



# TURKEY: THE CONTRIBUTION OF THE CLEAN TECHNOLOGY FUND TO ENERGY EFFICIENCY GOALS

TRANSFORMATIONAL CHANGE CASE STUDY - DECEMBER 2021



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# THE CLIMATE INVESTMENT FUNDS AND THE TRANSFORMATIONAL CHANGE LEARNING PARTNERSHIP

The Climate Investment Funds (CIF) were established in 2008 to mobilize resources and trigger investments for low carbon, climate resilient development in select middle income and developing countries. To date, 14 contributor countries have pledged over US\$8.5 billion to the CIF, which is expected to leverage an additional US\$61 billion in co-financing for mitigation and adaptation interventions at an unprecedented scale in 72 recipient countries. CIF's large-scale, low-cost, long-term financing lowers the risk and cost of climate

financing. It tests new business models, builds track records in unproven markets, and boosts investor confidence to unlock additional sources of finance.

CIF's [Evaluation and Learning Initiative](#) established the [Transformational Change Learning Partnership](#) (TCLP) in 2017 to facilitate a collaborative, evidence-based learning process on transformational change and CIF's role in supporting transformational change since 2008.



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# EXECUTIVE SUMMARY

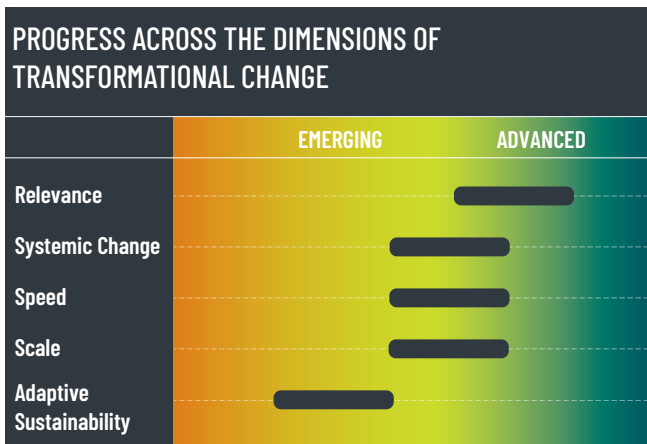
This case study describes the progress that has been made in transforming the energy sector in Turkey, with support from the Climate Investment Funds (CIF). The first part details the investments made by CIF's Clean Technology Fund (CTF) to advance the uptake of energy efficiency (EE) and renewable energy (RE) technologies in the country. The second part documents the changes that have occurred in the energy sector, with a focus on the gains made in EE, using a framework developed by CIF consisting of five dimensions of transformational change.

Turkey became a Party to the United Nations Framework Convention on Climate Change (UNFCCC) in 2004, with the commitment to reducing its greenhouse gas (GHG) emissions. The country's climate policy was linked to the promotion of other priorities, including strengthening energy security and improving economic competitiveness. Turkey's Ninth Development Plan in 2007 identified an increasing role for the private sector in the national economy,

which CIF responded to by targeting support for the private sector. The 2009 CTF country investment plan then detailed a strategy that aimed to support increasing EE and improving RE supply. This strategy was adopted to help accelerate the government's development and climate change policy goals by securing more rapid GHG emission reductions.

The CTF investment plan identified the energy sector as being key to the GHG mitigation interventions on the basis of its sizable contribution to Turkey's GHG emissions, a tightening balance between electricity demand and supply, and the estimated cost effectiveness of EE. Under the financing component of the investment plan, support was targeted at private investors involved in RE projects and companies investing in EE measures. The private sector was expected to benefit from an expanded availability of long-term financing, either directly through project loans or because of the demonstration effect of the projects.





A strength of the CIF business model was demonstrated through this investment plan process: it harnessed existing country expertise found within three collaborating multilateral development banks (MDBs)—the European Bank for Reconstruction and Development (EBRD), the International Bank for Reconstruction and Development (IBRD), and the International Finance Corporation (IFC)—to support the planned investments. The investment plan also identified multiple barriers to change that the projects would have to address, including financial, institutional, and knowledge gaps inhibiting the deployment and diffusion of low-carbon technologies and services.

