members of the European Industrial Symbiosis Association (EUR-ISA) in 2013. European Industrial Symbiosis Association (EUR-ISA) was founded with the guidance of European Commission emphasizing that industrial symbiosis would play an important role in achieving the goal for a source-efficient Europe, and the initiatives of International Synergies Ltd. (ISL). Also In 2013, Industrial Symbiosis Workshop was held for the Development Agencies in cooperation with TTGV. In this way, it was ensured that the subject of industrial symbiosis was included in the regional plans of 19 Agencies and TTGV implemented many demo projects with different regions in Türkiye with collaboration with National Development Agencies.

105. [https://webdosya.csb.gov.tr/db/dongusel/icerikler/1\\_gul-zar\\_yavas\\_tr-20221011172456.pdf](https://webdosya.csb.gov.tr/db/dongusel/icerikler/1_gul-zar_yavas_tr-20221011172456.pdf)

### 3.2.2. Local Government

Türkiye has different local governance models, while some of which have administrative and financial autonomy, some are directly affiliated to the central government. The municipality administrations come into force via the local elections in Türkiye are listed in the first group. The Regional Development Agencies and Administrations constitute the second group. Their policies are bounded by the top-down strategies and plans of the central government which allocates their budget though they are autonomous in deciding, planning, and managing their activities.<sup>106</sup> As a result, the aim of existence of these two types of local government entities and their functions in local governance as well as their organizational structure cause differences in their policy actions regarding the greening of the economy.

The mandatory functions that municipalities have (i.e. land development/building licensing, infrastructure, transport, water and sewer, waste management, fire-fighting, issuing license to work places within municipal boundaries and their regular inspection) lead them to undertake more implementing roles in the EU Green Deal thematic areas i.e., energy and resource efficient buildings, sustainable and smart mobility, decreasing pollution, clean and circular economy, clean and secure energy investments, sustainable and healthy agriculture, biodiversity and awareness raising in climate change. On the other hand, the regional development entities which are dedicated to planning and execution of the regional actions in accordance with the central government strategies and capacity building in pursuit of development of the relevant territories can be more focused on promoting, supporting, and facilitating transformation of these areas.

#### 3.2.2.1. Regional Entities Affiliated to the Central Government

Regional development entities in Türkiye can be examined in two subgroups: Regional Development Administrations and Regional Development Agencies. Regional Development Administrations were

basically founded to implement the regional plans attributed to their relevant territory; carrying out planning, project design, monitoring, evaluation, and coordination of the investments entailed by the plan for the fast development of the regions<sup>107</sup>. The roles assigned to the directorate of Regional Development Administrations can be summarized as:<sup>108</sup>:

- preparing and executing the regional action plans for their relevant territory in coordination with other entities in or outside the region.
- monitoring and evaluation of the investments in the region.
- by considering the complementarity and integrity of the regional plans, supporting the Development Agencies to work jointly and more effectively.
- facilitating and/or providing financial and technical support for the development of investment projects if requested by the public institutions or organizations.
- carrying out investigation, research, examination regarding the development problems, potential and opportunities of the region.
- design of innovative support programs, especially focused on institutional capacity and social capital for public, private, and NGOs, that are non-repeating with the existing ones according to the procedures and principles of the MoIT.

The regional administrations are substantially concentrated on the regions of which development require more attention and support. The first one, the South-eastern Anatolia Project (GAP) Regional Development Administration was established in 1989 as affiliated to the State Planning Organization until 2011 when its functions were transferred to the Ministry of Development. Meanwhile, three new administrations -i.e. The Eastern Anatolia Project (DAP) Regional Development Administration; The Eastern Black Sea Project (DOKAP) Regional Development Administration; The Konya Plain Project (KOP) Regional Development Administration- were established. Though they were established for

106. Plans of GAP, DAP and DOKAP were prepared by the central government by outsourcing them to universities and consultancy companies before their foundation.

107. The Emergency Decree No 642 2011

108. The Emergency Decree No 642 2011

certain period of years, their duties have been extended until 2026<sup>109</sup> except GAP of which duties have been extended till 2023<sup>110</sup> with the final amendment.

As to the Regional Development Agencies, they were established to accelerate the development and sustainability in the territories under their authority as well as to decrease the inequality within and between regions aligned with the principles and policies defined in the national development plans and programs by improving collaborations among public bodies, private entities and NGOs; ensuring in-situ resource utilization and their effective use as well as by enabling the regional potential.<sup>111</sup> The main roles of the Regional Development Agencies are listed below:<sup>112</sup>

- Supporting local administrations technically in their planning activities
- Supporting the execution of regional plans and programs as well as their monitoring and evaluation
- Capacity building for local and rural development
- Enhancing collaboration among public, private, and NGOs and monitoring their development related activities
- Use or enabling use of resources in accordance with the regional plans and programs
- Carrying out promotion and introduction of the region in national and international levels
- Introducing bilateral and multilateral funding schemes and contributing to project development
- Financing SMEs and new entrepreneurs in the region for capacity creation and enhancement
- Following up investments and bringing them into conclusion from one source

109. <https://www.resmigazete.gov.tr/fihrist?tarikh=2021-06-04>

110. <https://www.resmigazete.gov.tr/eskiler/2019/10/20191017-5.pdf>

111. Development Agency Law No 5449

112. Development Agency Law No 5449

The first two Regional Agencies were established under the State Planning Organization in 2006 and their numbers increased to 10 and 26 in 2008 and 2009, respectively. The Agencies were transferred to the Ministry of Development in 2011 as well and finally all regional entities were gathered under MoIT in 2018.

Though the Regional Development Administrations and the Regional Development Agencies share similar aims and have some common roles, they basically differ: 1) in territorial levels i.e. while the territories of Regional Development Administrations are defined for levels larger than NUTS3, the Regional Development Agencies are founded at the NUTS2 level; 2) the Regional Administrations can be considered as upper level entities which determine regional development aims, create and execute the programs aligned with their regional action plans as well as ensure the integration and complementarity of the projects executed within their territory considering the regional development problems, potentials and opportunities, while the Agencies are acting as implementing and coordinating bodies of the regional development policies in local level to address improvement of institutional capacities and enhancement of competitiveness within their lower territory.<sup>113</sup> Ideally, Regional Administrations can determine the regional Green Deal goals and identify the handicaps and advantages of the region for their realization. Also, they can design larger projects and create support mechanisms to attain the eco-innovative or environment-oriented goals defined for the region that cover many sub-regions, in coordination with the other public institutes and organizations. On the other hand, agencies can contribute by promoting these goals in their territory; monitoring, evaluating, investigating the related projects and their impacts; encouraging SMEs and entrepreneurs for eco-innovative and sustainable investments; carrying out dissemination and outreach activities such as conferences, trainings, workshops about the Green Deal and regional goals related to it; providing financial and technical supports to the stakeholders in the region to facilitate their involvement in green transformations, etc. Since the Regional Development Administrations were established mainly in the less developed areas of Türkiye, they cover only 12<sup>114</sup> of the 26 NUTS2 level regions. However,

113. Kalkınma Ajansları Faaliyet Raporu 2019 / Annual Report of Development Agencies 2019

114. Some are included partially.

each NUTS 2 level region is represented either in the territories of the Regional Administrations or the Development Agency. As a result, though Regional Development Administrations have an umbrella function, by definition and implementation still some of the agencies may have repeating roles. Therefore, the Green Deal strategies examined for the Regional Development Administrations will not be repeated for the Agencies located under the same territories and for the strategies of the Agencies. Three representative regions are selected according to their impacts on country.

The Regional Development National Strategy document which is binding for all regional entities in Türkiye was prepared by the Ministry of Development in December 2014 to determine the main strategic objectives in regional development for the years between 2014-2023. The strategies were divided into two categories as 6 spatial and 6 horizontal aims. The strategy "Promoting Sustainable Environment and Green Economy" is listed below the horizontal aims and its motivation is defined as: "To achieve the long-term sustainable development goals and transition to environment friendly economy require implementation of policies in different fields such as transition to clean production and consumption, solving infrastructural insufficiencies, a cleaner transportation system, re-interpreting the urban and rural development and the fundamental policies to be suggested to the local administrations or regional agencies are:<sup>115</sup>

- Giving priority to transition to maritime and railway transport and making the system economically more rational and environment friendly
- Giving priority to the metropolitan cities and the cities larger than 1 million, the municipalities will be encouraged to investigate population density and expansion areas and make transportation arrangements accordingly. The regional and local organizations can consider the alternative policies:
  - Decreasing the negative impact of uncontrolled and unneeded enlargement of the cities; not allowing new zoning areas before the existing ones reach a specific residence density,

- Especially in metropolitan cities, in scope of workplace-residence-urban services relations, encouraging multi central development that increase the effectiveness by decreasing environmental impacts and developing integrated transport systems,
- Constituting a transport system with an integrated, multi-mode, feasibility analysis substantially based on railway to decrease the environmental impacts,
- Making environment friendly, smart and energy efficient building systems and construction technologies widespread by giving priority to public service buildings
- By giving priority to the cities that have larger populations and intensive industrial and tourism activities, giving importance to increasing energy efficiency and clean production systems; decreasing environment related infrastructural insufficiencies,
- Taking actions by considering R&D, innovation and manufacturing capacities of the metropolitan cities and the industrial cities in terms of developing and production of environment friendly technologies. In this scope, the development strategies will be determined with a cluster approach by identifying the products and product groups to be specialized in and to be primarily developed. Thus, utilization of the green growth opportunities, exploiting the market potential that is growing in the world and decreasing the costs of environment friendly technologies, infrastructure and manufacturing systems that are planned to be deployed within the country will be enabled.
- Considering local and renewable energy potentials by conducting environmental impact analysis
- In order to support sustainable development of rural residences, the environmental implementations of local administrations will be evaluated as in scope of green growth.
- The risks and harms of natural disasters will be considered in the development process. Consciousness levels in natural disasters will be increased and residences that are safe and resistant to natural disasters will be built.
- Protection and efficient use of water and soil resources by carrying

115. Bölgesel Gelişme Ulusal Stratejisi 2014-2023 / Regional Development National Strategy 2014-2023

out precautions in the River Basin Management Plans prepared in compliance with the River Basin Protection Action Plans and Water Framework Directive in coordination with all relevant organizations.

In sum, the most highlighted Green Deal thematic areas in the Regional Development National Strategy seem to be i.e., energy and resource efficient buildings, sustainable and smart mobility as well as clean and circular economy. While decreasing pollution seems to be implicitly or indirectly addressed under urban management, promoting clean and secure energy investments is hardly emphasized though explicitly mentioned. Like pollution, sustainable and healthy agriculture is implicitly promoted by protection of water resources.

### Regional Development Administrations

The current strategies and plans of the Regional Development Administrations regarding the EU Green Deal thematic areas are briefly examined by their Strategic Plans for the years 2019-2023. The objectives, strategies and the Key Performance Indicators (KPIs) in the Regional Strategic Plans were selected according to their relevance to the Green Deal policy areas or eco-innovation. Still, the ones selected provide a summary which more or less reflects the salient strategies and the representative KPIs that are utilized to attain the objectives. Some indicative keywords or expressions considered to be associated with the Green Deal policy areas or eco-innovation during the examination of the documents were given below:

- *prevention of pollution* -i.e., cleaner production, process improvement, etc.
- *sustainable agriculture and from farm to fork* i.e., improvement of facilities regarding agricultural manufacturing and livestock farming; decreasing excess water use; organic agriculture etc
- *biodiversity* - i.e., cultivation of different plants; protection of flora/ fauna and vulnerable areas; environmental plans for natural areas that have tourism potentials, etc
- *clean energy* - i.e., promotion of renewable energies; energy efficiency-oriented actions/activities.
- *sustainable industry, circular economy* - i.e., transformation of industrial enterprises for efficient and effective use of resources;

industrial quality systems; efficient use of resources, waste management, recycling etc.



Figure 6. The terrestrial zones of 4 Regional Development Administrations.

**The South-eastern Anatolia Project (GAP) Regional Development Administration** is the first founded regional development administration is dedicated to the development of cities<sup>116</sup> located in the region. Long before the foundation of the administration around the 1970s, GAP was designed as a program based on efficient and effective use of water and soil resources and making investments regarding 22 hydroelectric dams, 19 hydroelectric power plants and 1.8 million hectares of irrigation areas in the Tigris- Euphrates Basin.<sup>117</sup> The regional development master plan was released in 1989. In the 2019-2023 Strategic Plan, the opportunities for the region include bringing irrigation to the new lands suitable for organic agriculture and advantageous position of the region in terms of renewable energies. Therefore, clean energy and sustainable agriculture have been the major areas from the past to the present for

116. Adıyaman, Diyarbakır, Gaziantep, Mardin, Siirt, Şanlıurfa, as well as Batman, Kilis, Şırnak which were added later after they attained the statue of province.

117. By the year 2019, with 22.8 billion kWh capacity, GAP had around quarter of the electricity generated from hydroelectric power plants and 7.5 % of the electricity generated from all sources in Türkiye (calculated based on the data retrieved from the websites of TEIAS and GAP in 19 May 2021).

the region. The Green Deal and eco-innovation-oriented objectives in the Plan can be found under two main aims i.e., Environmental and Physical Development and Economic Development. Their relevant strategies and the objectives with the KPIs are briefly described below:

#### ***Environmental and Physical Development***

- enhancement of the habitability of the cities
  - zero waste and clean energy using representative villages
  - number of the projects dedicated to building recreation areas
  - realization rate of the solid waste projects
- making recycling widespread in a selected district for conservation of natural resources
  - amount of the recycled solid waste

#### ***Economic Development***

- Enabling deployment of innovative applications for improvement of agricultural manufacturing
  - number of the trained farmers and collaborated farmer organizations
  - number of the irrigation action plans
  - number of the agricultural research projects
- Supporting the improvement of resources efficiency in agricultural and industrial enterprises
  - number of the projects
  - number of the contacted enterprises
- Raising awareness in use of renewable energy and energy efficiency
  - number of the preliminary feasibility reports
  - number of the supported projects
- Improving processes and establishing quality systems to make existing facilities work more efficiently, making precision farming system widespread in the region and increasing efficiency and compositeness of the agricultural production enterprises.
  - number of the trainees in precision farming
  - number of the demonstrations on precision farming

- number of the investigation project reports
- number of the entrepreneurship and innovation requirement analysis reports
- Exploiting the agricultural potential of the region and making the region more competitive in organic food, drink, and textile sectors
  - number of the pilot projects in organic agriculture
  - number of the trainees in organic agriculture

Additionally, in the GAP Action Plan for 2021-2023, under “Competitive Agriculture and Sustainable Environment” which is one of the main three targets, operational programs are defined such as program for use of renewable energy and increase in energy efficiency or program for enabling precision farming and sustainable applications. This target which is mainly composed of eco-innovation related activities takes 55% of the total allocated budget for the execution of sectoral operational programs within the relevant years.<sup>118</sup>

#### ***The Eastern Anatolia Project (DAP) Regional Development Administration:***

The master plan of DAP Regional Development was released in 2000, 11 years before the administration was founded. “Improvement of environmental quality” was one of the seven prominent intervention areas of which focus is elaborated as soil and water pollution, air pollution, biodiversity, and recreational areas. On the other hand, the strategies in the plan were examined in ten fields<sup>119</sup> including “environment” which was divided into 5 main tasks i.e., environmental management, preventing water pollution, preventing air pollution, solid waste plan, flora/fauna and vulnerable regions. From historical point of view, decreasing pollution and conserving biodiversity and ecosystems seem to be the main bases of eco-oriented strategies.

In the 2019-2023 Strategic Plan of the region, two aims can be attributed or related to the Green Deal policy areas: 1) improvement of agricultural infrastructural and increasing value added by enabling modern agricultural techniques, 2) based on the strategy that considers the

118. The total budget is estimated as 390 million TL.

119. Improvement of human resources; agriculture; industry; energy; transportation and communication; trade and construction; tourism and culture; spatial development; environment; financial structure, banking system and potential financial resources.

potential of the region, supporting development of specific production and service sectors that regard environmental sustainability. One of the objectives of the first aim is increasing efficiency in plant-based and animal products with a strategy of providing targeted supports which is relevant to sustainable agriculture policy. Basically, the efficient agriculture/farming objective related KPI parameters are irrigation facilities in terms of number and area of the covered fields, the number of beneficiary villages and number of relevant projects supported. The second aim is addressed by the strategy of supporting projects that increase life quality and are sensitive to the environment and the Green Deal policy relevant objective is raising awareness to renewable energies in the region. KPI is the targeted capacity for the solar power plants in the region i.e., determined as 5 MW (below 0.1% of the current installed solar power plant capacity in Türkiye).<sup>120</sup> As a result, the focus of administration has shifted to a clean and circular economy which is planned to be supported with clean energy technologies as well as sustainable and healthy agriculture in time.

**The Eastern Black Sea Project (DOKAP) Regional Development Administration:** The natural sources that the region has, were emphasized among the strengths in the 2019-2023 Strategic Plan of the region and tourism that regards sustainable environment is determined as one of the five main aims. Attributed objectives can be summarized as improving the so-called Green Road route and supporting the investments on it. The KPIs that are related to green tourism are preparation of landscape plans for tourism centres, projects dedicated to the enhancement of natural and cultural assets, etc. Another aim related to the Green Deal policy areas is contributing to the improvement of agriculture and manufacture-food sectors and its relevant objectives are cultivation of medical-aromatic plants and increasing the number of organic farmers and certified number of products which are measured by the KPIs such as organic agriculture farmer, organic certificates, organic fertilizers, organic product types. In the 2021-2023 Action Plan various programs were designed to promote and enhance the capacity in the mentioned fields. On the other hand, in the first Action Plan of the region for 2014-2018<sup>121</sup>, in addition to biodiversity and sustainable

agriculture, supporting renewable energy investments and integrated solid waste management projects were addressed. By September 2020, the share of renewable energy installations in the DOKAP region was 8.5% of the total installed electrical energy capacity in Türkiye which corresponded to 16,6% of the total renewable electrical energy capacity in the country.<sup>122</sup> Specifically, the region constitutes the quarter of the country's overall hydroelectric energy generation capacity.<sup>123</sup> As a result, in the current period the DOKAP Administration seems to focus on sustainable agriculture/from farm to fork and biodiversity in some extent though clean energy is already important in the greening economy.

**The Konya Plain Project (KOP) Regional Development Administration:** Despite hosting vast agricultural fields, the region has insufficient water resources, which caused irrigation to have a prominent place in the first strategic plan of the region.<sup>124</sup> Another area that the KOP administration has been focused on is renewable energy, notably not only its exploitation<sup>125</sup> but also development and manufacturing of relevant technologies in the region. In SWOT analysis carried out based on the factors that have had or may have impact on the region<sup>126</sup>, drought was listed among the threats which underlines the importance of irrigation for a sustainable agriculture in the region, while abundance of agricultural lands and high renewable energy potential were seen as opportunities. Among the five main strategic aims determined for the term 2019-2023<sup>127</sup>, "decreasing development differences within

120. Calculated from the data retrieved from the website of TEIAS on 19 May 2021

121. The second action plan after 2014-2018 was defined for the current period 2021-2023. For the years between 2018 and 2021, there is no document released.

122. Based on the data retrieved from the websites of TEIAS on 19 May 2021 and 2021-2023 DOKAP Action Plan.

123. 2021-2023 DOKAP Action Plan

124. "2017-2021 Strategic Plan" was revised in 2019 as "2019-2023 Strategic Plan" since new cities (or provinces?) were added.

125. As announced by the head of the administration, the YEKA law provides the opportunity to exploit 5 GW renewable energy potential by the Energy Specialized Industrial Zones located in the region. The largest solar PV power plant which will be in 1 GW final capacity has already been started to be installed in scope of the first YEKA project. <http://www.kop.gov.tr/haber/kop-idaresi-nden-yenilenebilir-enerji-projelerine-11-milyon-tl-destek/252#prettyPhoto> accessed on May 25, 2021. Some of the funded projects in renewable energy field are "KOP Region Renewable Energy and Energy Efficiency Program"; "Silicon Purification Research Project", "Karaman Energy Efficiency Center", "Feasibility of Manufacturing PV Solar Cells in Türkiye" and "Evaluation of Geothermal Resources Project" <http://www.kop.gov.tr/haber/kop-idaresi-nden-yenilenebilir-enerji-projelerine-11-milyon-tl-destek/252#prettyPhoto> accessed in May 25, 2021. Strengths, Weaknesses, Opportunities and Threats

126. These factors were identified through the PESTLE Analysis that considers Political, Economic, Social, Technological, Legal, and Environmental dimensions.

127. 2019-2023 KOP Strategic Plan

the region” and “increasing economic competitive power of the region” aims include objectives that are related to the Green Deal. The relevant objectives addressed by the first one can be counted as modernization of irrigation facilities to maintain sustainability of water resources, rehabilitation/modernization of cultivation/breeding areas and manufacturing units for sake of sustainable agriculture and livestock farming as well as healthy production and cultivation of different plants that contribute to biodiversity. The objectives of the second aim focus on deployment of energy generation based on renewable resources, conservation of natural landscapes for touristic purposes, increasing skilled manpower in agriculture and modernization of livestock farming facilities. Supported facilities for modernization, dissemination and training activities, cultivation areas for different plants, irrigated areas, etc. were utilized as common KPIs. In sum, KOP administration seems to target clean energy, sustainable agriculture/farm to fork and less prominently or implicitly biodiversity and sustainable industry among the Green Deal policy areas.

### Regional Development Agencies

The agencies carry out their activities aligned with the national policy documents i.e., 11<sup>th</sup> Development Plan, Regional Development National Strategy document for 2014-2023 and the regional plans<sup>128</sup> which led the strategies of the agencies to be the local implications of the national strategies<sup>129</sup> based on the advantages and the disadvantages that their territories have. There are 26 Development Agencies, which were established with the Law No. 5449 on the Establishment, Coordination and Duties of Development Agencies, some of which have not released regular and/or current strategy documents or action plans. In addition, since regions of the 12 Agencies intersect with the territories of the Regional Administrations<sup>130</sup> of which strategies are binding for them, their Green Deal related policy areas and relevant strategies are similar. As a result, in this section, three agencies i.e., Istanbul Development Agency (İSTKA); Ankara Development Agency (ANKARAKA) and İzmir

Development Agency (İZKA) that represent the cities which constitute approximately 30% of the national population and 37% of the total industry and service entities in Türkiye<sup>131</sup> are examined regarding their Green Deal or eco-innovation related strategies.



Figure 7. The terrestrial zones of 26 Regional Development Agencies established at the NUTS2 level.

**Istanbul Development Agency (İSTKA):** Istanbul is the largest city of Türkiye in terms of both population and number of industry and service enterprises which makes its impact on environment important. However, the last strategy document of Istanbul was valid for the years 2016-2020 and the Development Agency has not released any current strategy document. But Istanbul Regional Plan 2014-2023 which is structured around three development axes is still in effect. There are only a few indirect and implicit eco-innovation-oriented objectives under the two axes titled “Globally effective, value added creating, innovative and creative economy” and “Fair sharing, inclusive and learning society”. In the first axis, only two objectives “to increase renewable energy

128. Kalkınma Ajansları Faaliyet Raporu (Development Agencies Activity Report), 2019

129. Which were discussed under the central government strategies.

130. İKA, KARACADAĞ, and DAKA are covered by GAP Regional Administration; DİKA, FKA, SERKA, ORAN (partially) and KUDAKA (partially) are covered by DAP Regional Administration; DOKA, OKA and KUDAKA (partially) are covered by DOKAP Regional Administration; AHİKA, MEVKA and ORAN (partially) are covered by KOP Regional Administration

131. TÜİK population and demography database 2020 and industry database 2019 (annual industry and service statistics>> number of enterprises) [accessed in 26 May 2021]



generation in Istanbul in pursuit of decreasing the share of energy import” and “industrial transformation & enhancing industrial efficiency” appear to have a direct relation. Under the second axis one objective related to the smart governance of the city<sup>132</sup> and a few objectives related to the prevention of immigration efforts may indirectly contribute to the Green Deal policy areas.

The third axis, “Unique urban spaces and sustainable environment to be lived with pleasure”, has explicit areas and objectives that can be directly associated with the Green Deal. Among 9 preliminary areas under the third axis, 3 of them are found to be the Green Deal or eco-innovation related. The strategies under these three areas and some indicative objectives especially the ones that are found to be more or less related to eco-innovation are summarized in Table 7 below. In sum, with 3 preliminary areas and 106 objectives that are environment related, Istanbul Region plan seems to be multi focused and comprehensive but exhaustive as well. There are many auditing, control, planning, infrastructural improvement and repair actions and awareness raising activities in pollution and ecological destruction among which eco-innovative actions become hardly visible. In addition, the urgency and prominence of them are not distinguishable. As the largest metropolitan of Türkiye, with its cosmopolitan and fast-growing structure, the first step for the Green Deal seems to be correction of impacts of past actions and cumulative effects by improvement of existing infrastructure, creating awareness and careful urban planning as well as supporting eco-innovative solutions of which a brief summary is presented in Table 7.

132. “Formation of a smart city governance system that evaluates the city with an integrated view by covering and coordinating all constituents of a smart city i.e., environment, transport, economy, city life and human” Istanbul Regional Plan 2014-2023

Table 7. Istanbul Development Agency (ISTKA)

Axis Unique urban spaces and sustainable environment to be lived with pleasure		
Preliminary Areas	Strategies	Indicative Objectives
sustainable transport and accessibility	improvement of public transport infrastructure and deployment of its use	<ul style="list-style-type: none"> <li>• promoting enhancement of public transport especially via railway, subway, sea, and improvement of their infrastructures</li> </ul>
	enhancement and promotion of pedestrian and bicycle transport	<ul style="list-style-type: none"> <li>• increasing and improving bicycle roads and sidewalks</li> <li>• development of bicycle rent system</li> <li>• integration of bicycle transport of pedestrian transport and public transport and development of bicycle parking systems</li> </ul>
	improvement of accessibility	<ul style="list-style-type: none"> <li>• decreasing transport demand and balancing the distribution within hours by promoting home based work or gradual/ flexible working hours</li> <li>• making traffic and accessibility plans and required revisions for the new constructions that cause high population and unbalanced transport demand</li> </ul>
	effective management of transport demand and efficient use of infrastructure	<ul style="list-style-type: none"> <li>• promotion of deployment of composite areas that gather residence, work, and shopping facilities at one place</li> </ul>
sustainable environment	enabling management of sustainable river basins and water resources	<ul style="list-style-type: none"> <li>• formation of water fingerprint of Istanbul and carrying out studies to decrease water use in sectors that are investigated to use excess amount of water</li> <li>• enabling efficient use of water resources by environmentally friendly technologies in large residences, facilities, hospitals, hotels</li> </ul>
	conservation and enhancement of forest and agricultural areas	<ul style="list-style-type: none"> <li>• promoting and supporting organic agriculture implementations</li> <li>• creating marketplaces for their sales</li> <li>• conservation and enhancement of the biodiversity, flora, fauna and endemic plants in forests</li> </ul>
	protection and increasing quality of sea and coastal areas	<ul style="list-style-type: none"> <li>• creating consciousness not to consume products obtained by in illegal fishing</li> <li>• increasing number of blue flag coasts</li> </ul>
	control and improvement of air quality	<ul style="list-style-type: none"> <li>• preparation of a comprehensive of emission inventory</li> <li>• promotion of use of environment friendly fuels and motor systems in vehicles</li> <li>• promotion of use of environment friendly fuels in residential and industrial heating and decreasing fuel consumption by isolation</li> </ul>

sustainable environment	decreasing solid waste and wastewater and their sustainable management	<ul style="list-style-type: none"> <li>• promoting the use of recycled wastes in production, deployment of greywater recycling applications</li> <li>• increasing the number of solid waste recovery and recycle facilities and promoting their reuse in production.</li> <li>• enabling reuse of treated water in industrial processes</li> </ul>
	decreasing creation of waste caused by using resources in industrial activities	<ul style="list-style-type: none"> <li>• supporting clean production through pilot applications</li> <li>• creating a common waste management system by promoting clustering of industrial firms that produce similar wastes</li> <li>• making the waste exchange market functional by creating industrial symbiosis networks for the whole Marmara Region</li> </ul>
environment friendly energy	ensuring energy efficiency and deployment of clean energy use	<ul style="list-style-type: none"> <li>• increasing wind energy power plants</li> <li>• establishing energy efficiency and clean energy centres in both sides of the Bosphorus to promote R&amp;D studies in energy efficiency and clean energy</li> <li>• supporting actions, investigation and consultancy services regarding use of renewable energy and increasing production efficiency in industry</li> <li>• increasing institutional capacities in green buildings and deployment of the implementations</li> <li>• use of energy efficient or renewable energy technologies in public tools such as city lightening, traffic lamps, advertisement boards</li> <li>• use of motor technologies that have efficient energy use or utilize clean energy resources</li> </ul>

**Ankara Development Agency (ANKARAKA):** ANKARAKA has released a new strategy plan for the years 2022-2026, the mission according to the strategic plan is accelerating sustainable regional development and reducing intra-regional disparities. The strategic plan does not have an objective directly related to Green Deal, but the regional plan enacted for 2014-2023 includes strong implications for the Green Deal related areas.

The development plan of Ankara is structured around three axes as “living in Ankara”, “working in Ankara” and “environment in Ankara” which are examined in terms of vulnerabilities and potentials. The third axis in long version “Green Ankara that is sensitive to the environment and uses natural resources with conservation” has two preliminary areas which can be seen as regional strategies in a sense. 12 precautions

namely objectives are attributed to these strategies. While the objectives determined for the first strategy is associated with the vulnerabilities, the second one is related to the potentials of Ankara identified in terms of climate, industry, energy/transport, green fields and built environment, urban area, agriculture and tourism. The Green Deal policy area and/or eco-innovation-oriented policy objectives for Ankara and their relation to the vulnerability and potential areas mentioned above can be found below in Table 8.

In sum, in Ankara Regional Plan, the objectives of the third axis cover more or the less all Green deal policy areas and the sub actions defined under them include mainly eco-innovative solutions such as transformation of transport in terms of both infrastructure and vehicles, use of renewable energy resources, transformation of industrial organizations and reinforcing waste-feedstock exchange relations, recovery of agricultural wastes in biogas plants and promoting at source segregation, decreasing pesticide use further towards natural agriculture, which sound to be clear, feasible, comprehensive, but not exhaustive in accordance with the situation described in Ankara.

**Table 8.** Ankara Development Agency (ANKARAKA)

Axis Green Ankara that is sensitive to the environment and uses natural resources with conservation			
Preliminary Areas (Environment Related Strategies)	Objectives (Precautions)	Vulnerability Area	Potential Area
to decrease the negative impacts of economic and daily activities on environment	Creation of awareness in climate change and taking precautions	Climate (risk of drought)	
	Minimizing environmental impacts by promoting clustering industrial facilities in OIZs and industrial sites	Industry (under capacity working OIZs require enhancement in technical infrastructure and services provided)	
	Deploying use of alternative and renewable energy	Energy-Transport (air pollution due to share of thermal power plants in electricity generation)	
	Increasing the share of environment friendly transport in urban region. (railway, pedestrian, bicycle, natural gas fuelled buses)	Energy-Transport (dependence of transport mainly on highways causes high GHG emissions)	
	Increasing the green fields and their accessibility	Climate (risk of drought)	
	Protection of ecologic regions and promotion of efficient use of natural resources	Green fields and built environment (4m2 green field per capita is too low compared to the EU cities)	
	Increasing adoption of environmental sustainability principles	Green fields and built environment (4m2 green field per capita is too low compared to the EU cities)	

to reinforce clean production, clean consumption and effective solid waste management	Enhancement of clean production and industrial symbiosis implementations.		Industry (Ankara is the 5 <sup>th</sup> harmful industrial waste producing city in Türkiye and there are a few existing waste exchange relations, 3 storage and 12 recovery facilities for harmful wastes in Ankara)
	Developing applications based on segregation of waste at source to ensure maximum recovery		Urban area (residential waste segregation is in good position but can be improved by doing it at source. With its waste-based biogas power plants, Ankara is the biogas electricity generation leader in Türkiye which can be enhanced further by increasing the capacity of the facilities.
	Increasing share of clean fuels within sustainability		Energy-Transport (access to natural gas is 94% in Ankara of which effect on clean air can be enhanced by transformation of road-based transport.
	The consumption of pesticides and chemical fertilizers will be decreased; deployment of recovery and harmless disposal of agricultural wastes		Agriculture (use of pesticides and chemical fertilizers despite large planted areas is relatively lower in Ankara which may be improved and the agricultural wastes can be utilized in biogas plants. Good position in livestock farming and urbanization should not cause damage agricultural areas)
	The values of natural and cultural resources will be considered in tourism		Tourism (which is more nature based (spa, plateau, trekking, skiing, climbing and camping based) is improving by careful planning which should be maintained by preventing pollution.)

**Izmir Development Agency (İZKA):** Izmir Development Agency has updated its regional strategy for 2012-2025. The mission of Izmir is defined as knowledge production and development of leading, unique, inspiring projects based on green and blue growth and three out of the five strategies determined are dedicated to the actions related to green growth, blue growth and development of technology-based entrepreneurship and innovations. Thus, by the third strategy, activities of Izmir in the Green Deal policy areas seem to be attributed an eco-innovative identity. The strategies are elaborated below.<sup>133</sup>

### 1. Awakening the Region for Transition of Izmir to Green Growth Economy

Despite vast agricultural potential and touristic attributes of sea and coastal areas, Izmir confronts threats related to extinction of natural resources, industrial pollution and climate change. The objectives and some indicative actions to awaken the green growth in Izmir are defined as follows:

- Increasing the regional sustainable manufacturing capacity
  - Effective strategy, analysis, investigation reports for applications regarding green growth
  - Arranging trainings, meetings, seminars to raise awareness in sustainable production and efficient resource use
  - Development of, carrying out and monitoring innovative support mechanisms in sustainable production which are specialized to regional requirements
  - Enacting Izmir Industrial Symbiosis Program
- Deployment of renewable energies and development of national technologies
  - Developing international collaborations and involving in networks in renewable energy field
  - Carrying out activities to enhance human capital in renewable energies
  - Developing and carrying out projects to increase the capacities of renewable energy enterprises

133. In addition, in the original document, these objectives are associated with the UN's SDGs.

- Carrying out strategy, analysis, advertising, and internationalization activities to increase capacity of the clean energies and clean technologies cluster
- Improving business and investment mediums for clean energy and clean technologies
  - Preparation of advertisement materials that introduce the investment medium
  - Attending international activities to introduce investment opportunities

### 2. Awakening the Region for Transition of Izmir to Blue Growth Economy

Izmir as a 5000-year harbour city has 14 harbours and is the largest back field storage area of Türkiye. Blue growth defined by the UN can be basically defined as ensuring sustainability of resources while exploiting the economic advantages of oceans/seas through tourism, fishery and sea life, sea transport and ports but also by novel ways such as offshore renewable energies, marine biotechnology, and seabed extraction. From protection of the ecosystem health to preventing pollution and sustainable management of marine resources, there are different challenging aspects to be considered during these activities.<sup>134</sup> In the current strategic plan term, sea transport and seaports components of the blue economy are selected as the main focus of Izmir which is planned to be complemented by the activities regarding increasing the creative capacity of the region that leads to production of value-added products and improving the coastal tourism. As one of the main objectives of the blue growth strategy, increasing sea transport and the capacity of seaports may contribute to decreasing carbon emissions and air pollution. On the other hand, Green Deal impacts or eco-innovative character of the substantial part of the objectives remain more implicit and indirect.

### 3. Development of Technology-based Entrepreneurship and Innovations around the Green and Blue Growth

This strategy aims at making R&D based or innovative economic activities, sustainable, environment oriented and relied on resource

134. World Bank and United Nations Department of Economic and Social Affairs. 2017. The Potential of the Blue Economy: Increasing Long-term Benefits of the Sustainable Use of Marine Resources for Small Island Developing States and Coastal Least Developed Countries. World Bank, Washington DC.

efficient clean technologies. Despite the intention is clear and emphasis is strong, the objectives and sub actions are not elaborated in terms of their green growth or blue growth relation except the one given below. The strategy might be expected to be guiding for promoting the activities of enterprises in favour of green and blue growth.

- Commercialization of technology enterprises and improvement of financial resources
- Development of tools for commercialization of the technologies regarding the blue and green economy

As a result, while the strategic plan of Izmir for the next 4 years has a strong emphasis and includes elaborated actions on renewable energy in scope of green economy strategy, other fields mainly remain less structured and left implicit in terms of their relation to the Green Deal policy areas. In addition, the current Izmir Regional Plan 2014-2023 includes some eco-innovative and Green Deal related preliminary areas and the objectives as well. A brief summary of them can be found in Table 9.

### 3.2.2.2. Municipalities

In line with creating environmentally friendly cities in Türkiye, municipalities aim to create cities that produce solutions to future problems and needs by using their limited resources effectively and applying new technologies and innovative approaches, respecting the environment and natural resources, and human improving the quality of life.

Smart technologies that enable municipal services to be carried out more efficiently with less cost allow municipalities to provide more effective services to citizens. Smart city applications, which are already being used in many municipalities in Türkiye, are primarily focused on the environment, transportation, governance, security, health, and geographical information systems.<sup>135</sup> For this purpose, municipalities design various projects and organize competitions. Some of these projects are Bicycle Transportation, Zero Waste, Local Development Projects, Child-friendly cities.<sup>136</sup>

135. <http://akillisehirler.tbb.gov.tr/>, Akıllı Şehirler

136. <https://www.ebelediye.gov.tr:8443/AnketTbb/bisikletUygulamaYarismasi.jsp>

Table 9. İzmir Development Agency (İZKA)

Axis Strong Economy	
Preliminary Areas	Indicative objectives
sustainable production and service providing	• In compatibility with the regional eco-efficiency strategy, increasing the capacity and information sharing and awareness of enterprises
	• Sustainable production implementations will be deployed giving priority to eco-efficiency and industrial symbiosis.
	• Energy efficiency and renewable energy use will be deployed in all sectors and energy generation based on renewable sources will be increased.
	• Activities for the development of clean technologies and their use will be supported.
	• Sustainable agricultural production will be ensured.
Sustainable Environment	• Sustainable tourism implementations and its deployment will be provided.
	• Sustainable management of wastewater and drinking and domestic water will be ensured.
	• Solid and harmful waste recovery, storage and disposal capacities will be increased.
	• Control of air pollution will be provided in industrially dense areas
	• Energy efficiency will be ensured and renewable and clean energy use in residential heating will be deployed.
	• Prevention and control of industrial, agricultural, and urban pollution will be provided in three main river basins through making integrated basin management at the corporate level
Qualified Urban Life	• The biodiversity in vulnerable ecosystems in Izmir will be conserved.
	• Environment planning, green transport, efficient and clean energy use in planning of urban development will be prioritized.
	• Sustainable and integrated coastal management will be provided and the relation with sea will be reinforced.

Due to rapid urbanization, population growth, and sharing of duties and power between the central government and local governments, local governments were restructured in Türkiye in the first half of the 2000s. This change continued with both new regulations on legal infrastructure and administrative and financial practices that would strengthen the roles and responsibilities of local governments. Thus, while the administrative structure of local governments and their relations with the central government were reshaped within the constitutional framework, the fundamental change manifested itself in the diversification of roles and responsibilities of the local governments.

In accordance with the change in Türkiye's financial management system and the changing structure of local governments, steps have been taken to increase the resources of local governments. As a result, in addition to the strategic plan, performance program, budget and accounting system applications in local governments, the tools of a modern financial management system were implemented.

The Strategic Plan prepared in this direction is an important guiding tool for adequately fulfilling the duties and responsibilities undertaken by the Union of Municipalities of Türkiye. Within this understanding, the Union of Municipalities of Türkiye prepared the first Strategic Plan to cover the 2010-2014 period and the second Strategic Plan to cover the 2015-2019 period. During these periods, emphasis was placed on improving the institutional structure and lobbying activities were carried out to protect the training needs of its members and their rights and interests on the legal ground.

In the period of 2020-2024, which constitutes the third Strategic Plan period of the Union, the main purpose is to increase the quality and efficiency of local public services by supporting municipalities that are trying to improve the quality of life in cities. The 2020-2024 strategic plan<sup>137</sup> has been prepared to meet the needs of the members. It constitutes an important basis for establishing a culture of consultation and reconciliation especially with municipalities, public institutions and other institutional structures.

<https://sifiratik.tbb.gov.tr/>  
<http://yerelkalkinma.tbb.gov.tr/>  
<http://cocukdostu.tbb.gov.tr/>  
<https://tbb.gov.tr/birligimiz/faaliyet-raporu-ve-stratejik-plan/stratejik-plan/>  
 137. [https://tbb.gov.tr/online/stratejik\\_plan\\_2020/](https://tbb.gov.tr/online/stratejik_plan_2020/)

When the ecological strategies of the municipalities are examined according to the 2020-2024 strategic plan, it is seen that they are grouped under the following headings:

1. To support the development of municipalities in Smart City Systems.
2. Cooperation will be developed with relevant national or international institutions on waste, water, zoning, transportation, disaster management and climate change and joint projects will be developed.
3. To carry out research, training and support activities to improve the service production capacity of municipalities in the fields of environment and urbanism in line with the UN SDGs.<sup>138</sup>
4. Providing project-based support to municipalities within the scope of the Zero Waste Project.
6. Within the Zero Waste Project scope, ensuring that wastes are collected at source, separated and recycled separately, and delivered to the municipalities by supplying the necessary equipment.<sup>139</sup>
7. Carrying out studies to encourage inter-municipal solidarity affected by natural disasters.

### The Environmental Activity Areas of Municipalities

#### Waste Management/Zero Waste

There have been remarkable developments in sustainability approaches in the environment, recycling of household waste, and waste disposal methods in metropolitan, provincial and district environmental directorates. Zero Waste principles are applied by the

138. <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>  
 The "17 Sustainable Development Goals", which were decided to be realized by all member countries until 2030 at the United Nations General Assembly in 2015 held in New York, draws an important roadmap for our global future. One of these goals, "Goal 11: Sustainable Cities and Communities", defines risks and expectations related to better and liveable standards in urban areas. The actions aimed to achieve the goal mentioned above are listed as follows (United Nations, 2015): to provide safe and liveable cities and adequate urban services, Protecting the world's natural and cultural heritage assets, to prevent the negative effects of natural disasters and epidemics, consider the impact of urban settlements on the environment, air quality and waste management, adapting to the consequences of climate change and improving disaster risk management.

139. When the Turkish Green Building Council website examined, it is seen that the service buildings of the Küçükçekmece, Sarıyer, Gaziantep Municipalities have received a green building certificate and are active in this field. As can be seen on this website, there are 518 projects in total in the Turkish Green Database. (<https://cedbik.org/tr/sertifikali-projeler>) <https://tbb.gov.tr/online/faaliyetraporu/2019/>

ministries as regulated by the MoEUCC. Greater city municipalities are obliged to install waste disposal facilities and coordinate recycling and recovery activities accordingly. Province municipalities prepare zero waste action plans in coordination with district municipalities. District municipalities are responsible for collection and transfer of municipal wastes to the disposal facilities as well as coordinating zero waste implementation within their premises.

According to the Union of Municipalities of Türkiye/2019<sup>140</sup> Annual Report, the TBB Zero Waste Management System and Zero-Waste Project was initiated by the MoEUCC in 2018. In 2019, a zero-waste fair and a zero-waste summit were held, while contributing to the determination of smart city strategies and road maps of municipalities within the scope of Smart Cities Activities.

### **Sustainable Municipalism**

According to World Bank data, approximately 76% of the resident population in Türkiye lives in urban areas. The ever-increasing urban population and migration bring along many environmental problems.

In this context, the main purposes of urbanization under the title of “Liveable Cities, Sustainable Environment”, which is one of the goals of the 11<sup>th</sup> Development Plan are “people-oriented, respectful to natural life and historical heritage, and high quality of life.” and value generating cities and settlements where essential urban services are provided in an equitable and accessible way.

Local governments prepare policies and projects to reduce the effects of these problems that arise with urbanization. The Green Cities Ideas and Projects Competition aims to improve the quality of the urban environment in our cities and improve the urban economy and quality of life by publicly recognizing and rewarding the efforts of local governments. In this context, practices that will provide a better and sustainable future for cities are the target of competition. For example, green building certificate has started to be obtained in line with the demands of building owners and project managers, and it has become a competitive element in design.

Sustainable transportation has started to be established comprehensively, especially in municipalities such as İzmir and Bursa Metropolitan Municipalities, which are members of the Healthy Cities Association.<sup>141</sup> Initiatives to increase bicycle and pedestrian roads and organize municipal activities to make these environmentally friendly modes of transportation become a lifestyle, and initiatives to create sustainable communities have spread. Increase in bicycle and pedestrian roads and living these environmentalist modes of transport to create sustainable communities are becoming widespread.

The projects of the municipalities, which take the development of renewable energy resources on their agenda<sup>142</sup>, are generally carried out with the funds of international organizations and cooperation with the private sector. Solar energy project of Bursa Gürsu Municipality and wind turbines project of Kırşehir Municipality are examples in this field.

140. <https://www.tbb.gov.tr/online/faaliyetraporu/2019/>

141. Turkish Healthy Cities Association / <https://www.skb.gov.tr/>

142. According to Türkiye's Energy Atlas 2018 data the first five provinces with the highest number of renewable energy power plants among 30 provinces are respectively; İzmir (85 plants), Kayseri (75 plants), Antalya (65 plants), Kahramanmaraş (56 plants) and Ankara. (55 plants). The provinces with the least number of renewable energy power plants are; Mardin (3 plants), Şanlıurfa (7 plants), Sakarya (7 plants), Van (8 plants) and Tekirdağ (8 plants). (<https://dergipark.org.tr/en/download/article-file/837829>). Municipalities have included more than one title in their main activity areas for renewable energy fields in their plans. Among these titles, the field of activity, which is mostly included in the field of renewable energy in the strategic plans, has been determined as “meeting the electricity and fuel expenses of municipal service buildings”. This field of activity is reflected in the strategic plans and activity reports of 12 metropolitan municipalities. This activity title is followed by the titles of “establishing and operating GES, HES and RES”, “doing lighting works” and “developing and executing projects for renewable energy”. (<https://dergipark.org.tr/en/download/article-file/837829>)

**Table 10.** Activities of municipalities on renewable energy (extracted from the Strategic Plans)

Activity Areas for Renewable Energy	Metropolitan Municipalities List
Lighting (solar energy, solar panels)	Kayseri <sup>143</sup> , Hatay <sup>144</sup>
To meet the electricity and fuel expenses of municipal service buildings.	Ankara <sup>145</sup> , Balıkesir <sup>146</sup> , İstanbul <sup>147</sup> , Şanlıurfa <sup>148</sup> , Adana <sup>149</sup> , Kocaeli <sup>150</sup> , Bursa <sup>151</sup> , Sakarya <sup>152</sup> , Trabzon <sup>153</sup> , Mersin <sup>154</sup> , Mardin <sup>155</sup> , Samsun <sup>156</sup>
Information, seminar in the field of renewable energy.	Gaziantep <sup>157</sup> , Antalya <sup>158</sup> , Erzurum <sup>159</sup> , Trabzon <sup>160</sup> , Samsun
Solid waste recycling and clean energy production.	Eskişehir <sup>161</sup> , Bursa <sup>162</sup> , Hatay, Sakarya
Establishment of an animal drinking water facility in the pasture with solar energy.	Gaziantep
Establishing and operating GES, HES, RES.	Antalya, İzmir <sup>163</sup> , Malatya <sup>164</sup> , Manisa <sup>165</sup> , Diyarbakır <sup>166</sup> , Eskişehir, Muğla <sup>167</sup> , Van <sup>168</sup>
Determination of investment areas for GES, HES and RES in plans and projects.	Hatay, Konya <sup>169</sup> , Diyarbakır, Kahramanmaraş <sup>170</sup> , Mardin <sup>171</sup>
Developing and executing projects in the field of renewable energy.	İzmir, Eskişehir, Erzurum, Gaziantep, Samsun <sup>172</sup>

143. <http://www.sp.gov.tr/tr/stratejik-plan/s/2173/Kayseri+Buyuksehir+Belediyesi+2020-2024>

144. <http://www.sp.gov.tr/tr/stratejik-plan/s/2206/Hatay+Buyuksehir+Belediyesi+2020-2024>

145. [https://www.ankara.bel.tr/files/9915/7189/6995/2020-2024\\_Stratejik\\_Plan\\_BASKI\\_son.pdf](https://www.ankara.bel.tr/files/9915/7189/6995/2020-2024_Stratejik_Plan_BASKI_son.pdf)

146. [https://www.balikesir.bel.tr/documents/file/bb\\_StrategicPlanFiles/BBB%20Stratejik%20Plan%202020-2024-b4f94fd9-9743-4c67-9b20-0646e1cbd215.pdf](https://www.balikesir.bel.tr/documents/file/bb_StrategicPlanFiles/BBB%20Stratejik%20Plan%202020-2024-b4f94fd9-9743-4c67-9b20-0646e1cbd215.pdf)

147. <https://www.ibb.istanbul/Uploads/2020/2/iBB-STRATEJIK-PLAN-2020-2024.pdf>

148. [https://www.sanlıurfa.bel.tr/files/1/bsb\\_sonra/sanlıurfa\\_buyuksehir\\_belediyesi\\_2020-2024\\_stratejik\\_plani.pdf](https://www.sanlıurfa.bel.tr/files/1/bsb_sonra/sanlıurfa_buyuksehir_belediyesi_2020-2024_stratejik_plani.pdf)

149. [https://www.adana.bel.tr/panel/uploads/stratejikplani\\_v/files/2020-2024-adana-buyuksehir-belediyesi-stratejik-plani.pdf](https://www.adana.bel.tr/panel/uploads/stratejikplani_v/files/2020-2024-adana-buyuksehir-belediyesi-stratejik-plani.pdf)

150. <https://www.kocaeli.bel.tr/webfiles/userfiles/files/plan-raporlar/Kocaeli%20B%C3%BCY%C3%BCK%C5%9Fehir%20Belediyesi%202020-2024%20Stratejik%20Plani.pdf>

151. [https://www.bursa.bel.tr/dosyalar/yayinlar/191011104504\\_0.0.0.BBB-2020-2024-Stratejik-Plani.pdf](https://www.bursa.bel.tr/dosyalar/yayinlar/191011104504_0.0.0.BBB-2020-2024-Stratejik-Plani.pdf)

152. <https://www.sakarya.bel.tr/uploads/stratejik/Kki37LN1A5.pdf>

153. <https://www.trabzon.bel.tr/fck-sayfalar.aspx?id=4457>

154. <https://www.mersin.bel.tr/doc/mbb-2020-2024-stratejik-planipdf>

155. <http://www.sp.gov.tr/tr/stratejik-plan/kurum/539/Mardin+Buyuksehir+Belediyesi>

156. <https://www.samsun.bel.tr/uploads/dokumanlar/44c1fda479266012f488a7cc8c45f1a95da.pdf>

157. <https://www.gaziantep.bel.tr/uploads/2020/07/2020-2024-stratejik-plan.pdf>

158. <https://www.antalya.bel.tr/stratejik-yonetim/stratejik-plan>

159. <http://www.erzurum.bel.tr/DOSYA/stratejiplan2020.pdf>

160. [https://www.trabzon.bel.tr/uploads/FCK\\_SAYFALAR/4457.pdf](https://www.trabzon.bel.tr/uploads/FCK_SAYFALAR/4457.pdf)

161. [http://www.eskisehir.bel.tr/dosyalar/stratejik\\_plan/2020.pdf](http://www.eskisehir.bel.tr/dosyalar/stratejik_plan/2020.pdf)

162. [https://www.bursa.bel.tr/dosyalar/yayinlar/191011104504\\_0.0.0.BBB-2020-2024-Stratejik-Plani.pdf](https://www.bursa.bel.tr/dosyalar/yayinlar/191011104504_0.0.0.BBB-2020-2024-Stratejik-Plani.pdf)

163. [https://www.izmir.bel.tr/CKYuklenen/Dokumanlar\\_2020/Stratejik%20Plan2024.pdf](https://www.izmir.bel.tr/CKYuklenen/Dokumanlar_2020/Stratejik%20Plan2024.pdf)

164. <http://www.sp.gov.tr/tr/stratejik-plan/s/2270/Malatya+Buyuksehir+Belediyesi+2020-2024>

165. <http://www.sp.gov.tr/tr/stratejik-plan/s/1855/Manisa+Buyuksehir+Belediyesi+2020-2024>

166. <https://www.diyarbakir.bel.tr/bilgi-bankasi/1/stratejik-plan.html?download=255:2020-2024-dbb-stratejik-plan>

167. [https://www.muğla.bel.tr/uploads/sayfatr/mali\\_hizmetler/2020\\_2024%20STRATEJ%C4%B0K%20PLAN.pdf](https://www.muğla.bel.tr/uploads/sayfatr/mali_hizmetler/2020_2024%20STRATEJ%C4%B0K%20PLAN.pdf)

168. <http://www.sp.gov.tr/tr/stratejik-plan/s/2183/Van+Buyuksehir+Belediyesi+2020-2024>

169. <http://www.sp.gov.tr/tr/stratejik-plan/s/1822/Konya+Buyuksehir+Belediyesi+2020-2024>

170. <https://kahramanmaraş.bel.tr/stratejik-plan>

171. <http://www.sp.gov.tr/tr/stratejik-plan/s/1895/Mardin+Buyuksehir+Belediyesi+2020-2024>

172. <https://samsun.bel.tr/uploads/dokumanlar/f90357891312af40c3bf9514913d71a25fb.pdf>

In connection with the practices in Europe, sustainable urban life models such as eco-city, health city, calm city have started to be developed in Turkish municipalities. Bursa Nilüfer Municipality Health City<sup>173</sup>, Gaziantep Ecological City Project<sup>174</sup>, Slow City Seferihisar<sup>175</sup> are among the examples.

To develop the eco-municipality model in Türkiye, regional mapping is carried out for the development of renewable energy resources; sister city relations and joint projects are being developed between the countries that make up this model and Türkiye; social projects that support participation have been produced so that the eco-municipality model is adopted and owned by the citizens.