CTF adopted an intermediated approach in two major EE initiatives directed at small and medium-sized enterprises (SMEs): the Turkish Sustainable Energy Financing Facility (TurSEFF) and the Commercializing Sustainable Energy Finance project (CSEF). TurSEFF, implemented by EBRD, facilitated investments of USD250 million in EE projects delivered through five commercial banks. CSEF, implemented by IFC, supported a highly innovative project design that involved leveraging the deep networks that leasing companies had forged with SMEs since the 1980s.

CTF’s support for renewables focused on the promotion of private sector investment in utility-scale wind, geothermal, and solar photovoltaic (PV) energy. In the renewables sector, the Private Sector Renewable Energy and Energy Efficiency Project also adopted an intermediated approach, with funding for the projects channeled through two national development banks.

Much has changed since the first CTF investments were made in 2009. Turkey has faced significant social, economic, and political challenges, including the arrival of almost three million Syrian refugees in 2015–2016, and an overall weak investment climate in the country since 2017. It is thus important to view the CTF goal of supporting Turkey’s transition to low-carbon technologies within this dynamic societal context.

This case study considers the changes brought about by the CIF-supported investments in Turkey through five dimensions of transformational change: Relevance, Systemic Change, Speed, Scale, and Adaptive Sustainability. Overall, based on available evidence from the CTF EE investments in Turkey, advanced signals of change in the Relevance, Systemic Change, Speed, and Scale dimensions are apparent, with strong emerging signals in the Adaptive Sustainability dimension.



**Relevance:** SMEs dominate the Turkish economy. Both TurSEFF and CSEF were designed to target such businesses to leverage their latent demand for EE services. These projects addressed known barriers to change, specifically the commercial banks’ lack of familiarity with the financing of RE and EE projects, and more broadly, SMEs’ lack of awareness of the benefits of RE and EE investments. The timing of the first CTF investments was also critical, as the CTF investment plan responded to the new direction set out in the government’s Ninth National Development Plan to promote private sector activity by improving the business environment.



**Systemic change:** CTF’s investments in Turkey helped increase awareness in national banks about the profitability of working in the EE/RE sector, which thus lowered the perceived risks of investing in EE/RE projects among industry. Compared to the situation prior to the CTF investments, a wider range of financial instruments is now available through national financial intermediaries to support climate-related investments made by the private sector.





**Speed:** The concessionality of the CTF finance distinguished it from other international finance provisions, allowing low-carbon investments to move forward quickly into a second phase of CTF support after just three years. This rapid rollout was assisted by the involvement of EBRD, IBRD, and IFC—three MDBs which possess the expertise and knowledge to support the country’s low-carbon development trajectory.



**Scale:** There are advanced signals of the move toward market-based approaches for low-carbon energy in Turkey. In terms of scaling up EE deployment, both the TurSEFF and CSEF project partners attracted follow-on credit lines from participating banks and leasing companies on fully commercial terms that enabled an expansion of EE investments. As of August 2021, the total annual energy savings delivered by TurSEFF, which have continued to grow since the original CTF support, are equivalent to the electricity consumed by almost a million households in Turkey every year. The success of the CSEF leasing model has provided a template to catalyze EE lending for commercial and industrial customers. This model was subsequently transferred to other developing countries’ markets, with IFC taking these lessons to other country programs, including those in Pakistan and Lebanon.



**Adaptive sustainability:** CTF helped the Turkish EE market to achieve a more robust state of functioning, with the leasing of energy-efficient equipment now established as a commercial business model in Turkey. TurSEFF helped by creating the critical capacity of trained bank analysts in commercial banks who can identify and structure RE and EE projects for lending. Government policies are also ensuring a resilient future for such investments, with two major milestones being the 2015 National Renewable Energy Action Plan (NREAP) and the 2018 National Energy Efficiency Action Plan (NEEAP).

In countries where fossil fuels continue to dominate the energy supply, securing the transformation in national energy usage toward a low-carbon future requires the fast tracking of EE investments that help reduce energy consumption, while promoting the development of RE sources. The CTF investment plan for Turkey adopted, and then followed, this twin strategy. Furthermore, because of the extent to which SMEs drive economic activity, working through national financial intermediaries proved to be a critical change pathway. In addition, implementing projects through MDBs enabled CTF investments to influence and mobilize much larger funding flows and specialist expertise. The overall coherence of the CTF programmatic approach thus far provides a strong model for continuing efforts that aim to support the transformation of Turkey’s energy sector.



# 1. INTRODUCTION

The Clean Technology Fund (CTF) was established as part of the Climate Investment Funds (CIF) in 2008. The aim of CTF is to provide scaled-up financing that contributes to the demonstration, deployment, and transfer of low-carbon technologies with significant potential for long-term greenhouse gas (GHG) emission savings. By 2021, CTF's resources have grown to USD5.7 billion, covering 15 country investment plans, one regional program, and four phases of the Dedicated Private Sector Program (DPSP).<sup>1</sup>

Turkey's CTF investment plan was one of the first to be prepared in 2009. It aimed to support the low-carbon objectives of the country's Ninth Development

Plan (2007–2013), which had endorsed private sector-led development. The Government of Turkey (GoT) identified energy efficiency (EE) and the accelerated deployment of renewable energy (RE) as strategic interventions for securing a lower-carbon development trajectory. CTF support was provided to speed up GHG emission reductions through these two strategies.<sup>2</sup>

Twelve years after the development of the investment plan, this case study examines the impact of the CTF investments in contributing to the transformation of the use and production of energy in Turkey, with a focus on the development of the EE market.





## 2. COUNTRY CONTEXT

From 2001 to 2010, Turkey's economy tripled in size and its population grew by 14 percent, raising its electricity demand by seven percent each year between 2005 and 2013.<sup>3</sup> As a consequence, GHG emissions increased significantly in the early 2000s, with emissions in Turkey (excluding land use and land use change and forestry) showing the highest growth among the Annex 1 countries of the United Nations Framework Convention on Climate Change (UNFCCC) between 1990 and 2006.<sup>4</sup> As Turkey's domestic energy production supplied less than 30 percent of its total consumption,<sup>5</sup> national policy attention turned to scaling up the deployment of RE and developing the EE market in order to strengthen energy security.<sup>6</sup> At the same time, the government saw EE investments as a strategic opportunity for improving the country's economic competitiveness through energy savings.

In 2005, the Renewable Energy Law was enacted to increase the utilization of RE sources, and in 2007, the Energy Efficiency Law established a national Energy Efficiency Coordination Board to promote EE. The Renewable Energy Law was amended in 2010, increasing the feed-in tariff levels that would then have been applicable until 2020, thus successfully supporting the penetration of RE in the country's power mix. All these measures reflected the GoT's efforts to align its energy and climate goals with those of the European Union (EU), as part of its overall strategy of implementing the EU pre-accession steps.

Another distinguishing element of Turkey is that its economy is dominated by small and medium-sized enterprises (SMEs): the Organisation for Economic Co-operation and Development (OECD) estimated that



SMEs made up 99.8 percent of the total number of enterprises and 76.7 percent of total employment in 2000.<sup>7</sup> SMEs had traditionally struggled to access debt finance, thus constraining their growth.<sup>8</sup> This context provided an opportunity for CTF to target SMEs through the provision of concessional finance to help grow the economy while reducing GHG emissions.

The collective experience of the multilateral development banks (MDBs) with RE and EE investments in Turkey, prior to the involvement of CTF, helped to identify several significant barriers that had to be overcome for the CTF-supported investment program to be successful (see Box 1).<sup>9</sup>

#### Box 1.

#### **BARRIERS TO RE/EE INVESTMENTS IN TURKEY**

- Lack of familiarity with renewable energy and energy efficiency projects and insufficient capacity to evaluate them among commercial banks.
- Insufficient capacity to implement renewable energy and energy efficiency policies and programs effectively within the regulatory administration.
- High transaction costs in developing renewable energy and energy efficiency investments, associated with energy audits and feasibility studies.
- Limited awareness of the benefits of energy efficiency and perceived high technical and financial risks of such investments among industry.
- Lack of financial resources and lending facilities, particularly for small-scale projects and SMEs.