In line with the goal of creating sustainable municipal services, solid waste storage facilities, recycling waste water treatment facilities, medical waste sterilization facilities, waste incineration facilities, biogas facilities, thermal power plant, and wind turbines, waste separation plants, compost plant and solar parks are established and to increase environmental awareness, training and conferences, green schools, urban green spaces have been conducted.

### Sustainable Tourism and Green Winter Tourism

The general purpose of sustainable tourism projects is to raise awareness on energy efficiency and to take measures with the cooperation of local governments in two regions where winter tourism is widespread. Erzurum Municipality's work comes to the fore in sustainable winter tourism. Erzurum Metropolitan Municipality has signed a project partnership protocol between Erzurum and Bansko cities of Bulgaria with the "Green Winter Tourism Cooperation Project" prepared by the Metropolitan Municipality with an environmentally friendly management approach which is financed within the scope of the EU IPA II. Within the scope of the project, awareness was created on energy efficiency and feasibility studies were carried out on environmental investments in tourism centres in both cities, which are famous for winter tourism and ski resorts. The special purpose of the project is to increase energy saving

173. [http://www.nilufer.bel.tr/saglikkenti#PopupGoster\[popup\]/0/](http://www.nilufer.bel.tr/saglikkenti#PopupGoster[popup]/0/)

174. <https://www.gaziantep.bel.tr/tr/haberler/adim-adim-ekolojik-kent>

175. <http://seferihisar.bel.tr/cittaslow-seferihisar/>



practices in Palandöken and Bansko ski resorts, signing a protocol for cooperation, drawing up a roadmap for the use of alternative energy resources in two regions, and spreading environmentally friendly practices in Palandöken and Bansko ski centres.

Feasibility and energy applications study was conducted to calculate the costs of solar energy systems that can be installed in Palandöken and Bansko and the return time of investments, ski facilities and renewable energy resource investments in Palandöken and Bansko were examined and a report on cooperation areas was prepared (February 2021).<sup>176</sup>

In another example, to develop sustainable tourism relations between Kuşadası, Sinaia, Cluj and Söke, SWOT analyses were carried out in Türkiye and Romania, a meeting on sustainable tourism was held in Kuşadası with the participation of the leading institutions and organizations of the project partner cities and a memorandum was signed.<sup>177</sup>

The purpose of the Convention on Biological Diversity is not only to “protect” biodiversity, but also to pursue the “sustainable use” of its components and to promote the “fair sharing” of the resulting benefits. Some municipalities, on the other hand, carry out activities to protect biodiversity while ensuring sustainability in summer tourism.

### Smart Cities

The smart city approach is one of the most popular phenomena in creating sustainable spatial spaces or protecting existing spaces. Considering the urban infrastructures in the post-2000 period, it is seen that technological investments in urban areas are concentrated and cities are almost a test area for new technologies due to their population density. In smart cities, people can reach a more comfortable, clean, participatory, healthy, and reliable lifestyle. Today, it is underlined that cheap energy, public transportation supported and developed with new technologies, disaster and emergency systems, clean air and water, low

crime rates are associated with smart cities. In the 2020-2023 National Smart Cities Strategy and Action Plan emphasizing circular economy<sup>178</sup>, it was stated that the need of cities to compete in a globally interconnected economy and to ensure the welfare of city residents in a sustainable way leads countries and cities to evaluate new technology and innovative approaches. In the January 2020 issue of the Union of Municipalities of Türkiye magazine<sup>179</sup>; evaluations were made on smart Cities and municipalities and examples of smart city technology applications from Türkiye are given.<sup>180</sup>

### Slow Cities

Founded in 1999, the International Cittaslow Association aims to preserve the local values of cities and increase the quality of life of city residents. Slow cities adopt a city goal that ensures communication between people, sociality, highlighting traditional products, protecting the environment, preventing pollution, and encouraging renewable energy sources with a sustainable urbanization approach.

There are 72 criteria for slow city membership and these criteria are grouped under the following seven main headings<sup>181</sup>: environmental

176. <https://www.yereldeab.org.tr/sehireslestirme/Haberler/TabId/450/ArtMID/3640/ArticleID/4875/199evreci-K%C4%B1C5%9F-Turizmi-%C4%B0231in-%C4%B0C5%9Fbirli%C4%9Fi.aspx>

177. <https://www.kusadasi.bel.tr/Haberler/iki-kardes-sehir-surdurulebilir-turizm-is-birligi-konusunda-anlasti>, <https://www.mevzuat.gov.tr/MevzuatMetin/CumhurbaskanligiGenelgeleri/20191224-29.pdf>, [https://www.tbb.gov.tr/online/dergiler/2020\\_ocak/index.html](https://www.tbb.gov.tr/online/dergiler/2020_ocak/index.html)

178. <https://www.akillisehirler.gov.tr/wp-content/uploads/EylemPlani.pdf>

179. [https://www.tbb.gov.tr/online/dergiler/2020\\_ocak/index.html](https://www.tbb.gov.tr/online/dergiler/2020_ocak/index.html)

180. Smart Antalya

Smart Lighting System Street lighting, which serves citizens in parks, gardens and roads in the city, ensures efficient use of resources and produces solutions that will contribute to city security, thanks to smart components. In 2018, energy savings of up to 80% were achieved in Serdengeçti and Yavuz Özcan Parks in Antalya with the conversion to smart lighting system and LED lighting.

Smart İstanbul

The “Environmental Control Center” carries out the monitoring, inspection and management of vehicles carrying excavation, municipal waste, medical waste, industrial waste, marine waste and similar wastes, from the point where the waste is generated, until its delivery to the facility where it will be disposed of. The Environmental Control Center aims to minimize the risk of traffic accidents, prevent environmental pollution and illegal dumping violations, monitor and manage waste logistics, save fuel and time, and coordinate with urban traffic density.

“Air Quality Monitoring Center” carries out İstanbul Air Quality Monitoring studies. In order to share İstanbul air quality data with the public more efficiently and better understand the quality of the ambient air they live in and their possible negative effects on their health, air quality measurement values are published instantly on the website every day.

Smart Recycling Container is a subsidiary of İstanbul Metropolitan Municipality ISBAK A.Ş. The application aims to develop a culture of recycling and bring social responsibility and environmental awareness to primary school children. It is currently offered to citizens at some metro stations and to students in primary schools.

Smart Kayseri

Smart Lighting With the lighting plan developed in order to ensure the sustainability of effective energy use in lighting the city and to reduce transaction costs, smart street lighting pilot applications were started in many parts of Kayseri and carbon emissions were reduced.

181. <https://www.cittaslow.org/content/how-become>

and energy policies; infrastructure policies; urban quality of life policies; policies for agriculture, tourism, tradesmen and craftsmen; hospitality, awareness, and education policies; social cohesion policies; partnerships.

After the Cittaslow membership of Seferihisar<sup>182</sup> in 2009, with the membership of Taraklı<sup>183</sup>, Gökçeada<sup>184</sup>, Yenipazar<sup>185</sup> and Akyaka<sup>186</sup> cities in 2011, the Cittaslow network started to spread in Türkiye and the Association now have 18 members. Cittaslow is gathered under the philosophies of slow life in Türkiye, sustainable development, urban spirit, and slow food.<sup>187</sup> Seferihisar, Türkiye's first slow city, carries out actions under the main headings of environmental, social and cultural, economic, and education policies. "Can Yücel Seed Centre" was established as a result of Seferihisar municipality's environmental policies, and many seeds that were on the verge of disappearing were revealed. Seeds taken from many villages in the Seferihisar district are kept in the seed centre. In this process, where sales are prohibited, many seeds are made available to the people of the district or visitors through the seed exchange festivals. As an example of economic policies, Producer Markets were created. The producer markets, which started operating with 45 looms in 2009, allowed local producers, especially women, to contribute to the home economy by selling their products with 350 looms in 2017. As an example of education policies, School Fields were created, agricultural fields were established in 8 different schools for students to meet farming at a young age and thus become more conscious citizens.

All in all, environmental activities of municipalities that are related to green deal are gathered under three main headings 1) waste management to prevent pollution; 2) sustainable municipality associated to sustainable transportation, renewable energy technologies, and the creation of sustainable urban life models, and 3) smart city structuring proposes to develop new technology and innovative approaches for cities to

182. <https://cittaslowturkiye.org/cittaslow-seferihisar/>

183. <https://cittaslowturkiye.org/cittaslow-tarakli/>

184. <https://cittaslowturkiye.org/cittaslow-gokceada/>

185. <https://cittaslowturkiye.org/cittaslow-yenipazar/>

186. <https://cittaslowturkiye.org/cittaslow-akyaka/>

187. <https://www.tbb.gov.tr/belediyelerimiz/ornek-uygulamalar/buyuksehir-belediyeleri-ornek-tesis-inceleme-raporlari/>

provide a sustainable life. It can be said that municipalities are actively carrying out their activities in the fields of clean energy, eliminating pollution, sustainable mobility, aiming to increase the quality of life for the residents of the city.

#### Advanced Environmental Facility Examples from Metropolitan Municipality Cities

On the website of the Union of Municipalities of Türkiye, the Sample Facility Investigation Reports of the Metropolitan Municipalities of Ankara, Konya, Kocaeli, Kayseri and Gaziantep regarding social, cultural, technical and ecological facilities that can serve as an example for municipalities throughout the country have been examined.<sup>188</sup> Figure 8 shows the Gaziantep Metropolitan Municipality Biogas Facility that produce electricity, heat and organic fertilizer from animal waste. Functions are Waste Disposal, Electricity Generation, Organic Fertilizer Production. Figure 9 shows Gaziantep Metropolitan Municipality Bağlarbaşı Solar Energy Power Plant.



Figure 8. Gaziantep Metropolitan Municipality Biogas Facility.

188. <https://www.tbb.gov.tr/download.php?dosya=storage/catalogs/0577355001551166530.pdf&dosyaAdi=buyuksehir-belediyeleri-ornek-tesis-inceleme-raporlari>



Figure 9. Gaziantep Metropolitan Municipality Bağlarbaşı Solar Energy Power Plant.



Figure 10. Ankara Metropolitan Municipality Solar Energy Power Plant

Figure 10 shows Ankara Metropolitan Municipality Ankara Solar Energy Power Plant. This facility can generate electricity from solar to charge 4,500 electric vehicles per month with 20 charging stations. In practice, using 83,400 pieces of 120-Watt Thin Film Panels on the Roof, it will generate 15,000,000 kilowatt-hours of electricity per year with 10 Megawatts of Electric Energy Capacity. 88% of municipal wastewater discharge is treated. Greater city municipalities have advanced in sludge treatment for biogas recovery and cogeneration of electricity.<sup>189</sup> Ankara Metropolitan Municipality has taken important step towards a green environment and a healthy society by reducing the use of coal, 4,630,173.56 litres of LPG and 3,260,927.21 litres of natural gas. Biogas generation from wastewater sludge is also applied in WWTPs of the Istanbul Metropolitan Municipality.

Municipalities in Türkiye also advance in waste management services. Over 90% of generated municipal waste is collected by municipalities. There are 174 landfills in Türkiye with a total capacity of 1,2 billion cubic meters of waste. 49,1 million tons of waste were recovered in recycling facilities in 2020 with a 22% increase with respect to 2018 data. Almost all landfills are equipped by landfill gas to electricity facilities.<sup>190</sup> Figure 11 shows the LFGTE facility of Samsun Municipality which is equipped with an additional unit of sludge cogeneration.

189. <https://data.tuik.gov.tr/Bulten/Index?p=Su-ve-Atiksu-Istatistikleri-2020-37197>

190. <https://data.tuik.gov.tr/Bulten/Index?p=Atik-Istatistikleri-2020-37198>



Figure 11. Landfill Gas to Electricity and Sludge fed Cogeneration Plant in Samsun<sup>191</sup>



Figure 12. Municipal Waste Incineration Facility of İstanbul Municipality

Municipal waste incineration is not common in Türkiye. The first and only waste incineration facility is installed by İstanbul Metropolitan Municipality in 2021. It has a capacity of 3000 tons of waste incineration per day with an electricity generation potential of 85 MWh which is equivalent to electricity need of 1,4 million citizens. The facility has a capacity to prevent 1,38 million tons of greenhouse gas emissions from landfilling which earns the municipality 1,5 million tons of carbon credits annually.<sup>192</sup>

191. <https://www.samsunavdan.com.tr/804s.html>

192. <https://www.istac.istanbul/tr/medya-ve-duyurular/haberler-ve-duyurular/turkiyenin-ilk-avrupanin-en-buyuk-atik-yakma-ve-enerji-uretim-tesisi-acildi>

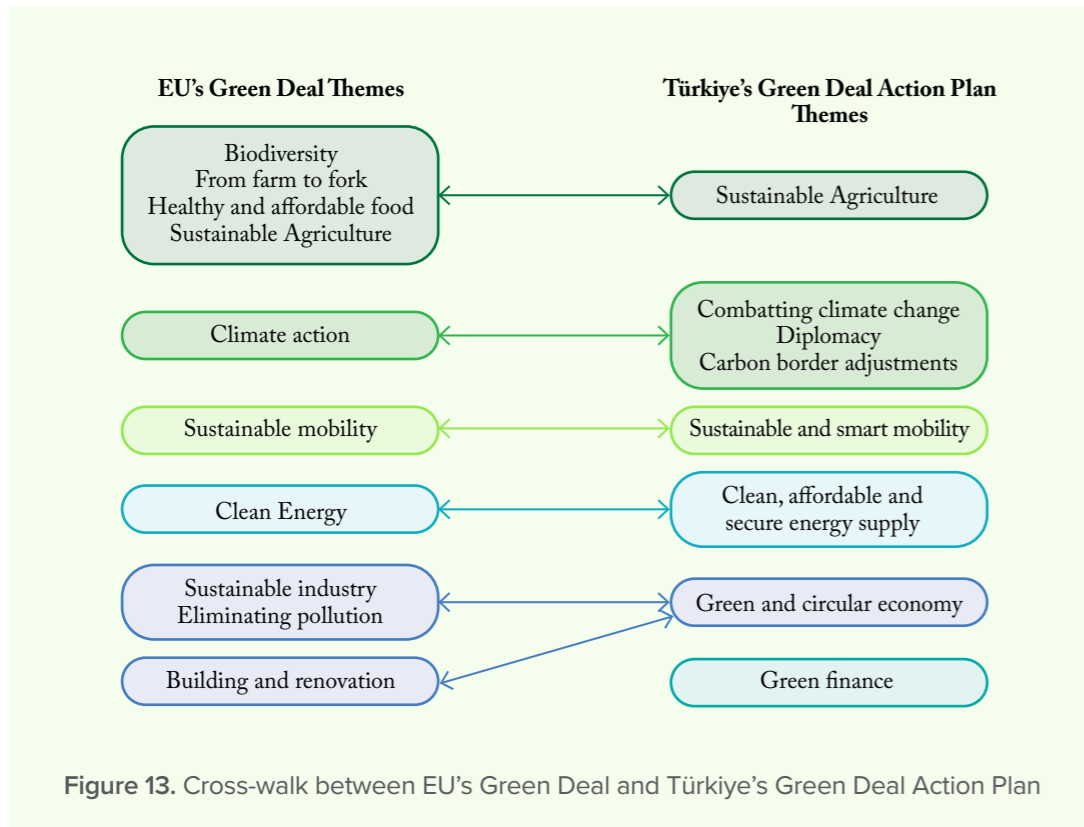
## 4

## 4. Policy Attempts in Türkiye Towards EU's Green Deal

How do the government support a green transition path in Türkiye? This section details the policy tools of the Turkish government to reach the ultimate policy aim of realizing net-zero emissions by 2053. The policy tools, the implementing government organizations, and the stakeholders are various. To reflect an easy-to-follow discussion, first, the taxonomy of Borrás and Edquist (2013)<sup>193</sup> in classifying innovation policy tools is used. This classification divides policy tools in three broad categories (i) regulations, (ii) economic benefits that are any policy tool that directly affects the cost structure of economic agents (direct cash transfers, projects, tax deductions etc.) and (iii) soft policy tools that do not directly provide economic benefits to economic actors but rather help establish a favourable environment (e.g., networking opportunities, user-producer platforms, training etc.). Second, since the themes of the EU's Green Deal and Türkiye's Green Deal Action Plan are different, the presentation of the policy tools has to be done on a crosswalk between the themes.

The EU's Green Deal themes and the Türkiye's Green Deal Action Plan themes and the crosswalk in between are presented in Figure 13. This section has six subsections according to the first column of Figure 13. Some themes are easier to match (also in terms of content) such as clean energy and sustainable mobility. The four themes related to biodiversity and agriculture are matched to one theme in the Turkish action plan, "sustainable agriculture". Climate action encompasses three themes in the Turkish action plan. While combatting climate change and carbon border adjustments are related to climate action, "diplomacy" also falls under climate action as the action plan relates this theme to carbon border adjustments where the broad aim of the theme is defending Türkiye's position and rights in line with international agreements. Green finance is cross-cutting theme that relates to all themes and it is partially covered under economic benefits. This section focuses on the most recent policy attempts using mostly a time frame of about five years (2018 onwards) where this time frame is extended in the case of regulations.

193. Susana Borrás and Charles Edquist (2013) The choice of innovation policy instruments, *Technological Forecasting and Social Change*, Volume 80, Pages 1513-1522.



## 4.1. Biodiversity, sustainable agriculture and farm to fork

After EU announced Green Deal in December 2019<sup>194</sup> that aims the transformation of EU industry and society into a more resource efficient and competitive economy, Turkish Government has prepared an action plan and put it into practice in July 2021. The motivation of the green deal action plan<sup>195</sup> is to sustain the relations and trade between Türkiye and EU as well as tackling the climate change related challenges. Furthermore, the government plans to transform Turkish industry in line with sustainability and green transformation.

194. [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en)

195. [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en)

The action plan has nine chapters including sustainable farming. The chapters resemble the elements of the EU green deal. Although EU policy recommendations cover establishing food supply chain structures, identifying local potentials for organic productions, attracting young farmers for organic farming, increasing values of organic agricultural products at the level of primary producers and maintenance of organic farming, we can see that for sustainable agriculture Türkiye's policies are limited and majority of the policies involve regulations.

The sub-actions under sustainable agriculture are:

- Reduction of pesticides and antibiotics
- Development of organic agriculture
- Reduction in chemical fertilizers
- Unification of arable land
- Increasing the usage of renewable energy in agriculture
- Improvement of agricultural waste management system
- Reduction of food waste and loss
- Creation of awareness in farm to fork and biodiversity strategy

The timing of the plan shows that all the actions for the focus areas will be taken between 2021 and 2025.<sup>196</sup> The following sections provide the completed or ongoing activities relevant to the sub-actions.

### 4.1.1. Regulations

#### 4.1.1.1. Reduction in pesticides and antibiotics

The farmers use pesticides to fight with the insects, fungi, and weeds that harm the agricultural product. Although the chemical pesticides provide fast impact, they can be harmful for the ecosystem and humans. Türkiye is ranked 12<sup>nd</sup> in pesticides usage in the world. The analysis<sup>197</sup> shows that Antalya, Manisa and Adana has the highest usage in Türkiye and total amount is 2.2 kg/ha (2.69 kg/ha in the world)

Ministry of Agriculture and Forestry (MoAF) released a regulation on

196. <https://ticaret.gov.tr/data/60f1200013b876eb28421b23/MUTABAKAT%20YEŞİL.pdf>

197. <https://dergipark.org.tr/en/download/article-file/2444374>

27 September 2021<sup>198</sup> to define the limits of pesticides residual on the agricultural products. The main aim of the regulation is to protect the consumers from excess amount of pesticide. The regulation does not directly limit and reduce the usage.

#### 4.1.1.2. Development of organic agriculture

Organic agriculture focuses on the elimination of chemicals as well as utilization and protection of renewable resources. Therefore, organic agriculture aims at biodiversity and productivity, and can be classified under sustainable agriculture.

The progress of organic agriculture in Türkiye can be classified into four different periods.

- 1984 – 1998: There are not any legal regulations.
- 1999 – 2022: Several codes as regulations, however no definitive law yet
- 2003 – 2008: Organic agriculture law (number 5262) has been released on 3 December 2004 and it provides the general framework for the organic agricultural activities
- 2009 onwards: The code of organic agriculture rules and application in compliance with EU regulations has been released on 18 August 2010

The government has released the last amendments on 28 April 2020. However, after 2010, all the releases have just changed the code of organic agriculture rules and applications.<sup>199</sup>

It is worth mentioning the good agricultural practices which is different from organic agriculture. It covers all the value chain from planting and production to harvesting and marketing. It is based on a set of standards for the safe and sustainable production of crops and livestock by decreasing the usage of chemicals and aims to help farm owners maximize yields and optimize business operations while also minimizing production costs and environmental impact. Good agricultural practices started in 18 cities in 2007. The government released 23 codes and laws

198. <https://www.resmigazete.gov.tr/fihrist?tarikh=2021-09-27&mukerrer=1>

199. <https://www.resmigazete.gov.tr>

since 2004 and the last one is dated 09 April 2021 to prevent nitrate pollution in the water due to agricultural activities.<sup>200</sup>

#### 4.1.1.3. Reduction in chemical fertilizers

Like pesticide, the excess amount of chemical fertilizers usage in agricultural activities emits a significant amount of contamination. It increases the saltiness level of the soil and may cause accumulation of heavy metals, nitrate, and eutrophication in the water resource. Furthermore, it results in the emission of greenhouse gas based on the type and the content of chemical fertilizer.<sup>201</sup> Although the chemical fertilizer usage cannot be eliminated, we can decrease the environmental impacts by promoting organic fertilizers and using chemical fertilizers in accordance with an analysis of soil and prescription. There is not any specific law or regulation for the reduction of chemical fertilizers in Türkiye.

#### 4.1.1.4. Unification of arable land

The small scale and multi-shared agricultural land are important problems as they decrease and deteriorate the efficiency of agricultural output. Average land size of 6.8 hectare for the farmers in Türkiye cannot support the diffusion of new technologies and causes excessive resource usage.

The first application of land consolidation in Türkiye is dated back to 1961 in Çumra/Konya. Since then, the governments released 230 law and regulations<sup>202</sup> to consolidate the lands in different regions and especially after 2018, the initiative has accelerated, and many cities were put under these regulations. Till November 2022, 6.8 million hectares has been consolidated<sup>203</sup> and the target is to reach 8.5 million hectares at the end of 2023.<sup>204</sup> However, the process cannot run as desired due to many physical and social constraints.

200. <https://www.resmigazete.gov.tr>

201. <https://www.ekoiq.com/2021/10/kimyasal-gubre-kullaniminin-cevresel-etkileri-ve-cozum-onerileri/>

202. <https://www.resmigazete.gov.tr>

203. <https://www.yenisafak.com/ekonomi/68-milyon-donum-arazi-toplulastirildi-3879584>

204. <https://www.trthaber.com/haber/ekonomi/2023e-kadar-85-milyon-hektar-arazi-toplulastirilacak-639615.html>

#### 4.1.1.5. Increasing the usage of renewable energy in agriculture

Although the energy consumption of agricultural activities in overall consumption is less than 5% in Türkiye<sup>205</sup>, the greenhouse gases due to energy and the greenhouse gases resulting from other agricultural activities in total are increasing and has reached to a considerable amount. Therefore, renewable energy resources are crucial to reduce the impacts of the greenhouse gases due to energy production from fossil fuels. The available renewable resources are solar, geothermal, biomass, wind and hydraulic all of which can be utilized to meet the energy demand for agricultural activities. Despite several regulations for renewable energy production and utilization, there is not any direct law or regulation for the agricultural activities.

#### 4.1.1.6. Improvement of agricultural waste management system

The agricultural waste in Türkiye is around 28 million tons and 65% of total amount has organic composition. In the case of an insufficient waste management system, social and environmental impact of agricultural waste is significant. Therefore, an integrated waste management system that follows the waste management hierarchy in line with the principles of circular economy needs to be established.

Agricultural wastes, unless stated otherwise are managed under the framework of Waste Management Regulation. Minimization of wastes, and use of best available technologies for practice are stated as primary steps to be followed before any course of disposal. Management of agricultural wastes are further regulated by the legislation that covers technical specification of compost facilities and biomethanisation facilities. However, these regulations do not aim to institutionalize waste management system, nevertheless, the regulations stress the establishment of waste recycling centre at Düzce University and kick off an initiative.<sup>206</sup> Agricultural organic wastes are defined as “biomass” and

205. <https://www.enver.org.tr/enerji-verimli-tarim>

206. <https://www.resmigazete.gov.tr/eskiler/2019/11/20191111-2.htm>

energy recovery from such waste is supported in the form of renewable energy subsidies.<sup>207</sup>

#### 4.1.1.7. Reduction of food waste and loss

One third of the total food produced in the world is getting lost along the supply chain. Consequently, food waste and loss are significant concerns that need to be dealt with. It is expected that the government will release the regulations to reduce the food loss and waste in 2023.

#### 4.1.1.8. Creation of awareness in Farm to fork and biodiversity strategy

This initiative aims to support sustainable food value chain that is profitable throughout all of its stages, beneficial for society and has positive or neutral impact on environment.<sup>208</sup> In brief, it has three dimensions: economic, social, and environmental sustainability. The government has not released any regulation yet to deal with this chapter directly. There are several initiatives that can be classified as soft tools.

### 4.1.2. Economic Benefits

The government has provided several incentives for some of the actions that were mentioned above.

- The MoAF supports the organic agriculture yield and livestock based on the category of producer. Moreover, the ministry incentivizes the certification process that verify whether the agricultural activity comply with the organic requirement.<sup>209</sup>
- MoAF also helps the farmers who apply the good agricultural practices for fisheries and agricultural product such as fruit, vegetables, rice, aromatic plant.<sup>210</sup>

207. <https://enerji.gov.tr/eigm-yenilenebilir-enerji-kaynaklar-biyokutle>

208. <https://www.fao.org/sustainable-food-value-chains/what-is-it/en/>

209. <https://www.tarimorman.gov.tr/Konular/Tarimsal-Destekler/Alan-Bazli-Destekler/Organik-Tarim-Destegi>

210. <https://www.tarimorman.gov.tr/Konular/Tarimsal-Destekler/Alan-Bazli-Destekler/Lyi-Tarim-Uygulamalari-Destegi>



- The economic rationale for reduction of fertilizer is not definitive. Nevertheless, the ministry supports financially the use of organic and organomineral fertilizer which is higher than the support for chemical fertilizer.<sup>211</sup>

Apart from these supports described above, there is no specific support in the scope of the Green Deal Action Plan such as reduction of food waste and loss, improvement of agricultural waste management system, and use of renewable energy resources. The government may have a plan, however, all the activities in the plan have been addressed between 2021 – 2025 and two years have already passed.

### 4.1.3. Soft Tools

The government has either organized and conducted or participated in several activities related with sustainable agriculture such as working group, communication event, media interaction and awareness deployment before and after the green deal action plan released. Several examples are listed below.

- Formation of Agriculture and Forestry Council and periodical meetings<sup>212</sup>
- Reduction of food waste and loss action plan compiled by the MoAF and Food and Agricultural Organization (FAO)<sup>213</sup>
- Tarım Orman Akademisi (Agriculture Forest Academy) which is managed by the ministry provides many training packages including sustainable agriculture, organic agriculture, renewable energy resources and usage, food waste and loss and many more<sup>214</sup>
- Tarım ve Orman magazine by the ministry covering different topics including the chapters in green deal action plan<sup>215</sup>
- Formation of expert task forces on the chapters in the action plan<sup>216</sup>

211. <https://www.tarimorman.gov.tr/Konular/Tarimsal-Destekler/Alan-Bazli-Destekler/Mazot-Gubde-ve-Toprak-Analizi-Destegi>

212. [www.tarimormansurasi.gov.tr/Sayfa/Detay/1416](http://www.tarimormansurasi.gov.tr/Sayfa/Detay/1416)

213. <https://www.tarimorman.gov.tr/ABDGM/Belgeler/Uluslararası%20Kuruluşlar/Gıdanı%20Koru%20Strateji%20Belgesi%20ve%20Eylem%20Planı.pdf>

214. <https://akademi.tarimorman.gov.tr/enrol/index.php?id=122#page-content>

215. [www.turktarim.gov.tr](http://www.turktarim.gov.tr)

216. <https://www.tarimorman.gov.tr/ABDGM/Haber/655/Surdurulebilir-Tarim-Ihtisas-Calisma-Grubunun-2-Toplantisi-Gerceklestirildi>

- The government released a regulation in September 2021 to establish a sustainable food system research and application centre at Bahçeşehir University. Furthermore, several non-profit organizations conducted awareness activities.<sup>217</sup>

The MoAF has a variety of programs to train the farmers, students and people who are interested using digital platforms. Unfortunately, the training and awareness programs could be reviewed and restructured either on a digital platform or in class/on the job training based on the requirements of each group. Türkiye's Green Deal Action Plan put the initiation of activities for sustainable agriculture in the time frame of 2021 – 2025. However, some activities have not been started yet and the government needs to expedite the program by providing resources.

## 4.2. Climate action

One of the first strong reference to climate change in official documents can be found in the 8<sup>th</sup> Development Plan (2001–2005). The need for regulations for energy efficiency and greenhouse gas emission mitigation in transportation, energy, and industry were highlighted in the plan. As early as 1991, Türkiye signed the Vienna Convention and Montreal Protocol and became a member of the EIONET in 2003.

Together with the signature of the UNFCCC and Kyoto Protocol in 2004 and 2009 respectively, the climate change related issues have become one of the essential concerns in Türkiye. These agreements promoted the development of the policies and strategies to combat climate change such as GHG minimization and protection of the ozone layer. As an Annex-I country, Türkiye is responsible for submitting National Communication of Türkiye document every 4 years and Bi-Annual Report every 2 years to UNFCCC Secretariat. 7<sup>th</sup> National Communication and 4<sup>th</sup> Bi-Annual Report were presented to UNFCCC Secretariat in 2018 and 2019 respectively.<sup>218</sup>

Although there are several other completed and ongoing policy studies to reach SDGs and eliminating the effects of climate change, the approval of the Paris Agreement and preparation of the Green Deal Action Plan in 2021 were the latest highlights in the climate change strategy of Türkiye.

217. <https://www.akib.org.tr/faaliyetler-avrupa-yesil-mutabakati-tarlardan-sofraya-stratejisi.html>

218. <https://iklim.gov.tr/ulusal-bildirimler-i-21>

There are several actions against climate change in Green Deal Action Plan of Türkiye:

- Preparation of the Türkiye's Climate Change Combat Report, 2023-2030 Climate Change Action Plan and 2050 Climate Change Strategy,
- Evaluation of the Türkiye's position on the Paris Agreement in a multidimensional way, considering the international financing needs of it,
- Development of the R&D projects and studies to determine the effects of climate change on biodiversity and ecosystems, along with desertification and land degradation, and to take adaptation and mitigation measures,
- Determination of the possible loss of coastal and fresh water as a result of climate change and the nature-based climate change adaptation measures for the coasts and lakes and/or wetlands,
- Ensuring the inclusion of the Land Degradation Balancing approach in the national investment programs and conducting planning and implementation studies within the direction of this approach in high land degradation areas,
- Contributing to increase in carbon stocks and carrying out research studies in this field,
- Providing trainings on sustainable agriculture techniques and carrying out R&D projects and practices with nature-based approach in land applications.<sup>219</sup>

There are also actions related with the EU Green Deal Carbon Border Adjustment Mechanism (CBAM) in Türkiye's Green Deal Action Plan:

- Modelling the effects of the CBAM on Türkiye's energy-intensive and resource-intensive sectors based on sector scenarios and to determine the related actions,
- Türkiye's roadmap to support the reduction of GHG emissions in five carbon intensive manufacturing sectors (aluminium, cement, electricity, fertilisers iron and steel) targeted in CBAM,
- Determination of the position of Türkiye in carbon pricing by considering EU's carbon adjustment and development of financial support mechanisms and strategies for the sectors that is expected to be affected from those adjustments,
- Development of monitoring system for the GHG emissions originating from industry based on the legal requirement,

219. <https://ticaret.gov.tr/data/60f1200013b876eb28421b23/MUTABAKAT%20YE%C5%9E%C4%B0L.pdf>

- Carrying out studies for the low carbon or carbon free certification for the products/processes within the framework of the methodology/standards to be determined by the EU and providing technical support for the reporting.<sup>220</sup>

In addition to the Green Deal Action Plan, there are several action plans and strategy documents developed within the direction of Türkiye's long-term targets for climate change mitigation, promotion of resource efficiency and dissemination of renewable energy:

- Climate Change Strategy of the Türkiye (2010 – 2023)<sup>221</sup>
- Climate Change Action Plan of Türkiye (2011 – 2023)<sup>222</sup>
- Climate Change Adaptation Strategy and Action Plan (2011 – 2023)<sup>223</sup>
- EU Integrated Environmental Approximation Strategy (2016 – 2023)<sup>224</sup>
- National Renewable Energy Action Plan for Türkiye<sup>225</sup>
- National Energy Efficiency Action Plan (2017-2023)<sup>226</sup>
- Integrated Urban Development Strategy and Action Plan<sup>227</sup>
- Intended Nationally Determined Contributions (INDC)<sup>228</sup>
- National Strategy and Action Plan to Combat Desertification (2019-2030)<sup>229</sup>

### 4.2.1. Regulations

The existing regulations, laws and other regulative legal documents related to resource management and environmental protection are main tools to eliminate the effects of climate change and develop new strategies:

220. <https://ticaret.gov.tr/data/60f1200013b876eb28421b23/MUTABAKAT%20YE%C5%9E%C4%B0L.pdf>

221. [https://webdosya.csb.gov.tr/db/iklim/editordosya/iklim\\_degisikligi\\_stratejisi\\_EN\(2\).pdf](https://webdosya.csb.gov.tr/db/iklim/editordosya/iklim_degisikligi_stratejisi_EN(2).pdf)

222. [https://webdosya.csb.gov.tr/db/iklim/editordosya/file/eylem%20planlari/iklim%20Degisikligi%20Eylem%20Plani\\_TR.pdf](https://webdosya.csb.gov.tr/db/iklim/editordosya/file/eylem%20planlari/iklim%20Degisikligi%20Eylem%20Plani_TR.pdf)

223. [https://webdosya.csb.gov.tr/db/iklim/editordosya/file/eylem%20planlari/uyum\\_stratejisi\\_eylem\\_plani\\_TR.pdf](https://webdosya.csb.gov.tr/db/iklim/editordosya/file/eylem%20planlari/uyum_stratejisi_eylem_plani_TR.pdf)

224. <https://webdosya.csb.gov.tr/db/cygm/icerikler/ucel-belges--20180125144313.pdf>

225. <https://www.ebrd.com/documents/admin/trkiye-ulusal-yenlenebilir-enerji-eylem-plani.pdf>

226. <https://enerji.gov.tr/Media/Dizin/EVCED/tr/EnerjiVerimlili%C4%9Fi/ulusalEnerjiVerimlili%C4%9FiEylemPlan%C4%B1/Belgeler/UEVEP.pdf>

227. <https://webdosya.csb.gov.tr/db/kentges/icerikler/kentges-en-20191223090807.pdf>

228. [https://unfccc.int/sites/default/files/NDC/2022-06/The\\_INDC\\_of\\_TURKEY\\_v15.19.30.pdf](https://unfccc.int/sites/default/files/NDC/2022-06/The_INDC_of_TURKEY_v15.19.30.pdf)

229. <https://www.tarimorman.gov.tr/CEM/Belgeler/yay%C4%B1nlar/yay%C4%B1nlar%202020/COLLESME%20%C4%B0LE%20M%C3%9CCADELE%20ULUSAL%20STRATEJ%C4%B0S%C4%B0%20VE%20EYLEM%20PLANI%20.pdf>

- Regulation on Monitoring of Greenhouse Gas Emissions<sup>230</sup>
- Regulation on Fluro Greenhouse Gases<sup>231</sup>
- Regulation on Ozone-Depleting Substances<sup>232</sup>
- Regulation on Climate Change Presidency Service Units and Working Procedures and Principles<sup>233</sup>
- Regulation on Climate Change Directorate Disciplinary Supervisors<sup>234</sup>
- Regulation on Climate Change Expertise<sup>235</sup>
- Regulation on Istanbul Technical University Climate Change Application and Research Centre<sup>236</sup>
- Regulation on Middle East Technical University Climate Change and Sustainable Development Application and Research Centre<sup>237</sup>
- National Environment Law<sup>238</sup>
- Energy Efficiency Law<sup>239</sup>
- Regulation on Environmentally Responsible Design of Energy Related Products<sup>240</sup>
- Regulation on Renewable Energy Area Sources<sup>241</sup>

The Climate Law is scheduled to be enacted in 2023 and is expected to include both climate action and regulations to reduce carbon emissions.

Partnership for Carbon Market Readiness Project could be reported under this section since it sets the grounds for some regulations on carbon emission management. The partnership of MoEUCC with the World Bank has started in 2013. The main goals of the project are building capacity towards market-

230. <https://iklim.gov.tr/db/turkce/icerikler/sera-gazi-emisyonlarinin-takibi-hakkinda-yonetmelik-045252.pdf>

231. [https://iklim.gov.tr/db/turkce/icerikler/files/F-Gaz%20Y%C3%B6netmeli%C4%9Fi%20\(31881%20-%2029.06.2022\).pdf](https://iklim.gov.tr/db/turkce/icerikler/files/F-Gaz%20Y%C3%B6netmeli%C4%9Fi%20(31881%20-%2029.06.2022).pdf)

232. <https://iklim.gov.tr/db/turkce/icerikler/files/otim%20y%C3%B6netmelik.pdf>

233. <https://iklim.gov.tr/db/turkce/icerikler/teskilat-yonetmeligi-2022.pdf>

234. <https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=39679&MevzuatTur=7&MevzuatTertip=5>

235. <https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=39685&MevzuatTur=7&MevzuatTertip=5>

236. <https://www.resmigazete.gov.tr/eskiler/2019/05/20190517-8.htm>

237. <https://www.resmigazete.gov.tr/eskiler/2022/10/20221028-14.htm>

238. <https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=2872&MevzuatTur=1&MevzuatTertip=5>

239. <https://www.mevzuat.gov.tr/mevzuatmetin/1.5.5627.pdf>

240. <https://www.resmigazete.gov.tr/eskiler/2010/10/20101007-7.htm>

241. <https://www.resmigazete.gov.tr/eskiler/2016/10/20161009-1.htm>

based mechanisms in public/private sectors and understanding the applicability of different mechanisms in Türkiye. The first phase (in 2018) was mainly on carbon pricing policies and renewable energy incentives which was concluded by determining carbon pricing options providing emissions reductions with possible costs. The second phase of the project focuses on an Emission Trading System (ETS) including creation of necessary legal and corporate infrastructure for pilot carbon pricing, determination of emissions limits and preparing allocation plans, an ETS simulation study and establishment of a registration system that could go into effect after 2020.<sup>242</sup>

## 4.2.2. Economic Benefits

Most of the financial strategy documents, economic plans and programs such as the 11<sup>th</sup> National Development Plan<sup>243</sup>, May 2022 Financial Stability Reports<sup>244</sup> and 2<sup>nd</sup> Inflation Report<sup>245</sup> and The Medium-Term Programme of Presidency (2022- 2024)<sup>246</sup> include climate change mitigation and adoption paving the way towards a rapidly developing climate strategy of Türkiye.

### 4.2.2.1. EU Environment and Climate Action Sector Operational Programme

The programme aimed at eliminating the climate change effects ensuring the harmonization of Türkiye with EU to implement the EU climate change policy to protect the environment and improve the quality of life of the citizens. The programme funding was granted by the EU within the framework of Instrument for Pre-Accession Assistance II (IPA II) between 2014 and 2020.<sup>247</sup>

242. <https://pmrturkiye.csb.gov.tr/closing-meeting-of-development-of-ets-simulation-for-turkey-report/?lang=en>

243. [https://www.sbb.gov.tr/wp-content/uploads/2022/07/On\\_Birinci\\_Kalkinma\\_Plani-2019-2023.pdf](https://www.sbb.gov.tr/wp-content/uploads/2022/07/On_Birinci_Kalkinma_Plani-2019-2023.pdf)

244. <https://www.tcmb.gov.tr/wps/wcm/connect/tr/tcmb+tr/main+menu/yayinlar/raporlar/finansal+istikrar+raporu/2022/sayi+34>

245. [https://www.tcmb.gov.tr/wps/wcm/connect/d7f61d6a-f1a3-4c95-9e1b-c4f75e7044a9/enfekim22\\_iv\\_tam.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-d7f61d6a-f1a3-4c95-9e1b-c4f75e7044a9-ojHsLsx](https://www.tcmb.gov.tr/wps/wcm/connect/d7f61d6a-f1a3-4c95-9e1b-c4f75e7044a9/enfekim22_iv_tam.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-d7f61d6a-f1a3-4c95-9e1b-c4f75e7044a9-ojHsLsx)

246. [https://www.sbb.gov.tr/wp-content/uploads/2021/10/Medium\\_Term\\_Programme\\_2022-2024.pdf](https://www.sbb.gov.tr/wp-content/uploads/2021/10/Medium_Term_Programme_2022-2024.pdf)

247. <https://ab.csb.gov.tr/en/ipa-2-i-104588>

### 4.2.2.2. Instrument for Pre-Accession Assistance (IPA) III Term

Following the conclusion of the IPA I and IPA II terms, the IPA III covers the actions between 2021- 2027. The five thematic windows including to be prioritized within the scope of IPA III are introduced. The project applications are expected to be received within the areas of environmental and climate change under the “Green Agenda and Sustainable Connectivity” thematic window.<sup>248</sup>

### 4.2.2.3. TÜBİTAK Programs

*1512 Entrepreneurship Support Program BIGG Green Growth Call* (in 2021) aimed at enabling entrepreneurs to transform their technology and innovation-oriented business ideas into enterprises. The applications on priority R&D and innovation themes serving green growth were accepted within the scope of the call.<sup>249</sup> According to the Impact Assessment Department, the number of the total entrepreneurs is 1513 (till 2021). There is no specific number for green growth and sustainability related projects.<sup>250</sup>

In last quarter of 2022, TÜBİTAK has announced its priority R&D and innovation themes and products/technologies to be supported under these themes. The products and technologies to be evaluated under the climate change, environment and biodiversity themes, and the innovative features/metrics/studies expected to be focused on the development of those products/technologies are described in the *Adaptation to the European Green Deal / Priority R&D and Innovation Themes for Combating and Adaptation to Climate Change* document. The products and technologies to be supported under the climate change, environment and biodiversity theme are given as below:

- Resilience Analytics, Risk Maps and Decision Support Systems
- Global Climate Model: Scenarios Operated with Global Models
- Multi-Use Offshore Blue Economy Platforms

248. <https://ab.csb.gov.tr/ipa-iii-i-107022>

249. [https://www.tubitak.gov.tr/sites/default/files/21566/bigg-yesil\\_buyume\\_cagrisi\\_duyurusu\\_23082021.pdf](https://www.tubitak.gov.tr/sites/default/files/21566/bigg-yesil_buyume_cagrisi_duyurusu_23082021.pdf)

250. <https://www.sanayi.gov.tr/assets/pdf/birimler/SAVGMMF1512GirisimcilikDestekProgramiBIGG.pdf>

- High Resolution, Intelligent, Integrated Ecosystem and Biodiversity Observation Networks
- Intelligent and Artificial Intelligence-Based Technological Solutions in the Framework of “One Health”
- GIS and Remote Sensing Supported Optimization Technologies and Platforms<sup>251</sup>

### 4.2.2.4. Small and Medium Enterprises Development Agency (KOSGEB) Call for Supporting the R&D, Innovation and P&D Projects for Carbon Emission Reduction

It aims to reduce the carbon emissions of Türkiye and contribute to the 2053 net zero carbon emissions target by supporting R&D, innovation, and product development projects in the field of carbon emission reduction. The project applications have been received between May and June 2022.<sup>252</sup>

#### Box 3. TTGV Climate Technologies, 2022-2023

TTGV Focused on supporting “First-of-a-Kind (FOAK)” commercial scale demo projects and climate pioneering programs in Türkiye, based on climate Technologies. In 2023 TTGV established a Venture Capital Investment Fund for Climate Pioneer projects.

### 4.2.2.5. EU Research and Innovation Funds

Under the Solutions to Social Problems component in Horizon 2020, it was aimed to support effective solution proposals to social problems with six main focus area including climate change, environment, resource efficiency and raw materials with an allocated budget of 3,1

251. [https://www.tubitak.gov.tr/sites/default/files/21566/yesilmutabakat\\_0.pdf](https://www.tubitak.gov.tr/sites/default/files/21566/yesilmutabakat_0.pdf)

252. [https://webdosya.kosgseb.gov.tr/Content/Upload/Dosya/AR-GE%20UR-GE/2022-1/2022-01\\_Proje\\_Teklif\\_%C3%87a%C4%9Fr%C4%B1s%C4%B1.pdf](https://webdosya.kosgseb.gov.tr/Content/Upload/Dosya/AR-GE%20UR-GE/2022-1/2022-01_Proje_Teklif_%C3%87a%C4%9Fr%C4%B1s%C4%B1.pdf)

billion euros through multidisciplinary and multi-partner research.<sup>253</sup> In terms of the amount of received funds, the performance of Türkiye is 271.4 million euros for 756 projects (until 2020).<sup>254</sup>

The Horizon 2020 Green Deal Call was the last and biggest call of the Horizon 2020 with 1 billion euros budget from 2020 to 2021. It was aimed to support the transition of the EU to low carbon economy through R&D and innovation in 10 call areas with 20 topic titles. The five of these topic titles were directly on climate change regarding extreme wildfires, climate-resilient innovation packages, biodiversity and ecosystem services, and end-user products/services for climate adaptation and mitigation.

The Horizon Europe, the current EU R&I Investment Programme, is introduced with an allocated proposal of 100 billion euros to be used in the years between 2021 and 2027. 35% of the program budget is allocated for the elimination of the effects of climate change. In this framework, 5 mission areas are introduced including climate adaptation and development of climate-neutral and smart cities.<sup>255</sup>

### 4.2.3. Soft Tools

#### 4.2.3.1. Turkish Climate Council

The Climate Council was held by the MoEUCC between 21-25 February 2022 in Konya. The theme of the Council was “2053 Net Zero Emission Target: The Green Revolution of Türkiye”. The green transformation concept was discussed together with the attendees by focusing on new climate change vision of Türkiye.<sup>256</sup>

#### 4.2.3.2. Determination of Industrial Emissions Strategy of Türkiye in Accordance with Integrated

253. [https://abmerkezi-arastirma.itu.edu.tr/docs/librariesprovider81/horizon-2020-belgeler/horizon\\_2020\\_btyk\\_bilgi\\_notu\\_26062012\\_v06.pdf?sfvrsn=4](https://abmerkezi-arastirma.itu.edu.tr/docs/librariesprovider81/horizon-2020-belgeler/horizon_2020_btyk_bilgi_notu_26062012_v06.pdf?sfvrsn=4)

254. [https://tudoksad.org.tr/upload/files/TUBITAK\\_DEIK\\_ULASTIRMA\\_23.11.2020.pdf](https://tudoksad.org.tr/upload/files/TUBITAK_DEIK_ULASTIRMA_23.11.2020.pdf)

255. <https://ufukavrupa.org.tr/tr/iklim-degisikligine-uyum>

256. <https://iklimsurasi.gov.tr/en/sayfa/the-aim-and-goals-of-the-council>

### Pollution Prevention and Control (DIES Project)

The aim of the project could be summarized as improvement of the institutional and technical capacity of authorities to implement the requirements of IPPC in Türkiye effectively, in line with the EU Industrial Emissions Directive. The duration of the project is 36 months from July 2020 to July 2023 in line with IPA II.<sup>257</sup>

#### 4.2.3.3. Enhancing Adaptation Action in Türkiye Project

The aim of the project is building societal resilience by reinforcement of climate change adaptation, particularly at the sector and urban level (October 2019-October 2023). The project is conducted in line with the IPA II.<sup>258</sup>

#### 4.2.3.4. Training for the Institutional Capacity Building on Climate Change Adaptation

Within the framework of IPA II, the aim of the project was capacity development of the staff in Turkish institutions regarding climate change issues with trainings arranged between January 2020 and September 2021.<sup>259</sup>

#### 4.2.3.5. Capacity Development for the Implementation of a Monitoring, Reporting and Verification (MRV) System for Greenhouse Gas Emissions Project

The aim of the project was introduction of an MRV system including data source to identify GHG emissions to establish a baseline scenario for future mitigation measures within the consideration of existing regulatory framework. Within the purpose of building a nation-wide installation-level MRV System for Türkiye, the MoEUCC was introduced Turkish Regulation on MRV of GHG Emissions as a bylaw to monitor, report and

257. [https://www.ab.gov.tr/52175\\_en.html](https://www.ab.gov.tr/52175_en.html)

258. [https://www.ab.gov.tr/52178\\_en.html](https://www.ab.gov.tr/52178_en.html)

259. [https://www.ab.gov.tr/52997\\_en.html](https://www.ab.gov.tr/52997_en.html)

verify the GHG Emissions in 2015. Following the revision period, it was put in force on May 17, 2014. It was mainly adapted from Commission Regulations 600/2012/EC and 601/2012/EC.<sup>260</sup>

#### 4.2.3.6. Developing an Analytical Basis for Formulating Strategies and Actions Towards Low Carbon Development Programme

The programme was funded by the EU for the reduction of GHGs by enhancing the national and local capacity to prepare medium and long-term action toward climate-resilient low-carbon development. An analytical basis including 84 working group workshops, 20 technical reports and the National Climate Knowledge Portal was provided to support low-carbon tools for the transportation, agriculture, building and waste sectors between 2017 and 2020.<sup>261</sup>

#### Box 4. Eco-efficiency (Cleaner Production) Program, a sub-program under the United Nations Joint Programme for Enhancing the capacity of Türkiye to adapt to climate change, 2008-2011.

Carried out as a sub-program by TTGV under the responsibility of UNIDO conducted with the consultancy of Middle East Technical University (METU), Eco-efficiency (Cleaner Production) Program was the only national-based program performed within this framework. The goal of the program was to raise the awareness of eco-efficiency and increase the capacity, to disseminate the related technologies, and to establish an Eco-Efficiency Centre to serve this purpose. It was planned to expand the application to the companies to be selected from the chemical and textile sectors.

The Ministry of Environment and Forestry (current MoEUCC) launched the "Project to Determine the Framework Conditions and R&D Requirement for Dissemination of Cleaner (Sustainable) Production Practices in Türkiye" in 2009 to establish the infrastructure for a roadmap to disseminate the cleaner (sustainable) production in our country. Within the framework of this

260. <https://www.carbon-turkey.org/tr>

261. <https://www.dai.com/our-work/projects/turkey-developing-an-analytical-basis-for-formulating-strategies-and-actions-towards-low-carbon-development>

project, which was carried out by TTGV in cooperation with METU on behalf of the Ministry of Environment and Forestry (current MoEUCC), the current situation in Türkiye was determined using a participatory method within the scope of cleaner (sustainable) production; proposals were defined for the steps to raise awareness, build capacity, establish partnerships and create information-sharing networks, establish financial mechanisms and make necessary policy reforms. In 2012, UNIDO Eco-efficiency (Cleaner Production) Program led by TTGV was awarded as one of the best projects and also it represented Türkiye at Rio +20.

#### 4.2.3.7. National Eco-Efficiency Programme

This program was started in line with the Turkish Industrial Strategy Document and Action Plan (2015-2018). The aim of the program was supporting environmentally friendly practices such as raising awareness on eco-efficiency and cleaner production concepts, enhancing cooperation among institutions and businesses, providing technical and financial support for capacity development of the industry.<sup>262</sup>

#### 4.2.3.8. Raising Awareness Project for Climate Change

The project was conducted between 2015 and 2017 under the coordination of MoEUCC. The project aimed at raising awareness of local authorities, teachers and students on climate change.<sup>263</sup>

#### 4.2.3.9. Enhancing Required Joint Efforts on Climate Action (İklimİN) Project

The project (14 August 2017 – January 2020) had three main components. First one was a comprehensive training programme on climate mitigation issues to achieve technical assistance for capacity building to support the MoEUCC. Second one was the development of effective communication among stakeholders related with climate, and the last one was a grant to finance activities (in total 38 projects) conducted to raise awareness and climate change oriented local activities.<sup>264</sup>

262. [https://unfccc.int/sites/default/files/resource/14936285\\_Turkey-NC7-2-Seventh%20National%20Communication%20of%20Turkey.pdf](https://unfccc.int/sites/default/files/resource/14936285_Turkey-NC7-2-Seventh%20National%20Communication%20of%20Turkey.pdf)

263. [https://unfccc.int/sites/default/files/resource/14936285\\_Turkey-NC7-2-Seventh%20National%20Communication%20of%20Turkey.pdf](https://unfccc.int/sites/default/files/resource/14936285_Turkey-NC7-2-Seventh%20National%20Communication%20of%20Turkey.pdf)

264. <https://www.iklimin.org/en/>

#### 4.2.3.10. Climate Camps Project

In 2016, six different climate camps were held together with the attendance of 120 upper primary school students within the coordination of the MoEUCC. The aim of the project was informing the students about the responsible consumption of natural resources and social precautions to make one of each a climate volunteer. The theoretical and practical trainings on climate change were provided for the students, teachers, and teacher candidates on climate change in 18 provinces for two years.<sup>265</sup>

#### 4.2.3.11. Voice of Meteorology Project

Turkish State Meteorological Service is broadcasting, beside weather forecasts, the Voice of Meteorology (Meteor FM) radio channel to raise public awareness on meteorological disasters, climate change, environmental protection efforts and renewable energy systems.<sup>266</sup>

#### 4.2.3.12. Water Ambassadors Project

By providing trainings and communication campaigns the aim of the project was raising the young generations as water ambassadors. The EU and Türkiye were the co-financers of the project. The Ministry of National Education, General Directorate of Turkish Radio and Television Corporation (TRT) and General Directorate of State Hydraulic Works (DSİ) were the implementers of the Project.<sup>267</sup>

#### 4.2.3.13. Climate Action Week

The campaign was coordinated by the EU Information Centres Network in Türkiye between 16 and 27 October 2017. The campaign aimed at awareness raising on climate action and environmental protection with

265. [https://unfccc.int/sites/default/files/resource/14936285\\_Turkey-NC7-2-Seventh%20National%20Communication%20of%20Turkey.pdf](https://unfccc.int/sites/default/files/resource/14936285_Turkey-NC7-2-Seventh%20National%20Communication%20of%20Turkey.pdf)

266. [https://unfccc.int/sites/default/files/resource/14936285\\_Turkey-NC7-2-Seventh%20National%20Communication%20of%20Turkey.pdf](https://unfccc.int/sites/default/files/resource/14936285_Turkey-NC7-2-Seventh%20National%20Communication%20of%20Turkey.pdf)

267. [https://unfccc.int/sites/default/files/resource/14936285\\_Turkey-NC7-2-Seventh%20National%20Communication%20of%20Turkey.pdf](https://unfccc.int/sites/default/files/resource/14936285_Turkey-NC7-2-Seventh%20National%20Communication%20of%20Turkey.pdf)

key stakeholders from local government, academia, business, media and civil society. The key message of the campaign was “everyone can make a difference,” to emphasize the importance of individual and local contribution to reach the goals of the Paris Climate Agreement.