*Source: 2009 Clean Technology Fund Investment Plan for Turkey*



### 3. CIF'S STRATEGY TO SUPPORT TURKEY'S EE AND RE AGENDA

Two phases of CTF support were planned from the outset taking into consideration the uncertainty associated with worsening global economic conditions and financial markets in 2009.<sup>10</sup> The first phase of the work was outlined in the 2009 investment plan. With the successful completion of phase I, an updated investment plan was completed three years later in 2012.

The 2009 investment plan identified the energy sector as being key to GHG mitigation interventions on the basis of its sizable contribution to Turkey's GHG emissions, a tightening balance between electricity demand and supply, and the estimated cost effectiveness of EE. For example, during the project appraisal of the first CTF investment in 2009, the estimated cost effectiveness of CTF resources for various prototype RE and EE projects ranged from a highly economic USD5 per tCO<sub>2</sub> (total carbon dioxide) for energy efficiency, USD5.2 for geothermal energy, USD5.5–5.9 for wind and small hydro energy, to USD171 per tCO<sub>2</sub> for solar photovoltaic (PV) energy.<sup>11</sup>

Under the financing component of the investment plan, a small number of strategic investments were proposed that would contribute to the national low-carbon development trajectory. Primary beneficiaries were identified as private investors in RE projects and companies investing in EE measures that were expected to benefit from an expanded availability of long-term financing, either directly through project loans or indirectly through the demonstration effects of the projects.<sup>12</sup> For each project, CTF funds were co-invested alongside financing from EBRD, IBRD, or IFC.<sup>13</sup> These investments would build on the successful prior engagement between GoT and the MDBs, including IBRD's 2004 Renewable Energy Project—the predecessor of the largest CTF-supported project, the Private Sector Renewable Energy and Energy Efficiency Project. The investment plan process provided a coordination mechanism that allowed for the expertise within the three MDBs to be harnessed in support of Turkey's national EE and RE initiatives.

The following sections outline CTF's investments in EE and RE in Turkey.

### **3.1. CTF'S INVESTMENTS IN ENERGY EFFICIENCY**

CTF aimed to promote the efficient use of energy, and electricity in particular, in industrial, commercial, and residential applications, as well as the public sector.<sup>14</sup> From the outset, CTF adopted an intermediated approach in two EE initiatives directed at SMEs: the Commercializing Sustainable Energy Finance project (CSEF) and the Turkish Sustainable Energy Financing Facility (TurSEFF). These two initiatives that received CTF project funding under both phases of the investment plan provide insights into how CTF's support, channeled through its MDB implementing partners, helped to strengthen EE measures in the country.

#### **3.1.1. COMMERCIALIZING SUSTAINABLE ENERGY FINANCE PROJECT (CSEF)**

With CSEF, CTF supported a highly innovative project design that involved working through leasing companies, leveraging upon the deep networks that these companies had established with SMEs since the 1980s. CTF finance was blended with IFC funding under this project to provide credit lines to three leasing firms with varying levels of EE exposure. These firms also received technical assistance that built their capacity to identify investments and markets for potential SME clients, as well as helped them identify opportunities before purchasing the required technology with CTF-IFC blended finance. CTF funds were mostly used for investments that replaced old equipment with new, more energy-efficient models.

CSEF was the first global CTF-funded EE program to support the leasing of energy-efficient equipment. This funding model was identified as having strong potential in sectors made up of businesses with small balance sheets, limited collateral, or a poor credit history that prevented them from readily accessing debt finance. These attributes typically apply to SMEs. Leasing, therefore, enabled such businesses to utilize energy-efficient equipment without having to sustain burdensome capital requirements. In addition, CSEF's

activities came at a time when leasing companies in Turkey were seeking to expand into new markets, as the Value Added Tax increases in 2008 (from one percent to 18 percent) for leasing equipment meant that their traditional client base was shrinking.<sup>15</sup>

#### **3.1.2. PRIVATE SECTOR SUSTAINABLE ENERGY FINANCING FACILITY (TURSEFF)**

Between June 2010 and January 2013, TurSEFF facilitated investments of USD250 million in sustainable energy projects through five partner banks (that between them hold 60 percent of all banking assets in Turkey).<sup>16</sup> Blended CTF-EBRD funding provided credit lines to these commercial banks for onlending. These credit lines were characterized by longer loan repayment periods and lower interest rates than would have been possible with EBRD's commercial financing alone. For example, CTF's lending period of 15 years and grace period of seven years far exceeded EBRD's typical lending period of five years and grace period of two years.

During the period of CTF's support, TurSEFF financed around 240 EE projects through its partner banks, with very low non-performance levels. The average loan was USD0.7 million, reflecting the program's success in reaching SMEs, with the amount of financing per project set at a modest level. The TurSEFF program adopted a flexible approach by keeping the eligibility criteria of projects wide and being technology agnostic, focusing on energy and GHG savings performances. This allowed the participating banks to expand into new markets. Another important implementation feature of the program was the provision of technical assistance to build the capacity of the participating banks and final beneficiaries (that is, SMEs) by using grant finance from CTF and EU.

TurSEFF also catalyzed the development of the medium-sized sustainable energy financing facility (MidSEFF) by EBRD—a much larger commercial facility (that has since increased in size to approximately USD2.5 billion by 2021). MidSEFF focused on supporting mid-sized RE investments through the same partner banks that joined TurSEFF.





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### 3.1.3. ADDITIONAL PROJECTS

Extending the successful experience of promoting EE to the sustainable use of resources, EBRD developed the Near Zero Waste program (NØW) in 2013 to encourage companies to reduce waste.<sup>17</sup> Combining CTF’s concessional finance (10 years’ grace, one bullet repayment, and low interest rates) with EBRD’s commercial financing for direct corporate finance was a successful mechanism for triggering investments in the circular economy, leading to the leveraging

of large amounts of private financing and the achievement of significant energy and GHG savings.

In addition to CSEF, TurSEFF, and NØW, CTF also financed the Residential Energy Efficiency Finance Facility (TuREEFF), the Commercializing Sustainable Energy Finance Program Phase II (CSEF II), and the Energy Efficiency in Public Buildings (DPSP III) (see Table 1).

Table 1:  
SUMMARY OF CTF SUPPORT FOR ENERGY EFFICIENCY IN TURKEY, 2009–2020

PROJECT TITLE	MDB	CTF FUNDING (USD MILLION)	EXPECTED CO-FINANCING (USD MILLION)	APPROVAL DATE	CLOSURE DATE
Commercializing Sustainable Energy Finance Program (CSEF)	IFC	21.2	101.8 (IFC)	Sept 2009	Sept 2014
Private Sector Sustainable Energy Financing Facility (TurSEFF)	EBRD	49.2	222.0 (EBRD) 20.0 (JBIC) 7.7 (EU)	Jan 2010	April 2013
Residential Energy Efficiency Finance Facility (TuREEFF)	EBRD	69.8	603.0 (EBRD)	May 2013	On-going
Near Zero Waste (NØW)	EBRD	15.0	220.0 (EBRD)	May 2013	2020
Commercializing Sustainable Energy Finance Program Phase II (CSEF II)	IFC	34.7	66.8 (EBRD)	Oct 2014	On-going
Energy Efficiency in Public Buildings (DPSP III)	IBRD	50.0	154.0 (IBRD)	June 2019	On-going

Sources: CIF, 2015; CIF, 2020b.



### 3.2. CTF'S INVESTMENTS IN RENEWABLE ENERGY

CTF's support for renewables focused on the promotion of private sector RE investment in wind, geothermal, and solar PV energy, as well as small-scale hydro development (the last to a lesser extent).<sup>18</sup> The first phase of investments included the largest CTF project investment in Turkey—the Private Sector Renewable Energy and Energy Efficiency Project. This project combined RE and EE investment support, although most of the project funding went to RE. The project initially responded to the huge interest in hydro investments in Turkey. However, when

investments in hydropower became more attractive to private sector financiers, the project shifted its focus to non-hydro RE and EE opportunities.<sup>19</sup> A significant attribute of this project was that funding was channeled through two national financial intermediaries—the Turkish Industrial Development Bank (TSKB) and the Turkish Development Bank (TKYB)—providing confidence in such lending that was then taken up by commercial banks.