#### 4.2.3.14. TÜBİTAK 4004 Nature Education and Science Schools Project

The programme launched in 2007 still continues to support training programs for the simplification of scientific concepts and processes in natural sciences. The individual training project application of the public bodies, universities and schools for the governmental personnel, graduate and post-graduate students, teachers, primary and secondary school students and preschool children are also accepted.<sup>268</sup>

#### 4.2.3.15. 2204–D High School Students Climate Change Research Projects Competition

The purpose of the 2204-D High School Students' Climate Change Research Projects Competition was to increase the awareness of high school students about climate change, to encourage them to work on the sustainable use of natural resources, and to enable them to produce solutions for the negative effects of climate change.<sup>269</sup>

### 4.3. Sustainable Mobility

The UN defines sustainable mobility as the enhancement of services and infrastructure for the mobility of people and goods to achieve economic and social development for existing and future generations in a safe, accessible, affordable, efficient, and resilient way.<sup>270</sup>

The recent research indicates that almost one third of the GHG emissions of the EU-28 countries are sourced from the transport emissions. It was predicted that the passenger traffic will exceed 80,000 billion passenger kilometres which means a 50%

268. <https://www.tubitak.gov.tr/tr/destekler/bilim-ve-toplum/ulusal-destek-programlari/icerik-4004-doga-egitimi-ve-bilim-okullari>

269. <https://tubitak.gov.tr/sites/default/files/27044/2204d-pr.pdf>

270. <https://sustainabledevelopment.un.org/content/documents/12453HLAG-ST%20brochure%20web.pdf>

increase and freight volume is expected to increase by 70% globally by 2030. Besides, the number of vehicles on the road is expected to double by 2050 worldwide.<sup>271</sup> The dissemination of sustainable modes of transportation is one of the most urgent actions to achieve low emission mobility for most of the countries independently from their level of development. Within the direction of providing efficient, safe and environmentally friendly transport, EU Green Deal aims at sustainable mobility, smart mobility and resilient mobility. In the Green Deal Action Plan of the Türkiye, the planned actions are introduced in parallel with the EU Green Deal:

- Enforcement of the Regulation on Combined Transportation and Regulation on Logistic Centre,
- Improvement of the railway transportation,
- Publishing national legislation for the green port certification programme,
- Making studies for the announcement of Mediterranean Sulphur Emission Control Area (SECA) by the 2024
- Reduction of the hazardous emissions sourced from the maritime sector and supporting green maritime
- Conducting strategy planning for electrical vehicles and charging infrastructure development,
- Dissemination of the use of micromobility vehicles.<sup>272</sup>

In addition to the Green Deal Action Plan, there are many action plans and strategy documents related with the Türkiye's long-term targets for sustainable and smart mobility:

- 11<sup>th</sup> National Development Plan<sup>273</sup>
- National Smart Mobility System Strategy Document and Action Plan (2020-2023)<sup>274</sup>
- National Broadband Strategy and Action Plan (2017-2020)<sup>275</sup>
- Integrated Urban Development Strategy and Action Plan<sup>276</sup>

271. <https://www.worldbank.org/en/news/feature/2017/07/10/sustainable-mobility-for-the-21st-century>

272. <https://ticaret.gov.tr/data/60f1200013b876eb28421b23/MUTABAKAT%20YE%C5%9E%C4%BOL.pdf>

273. [https://www.sbb.gov.tr/wp-content/uploads/2022/07/On\\_Birinci\\_Kalkinma\\_Planı-2019-2023.pdf](https://www.sbb.gov.tr/wp-content/uploads/2022/07/On_Birinci_Kalkinma_Planı-2019-2023.pdf)

274. <http://www.sp.gov.tr/upload/xSPTemelBelge/files/bHBR2+ulusal-akilli-ulas-im-sistemleri-strateji-belgesi-ve-2020-2023-eylem-plani.pdf>

275. [http://www.sp.gov.tr/upload/xSPTemelBelge/files/lxRY+Ulusal\\_Genisbant\\_Stratejisi\\_ve\\_Eylem\\_Planı\\_2017-2020.pdf](http://www.sp.gov.tr/upload/xSPTemelBelge/files/lxRY+Ulusal_Genisbant_Stratejisi_ve_Eylem_Planı_2017-2020.pdf)

276. <https://webdosya.csb.gov.tr/db/kentges/icerikler/kentges-en-20191223090807.pdf>

- National Energy Efficiency Action Plan (2017-2023)<sup>277</sup>
- Accessible Mobility Strategy and Action Plan (2021- 2025)<sup>278</sup>
- Energy Efficiency Strategy (2012-2023)<sup>279</sup>
- Highway Traffic Safety Strategy (2021-2030)<sup>280</sup>
- National Science and Technology Policies Strategy (2033-2023)<sup>281</sup>
- National Strategy on Regional Development (2014-2023)<sup>282</sup>
- National Smart Cities Strategy and Action Plan (2019-2022)<sup>283</sup>
- Climate Change Strategy of the Türkiye (2010 – 2023)<sup>284</sup>
- Smart Mobility Systems Strategy Document (2014-2023) and Action Plan (2014-2016)<sup>285</sup>
- Türkiye Mobility and Communication Strategy Target 2023<sup>286</sup>
- 2020-2024 Strategy Document of the Ankara Metropolitan Municipality<sup>287</sup>
- 2020-2024 Strategy Document of the İstanbul Metropolitan Municipality<sup>288</sup>

### 4.3.1. Regulations

In Türkiye, there is no directly related legislative arrangement regarding the establishment and operation of sustainable and smart mobility systems. However, there are some indirect regulations and laws on smart and environmentally friendly mobility:

277. <https://enerji.gov.tr//Media/Dizin/EVCED/tr/EnerjiVerimlili%C4%9Fi/UlusalEnerjiVerimlili%C4%9FiEylemPlan%C4%B1/Belgeler/UEVEP.pdf>

278. <http://www.sp.gov.tr/upload/xSPTemelBelge/files/qzEC8+erisilebilir-ulasim-stratejisi-ve-eylem-plani.pdf>

279. <https://www.resmigazete.gov.tr/eskiler/2012/02/20120225-7.htm>

280. [http://www.trafik.gov.tr/kurumlar/trafik.gov.tr/01-Haberler/03-2021/2021\\_2030-Karayolu-Trafik-Guvenligi-Strateji-Belgesi.pdf](http://www.trafik.gov.tr/kurumlar/trafik.gov.tr/01-Haberler/03-2021/2021_2030-Karayolu-Trafik-Guvenligi-Strateji-Belgesi.pdf)

281. [https://www.tubitak.gov.tr/tubitak\\_content\\_files/vizyon2023/Vizyon2023\\_Strateji\\_Belgesi.pdf](https://www.tubitak.gov.tr/tubitak_content_files/vizyon2023/Vizyon2023_Strateji_Belgesi.pdf)

282. [https://www.sbb.gov.tr/wp-content/uploads/2018/11/2014-2023\\_B%C3%B6lgesel\\_Geli%C5%9Fme\\_Ulusal\\_Stratejisi.pdf](https://www.sbb.gov.tr/wp-content/uploads/2018/11/2014-2023_B%C3%B6lgesel_Geli%C5%9Fme_Ulusal_Stratejisi.pdf)

283. <https://www.akillisehirler.gov.tr/wp-content/uploads/EylemPlanı.pdf>

284. [https://webdosya.csb.gov.tr/db/iklim/editordosya/iklim\\_degisikligi\\_stratejisi\\_EN\(2\).pdf](https://webdosya.csb.gov.tr/db/iklim/editordosya/iklim_degisikligi_stratejisi_EN(2).pdf)

285. [http://www.sp.gov.tr/upload/xSPTemelBelge/files/rJ6g4+Ulusal\\_Akilli\\_Ulasim\\_Sistemleri\\_Strateji\\_Belgesi\\_2014-2023\\_ve\\_Eki\\_Eylem\\_Planı\\_2014-2016\\_.pdf](http://www.sp.gov.tr/upload/xSPTemelBelge/files/rJ6g4+Ulusal_Akilli_Ulasim_Sistemleri_Strateji_Belgesi_2014-2023_ve_Eki_Eylem_Planı_2014-2016_.pdf)

286. [http://www.sp.gov.tr/upload/xSPTemelBelge/files/93C5Y+Türkiye\\_Ulasim\\_velletisim\\_Stratejisi.pdf](http://www.sp.gov.tr/upload/xSPTemelBelge/files/93C5Y+Türkiye_Ulasim_velletisim_Stratejisi.pdf)

287. <https://www.ankara.bel.tr/files/2022/04/06/c2dd96f266679134a44d544972fd36dc.pdf>

288. <https://ibb.istanbul/BBIImages/Slider/Image/ibb-stratejik-plan-2020-2024.pdf>



- Regulation on Procedures and Principles for Increasing Energy Efficiency in Transport<sup>289</sup>
- Regulation on Consumer Disclosures on Fuel Economy and CO<sub>2</sub> Emissions of New Passenger Vehicles<sup>290</sup>
- Regulation on Recreational Crafts and Personal Watercrafts<sup>291</sup>
- Regulation on E-Scooter<sup>292</sup>
- Regulation on Charge Services<sup>293</sup>
- Regulation on Highway Traffic<sup>294</sup>
- Regulation on Bandırma Onyedi Eylül University Research and Application Centre for Smart Mobility Systems<sup>295</sup>
- Law No 5393 on Municipality<sup>296</sup>
- Law No 5216 on Metropolitan Municipality<sup>297</sup>
- Regulation on Bicycle Routes<sup>298</sup>

## 4.3.2. Economic Benefits

### 4.3.2.1. 1512 Entrepreneurship Support Program (BiGG) Green Growth Call Announcement (2021)

TÜBİTAK Technology and Innovation Support Programs (TEYDEB) 1512 – Entrepreneurship Support Program, known as Individual Young Entrepreneurship (BiGG), aims at bringing entrepreneurs' ideas to the market so that they can transform their technology-oriented ideas into startups. There were calls in 2021-1, 2021-2 and 2022-1 terms to

289. <https://www.mevzuat.gov.tr/File/GeneratePdf?mevzuatNo=31464&mevzuatTur=KurumVeKurulusYonetmeliqi&mevzuatTertip=5>

290. <https://www.mevzuat.gov.tr/File/GeneratePdf?mevzuatNo=8053&mevzuatTur=KurumVeKurulusYonetmeliqi&mevzuatTertip=5>

291. <https://www.resmigazete.gov.tr/eskiler/2017/05/20170505-5.htm>

292. <https://www.resmigazete.gov.tr/eskiler/2021/04/20210414-3.htm>

293. <https://www.resmigazete.gov.tr/eskiler/2022/04/20220402-2.htm>

294. <https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=8182&MevzuatTur=7&MevzuatTertip=5>

295. <https://www.mevzuat.gov.tr/anasayfa/MevzuatFihristDetaylframe?MevzuatTur=8&MevzuatNo=24087&MevzuatTertip=5>

296. <https://www.mevzuat.gov.tr/mevzuatmetin/1.5.5393.pdf>

297. <https://www.mevzuat.gov.tr/MevzuatMetin/1.5.5216.pdf>

298. <https://www.resmigazete.gov.tr/eskiler/2019/12/20191212-1.htm>

support several interest areas including sustainable mobility as one of the priority areas for this programme but there are no specific statistics on the beneficiaries that focus on sustainable mobility.

### 4.3.2.2. Technology Oriented Industry Movement Program Mobility Call (2021)

The Mobility Call of Technology-Oriented Industry Movement Program will support the production of transportation vehicles and their components/parts, autonomous or semi-autonomous concept vehicles, driver support and safety technologies, advanced material technologies, battery and energy management technologies, new generation advanced wireless and mobile technologies.<sup>299</sup>

### 4.3.2.3. Sustainable Urban Mobility Plans (SUMP) in Türkiye

The concept of SUMP was established in the 2013 Urban Mobility Package. Türkiye has no national guidance or regulation on SUMP but municipalities can benefit from funds for developing SUMP under the EU IPA II funds. According to data in 2015 there was only one city in Türkiye that started to implement a comprehensive SUMP, Eskişehir, to implement an 8.478 km bike lane in the years 2015-2019.<sup>300</sup> Also, within the efforts to comply with the EU's SUMP Framework, the SKHP- Sustainable Cities project has been launched in collaboration between the Republic of Türkiye, the World Bank and the EU.<sup>301</sup> By 2021, Istanbul Metropolitan Municipality started to implement SUMP transferring its Transport Master Plan into a SUMP Framework.<sup>302</sup> Istanbul Municipality has also interpreted urban mobility concepts into institutional structures by establishing specific departments for cycling, smart city and sustainable mobility. Furthermore, there are several initiatives and projects such as SOLUTIONS (Sharing Opportunities for Low-carbon Urban Transport) Project by the EMBARQ Türkiye which aims

299. <https://www.yatirimadestek.gov.tr/haber/teknoloji-odakli-sanayi-hamlesi-programi-2021-yili-mobilite-cagrisi-acilmistir/57>

300. [https://avrupa.marmara.edu.tr/dosya/avrupa/mjes%20arsiv/Vol%2027\\_1/8\\_Yerli.pdf](https://avrupa.marmara.edu.tr/dosya/avrupa/mjes%20arsiv/Vol%2027_1/8_Yerli.pdf)

301. <https://www.surdurulebilirhareketlilik.org/>

302. [https://www.lar.org.tr/wp-content/uploads/2021/05/7-Nisan\\_Surdurulebilir-Kentsel-Hareketlilik-Plani.pdf](https://www.lar.org.tr/wp-content/uploads/2021/05/7-Nisan_Surdurulebilir-Kentsel-Hareketlilik-Plani.pdf)

to help cities to achieve sustainable urban mobility.<sup>303</sup> In order to accelerate collaboration and engagement among different stakeholders, Türkiye's first multi-sectoral transport network KAVŞAK has been established in 2020.<sup>304</sup> Funded by the EU and several other partners, KAVŞAK provides grants for local sustainable urban mobility projects.<sup>305</sup>

#### 4.3.2.4. EU Research and Innovation Funds

Under the Solutions to Social Problems component of Horizon 2020 Programme, it was aimed to support effective solution proposals to social problems with six main focus area. The smart, clean and integrated mobility was one of these areas of the programme with an allocated budget of 6.34 billion euros through multidisciplinary and multi-partner research.<sup>306</sup> Though Türkiye received 271.4 million euros total amount funds for 756 projects by 2020, there is no specific statistics for mobility related projects.<sup>307</sup>

The Horizon 2020 Green Deal Call (2020-2021) was last and biggest call of the Horizon 2020 with 1 billion euros budget. It was aimed to support the transition of the EU to low carbon economy through R&D and innovation.<sup>308</sup> One of the topics was on green airports and ports as multimodal hubs for sustainable and smart mobility with 100 million euros budget to reduce the mobility sourced GHG emissions and contribute the climate change mitigation by developing innovative solutions.<sup>309</sup>

The Horizon Europe programme (2021-2027) includes 5 missions and 6 clusters are formed to conduct the targets of those missions. The Cluster 5 is on climate, energy and mobility and two of its main targets, clean and competitive solutions in transport modes and safe, resilient, intelligent and integrated transportation systems, are directly related with mobility.<sup>310</sup>

303. <https://wrirosscities.org/news/cities-across-Türkiye-gather-sustainable-mobility-workshop>

304. <https://wrirosscities.org/news/Türkiye%E2%80%99s-first-transport-network-%E2%80%98kav%C5%9Fak%E2%80%99-will-develop-collaborative-solutions-sustainable>

305. <https://kavsak.net/kavsak-hakkinda/kavsak-agi/>

306. [https://www.ab.gov.tr/files/SBYPB/birlik%20programlari/horizon\\_2020\\_programi.pdf](https://www.ab.gov.tr/files/SBYPB/birlik%20programlari/horizon_2020_programi.pdf)

307. [https://tudoksad.org.tr/upload/files/TUBITAK\\_DEIK\\_ULASTIRMA\\_23.11.2020.pdf](https://tudoksad.org.tr/upload/files/TUBITAK_DEIK_ULASTIRMA_23.11.2020.pdf)

308. [https://tudoksad.org.tr/upload/files/TUBITAK\\_DEIK\\_ULASTIRMA\\_23.11.2020.pdf](https://tudoksad.org.tr/upload/files/TUBITAK_DEIK_ULASTIRMA_23.11.2020.pdf)

309. [https://www.ab.gov.tr/52146\\_en.html](https://www.ab.gov.tr/52146_en.html)

310. <https://ufukavrupa.org.tr/tr/iklim-degisikligine-uyum>

### 4.3.3. Soft Tools

#### 4.3.3.1. Green Port Project

The “Green Port” project was initiated within the body of General Directorate of Maritime, considering that more environmentally friendly port facilities should be brought to Türkiye to eliminate the environmental problems experienced or likely to be experienced. It was decided to give the title of “Green Port” to honour the ports that fulfil certain conditions.<sup>311</sup>

#### 4.3.3.2. Green Airport Project

The Directorate General of Civil Aviation (DGCA) has put the project into implementation in 2009. If an institution authorized by DGCA at an airport fulfils the conditions determined by DGCA within the scope of the project, it is given the title of “Green Enterprise Certificate”. If all institutions at an airport receive a “Green Enterprise Certificate”, that airport could receive “Green Airport Certificate”.<sup>312</sup>

#### 4.3.3.3. Turkish-Owned Coaster Fleet Renewal Project

MoIT has introduced the project with the aim of equipping the Turkish coaster fleet with modern and technologically superior, energy efficient and environmentally friendly ships.<sup>313</sup>

#### 4.3.3.4. i-gCar4ITS: Innovative and Green Carrier Development for Intelligent Transportation System Applications Project

The project was developed by the Ondokuz Mayıs University Civil Engineering Department and funded by the “Connect4Innovation: UK-Türkiye Higher Education Institutional Partnership Fund”. The aim of the project is to provide on-site applied trainings to the engineering students about smart mobility systems.<sup>314</sup>

311. <https://denizcilik.uab.gov.tr/yesil-liman>

312. <https://web.shgm.gov.tr/tr/kurumsal-projeler/194-yesil-havaalani-green-airport-projesi>

313. <https://www.utikad.org.tr/Detay/Sektor-Haberleri/21292/koster-filosu-devlet-gucuyle-yeniden-buyuyecek>

314. <https://www.omu.edu.tr/tr/icerik/haber/doc-dr-metin-mutlu-aydinin-akilli-ulasim-sistemleri-projesine-british-councilden-destek>

### 4.3.3.5. ITU Istanbul On Mobility Lab (Istanbul-ON) imece-LAB

ITU IstanbulON is a living laboratory that produces sustainable, inclusive, contemporary, community-oriented mobility solutions together with the society, and brings together different components of the university, public and private sector with the civil society.<sup>315</sup>

### 4.3.3.6. Regional Bicycle Paths Implementation Project

It is aimed to increase the use of bicycles in the city centres of Tekirdağ, Edirne and Lüleburgaz, to increase the awareness of both the people living in these cities and the decision makers working for the development of the city. In addition, the project aims to emphasize the importance of cycling in urban transportation within the scope of sustainable transportation, to draw attention to the importance of active transportation and the necessity of establishing a safe bicycle transportation infrastructure in cities that are under the influence of heavy vehicle traffic.<sup>316</sup>

### 4.3.3.7. WRI- Bike Lab

WRI Türkiye Sustainable Cities was working to improve bicycle transportation in Antalya, Eskişehir and Sakarya in 2010. Within the scope of these studies, workshops were organized to improve the technical capacity of local governments. In 2012, WRI helped dissemination of bicycle transportation in Türkiye, primarily in Istanbul. The BikeLab Project was developed with the support of the Dutch Consulate on the occasion of the 400<sup>th</sup> Anniversary of Diplomatic Relations in İstanbul.<sup>317</sup> The project aims at creation of a cycling culture in Istanbul by introducing cycling for city residents as one of the transport options, using the mainstream media and television shows for the promotion of cycling and arranging education seminars on bike safety and the benefits of the integration of biking into daily lives of citizens.<sup>318</sup>

315. <https://istanbulon.itu.edu.tr/anasayfa>

316. <https://wrişehirler.org/arastirma/yayin/b%C3%B6lgesel-bisiklet-yollar%C4%B1-uygulama-projesi>

317. <https://wrişehirler.org/calismalarimiz/proje-sehir/bikelab>

318. <https://thecityfix.com/blog/bikelab-istanbul-helping-solve-transportation-troubles-historic-metropolis-arzu-tekir/>

### 4.3.3.8. Get Türkiye Cycling Project

The “Get Türkiye Cycling!” project serves to improve communication and advocacy between CSOs, private sector and governments.<sup>319</sup> In relation to this project, municipalities of İzmir, Eskişehir and Lüleburgaz conduct communication campaigns to promote cycling with the collaboration with WRI Türkiye Sustainable Cities. Ankara Metropolitan Municipality has also a cycling project “Ankara Bike Road Project”<sup>320</sup> and published Ankara Priority Bicycle Network Study in 2020.<sup>321</sup>

### 4.3.3.9. ITS Congress

In 2019, Türkiye held its first regional ITS Congress (Intelligent Transport Systems, a local type of ITS World Congress on smart mobility and the digitalisation of transport) with the support of both the Ministry of Transportation and ERTICO.<sup>322</sup>

## 4.4. Clean Energy

Energy sources that are environmentally friendly and have little negative impact on nature, such as solar, wind, geothermal, hydroelectric, and bioenergy can be classified as clean energy. Clean Energy is one of the main pillars of the European Green Deal and its coverage mostly coincides with the “Clean, Affordable and Secure Energy Supply” pillar in the Green Deal Action Plan of Türkiye.

In this section, clean energy policies in Türkiye are examined, based on the section titled “Clean, Affordable, Secure Energy Supply” in the Green Deal Action Plan of Türkiye. The actions within this pillar are as follows:

- Evaluation of development areas, if any, by conducting a gap analysis on renewable energy and energy efficiency studies (from 2022),
- Raising awareness and providing awareness training on energy efficiency for the authorities of industrial facilities, especially the enterprises operating in OIZs (2021-2023),

319. [https://wrişehirler.org/sites/default/files/HaydiTürkiyeBisiklete\\_Rapor\\_WEB.pdf](https://wrişehirler.org/sites/default/files/HaydiTürkiyeBisiklete_Rapor_WEB.pdf)

320. <https://bisiklet.ego.gov.tr/>

321. <https://bisiklet.ego.gov.tr/wp-content/themes/bisiklet/img/bisiklet-agi-etudu.pdf>

322. <https://erticonetwork.com/ertico-supports-turkey-in-its-first-its-summit/>

- Preparation of national strategy documents, guidelines, and roadmap for dissemination of energy-efficient and low-carbon heating and cooling systems (2024),
- Carrying out awareness-raising activities related to the Green Tariff and YEK-G Certificate (2021),
- Ultimate aim to provide 1000 MW WPP, SPP every year until the end of 2027 in accordance with the National Energy and Mining Policy (2027).

All these actions are planned to be carried out under the responsibility of the MoENR, with many different stakeholder institutions such as the Presidency of Strategy and Budget, the MoEUCC, the Ministry of Treasury and Finance, the MoIT, EPDK and EİAŞ. The Green Deal Action Plan provides a comprehensive set of strategies and actions some of which are already actively pursued by different stakeholders mentioned above. Such existing strategies have generally been defined under renewable energy and energy efficiency but do not relate to a clear global carbon net-zero target. For instance, although it is a positive action to increase the production capacity of solar and wind power plants targeting the 4th quarter of 2027, there is no indication of the use of these in the industry. Apart from the Action Plan, there are several other strategy documents that set actions towards clean energy:

**National Energy Plan<sup>323</sup>:** It sets up demand scenarios for 2035 which estimates the share of renewable energy in total installed electricity generation capacity to be around 65%, 38% of which will be based on solar and wind energy.

**National Climate Change Action Plan<sup>324</sup> (NCCAP) (2011-2023):** It was carried out jointly with UNDP Türkiye. The Plan aims for sustainable development by limiting greenhouse gas emissions and resilience by managing the effects of climate change and encouraging adaptation to climate change. Since there are no quantitative targets for overall emissions reductions etc., there is no formal benchmarking or monitoring of progress.

**Energy Efficiency Strategy Document<sup>325</sup> (2012-2023):** The aim of this strategy document is to improve energy efficiency at all stages from energy generation and transmission to final consumption. Among the actions and strategies of the document, are items such as “encouraging investments to increase energy efficiency” or

323. [https://enerji.gov.tr/Media/Dizin/EIGM/tr/Raporlar/TUEP/Türkiye\\_Ulusal\\_Enerji\\_Planı.pdf](https://enerji.gov.tr/Media/Dizin/EIGM/tr/Raporlar/TUEP/Türkiye_Ulusal_Enerji_Planı.pdf)

324. <https://www.ahika.gov.tr/assets/upload/dosyalar/klim-degisikligi-eylem-planı-2011-2023.pdf>

325. [https://www.bebka.org.tr/admin/datas/sayfas/files/Enerji\\_Verimlilik\\_Strateji\\_Belgesi\\_2010-2023.pdf](https://www.bebka.org.tr/admin/datas/sayfas/files/Enerji_Verimlilik_Strateji_Belgesi_2010-2023.pdf)

“imposing maximum emission limitation on buildings” that remain to be in the Green Deal Action Plan of 2021 even after 10 years.

**National Renewable Energy Action Plan<sup>326</sup> (2013-2023):** It is the key policy document that shows Türkiye’s vision for renewable energy. It was published to harmonize Türkiye’s clean energy policy in line with the EU’s Renewable Directive (2009/28/EC). The plan determines the national targets for 2023 and includes the expected progression of renewable sources in electricity generation, heating, and cooling, and transportation. Among the targets for 2023 is to obtain 30% of electrical energy production from renewable sources. According to the plan, 22% of the electricity produced in 2023 will come from hydroelectricity and 16% from other renewable energy sources. In addition, wind power is expected to increase from 3 GW to 20 GW and solar power to 5 GW. According to the Presidential Annual Program data, Türkiye met 42.3% of its electricity production from renewable sources in 2020.<sup>327</sup> In 2021, 30.9% of electricity production will come from coal, 33.2% from natural gas, 16.7% from hydraulic energy, 9.4% from wind, 4.2% from solar, 3.2% from geothermal energy, and 2.4% from other sources.<sup>328</sup> According to the 2022 report of Turkish Electricity Transmission Corporation, while the total installed power of wind power plants in Türkiye was 11 GW, the installed power of solar power plants increased by 8 GW.<sup>329</sup> Targets in heating-cooling and transportation have not yet been realized, and data are limited.