All the remaining RE projects began in 2015 during the second phase of CTF support (see Table 2).

Table 2:  
SUMMARY OF CTF SUPPORT FOR RENEWABLE ENERGY IN TURKEY, 2009–2020

PROJECT TITLE	MDB	CTF FUNDING (USD MILLION)	EXPECTED CO-FINANCING (USD MILLION)	APPROVAL DATE	CLOSURE DATE
Private Sector Renewable Energy and Energy Efficiency Project	IBRD	100.0	950.7 (IBRD) 2,048.9 (Other sources)	Mar 2009	Dec 2016
Early Stage Geothermal Support Framework: (PLUTO)	EBRD	5.0	312.0 (EBRD)	Jan 2015	2018
Geothermal Development Project (DPSP I)	IBRD	39.8	250.0 (IBRD) 62.5 (TSKB & TKYB)	Sept 2015	On-going
Renewable Energy Integration Project	IBRD	50.0	300.0 (IBRD) 125.0 (GoT)	Dec 2015	On-going

Source: CIF, 2015.





### 3.3. IMPLEMENTATION CHALLENGES

The slow start in the loan disbursements from the TurSEFF facility, due to the unfamiliarity with this type of lending, demonstrated the need to strengthen human capacity to institutionalize sustainable energy finance as a new business line for national commercial banks. This led to training activities involving regular coaching sessions in over 100 bank branches on evaluating RE and EE projects. Technical workshops and training for over 300 engineers, business owners, suppliers, and participants from industry associations were also conducted to raise the awareness of business opportunities in RE and EE. These events built on the Ministry of Energy and Natural Resources' earlier outreach supported by the World Bank and EU.

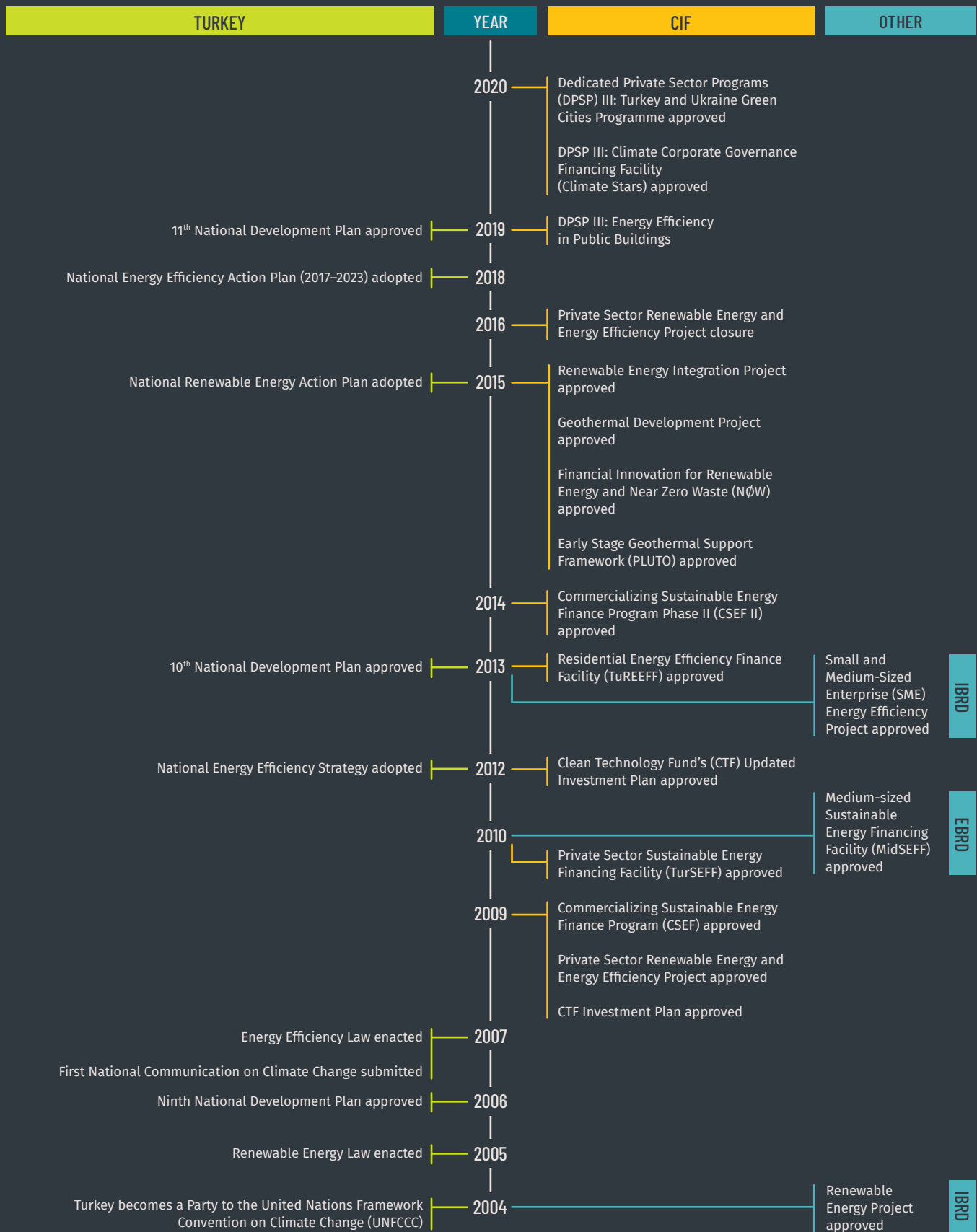
Project implementation throughout the RE and EE sectors also had to address several exogenous factors, including the restructuring of national financial intermediaries, the depreciation of the Turkish Lira, and the overall weak investment climate in Turkey since 2017.<sup>20</sup> This was particularly negative for the PLUTO geothermal program, which was aimed at supporting the development of new geothermal fields in unexplored areas. The difficult economic climate stopped clients from investing in high-risk projects, with the program providing support to only one out of five expected clients, before being closed.