**10th Development Plan (2014-2018) and 11th Development Plan<sup>330</sup> (2019-2023):** The 10th and 11th Development Plans aim to ensure an uninterrupted, sustainable, and affordable energy supply. Increasing the share of renewable energy sources in the energy sector is the target. The share of renewable energy sources in electricity production was targeted to be 38.8% compared to 32.5% in 2018. In the first nine months of 2022, approximately 44% of the total electricity production was provided by renewable energy sources.<sup>331</sup> Türkiye aims to produce 50% of its electricity from renewables by 2023 (36% in 2021).

326. <https://www.yumpu.com/tr/document/read/36876285/turkiye-ulusal-yenilenebilir-enerji-eylem-planı/9>

327. [https://enerji.enerji.gov.tr/Media/Dizin/SGB/tr/Faaliyet\\_Raporlari/2020/ETKB2020Y%C4%B1%C4%B1%C4%B1%OdareFaaliyetRaporu.pdf](https://enerji.enerji.gov.tr/Media/Dizin/SGB/tr/Faaliyet_Raporlari/2020/ETKB2020Y%C4%B1%C4%B1%C4%B1%OdareFaaliyetRaporu.pdf)

328. <https://enerji.gov.tr/bilgi-merkezi-enerji-elektrik>

329. <https://www.TurkishElectricityTransmissionCorporation.gov.tr/kurulu-guc-raporlari> (2022 Ekim)

330. [https://www.sbb.gov.tr/wp-content/uploads/2022/07/The\\_Tenth\\_Development\\_Plan\\_2014-2018.pdf](https://www.sbb.gov.tr/wp-content/uploads/2022/07/The_Tenth_Development_Plan_2014-2018.pdf) & [https://www.sbb.gov.tr/wp-content/uploads/2022/07/Eleventh\\_Development\\_Plan\\_2019-2023.pdf](https://www.sbb.gov.tr/wp-content/uploads/2022/07/Eleventh_Development_Plan_2019-2023.pdf)

331. <https://enerji.gov.tr/haber-detay?id=21085>

**The National Energy Efficiency Action Plan<sup>332</sup> (2017-2023):** When the EU obliged member states to prepare national energy efficiency action plans with Directive 2012/27/EU, Türkiye conducted the National Energy Efficiency Action Plan. Aiming to reduce Türkiye's primary energy consumption by 14% until 2023, the plan envisages cumulative savings of 23.9 million toes and an investment of 10.9 billion USD until 2023. Primary energy consumption in 2020 was recorded as 16.7% and 147.2 million toes. There was an annual average increase of 3.1% between 2000 and 2020. This rate is expected to increase by 2.2% in the period until 2035.<sup>333</sup>

**Ministry of Energy and Natural Resources Strategic Plan<sup>334</sup> (2019-2023):** According to the plan, it is aimed to increase the ratio of installed electricity based on domestic and renewable energy sources to the total installed power from 59% to 65% by 2023. According to the details of the target, a total of 56,804 MW of power based on renewable energy sources is targeted in 2023 (10,000 MW in solar energy, 11,883 MW in wind energy, 32,037 MW in hydroelectricity and 2,884 MW in geothermal and biomass). According to the Turkish Electricity Transmission Corporation January 2022 Installed Power Report, 7,881.1 MW of the total 99,734 MW installed power is solar energy. While the installed power of wind power plants is 10,682.8 MW, the installed power of hydroelectric power plants is 8,217.7 MW; geothermal is 1,676.2 MW, and the installed power of biomass is 1,658.0 MW. Geothermal and biomass targets have been achieved, and the target in solar and wind energy are close to targets.<sup>335</sup>

Türkiye's policy efforts on renewable energy (rather than clean energy) date back to the beginning of the 2000s. As a result of such policy actions according to EPDK<sup>336</sup> data, as of May 2022, the share of import-dependent natural gas in the electricity-licensed installed capacity decreased by 1.72% compared to the previous year, while the share of renewable sources has increased (wind by 13%, biomass by 50%, solar by 74.4%, geothermal by 2.3%, stream water by 1.5%). The 2019-2023 Strategic Plan of the MoENR, aims to increase the ratio of the electricity installed power based on domestic and renewable energy sources to the total installed power from 59% to 65%. While the installed power targets for 2023 were 10,000 MW in solar energy, 11,883 in wind, 32,037 in hydroelectric, and 2,884 MW in geothermal energy and biomass, as of the end of May, the 2022 target for wind and 2023 targets for geothermal and biomass were exceeded.

332. <https://enerji.gov.tr/bilgi-merkezi-enerji-verimlilik-ulusal-enerji-verimlilik-eylem-planlari#:~:text=2017%2D2023%20yillari%20arasinda%20uygulanacak,enerji%20tuketiminin%20%14%20azaltılması%20hedeflenmektedir.>

333. [https://enerji.gov.tr/Media/Dizin/EIGM/tr/Raporlar/TUEP/T%C3%BCrkiye\\_Ulusal\\_Enerji\\_Plan%C4%B1.pdf](https://enerji.gov.tr/Media/Dizin/EIGM/tr/Raporlar/TUEP/T%C3%BCrkiye_Ulusal_Enerji_Plan%C4%B1.pdf)

334. <http://www.sp.gov.tr/stratejik-plan/s/1971/Enerji+ve+Tabii+Kaynaklar+Bakanligi+2019-2023>

335. <https://www.teias.gov.tr/kurulu-guc-raporlari>

336. <https://www.enerjigunlugu.net/lisansli-elektrik-kurulu-gucu-mayista-yuzde-24-artti-49444h.htm>

The most important example of the studies carried out for the use of renewable energy sources is the “Green Tariff” application. According to this application, which started on August 1, 2020; consumers can request the electricity they want to use from the suppliers, which is obtained from renewable energy sources.

As a result of the steps taken to increase renewable energy production, Türkiye ranks 12th in the world and 5th in Europe in terms of renewable energy installed power.<sup>337</sup> Türkiye ranks 7th in Europe in wind energy.<sup>338</sup> Total installed power of geothermal energy in Türkiye is 4th in the world (and first in Europe).<sup>339</sup> Türkiye ranked 3rd after China and the Indonesia in the use of solar energy for heating and cooling process in 2021.<sup>340</sup> In 2020, it became one of the top 10 countries in the world in terms of hydroelectric installed power.<sup>341</sup>

## 4.4.1. Regulations

### 4.4.1.1. Utilization of Renewable Energy Sources Law 5346<sup>342</sup> (2005-2022)

This law covers the procedures and principles regarding the protection of renewable energy resource areas and the use of these resources. Its purpose is to expand the use of renewable energy resources for electrical energy generation, to increase the diversity of resources, and to reduce greenhouse gas emissions. In 2022, with decision number 735, paragraph 6/c of this document was amended to rearrange who can benefit from the domestic contribution prices.

### 4.4.1.2. Energy Efficiency Law 5627<sup>343</sup> (2007-2021)

This law aims for the efficient use of energy, prevention of waste, reduction of energy costs, and increasing the efficiency of energy resources and use. It covers the procedures and principles to be applied develop energy

337. <https://www.mfa.gov.tr/turkeys-energy-strategy.en.mfa>

338. <https://windeurope.org/about-wind/reports/wind-energy-in-europe-outlook-to-2020/>

339. [https://www.ren21.net/wp-content/uploads/2019/05/GSR2022\\_Full\\_Report.pdf](https://www.ren21.net/wp-content/uploads/2019/05/GSR2022_Full_Report.pdf)

340. [https://www.ren21.net/wp-content/uploads/2019/05/GSR2022\\_Full\\_Report.pdf](https://www.ren21.net/wp-content/uploads/2019/05/GSR2022_Full_Report.pdf)

341. <https://www.hydropower.org/publications/2021-hydropower-status-report>

342. <https://www.mevzuat.gov.tr/mevzuatmetin/1.5.5346.pdf>

343. <https://www.mevzuat.gov.tr/mevzuatmetin/1.5.5627.pdf>

awareness in society, and benefit from renewable energy sources. With the decision numbered 7346 in 2021, articles 2, 3, and 8 of the law were amended, and the expression “applicant” was used instead of “industrial enterprises” which makes the law flexible to beneficiaries.

#### 4.4.1.3. Electricity Market Law 6446<sup>344</sup> (2013-2022)

It aims to provide sufficient, high-quality, continuous, low-cost, and environmentally compatible electricity to consumers, establish a competitive, financially strong, stable, and transparent electricity energy market, and ensure independent regulation and supervision. It covers electricity generation, transmission, distribution, wholesale or retail sale, import and export, market operation, and the rights and obligations of all real and legal persons related to these activities. In 2022, Articles 6, 7, 14, and 17 were amended.

#### 4.4.1.4. The Regulation on Increasing Efficiency in the Use of Energy Sources and Energy<sup>345</sup>(2011)

It requires industrial enterprises of a certain size to have an energy efficiency study every four years. Specifically, industrial enterprises with an annual energy consumption of at least 1,000 toes are required to appoint an energy manager and auditor, while industrial enterprises with an annual consumption of at least 50,000 toes should establish an energy management unit. Department of Energy Efficiency and Environment (DEEE) offers training programs and audit support in this regard. Apart from DEEE, trade associations, universities, and MENR-certified companies that are labelled as “energy efficiency consulting companies” (ESCO or EVD) can also provide training. SMEs are given audit support by KOSGEB.

344. <https://www.mevzuat.gov.tr/MevzuatMetin/1.5.6446.pdf>

345. [https://www.emo.org.tr/mevzuat/mevzuat\\_detay.php?kod=105](https://www.emo.org.tr/mevzuat/mevzuat_detay.php?kod=105)

#### 4.4.1.5. Renewable Energy Source Guarantee Certificate Regulation in the Electricity Market<sup>346</sup> (2020-2021)

This regulation and the amendment to the Regulation on the Certification and Support of Renewable Energy Resources were published in the Official Gazette no. 31304 dated November 14, 2020. According to these Regulations, a Renewable Energy Resource Guarantee Certificate (YEK-G) system has been launched on 1 June 2021, in which YEK-G Certificates guarantee that the energy supplied to consumers is produced by renewable energy resources. Beyond this, the above-mentioned regulations brought forth the foundation of an Organized YEK-G Market which is a market built and operated by EPIAŞ where YEK-G certificates are traded among market participants. Contracts that oblige to receive or deliver the YEK-G certificates are processed by the Market Operator in line with the continuous trading model.

#### 4.4.1.6. Domestic Component Regulation<sup>347</sup> (2021)

This Regulation covers the procedures and principles regarding the domestic contribution prices to be applied to the components used in the facilities to support the use of domestic components in electrical power generation facilities based on renewable energy sources. This regulation has been prepared based on Article 6/B of the Law on the Use of Renewable Energy Resources for Electricity Generation, dated 10/5/2005, number 5346, and the Presidential Decision dated 29/1/2022, number 3453.

### 4.4.2. Economic Benefits

**Renewable Energy Support Mechanism<sup>348</sup>(YEKDEM):** In this program, which expired at the end of 2021, the government guaranteed tariffs for different power plants, including wind, solar, biomass, hydro and geothermal. Additional support is provided in case the facility requirements are domestically produced.

346. <https://www.resmigazete.gov.tr/eskiler/2021/05/20210521-2.htm>

347. <https://resmigazete.gov.tr/eskiler/2021/05/20210528-1.htm>

348. <https://www.mondaq.com/turkey/renewables/1055302/an-overview-of-yek-g-certificate-and-organized-yek-g-market>

**Renewable Energy Resource Areas<sup>349</sup> (YEKA):** In 2016, the government initiated a tender process to provide renewable energy generation in regions deemed most suitable for renewable energy generation (RE-Zones). This process has implemented the Renewable Energy Resource Areas (YEKA) strategy. The first tenders were held for the solar power plant in March 2017 and for the wind power plant in August 2017.

**Energy Efficiency Improvement Projects<sup>350</sup> (EEIP):** In 2009, various support mechanisms such as energy efficiency improvement projects (EEIPs) and voluntary agreements were put into practice to prevent energy waste and inefficiencies in industrial facilities. A company can simultaneously apply for and receive grants for EEIP and voluntary agreements.

**SME Energy Efficiency Project GEF<sup>351</sup>:** Between 2013 and 2019, the Energy Efficiency in Small and Medium Enterprises Project was carried out under the sponsorship of the World Bank. The project aimed to activate commercial bank loans for energy efficiency investments. It was aimed to increase the efficiency of energy use in SMEs. The total budget consists of three lines of credit for a total of 201 million USD to three financial intermediaries. The financing included the industrial sector as well as the construction and service sectors.

**Promoting Energy-Efficient Motors in Small and Medium-Sized Enterprises in Türkiye (TEVMOT) Project<sup>352</sup> (2017-2022):** It is a project realized in cooperation between the MoIT and KOSGEB. The project aims to provide funding for SMEs that are ready to replace their inefficient motors with energy-efficient electric motors.

**Energy Efficiency in Industry (SENVER) Project<sup>353</sup>:** The competition to improve energy efficiency in the industry, is organized once a year at an energy efficiency fair with the aim of creating public awareness to energy efficiency. It consists of two sections: energy efficiency in industry projects and energy-efficient industrial facilities. Winners from both sections are rewarded.

349. <https://www.iea.org/reports/turkey-2021>

350. <https://www.iea.org/reports/turkey-2021>

351. <https://www.iea.org/reports/turkey-2021>

352. <https://www.iea.org/reports/turkey-2021>

353. <https://www.iea.org/reports/turkey-2021>

**TEYDEB 1511<sup>354</sup>:** “Energy” is one of the priority areas in the TÜBİTAK TEYDEB 1511 support program. Within the scope of TEYDEB 1511 between 2012 and 2019 215 calls, 3,371 project applications, and 929 supported projects amounted to 956.1 million TL.<sup>355</sup> No specific numbers for clean energy specific projects.

**TTGV YETEP<sup>356</sup> (2018-2021):** It aims to increase the environmental performance of industrial establishments and reduce their production costs. Priority is given to projects that aim to develop domestic technologies with domestic opportunities and resources.

### Box 5. Initiation of TTGV Environmental Technologies Program Supports, 2006-2017

Within the scope of development of clean production technologies in the production processes of the Turkish industry, TTGV Environmental Supports were initiated to support the efforts of industrial companies in Türkiye for the applications of clean production on energy efficiency, environmental technologies and renewable energy technologies on project basis with TTGV's financial support.

**İzmir Development Agency<sup>357</sup>:** Clean Energy and Clean Technologies Result-Oriented Program aim to increase green jobs and added value in clean energy and technology sectors by supporting the production of clean energy equipment and environmental technologies in İzmir and its surroundings.

**Batı Akdeniz Development Agency<sup>358</sup>:** Specific projects that aim to reduce foreign dependency on energy production by reducing energy costs and expanding production based on alternative energy sources in the Western Mediterranean Region.

354. <https://tubitak.gov.tr/destekler/sanayi/ulusal-destek-programlari/1511/icerik-yonetmelik-ve-esaslar#x>

355. [https://www.tubitak.gov.tr/sites/default/files/21566/teydeb\\_web\\_sunum\\_2021.pdf](https://www.tubitak.gov.tr/sites/default/files/21566/teydeb_web_sunum_2021.pdf)

356. <https://www.ahika.gov.tr/destekler/diger-kurumlarin-destek-programlari/yesil-teknoloji-projeleri-yetep-destek-programi>

357. <https://ka.gov.tr/sayfalar/izmir-kalkinma-ajansi-enerji--13-290>

358. <https://ka.gov.tr/sayfalar/bati-akdeniz-kalkinma-ajansi-enerji--13-297>

**World Bank Funded OIZ Lending Project<sup>359</sup>:** To increase the efficiency, environmental sustainability, and competitiveness of the selected regions with the “Türkiye Organized Industrial Zones Project”, a Loan Agreement of 250 million Euros was signed with the World Bank on 26/02/2021. Activities within the scope of the project will be supported by providing loans.

**HYSouthMarmara Horizon Europe Project<sup>360</sup>:** Under the clean energy partnerships calls this project which constitutes of 16 partners 13 of which is from Türkiye has received about 7.5 million euros funding which is the highest amount of funding that is granted for an EU project in Türkiye.

### 4.4.3. Soft tools

**The Department of Energy Efficiency and Environment<sup>361</sup> (DEEE):** Established by decree in December 2019, DEEE was established with a monitoring mandate to develop and strengthen corporate infrastructure. It has its database (EnVer Portal) recording businesses and buildings that consume a certain amount of energy which is used to form an index. As the lead agency of the National Energy Efficiency Action Plan, it is also responsible for all other organizations involved in the plan.

**Green Certification Information System<sup>362</sup>:** Launched in 2020, YES-TR aims to increase energy efficiency in buildings. It was signed between the Ministry and Istanbul Technical University (ITU) on February 26, 2016, on the development of the “National Evaluation Guide” to evaluate and document buildings and settlements suitable for climate data. This system, which is based on volunteerism, is aimed to create “pass”, “good”, “very good” and “national superiority” certificate degrees for authorized institutions. The official YeS-TR system was included in e-government services in 2020.

**Presidential Annual Program<sup>363</sup>:** Within the scope of YEKA GES-4, 15 competitions with a total capacity of one thousand megawatts will be held and

359. <https://www.sanayi.gov.tr/sanayi-bolgeleri/dunya-bankasi-finansmanli-osb-kredilendirme-projesi>

360. <https://ufukavrupa.org.tr/en/news/clean-hydrogen-partnership-2022-second-call-hysouthmarmara-project-has-been-selected-funding>

361. <https://www.iea.org/reports/turkey-2021>

362. <https://www.yesilsertifika.net/>

363. <https://www.sbb.gov.tr/wp-content/uploads/2021/10/2022-Yili-Cumhurbaskanligi-Yillik-Programi-26102021.pdf>

applications will be received on March 30, 2022. The initial electrical energy purchase ceiling price for each competition will be 0.4 TL per kilowatt-hour.

**TÜBİTAK MAM<sup>364</sup>:** Clean Energy Technologies Research Group has been operating in the Gebze Campus since 2005. In line with its clean energy targets, R&D activities are also carried out in the field of capturing the carbon dioxide released in the industry and evaluating the captured carbon dioxide.

**TÜBİTAK Clean Energy, Climate Change and Sustainability Research Institute<sup>365</sup>:** Established in Konya, the institute will ensure that the knowledge and technologies created in universities, public research centres, and institutes on climate change mitigation will be transformed into innovative products and technological solutions. The institute focuses on three main areas: social policy studies on renewable and clean energy, climate change-oriented future scenarios, and economic and sociological reflections of climate change.

## 4.5. Sustainable industry and eliminating pollution

The EU, our largest trade and investment partner, have created the carbon-free economy roadmap for 2050 within the scope of the European Green Deal. One of the most important components of Green Deal is “circular economy”. In March 2020, the EC adopted the new Circular Economy Action Plan which started to be implemented immediately. Within the scope of circular economy, waste reduction, durability, recycling, pollution prevention, reuse, repair approach and sustainable industry policy have become important. The EU Circular Economy Action Plan have focused on six key products, batteries and accumulators, packaging and plastics, electrical and electronic equipment, textiles, construction and buildings, food, water and nutrients.

In scope of the green deal, “*New Industry Strategy for EU*” has been published in 2020, highlighting “*twin transformation*” which refers to transilience of EU's industry into a climate neutral and digital industry while enhancing the global competitiveness of European manufacturers. As the EU forces its member countries to follow those strategies and action plans, candidate countries and especially industrial goods

364. <https://mam.tubitak.gov.tr/tr/calisma-alanlari/enerji-teknolojileri-arastirma-alanlari>

365. <https://tubitak.gov.tr/tr/haber/konyada-temiz-enerji-iklim-degisikligi-ve-surdurulebilirlik-arastirma-enstitusu-kuruldu>



trade partners are trying to keep up with such actions. Türkiye, one of the largest manufacturing countries in Europe and also an exporter to the EU, is taking measures and steps, both for the protection of the environment and as well to conserve export potential.

According to the studies carried out in Türkiye, it is seen that air pollution, water pollution and wastes are at the top of the list of priority environmental problems. Water pollution, which is stated as the first priority environmental problem in 27 of our 81 cities, the second in 30, and the third in 16 cities, stands out as an important environmental problem in 73 provinces in total.<sup>366</sup> According to the results of the greenhouse gas inventory, the total greenhouse gas emission in 2020 increased by 3.1% compared to the previous year and was calculated as 523.9 million tons of CO<sub>2</sub> equivalent. Energy-related emissions had the largest share in total greenhouse gas emissions in 2020 (70.2%), followed by agriculture (14%), industrial processes (12.7%) and waste sector (3.1%).<sup>367</sup> A total of 104.8 million tons of waste, 30.9 million tons of which is hazardous, was generated in manufacturing industry sector, mining sector, thermal power plants, organized industrial zones, health institutions and households in 2020. The total amount of waste increased by 10.5% compared to 2018. According to the data of the MoEUCC, 22.4% of the waste is recovered and 35% recovery is targeted in 2023. In the process of waste management, the application of circular economy principles and increasing the recycling rate come to the fore.

Türkiye has already started to coordinate its environmental policies and legislation with EU standards. Considering its growing economy and increasing population, it is foreseen that resource use, energy consumption and waste production of Türkiye will increase in the future, unless circular economy principles are adopted.

The term “Circular Economy” was involved in the Environmental Law No. 2872 with the phrase “disseminating zero waste, applying circular economy principles and combating climate change” in 2020.<sup>368</sup> MoEUCC Strategic Plan also includes circular economy. There is also a specific section in the organization of MoEUCC for circular economy.

With the Law No. 7261 published in the Official Gazette on 30 December 2020, the Turkish Environment Agency was established to increase resource efficiency in keeping with the circular economy and zero waste approach and to conduct activities

366. [https://webdosya.csb.gov.tr/db/ced/icerikler/tu-rk-yecevresorunlariveoncel-kler-\\_2020-20210401124420.pdf](https://webdosya.csb.gov.tr/db/ced/icerikler/tu-rk-yecevresorunlariveoncel-kler-_2020-20210401124420.pdf)

367. <https://data.tuik.gov.tr/Bulten/Index?p=Sera-Gazi-Emisyon-Istatistikleri-1990-2020-45862>

368. [https://webdosya.csb.gov.tr/db/ab/icerikler/cevrederg-s-\\_15.06.2022-20220617144316.pdf](https://webdosya.csb.gov.tr/db/ab/icerikler/cevrederg-s-_15.06.2022-20220617144316.pdf)

for the establishment, operation and monitoring of a waste management system in Türkiye.<sup>369</sup>

Within the scope of the Green Deal Action Plan, specific actions were defined as: Identification of Priority Sectors in the Circular Economy and Detailed Impact and Needs Analysis. MoEUCC was appointed as the responsible institution for these actions. Another action under the responsibility of the ministry is the Preparation of the Circular Economy National Action Plan until the second quarter of the 2023.

MoEUCC implemented the “Zero Waste” project in 2017 to control the wastes within the framework of sustainable development principles and to leave a cleaner and liveable world to future generations. The Zero Waste Project is being implemented gradually within the framework of the Zero Waste Management Action Plan, 2018-2023.<sup>370</sup>

In line with the 2020-2024 Strategic Plan prepared by the MoIT, it is aimed to make the industry more environmentally friendly and to transform it into a green industrial ecosystem.<sup>371</sup> In the strategic plan, it was stated that to reduce the environmental impact of industrial production, technology-intensive modernization of enterprises and new investments based on cleaner production will be supported. KOSGEB, TÜBİTAK and Development Agencies, which are institutions affiliated to the MoIT, will also design their support programs within the theme of green transformation.

### 4.5.1. Regulations

Regulations and laws about Sustainable Industry & Eliminating Pollution that have been enacted in Türkiye, are listed in Table 11.

369. <https://www.tuca.gov.tr/sayfa/mevzuat>

370. <https://webdosya.csb.gov.tr/db/sifiratik/icerikler/k-tapc-k-2017-1-20180129130757.pdf>

371. <https://www.sanayi.gov.tr/plan-program-raporlar-ve-yayinlar/stratejik-planlar/mu2112012102>

**Table 11.** Regulations regarding Sustainable Industry & Eliminating Pollution

Regulations <sup>372</sup>	Effective Date	Date of Last Revision
Environmental Law	11.08.1983	15.06.2022
Waste Management Regulation	02.04.2015	23.03.2017
Packaging Waste Control Regulation	27.12.2017	26.06.2021
Waste Electrical and Electronic Equipment Control Regulation	22.05.2012	
General Principles of Waste Pretreatment and Recovery Facilities Regulation	09.10.2021	24.11.2022
Control of Waste Batteries and Accumulators Regulation	31.08.2004	23.12.2014
Waste Oil Management Regulation	21.12.2019	23.12.2020
Control of Waste Vegetable Oils Regulation	06.06.2015	
Recovery Contribution Share Regulation	31.12.2019	02.06.2021
Control of End-of-Life Vehicles Regulation	30.12.2009	21.12.2010
Control of End-of-Life Tires Regulation	25.11.2006	11.03.2015
Control of Medical Wastes Regulation	25.01.2017	18.08.2022
Mining Waste Regulation	15.07.2015	16.07.2016
Zero Waste Regulation	12.07.2019	9.10.2021
Environmental Noise Control Regulation	30.11.2022	
Air Quality Assessment and Management Regulation	06.06.2008	
Exhaust Gas Emission Control Regulation	11.03.2017	23.04.2021
Industrial Air Pollution Control Regulation	03.07.2009	6.11.2020
Regulation on Persistent Organic Pollutants	14.11.2018	25.03.2021
Urban Wastewater Treatment Regulation	08.01.2006	10.01.2016
Water Pollution Control Regulation	31.12.2004	17.12.2022
Environmental Label Regulation	19.10.2018	
The Organization and Working Procedures and Principles of the Turkish Environment Agency Regulation	15.04.2021	
Procedures and Principles Regarding Mandatory Deposit Management System Applications <sup>373</sup>	25.04.2022	
Environmental Permit and License Regulation	10.09.2014	16.10.2021
Environmental Impact Assessment Regulation	25.11.2014	29.07.2022

372. <https://cygm.csb.gov.tr/yonetmelikler-i-440>373. <https://tuca.gov.tr/userfiles/files/Zorunlu%20DYS%20UE.pdf>

Regulations <sup>372</sup>	Effective Date	Date of Last Revision
Strategic Environmental Assessment Regulation	08.04.2017	
Organized Industrial Zones Law <sup>374</sup>	15.04.2000	25.12.2021
Organized Industrial Zones Implementation Regulation	01.04.2002	31.03.2022
Industrial Regions Regulation	06.08.2019	

## 4.5.2. Economic Benefit

Actions on Sustainable Industry & Eliminating Pollution have been supported by different institutions and organizations in Türkiye. The IPA was designed by the EC to provide financial and technical assistance in support of reforms in the EU candidate countries. The implementation of the Environmental Operational Program, which started in 2007 within the scope of the IPA I period (2007-2013), was completed by the end of 2017. During this period, 27 water and wastewater projects and 3 solid waste management projects were carried out. The implementation period of the Environment and Climate Action Sector Operational Program, which started in 2014 within the scope of the IPA II period (2014-2020), will be completed by the end of 2026. The aim of the program is to improve the quality of life of citizens by strengthening the environmental infrastructure, to protect nature, to comply with Green Deal, and to reduce climate change.<sup>375</sup>

The IPA III Regulations, which sets out the priorities and legal framework of the IPA III (2021-2027) period entered into force after being published in the EU Official Gazette on 20 September 2021. Environmental Protection, Green Transformation, Combating Climate Change are among the priority topics.<sup>376</sup>

In 2022, TÜBİTAK announced the Priority R&D and Innovation Fields for Adaptation to the European Green Deal. In support programs launched by TÜBİTAK, the following issues have been prioritized under the title of Clean and Circular Economy<sup>377</sup>:

374. <https://www.mevzuat.gov.tr/>375. [https://webdosya.csb.gov.tr/db/ab/icerikler/cevrederg-s-\\_15.06.2022-20220617144316.pdf](https://webdosya.csb.gov.tr/db/ab/icerikler/cevrederg-s-_15.06.2022-20220617144316.pdf)376. <https://www.ab.gov.tr/siteimages/birimler/mib/programlama/bulten/pdf/kasim2021.pdf>377. [https://www.tubitak.gov.tr/sites/default/files/21566/yesilmutabakat\\_0.pdf](https://www.tubitak.gov.tr/sites/default/files/21566/yesilmutabakat_0.pdf)

- Carbon Capture Technologies in Industry, Renewable Energy in Heat Treatments and Green Hydrogen Based Combustion Technologies,
- Obtaining Useful Products with Innovative Chemical, Electrochemical and Biochemical Processes from Carbon Dioxide Captured in the Industry,
- Obtaining Green Hydrogen, Synthetic Fuels, Chemicals, Green Methane from Waste and Biomass Resources,
- Advanced Hybrid Wastewater Treatment Technologies for the Recovery of Valuable Chemicals, Recovery of Critical Raw Materials from Electronic and Domestic Waste,
- Advanced Sensor Technologies for Monitoring Greenhouse Gas Emissions, Waste Minimization, Process Optimization and Energy Efficiency,
- Artificial Intelligence and Remote Sensing,
- High Performance Innovative Materials Providing Energy Efficiency, Artificial Intelligence in Material Design.

In 2022, the project calls for Supporting R&D and Innovation Projects for Reducing Carbon Emissions was announced by KOSGEB. It is aimed to support R&D and Innovation projects to reduce carbon emissions and contribute to the net-zero target in 2053.<sup>378</sup>

Regional Development Agencies with the coordination of MoIT are assigned to plan resource efficiency activities at the regional level. To fulfil that measure, “Resource Efficiency” has been determined as the theme for 2020 and 2021 by the MoIT. With technical support and financial support programs, manufacturing industry firms are supported in terms of resource efficiency, green agreement compliance and lean production.

With the financial support program by the Ahiler Development Agency in 2020, it is aimed to provide sustainable production in the industry, to improve the investment conditions of the region (Aksaray, Kırıkkale, Kırşehir, Nevşehir, and Niğde) by eliminating the basic infrastructure deficiencies, and to develop the infrastructure for the dissemination of cleaner production practices.<sup>379</sup>

378. [https://webdosya.kosgeb.gov.tr/Content/Upload/Dosya/AR-GE%20UR-GE/2022-1/2022-01\\_Proje\\_Teklif\\_%C3%87a%C4%9Fr%C4%B1s%C4%B1.pdf](https://webdosya.kosgeb.gov.tr/Content/Upload/Dosya/AR-GE%20UR-GE/2022-1/2022-01_Proje_Teklif_%C3%87a%C4%9Fr%C4%B1s%C4%B1.pdf)

379. [https://www.yatirimadestek.gov.tr/pdf/assets/upload/dosyalar/ozet-sanayi\\_altyapisinin\\_guclendirilmesi2020ahika.pdf](https://www.yatirimadestek.gov.tr/pdf/assets/upload/dosyalar/ozet-sanayi_altyapisinin_guclendirilmesi2020ahika.pdf)

Mevlana Development Agency launched a financing support program in 2022 aimed at increasing productivity in the manufacturing industry.<sup>380</sup> In a similar manner the financial support program launched by the Oran Development Agency aims to improve the productivity of the firms by accelerating their adaptation to the green deal.<sup>381</sup>

EU funds are the major source of international funds for the science base in Türkiye. 2021 calls for the missions under the Horizon Europe components were opened as of June 24, 2021, which includes “Healthy oceans, seas, coastal and inland waters” and “Adaptation to Climate Change.”<sup>382</sup>

Within the scope of the Investment Incentive Certificate, which is another investment support program, environmental investments and investments in electricity generation through waste heat recovery have been included in the list of priority investments.<sup>383</sup>

World Bank Funded “Türkiye Organised Industrial Zones Project” was announced by the MoIT. With this Project, loans are provided for the green transformation of OIZs.<sup>384</sup> A Loan Agreement amounting to 250 million Euros was signed with the World Bank Group on 26/02/2021. Within the scope of this loan, Türkiye Organized Industrial Zones Project (OIZ Project) has been implemented and the MoIT is responsible body to coordinate the program. Under the OIZ project, the basic and green infrastructure needs of OIZs are supported. There are 47 sub projects in the project pipeline with a total investment cost of approximately 230 million Euros.

380. [https://www.yatirimadestek.gov.tr/pdf/assets/upload/dosyalar/ozet-imalat\\_sanayi2022mevka.pdf](https://www.yatirimadestek.gov.tr/pdf/assets/upload/dosyalar/ozet-imalat_sanayi2022mevka.pdf)

381. [https://www.yatirimadestek.gov.tr/pdf/assets/upload/dosyalar/ozet-imalat\\_sanayi2022oran.pdf](https://www.yatirimadestek.gov.tr/pdf/assets/upload/dosyalar/ozet-imalat_sanayi2022oran.pdf)

382. <https://ufukavrupa.org.tr/tr/funding-tender-opportunities>

383. <https://www.sanayi.gov.tr/destek-ve-tesvikler/yatirim-tesvik-sistemleri/md0103011615>

384. <https://www.sanayi.gov.tr/sanayi-bolgeleri/dunya-bankasi-finansmanli-osb-kredilendirme-projesi>

### Box 6. Eco-production industry program, TTGV

Eco-Production Industry Program focuses on climate and it aims at

- 1) Contributing to the sustainable transformation of the industry and the protection of its competitiveness by identifying and developing new project opportunities within the scope of clean production,
- 2) Delivering a structural impact that will create a comprehensive project value chain for financial institutions to permanently support cleaner production transformation in industry

The pilot of this program will run in Manisa, İzmir Atatürk and ASO 1. Organised Industrial Districts.

### 4.5.3. Soft Instruments

Various projects and activities have been carried out to raise awareness on sustainable industry and eliminating pollution and to disseminate good practices. Some examples in this regard are described below.

MoEUCC, General Directorate of EU and Foreign Relations and Department of EU Investments have started Technical Assistance for Assessment of Türkiye's Potential on Transition to Circular Economy (DEEP Project) in 2022 to encourage the transition to the circular economy, to strengthen the institutional and technical capacity of Türkiye and to prepare a comprehensive national strategy and action plan. Project duration is 36 months.<sup>385</sup>

IPPC-Integrated Pollution Prevention and Control Project have been started by MoEUCC in 2020. Project duration is 30 months. The aim of the project is to increase the technical and institutional capacity of the competent authorities for harmonious implementation of the IPPC approach in Türkiye in line with the EU IED.<sup>386</sup>

Another project of MoEUCC is Improving Air Quality and Raising Public Awareness in Cities in Türkiye. The project was started to improve air quality

385. <https://dongusel.csb.gov.tr/proje-bilgileri-i-105782>

386. <https://ippc.csb.gov.tr/proje-bilgileri-i-101835>

in Türkiye and to raise awareness in the society about air quality and air pollution.<sup>387</sup>

MoEUCC in cooperation with UNDP have started Identification and Remediation of Contaminated Sites with Persistent Organic Pollutants (Pops) Project in 2019. The aim of this project is to improve environmental protection and the quality of life of citizens by protecting human health and environment from adverse effects of Persistent Organic Pollutants (POPs) and other hazardous substances in contaminated areas through improving the implementing capacity of EU POPs Regulation and Soil Contamination Strategy.<sup>388</sup>

In supporting the OIZ Project MoIT started to implement the Green Industrial Zone certification system with the cooperation of Turkish Standards Institute. Applications have been accepted since December 2022. OIZs will be certified with the Green OIZ Certificate if they meet 6 prerequisites and a set of performance indicators under 4 main headings: economic, social, managerial and environmental. A set of incentives and supports explicitly for Green OIZs that will be provided after the certification will be designed by MoIT in the forthcoming period.

On the business side Business for Goals platform<sup>389</sup> builds a bridge between the business community and SDGs and strengthen the role of businesses in sustainable development. The platform in essence runs several awareness raising projects on sustainability and prepares public documents in Turkish and English, including for instance a Circular Economy Guide for Businesses.<sup>390</sup>

## 4.6. Building and Renovation

Starting from construction to demolition, buildings have been a crucial aspect of the EU Green Deal due to their large share in energy consumption and emissions. According to EC, the share of buildings in energy consumption and emissions is 40% and %36, respectively, as of July 2021, and a substantial share -about 75%- of buildings are energy inefficient. In addition, EC highlighted that through renovation total energy consumption would decrease by 5-6% while the decrease in carbon

387. [https://ab.gov.tr/hava-kalitesinin-ve-turkiyede-sehirlerde-toplum-bilincinin-arttirilmesi\\_52174.html](https://ab.gov.tr/hava-kalitesinin-ve-turkiyede-sehirlerde-toplum-bilincinin-arttirilmesi_52174.html)

388. <https://www.undp.org/tr/turkiye/projects/kalici-organik-kirleticiler-kok-ile-kirlenmis-sahalarin-tespiti-ve-iyilestirilmesi-projesi>

389. <https://www.business4goals.org>

390. <https://www.business4goals.org/wp-content/uploads/2021/03/Isletmeler-icin-Dongusel-Ekonomi-Rehberi.pdf>

dioxide emissions is expected to be about 5%. EC underlined the need to double the renovation process to catch up with the climate and energy targets.<sup>391</sup> Similarly, buildings and the construction industry are responsible for 33% of waste and water use.<sup>392</sup> Green Deal indicates renovating buildings would help people in reducing their energy bills and reducing energy use in general. In addition, it would protect people against extreme climate events. The green transition of the construction sector in energy efficiency and clean technologies and products would also create 160,000 additional green jobs in the construction sector by 2030.<sup>393</sup>

Building and renovation proceed through three main functions: energy efficiency, efficient use of other resources such as water and waste management (greener buildings), and new green jobs. Moreover, it covers all construction phases and all types of buildings (residential, non-residential, public, or private). Therefore, considering all these aspects and effects, EC aimed to “i) require Member States to renovate at least 3% of the total floor area of all public buildings annually, ii) set a benchmark of 49% of renewables in buildings by 2030, iii) require Member States to increase the use of renewable energy in heating and cooling by +1.1 percentage points each year, until 2030.”<sup>394</sup> through its Renovation Wave Initiative. The EU Council approved the EU Renovation Wave Strategy on June 11th, 2021.<sup>395</sup> To reach these targets, the strategy has defined three critical areas for action: addressing energy poverty and worst-performing buildings, decarbonization of heating and cooling and public buildings, and social infrastructure (social housing has a specific emphasis). These actions include direct investments, leveraging private investments, supporting research and innovation, removing market barriers, and additional technical assistance. The strategy, in a way, complements the national long-term building renovation strategies and national energy and climate plans of the members<sup>396</sup> and Commission's Recommendation on Energy Poverty.<sup>397</sup> The New European Bauhaus, Built-up, Built-up Skill, 4RinEU Initiatives launched through Horizon 2020 Funds and the new Social Climate Fund adopted by the Council in June 2022 for energy and mobility poverty have been among the solid steps taken so far and directly related to Renovation Wave some of which are initiated before the Council's decision.<sup>398</sup>

391. [https://ec.europa.eu/info/news/focus-energy-efficiency-buildings-2020-lut-17\\_en](https://ec.europa.eu/info/news/focus-energy-efficiency-buildings-2020-lut-17_en)

392. <https://eurocities.eu/wp-content/uploads/2021/03/2021-03-11-Open-Letter-EU-Strategy-for-a-Sustainable-Built-Environment.pdf>

393. [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/delivering-european-green-deal\\_en#leading-the-third-industrial-revolution](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/delivering-european-green-deal_en#leading-the-third-industrial-revolution)

394. [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/delivering-european-green-deal\\_en#renovating-buildings-for-greener-lifestyles](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/delivering-european-green-deal_en#renovating-buildings-for-greener-lifestyles)

395. <https://www.consilium.europa.eu/en/policies/green-deal/timeline-european-green-deal-and-fit-for-55/>

396. [https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/renovation-wave\\_en#documents](https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/renovation-wave_en#documents)

397. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32020H1563&qid=1606124119302>

398. [https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/renovation-wave\\_en#documents](https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/renovation-wave_en#documents)

Households' energy consumption has been an essential pillar of the total energy consumption of Türkiye as well. According to Eurostat, the final energy consumption of Türkiye by transport, industry, household, and other sectors in 2020 were 26.4%, 32.2%, 22.8%, and 18.7%, respectively. These ratios were 20.9%, 31.4%, 27.3%, and 20.4% in 2010. Türkiye's gross inland energy consumption increased to 140.5 toes in 2020, which in 2010 was accepted as 100 toes.<sup>399</sup> Furthermore, households' share in energy consumption has been announced as 30% by MoEUCC.<sup>400</sup> Unfortunately, there is no public information on the construction sector's share in energy consumption and GHG emissions to compare with EU data directing to the renovation wave. Yet, construction is one of the locomotive sectors of the Turkish economy. Although it does not provide specific information on the share of buildings in energy consumption and emissions, Turkstat's data on environment protection expenditures by institutional sectors is still helpful. According to data revealed in 2022, the environment protection-related expenditures of Türkiye reached 66.34 billion TL (7.4 billion USD) in 2021 from 41.63 billion TL (5.95 billion USD) in 2020. On a separate note, these expenditures consist of waste management, wastewater management services, the protection of biodiversity and landscape, protecting of the outdoor air and climate, protection and quality improvement of soil, ground, and surface waters, and other environmental protection issues. Of the environmental protection expenditures, 64.3% was made by financial and non-financial companies, 28.3% by general government and non-profit organizations serving the household, and 7.3% by households.<sup>401</sup> Emissions-related data of Turkstat can also be commented in the same way.<sup>402</sup> Thus, buildings deserve special attention in Türkiye.

### 4.6.1. Regulation

When we look into the building and renovation issue in Türkiye within the context of its Green Deal-related efforts, the primary laws, regulations, and other important policy documents are listed below (particularly on energy efficiency):

- The Law 6306 on Transformation of Areas at Disaster Risk (2012)
- Presidential Decree No 1 on the role of ministries dated July 10<sup>th</sup>, 2018

399. [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Enlargement\\_countries\\_-\\_energy\\_statistics#Energy\\_consumption](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Enlargement_countries_-_energy_statistics#Energy_consumption)

400. <https://csb.gov.tr/yesil-kalkinma-yolunda-turkiye-istisare-toplantisi-sonuc-bildirgesi-bakanlik-faaliyetleri-32046>

401. <https://data.tuik.gov.tr/Bulten/Index?p=Cevre-Koruma-Harcama-Istatistikleri-2021-45520>

402. <https://data.tuik.gov.tr/Bulten/Index?p=Sera-Gazi-Emisyon-Istatistikleri-1990-2020-45862>

- Regulation on the Implementation of the Law 6306 dated December 15<sup>th</sup>, 2012 (last revision in 2020)<sup>403</sup>
- Regulation on the Special Account for Transformation Projects on 25.07.2017 (last amendment in 2022)<sup>404</sup>
- Municipalities Law numbered 5393 on July 3<sup>rd</sup>, 2005 (final amendment in 2019)<sup>405</sup>
- Presidential Decree on the Interest Support/Advantage to be Provided by the Banks to the Beneficiaries of The Law 6306<sup>406</sup>
- Principles Regarding the Preparation of an Urban Transformation Strategy Documents<sup>407</sup>
- Presidential Circular on Green Deal Action Plan of Türkiye dated July 16<sup>th</sup>, 2021<sup>408</sup>
- The Green Deal Action Plan of Türkiye under the coordination of the Ministry of Trade (July 2021)<sup>409</sup>
- 11<sup>th</sup> Development Plan
- Law 5627 on Energy Efficiency dated 18.04.2007 (last amendment in 2021)
- Regulation about Energy Performance in Buildings on December 5<sup>th</sup>, 2008 (and last amendment on February 19<sup>th</sup>, 2022)
- Energy Efficiency Strategy Document (2012-2023)
- National Energy Efficiency Action Plan (2017-2023)
- Green Certificate Regulation for Buildings and Settlements (YeS-TR) (on December 23<sup>rd</sup>, 2017, and amended on June 12<sup>th</sup>, 2022)
- Regulation on Renewable Energy Source Warranty Certificate in the Electricity Market on November 14<sup>th</sup>, 2020 (Green Price Application (YETA and YEK-G))
- Climate Change Action Plan (2011-2023) (IDEP)<sup>410</sup>
- Building materials regulation on July 10<sup>th</sup>, 2013 (last amendment on April 29<sup>th</sup>, 2022)<sup>411</sup>

403. [https://webdosya.csb.gov.tr/db/altyapi/icerikler/6306\\_s\\_kanun\\_uygulama\\_yonetmelik-20220803095655.pdf](https://webdosya.csb.gov.tr/db/altyapi/icerikler/6306_s_kanun_uygulama_yonetmelik-20220803095655.pdf)

404. <https://webdosya.csb.gov.tr/db/altyapi/icerikler/dpoh-yonetmelik-20220802085559.pdf>

405. <https://webdosya.csb.gov.tr/db/altyapi/icerikler/5393-20191001093047.pdf>

406. <https://altyapi.csb.gov.tr/khk-i-460>

407. <https://altyapi.csb.gov.tr/kentsel-donum-strateji-belgesi-i-95271>

408. <https://www.resmigazete.gov.tr/eskiler/2021/07/20210716-8.pdf>

409. <https://ticaret.gov.tr/data/60f1200013b876eb28421b23/MUTABAKAT%20YE%C5%9E%C4%B0L.pdf>

410. <https://webdosya.csb.gov.tr/db/iklim/banner/banner591.pdf>

411. <https://www.mevzuat.gov.tr/File/GeneratePdf?mevzuatNo=18568&mevzuatTur=KurumVeKurulusYonetmeliqi&mevzuatTertip=5>

Environmentally friendly use of natural resources in buildings also has a waste management dimension. The laws and primary policy documents setting and leading the main framework of waste management in buildings are:

- Metropolitan Municipality Law numbered 5216 (on July 10<sup>th</sup>, 2004, and last amendment on November 26<sup>th</sup>, 2022)
- Municipal Law No. 5393 (on July 3<sup>rd</sup>, 2005, and last amendment on November 26<sup>th</sup>, 2022)
- National Waste Management and Action Plan (2016-2023)
- Regulation on Waste Management on April 2<sup>nd</sup>, 2015 and last amendment March 23<sup>rd</sup>, 2017
- Regulation on the Control of Excavation Soil, Construction, and Waste on March 18<sup>th</sup>, 2004 (last amendment in October 2021)
- National Recycling Strategy Document and Action Plan (2014-2017)
- Regulation on Zero Waste on July 12<sup>nd</sup>, 2019 (last amendment on October 9<sup>th</sup>, 2021)

Regarding wastewater management:<sup>412</sup>

- Regulation on Water Pollution Control (December 31<sup>st</sup>, 2004<sup>413</sup> last amendment on January 14<sup>th</sup>, 2020<sup>414</sup>)
- Regulation on Urban Wastewater Treatment (adopted on January 8<sup>th</sup>, 2006 and the last amendment on January 10<sup>th</sup>, 2016)
- Wastewater Treatment Plants Technical Procedures Communiqué adopted on March 20<sup>th</sup>, 2010<sup>415</sup>

Some of these documents, such as the Development Plan, Green Deal Action Plan, and Energy Efficiency Strategy, have been leading framework documents setting targets and have steered referred laws and regulations. As such, briefly reminding building renovation-related aspects of these documents would be beneficial.

412. Environment Law and Waste Regulation are not referred to as they focus more on industry and have minimal and indirect links to wastewater from buildings.

413. <https://www.mevzuat.gov.tr/File/GeneratePdf?mevzuatNo=7221&mevzuatTur=KurumVeKurulusYonetmeliqi&mevzuatTertip=5>

414. <https://www.resmigazete.gov.tr/eskiler/2020/01/20200114-2.htm>

415. <https://www.resmigazete.gov.tr/eskiler/2010/03/20100320-7.htm>

Energy Efficiency Strategy (2017-2023) document aims to reduce buildings' energy demands and carbon emissions and promote sustainable, environmentally friendly buildings using renewable energy sources. The strategy, in line with these aims, mandates relevant ministries to change respective laws, including energy efficiency law and the introduction of the regulation on the sustainability of the buildings.

11<sup>th</sup> Development Plan (2019-2023) concerning energy efficiency and building renovation includes aims and actions on energy efficiency, certification of buildings according to their energy and environment friendliness, improvement of energy efficiency of public buildings, creation of legislation and technical infrastructure, and energy-efficient district heating and expansion of heat market legislation to cooling systems throughout the country and enabling heat trade, increasing public awareness on recycling of solid waste, expansion of Zero Waste Project practices and Solid Waste Program, development of recycled secondary product technical standards, the establishment of a separate collection system for garbage.

The Green Deal Action Plan (2021) aims to support the transition to a sustainable, resource-efficient, and green economy. Looking into the specific actions of the action plan building renovation could coincide with a Green and Circular Economy with its energy efficiency aspect (environment-friendly labelling system), Green Finance (by easing access to finance for energy-efficient technologies to be used in homes and public buildings by new tools) and Clean, Economic and Secure Energy Supply pillars. The last one concerns national guidelines for energy-efficient and low-carbon heating and cooling systems, which is the most/direct interaction with the EU Green Deal's respective scope of building renovation.

Building on these documents, first, we observe that Türkiye's policy agenda has actions related to building and renovation for a long while. However, their focus is instead on energy efficiency and waste. In addition, the Green Deal Action Plan has no specific reference to building and renovation and has an industry, trade, and agriculture perspective. Thus, Türkiye's Action Plan has a different view with its approach to renovating buildings. This could be understandable up to a certain point due to the high volume of the old building stock in Europe. On the other hand, Türkiye needs to replace or strengthen its building stock, particularly to maintain earthquake resilience. With that, urban transformation efforts also create a chance for improving energy efficiency in buildings.

In line with these plans, the Regulation on Renewable Energy Source Warranty Certificate in the Electricity Market was adopted on November 14<sup>th</sup>, 2020 (Green Price Application (YETA and YEK-G), and the Regulation about Energy Performance in Buildings was amended on February 19<sup>th</sup>, 2022. Last but not least, Green Certificate Regulation for Buildings and Settlements (YeS-TR) was adopted on December 23<sup>rd</sup>, 2017 amended on June 12<sup>th</sup>, 2022. With these regulations, sustainable building or green building evaluation systems used worldwide have been largely adopted by Turkish legislation. Implementation Guidance of this regulation has adopted a very comprehensive coverage and touches up on different aspects of a green building, such as; integrated building design, construction and management, building material and life cycle evaluation, indoor environment quality, energy use and efficiency, water and waste management and innovation and building.<sup>416</sup>

Waste management is generally the responsibility of the municipalities. Metropolitan Municipality Law numbered 5216, and Municipal Law No. 5393 states that local governments are responsible for planning, managing, and monitoring waste. According to the type of municipality, these responsibilities may cover waste collection at the source, the transfer station reuse, storage, and disposal of excavation to perform the services related to the setting up and operation; to carry out industrial and medical waste-related services, to establish the necessary facilities, etc. municipalities other than metropolitan ones collect their domestic waste at the source.

To briefly provide some information on the implementation results:

On energy efficiency in buildings, the number of energy identity certificates issued by the ministry is 1,297,275, of which 333,691 are existing buildings while 963,584 are newly built, as of December 2021. 60,437 of these buildings with energy identity certificates are also using renewable energy.<sup>417</sup> The ministry also expects at least ten facilities to be certified with YeS-TR (Green Certificate of the Ministry for Buildings and Settlements).

In line with these laws and Zero Waste Regulation (2019), governors of 81 cities in Türkiye have prepared their Provincial Zero Waste Management System Plan for the sustainable, efficient, and harmonized Implementation of the Zero Waste Management System. The number of buildings and campuses that have

416. <https://www.resmigazete.gov.tr/eskiler/2022/06/20220612-1-1.pdf>

417. [https://webdosya.csb.gov.tr/db/ced/icerikler/csidb\\_cevresel\\_gostergeler\\_2022en\\_31agustos-20220909135203.pdf](https://webdosya.csb.gov.tr/db/ced/icerikler/csidb_cevresel_gostergeler_2022en_31agustos-20220909135203.pdf)

switched to Zero Waste Management System since June 2017 has reached 150,000.<sup>418</sup>

All in all, Türkiye is progressively working on the building renovation aspects. Soon, among many others, according to the Green Deal Action Plan of Türkiye, the critical milestones are the dissemination of national strategy and manuals for energy efficient and low carbon heating and cooling systems by 2024 Q1 and, on the wastewater management side, about building renovation (under Green and Circular Economy pillar) the amendment of the regulation of Wastewater Treatment Plants Technical Procedures and completion of the “Reuse of Treated Urban Wastewater for Different Alternatives” (2021-2024) IPA III project.

## 4.6.2. Economic benefits

The economic and financial supports are somewhat limited when we evaluate the issue from the building and renovation perspective.

### 4.6.2.1. Supports provided under Law No. 6306 about the Transformation of Areas at Disaster Risk

Several financial support alternatives are provided under Law No. 6306 about the Transformation of Areas at Disaster Risk. These are mainly rent support and benefits regarding favourable interest rates on loans.

- Real or legal persons whose structure is determined to be risky can benefit from interest support for their bank loans. The upper limit of the principal loan amount that will be supported based on entitlement is 240 thousand TL for the loan that will be used to strengthen the buildings, 600 thousand TL for housing construction and acquisition loans, 600 thousand TL for business building loans, and 250 thousand TL for the acquisition of a workplace. The interest support rate of the Ministry is 0.50 points per month for reinforcement and housing loans and 0.38 points per month for workplace loans. The total loan amount to be provided with interest support on behalf of a beneficiary will not exceed 3 million TL.<sup>419</sup>

418. <https://sifiratik.gov.tr/kutuphane/haberler/sifir-atik-yonetim-sistemi-ne-5-yilda-150-bin-bina-ve-yerleske-gecti>  
419. <https://webdosya.csb.gov.tr/db/altyapi/icerikler/fa-z-desteg---le--lg-l--deg-s-kl-kler-2022-002-20221003105522.pdf>  
<https://www.csb.gov.tr/afet-riskli-alanlarin-donusturulmesine-iliskin-faiz-destekli-kredi-karari-resmi-gazetede-bakanlik-faaliyetleri-36242>

- Citizens living in risky areas, reserve building areas, or risky buildings will be provided with rent assistance for up to 18 months based on their demands. In addition, transactions, contracts, transfers, registrations, and practices to be made per the law; will be exempt from several fees such as notary, municipal fees, stamp duty, inheritance, transfer tax, revolving fund fee, and other fees, and banking and insurance transactions tax. Owners and tenants of the buildings evacuated, demolished, or appropriated by agreement can benefit from the aid and support provided under the law.<sup>420</sup> Minimum monthly rent support for owners is 1,000 at the lowest and 1,500 TL at the highest. The maximum amount of support provided to tenants is 3,000 TL. The level of supports changes in accordance to the cities where the buildings are renovated.<sup>421</sup>

### 4.6.2.2. Climate and Disaster Resilient Cities Project

This Project aims to build disaster and climate-resistant housing, urban infrastructure, and services in pilot provinces, to increase access and to respond quickly and effectively in the event of a crisis or emergency. The project has been funded by the World Bank and implemented by the MoEUCC and local authorities. The project focuses on Istanbul, İzmir, Kahramanmaraş, Manisa, and Tekirdağ as pilot provinces and aims to overcome the difficulties in creating disaster-resistant housing/workplace, disaster risks and improve energy efficiency by increasing the scale with various financing sources.<sup>422</sup>

### 4.6.2.3. Türkiye Sustainable Energy Financing Program (TurSEFF)

Türkiye Sustainable Energy Financing Program (TurSEFF) is another tool to be noted. EBRD established TurSEFF to provide financing for sustainable energy and resource efficiency investments of the public and private

420. <https://webdosya.csb.gov.tr/db/altyapi/icerikler/kira-yardimi-kilavuzu-20190513095551.pdf>  
<https://izmir.csb.gov.tr/50-soru-50-cevapta-kentsel-donum-i-5067>

421. <https://webdosya.csb.gov.tr/db/altyapi/icerikler/kopya-guncellenm-s-2022-yili-k-ra-yardimi-tablosu-2-20220907151019.pdf>

422. [https://webdosya.csb.gov.tr/db/altyapi/icerikler/esmf\\_tr-p173025-20220705095303.pdf](https://webdosya.csb.gov.tr/db/altyapi/icerikler/esmf_tr-p173025-20220705095303.pdf)  
<https://projects.worldbank.org/en/projects-operations/project-detail/P173025>



sectors. In 2017, TurSEFF's coverage was extended by the inclusion of water efficiency, raw material efficiency, and waste management investments, the participation of public institutions as beneficiaries, and the introduction of leasing options. Since 2010, TurSEFF has financed 2,248 projects worth 719 million euros and supported the establishment of 616 MW of renewable energy power. With clean energy produced via the projects financed by TurSEFF, the consumption of more than 1 million houses is met every year, and air pollution caused by more than 1 million 100 thousand cars is prevented.<sup>423</sup>

#### 4.6.2.4 Supports by the TÜBİTAK

TÜBİTAK also supports energy efficiency, heating systems, clean technologies, and smart cities, which could also be reflected in building and renovation. Energy efficiency and heating systems in the buildings were among the prioritized areas announced by TÜBİTAK for the 2021-2022 calls. One of these support programs is BIGG 1512 Entrepreneurship Support Program. The program provides support to entrepreneurs' projects with a technology and innovation focus related to energy efficiency, isolation, and materials or technologies for the optimization of heating and cooling systems, Nearly Zero-Emission Buildings (NZEB) technologies, among many others.<sup>424</sup> TÜBİTAK has just released the priorities for the 2022-2023 period, and Green Deal is one of the main pillars of the list.<sup>425</sup>

#### 4.6.3. Soft Policy Tools

In addition to these laws and regulations, there are other public policy documents that aim to set guidance and inform about best practices.

Regarding energy efficiency, Energy Efficiency Applications in Environment-Friendly Buildings, Energy Efficient Building Design Strategies, Guide to Energy Efficient Renovation of Public Buildings, Guidance for Nearly Zero-Emission Buildings, Building Industry Energy Efficiency Technology Atlas provide data, strategies and information to related actors.<sup>426</sup>

423. <https://www.turseff.org/index>

424. [https://tubitak.gov.tr/sites/default/files/18842/1512\\_girisimcilik\\_destek\\_programi\\_-\\_bigg\\_-\\_1.asama\\_uygulayici\\_kurulus\\_cagrisi-07072022.pdf](https://tubitak.gov.tr/sites/default/files/18842/1512_girisimcilik_destek_programi_-_bigg_-_1.asama_uygulayici_kurulus_cagrisi-07072022.pdf)

425. <https://www.tubitak.gov.tr/tr/duyuru/tubitak-2022-2023-oncelikli-ar-ge-ve-yenilik-konulari>

426. <https://meslekihizmetler.csb.gov.tr/>

On the project side Türkiye's Energy Efficiency in Public Buildings Project deserves attention. The Energy Efficiency in Public Buildings Project is funded by the World Bank and implemented by MoEUCC, General Directorate of Construction Affairs (YİGM), with the financial assurance of the Ministry of Treasury and Finance, with the support of MoENR. The project aims to renovate 500-700 public buildings providing energy-efficient renewal of public buildings and energy saving. The selection of public buildings to be included will be based factors such as not needing retrofitting in terms of earthquakes, being at least five years old, and not having made a complete improvement based on energy efficiency in the last ten years. The project also aims to increase awareness through a series of communication tools.<sup>427</sup>

There are also efforts in providing green building certificates. Green buildings are environmentally responsible and resource-efficient structures covering the building's life cycle from design, construction, operation, maintenance, renovation, and deconstruction.<sup>428</sup> There are many evaluation metrics and certificates systems used for assessing green buildings, such as LEVEL(s), BREEAM (Building Research Establishment Environmental Assessment), LEED (Leadership in Energy and Environmental Design) and Greenstar.<sup>429</sup> The World Green Building Council (WGBC) is one of the leading organizations supporting the improvement and diffusion of sustainable and decarbonized built environments for everyone to reach the aims of the Paris Agreement and UN SDGs. The WGBC, via regional councils, supports adopting green building solutions worldwide. Environmentally Friendly Green Buildings Association (ÇEDBİK), founded in 2007, has been a member of the WGBC since 2012. ÇEDBİK supports the development of Türkiye where existing structures and settlements have been transformed in accordance with sustainability principles, and new structures and settlements are designed and implemented in the light of such principles. In this context, ÇEDBİK produced the Ecological and Sustainable Design in Buildings (BEST) certification system and the BEST Green Building Certification System for Commercial Buildings and Residential

427. <https://kamuenerji.csb.gov.tr/proje-hakkinda-genel-bilgi-i-96445#:~:text=KABEV%20Projesi%2C%20yakla%C5%9F%C4%B1k%20500%2D700,toplumun%20bilin%C3%A7lendirilmesini%20ve%20geli%C5%9Ftirilmesini%20kolayla%C5%9Ft%C4%B1racak>

<https://projects.worldbank.org/en/projects-operations/project-detail/P175894>

428. <https://archive.epa.gov/greenbuilding/web/html/about.html>

429. <https://www.nist.gov/programs-projects/metrics-and-tools-sustainable-buildings>  
[https://www.apec.org/docs/default-source/Publications/2015/6/Guide-to-Performance-Metrics-and-BIM-to-support-Green-Building-Objectives/APEC\\_MetricsandBIMforGreenBuildingGuide\\_Final\\_June2015.pdf](https://www.apec.org/docs/default-source/Publications/2015/6/Guide-to-Performance-Metrics-and-BIM-to-support-Green-Building-Objectives/APEC_MetricsandBIMforGreenBuildingGuide_Final_June2015.pdf)

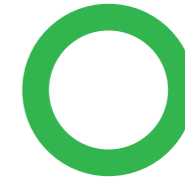
[https://www.bicsi.org/docs/default-source/conference-presentations/2017-canada/green-building-metrics-codes-standards.pdf?sfvrsn=75e3d6b\\_2](https://www.bicsi.org/docs/default-source/conference-presentations/2017-canada/green-building-metrics-codes-standards.pdf?sfvrsn=75e3d6b_2)

<https://cedbik.org/tr/yesil-bina-7-pg>

[https://ec.europa.eu/environment/eussd/pdf/Level\\_publication\\_EN.pdf](https://ec.europa.eu/environment/eussd/pdf/Level_publication_EN.pdf)

Buildings.<sup>430</sup> The number of Projects with BEST Certificate, Certificate by CEDBİK, and LEED and BREEAM certificates have been 23, 591, 498, and 70, respectively, as of November 2022.<sup>431</sup>

On the other hand, there is a nationwide Zero Waste Project governed by the MoEUCC. Launched in 2017, the project aims to prevent waste, use resources more efficiently, prevent or minimize waste generation by reviewing the sources and causes of waste and collect and recycle waste at the source. TRT, TEMA, Turkish Airlines, and the Turkish Marine Environment Protection Agency (Turmepa) support the project. Within the context of the project, several guidance documents have been published that guides actors such as schools, municipalities, and shopping malls in transforming themselves to adopt zero waste principles.<sup>432</sup>



430. <https://cedbik.org/>

431. <https://cedbik.org/tr/sertifikali-projeler>

432. <https://sifiratik.gov.tr/>

## 5

## 5. Conclusion

How prepared is Türkiye for the Green Deal? The preparedness encompasses various aspects, ranging from the government's willingness to facilitate the green transition and address associated challenges, to firms' readiness to invest in sustainable practices, and even the public's perception of the Green Deal. This chapter focuses specifically on the policy aspect, summarizing the policy measures related to the Green Deal in Türkiye. Additionally, we highlight potential difficulties that Türkiye may encounter while implementing these policies.

In Chapter 4, we extensively discussed the policy measures in Türkiye, which are summarized in Table 12. This table assesses the current state of Green Deal associated policies on a scale from 1 to 10, as explained in the table's bottom section. The black cells indicate the most likely scale of the current state for each theme of the Green Deal, while the grey cells represent the possible scale. It's important to note that this assessment was conducted by the researchers who contributed to this report.

Türkiye has made commendable progress in implementing climate change policies, while also actively participating in international climate change treaties and adopting crucial legal frameworks. However, it is important to acknowledge that Türkiye's legislative framework concerning climate change remains susceptible when it comes to the actual implementation and monitoring of existing legislation. In order to ensure the successful achievement of **climate action** objectives, the introduction of stronger control and accountability measures is imperative. A significant obstacle in combating climate change lies in Türkiye's heavy reliance on fossil fuels for its energy supply. To address this challenge head-on, it is crucial to develop comprehensive incentives and policies that facilitate a smooth transition towards cleaner and renewable energy sources. Additionally, the role of local governments in the fight against climate change should not be underestimated. Strengthening the capacity and resources of local governments is vital to effectively adapt to climate change. In conclusion, despite the notable progress made in Türkiye's legal framework pertaining to climate change, further steps must be taken to ensure the effective implementation of existing laws. It is crucial to establish more comprehensive policies, incentives, and monitoring mechanisms that enable the country to effectively tackle climate change.

The Turkish Green Deal Action Plan recognizes the importance of affordability and ensuring a secure energy supply, particularly in light of the ongoing tensions

in the Middle East and the recent tensions between Russia and Ukraine. The plan encompasses a comprehensive range of strategies and actions for the production of **clean energy**, many of which are already being actively pursued by different stakeholders. However, it is worth noting that these strategies primarily focus on renewable energy production and energy efficiency, rather than directly referencing a net-zero target. While the regulatory framework is continuously adapting to address these issues, there exist various government policies aimed at incentivizing renewable energy production and enhancing energy efficiency. Additionally, some soft policies are also being implemented. Nevertheless, it is important to acknowledge that these attempts are primarily aligned with promoting renewable energy production and are confronted with several coordination challenges. However, there is room for improvement in terms of directly addressing the net-zero target and overcoming coordination obstacles within the regulative framework and government policies.

Türkiye has made significant progress and has implemented various policies regarding **sustainability and eliminating pollution**. However, further actions are needed to address several key issues. It is essential to strengthen the implementation and monitoring procedures of regulations, aligning them with global standards within the legal framework. While Türkiye currently provides financial incentives and benefits to promote environmental sustainability and pollution reduction in the industrial sector, greater incentives are required to effectively reduce carbon emissions and encourage the adoption of cleaner industrial practices. To ensure proper environmental monitoring, stricter inspections and a well-defined strategy for identifying and penalizing violations should be implemented. The promotion of sustainability awareness among employees and management, particularly in the industrial sector, is crucial. Organizing training programs and awareness-raising initiatives can help disseminate knowledge about sustainability and pollution prevention. Additionally, it is important to periodically assess the effectiveness and implementation efficiency of each policy to drive continuous improvement. Furthermore, given the ever-evolving nature of technology and sustainability objectives, it is vital to update the regulatory framework on a continuous basis. This proactive approach will ensure that Türkiye remains aligned with current sustainability trends and objectives.

When it comes to **sustainable agriculture**, the Turkish government's Green Deal Action Plan is commendable as it encompasses and addresses most of the items outlined in the EU Green Deal program. However, there are certain areas that require further attention and improvement. One of the key challenges lies in establishing an effective governance model for sustainable agriculture. A definitive model that ensures proper alignment among various stakeholders

**Table 12.** Summary of policy measures on Green Deal in Türkiye

Themes	1	2	3	4	5	6	7	8	9	10
Biodiversity, sustainable agriculture, farm to fork			■	■	■					
Climate action				■	■	■				
Sustainable mobility			■	■	■					
Clean energy						■	■	■		
Sustainable industry and eliminating pollution			■	■	■					
Building and renovation					■	■	■			
<p>1: No policy actions.</p> <p>3: Weak in terms of regulations. There are some regulations but not updated. There are some tools that provide economic benefits. Weak policy landscape in soft policies. The economy needs strong economic benefits and a regulatory framework.</p> <p>5: Regulatory actions are taken but related to only some issues that require action. There are some policy tools that provide economic benefits but not specifically directed to certain action areas and are mostly uncoordinated. There is also a set of uncoordinated soft policies. The economic benefits and soft tools are not enough and linked to each other and to the regulatory framework.</p> <p>7: Regulatory actions are good and up to date but they do not comprise all action areas and not all the time binding. There are various policy tools (economic benefits) that directly address certain green deal areas but are not good in coordination. The economic benefits, regulations and soft tools are various but do not clearly complement each other.</p> <p>9: Regulatory actions are good, up to date and binding but they do not comprise all action areas. There are various policy tools that directly address certain GD areas, there are minor coordination and complementarity issues.</p> <p>10: Regulatory actions are strong and comprise almost all action areas; regulatory actions are binding; various coordinated tools that provide economic benefits, coordination is achieved at the GD theme and between theme levels, coordination among institutions that design policies are also achieved; soft policies are designed to complement economic benefits and regulations in a coordinated manner.</p>										

and streamlines activities is lacking which may hinder the overall progress and coordination of efforts in this sector. Additionally, the existing regulations and incentives for sustainable agriculture are limited in scope and only applicable to certain sub-actions of the Green Deal. To achieve comprehensive and impactful results, it is crucial to expand the range of regulations and incentives to encompass a wider array of sustainable agricultural practices. Another aspect that needs to be addressed is the issue of integrity within the link between regulations and policies. It is essential to establish a strong and cohesive connection between these two

elements to ensure that they work in tandem to drive sustainable agriculture forward. Furthermore, the issue of integrity extends to the soft tools employed in promoting sustainable agriculture.

The legal framework for **sustainable mobility** in Türkiye is still in its nascent stages and faces significant challenges that need to be addressed. Firstly, there are gaps in the implementation and monitoring of existing policies, which hinders the effective achievement of sustainable mobility goals. Furthermore, comprehensive policies and incentives should be developed to promote sustainable transport. This could involve increasing incentives for electric vehicles, expanding the public transport network, and encouraging the use of environmentally friendly modes of transportation. These actions will contribute to reducing reliance on fossil fuel-driven vehicles and promote sustainable mobility options. Another challenge Türkiye faces is the lack of infrastructure to support sustainable mobility in many regions. The availability and accessibility of essential infrastructure elements such as bicycle lanes, pedestrian pavements, and charging stations are vital for achieving sustainable mobility. It is necessary to prioritize the development and widespread implementation of these infrastructure elements to enable a shift towards sustainable transportation methods. In conclusion, while Türkiye has taken some initial steps in establishing a legal framework for sustainable mobility, further actions are required. Effective implementation of existing laws, the development of comprehensive policies, and the strengthening of sustainable transport infrastructure will be crucial in realizing Türkiye's sustainable mobility goals.

Türkiye has dedicated significant efforts to **building and renovation**, with a particular focus on enhancing the earthquake resistance of its existing building stock. While the EU Green Deal places a greater emphasis on building and renovation, Türkiye's Green Deal Action Plan incorporates this objective to a slightly lesser extent. However, Türkiye's building and renovation initiatives encompass various aspects, including energy efficiency, urban transformation, and water management, which align with the goals outlined in the EU Green Deal. These efforts are supported by a diverse range of policy tools, including economic incentives, regulations, and soft instruments. Successfully implementing these policies necessitates the collaboration and cooperation of multiple stakeholders with diverse interests, including government ministries, municipalities, companies, and households. Irrespective of the specific objectives under the Green Deal, these endeavours provide an opportunity to promote the environmentally friendly utilization of natural resources. Additionally, establishing a comprehensive, consistent, and cooperative implementation framework would greatly facilitate the effective execution of these initiatives.

In summarizing the findings related to the alignment of Türkiye's policy tools with the Green Deal, this report brings attention to several challenges that Türkiye may face in implementing policies aimed at greening its economy.

Firstly, Türkiye experienced a delay in ratifying the Paris Agreement, with a gap of approximately five years between signing the agreement in 2016 and its eventual ratification in October 2021. Türkiye's primary objection was rooted in the perception that the agreement treated Türkiye as a developed country, imposing greater responsibilities for reducing greenhouse gas emissions within a shorter timeframe. While Türkiye has made progress in addressing this concern, the delay in ratification sent a negative signal that, to some extent, hindered actions by the central and local government, non-governmental organizations, and especially firms. The effective use of signalling as a soft policy is an area where Türkiye has room for improvement. Considering the potential impact of the EU's Green Deal in the medium term, which may introduce binding regulations governing EU imports, it is essential to assess the level of awareness among Turkish firms regarding the EU's Green Deal initiatives. Given that the EU stands as Türkiye's largest trading partner, understanding and adapting to the requirements of the EU's Green Deal is of utmost importance for Turkish firms.

The EU's Green Deal has played a significant role in prompting Türkiye to take action in greening its economy. It is noteworthy that both the ratification of the Paris Agreement and the formulation of Türkiye's Green Deal Action Plan occurred after the EU's declaration of its Green Deal strategy. Thus, the EU's policies continue to serve as a guiding influence for Türkiye. Given the substantial financial, trade, and knowledge flows between Türkiye and the EU, EU policies will continue to impact Türkiye's policy framework. However, there has been a rise in euroscepticism within Türkiye. This sentiment, combined with tensions between the EU and Türkiye concerning the influx of refugees from Syria and Afghanistan, as well as a fading perspective of Türkiye becoming an EU member country from the viewpoint of its citizens, contributes to a blurring of the ideal of Türkiye's EU membership. As a result, if the EU, as a policy anchor, loses its significance and influence, the question arises as to whether Türkiye will still actively and willingly pursue its green deal actions. The diminishing importance of the EU in shaping Türkiye's policies may impact Türkiye's commitment to implementing its own Green Deal Action Plan.

Another noteworthy aspect is the limited emphasis placed on publicizing the green transition path in Türkiye. The level of public support for greening initiatives remains unclear, primarily due to concerns over short-term and medium-term costs associated

with such endeavours. Moreover, many industrial firms find themselves grappling with the challenges of both digital transformation and the green transition, with a lack of comprehensive understanding regarding the implications of the EU's Green Deal. The Turkish government and firms have been preoccupied with domestic politics and the implementation of unconventional policies aimed at stimulating economic growth. Consequently, the green transition tends to be continuously sidelined on the agenda.

Another important aspect is the association of green transition and climate change with environmental protection in Türkiye. In October 2021, the government sought to emphasize the significance of climate change by renaming the Ministry of Environment and Urbanization to the Ministry of Environment, Urbanization, and Climate Change. This indicates that climate change and the Green Deal are primarily perceived as an environmental issue rather than economic one. In contrast, the EU increasingly regards climate change as an economic matter, as evidenced by the ministry titles in countries like the Netherlands (Ministry of Economic Affairs and Climate Policy) and Germany (Ministry of Economic Affairs and Climate Action). This distinction is significant because it impacts the way climate change is approached and understood, particularly within the business sector. The current association of climate change with environmental protection in Türkiye, combined with weak signalling efforts by the government, creates a challenge in raising awareness and engagement among firms. To address this, it is crucial to establish a clear connection between climate change and economics. By emphasizing the economic aspects of climate change, Türkiye can effectively communicate the relevance and benefits of the green transition to the business community.

Furthermore, it is important to highlight the disparity in the emphasis on “research and innovation” between the EU and Türkiye. The EU recognizes that addressing grand societal challenges, such as climate change, requires advancements in science and technology. Consequently, the EU's Research and Innovation Strategy is closely integrated into the Green Deal, underscoring the importance of technological development in achieving environmental goals. In Türkiye, however, the connection between the green transition and technological advancement is comparatively weaker. While efforts are being made in the field of research and innovation, there is a need for a more robust and coordinated approach that aligns with the principles of the Green Deal.

Lastly, it is important to acknowledge that while the Green Deal Action Plan outlines a comprehensive set of actions, the establishment of an effective governance model to support its implementation is still a work in progress. Currently, there is a need

to further define and clarify the governance structures and mechanisms that will oversee and coordinate the various actions outlined in the plan. A clear and definitive governance model is essential for ensuring effective coordination, accountability, and monitoring of the Green Deal actions. This includes establishing clear roles and responsibilities for different stakeholders, defining decision-making processes, and establishing mechanisms for evaluating and adjusting the implementation of the plan over time.

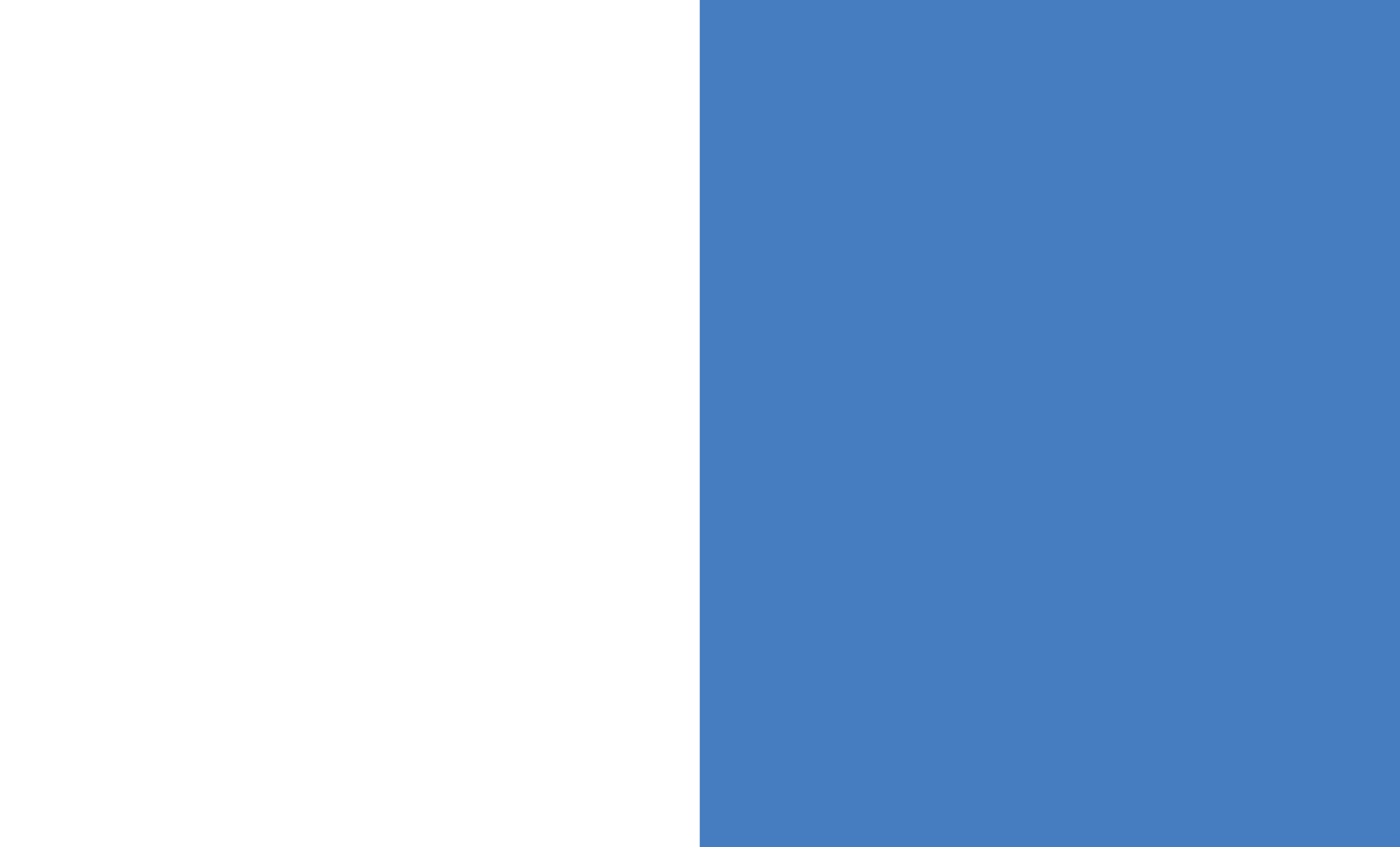
The occurrence of natural disasters, such as earthquakes and floods, serves as a stark reminder of the urgent need to prioritize the green transition and establish sustainable infrastructure. The devastating earthquakes in İzmir (2020) and Kahramanmaraş (2023), the flood in Kastamonu (2021), and the increasing frequency of such catastrophic events highlight the vulnerability of our cities and the need for resilient and environmentally friendly infrastructure. The Green Transition offers a framework for rebuilding cities and infrastructure in a manner that is in harmony with nature. By incorporating principles of sustainability, resilience, and environmental stewardship into urban planning and infrastructure development, Türkiye can mitigate the risks associated with natural disasters and create more sustainable and liveable communities. Furthermore, the green transition presents an opportunity to not only address the immediate challenges posed by natural disasters but also to tackle broader environmental issues, such as climate change and resource depletion, and their economy-wide effects. By embracing sustainable practices and technologies, Türkiye can reduce its ecological footprint, promote energy efficiency, and protect its natural resources for future generations.

**Notes**

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**Notes**

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TECHNOLOGY DEVELOPMENT FOUNDATION OF TÜRKİYE

**MERKEZ / HEAD OFFICE**  
CYBERPARK CYBERPLAZA  
B Blok Kat: 5-6 06800  
Bilkent ANKARA - TÜRKİYE  
Tel: +90 (312) 265 0272  
Faks: +90 (312) 265 0262

**İSTANBUL/İSTANBUL OFFICE**  
ARI TEKNOKENT  
Arı 2 Binası A Blok Kat: 7 34469  
İTÜ Ayazağa Yerleşkesi, Koruyolu  
Maslak İSTANBUL - TÜRKİYE  
Tel: +90 (212) 276 7560  
Faks: +90 (212) 276 7580

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