Another challenge associated with RE projects is the significant environmental and social impacts that can arise from such developments, even in the case of small and medium-size projects. With a large increase in planned project investments, the agencies involved in the environmental impact assessment and project clearance processes were, at times, overwhelmed by the sheer number of applications. Project developers drew attention to complicated regulatory procedures and delays, as well as highlighted the need for further information on the application of environmental permitting and licensing procedures/guidelines along with the decisions made.<sup>21</sup> Since 2015, the Ministry of Energy and Natural Resources has taken several measures to simplify regulatory procedures and enhance transparency in the field of RE.

### 3.4. MILESTONES OF CHANGE

Turkey has achieved a number of major policy milestones with respect to RE/EE since the early 2000s, with the 10<sup>th</sup> and 11<sup>th</sup> National Development Plans being prepared in 2013 and 2019, respectively. Figure 1 provides a timeline highlighting these milestones, together with the timing of CTF's investments.

Figure 1:  
TIMELINE OF NATIONAL RE/EE INITIATIVES AND REFORMS







## 4. PROGRESS TOWARD TRANSFORMING THE ENERGY SECTOR

“Transformational change” is an emerging concept of international climate action. The CIF [Transformational Change Learning Partnership’s](#) (TCLP) working definition of “transformational change” is fundamental change in systems relevant to climate action with large-scale positive impacts that shift and accelerate the trajectory of progress toward climate-neutral, inclusive, resilient, and sustainable development pathways. Progress across five dimensions (Relevance, Systemic Change, Speed, Scale, and Adaptive Sustainability) has to be achieved for transformation to be realized. However, it is important to point out that these dimensions often do not advance in a linear or sequential manner. For each dimension, transformational change, at any moment in time, should be considered on a continuum of advancement from emerging to advanced stages (see Box 2).

### 4.1. OVERALL PROGRESS






Much has changed in Turkey since the first CTF investments were made in 2009. Turkey has faced significant social, economic, and political challenges over the last 10 years, including the arrival of almost three million Syrian refugees in 2015–2016. The CTF goal of supporting Turkey in embarking on its transition to low-carbon technologies should thus be viewed within this dynamic societal context.

The changes in Turkey’s EE, brought about by the investments made under the CTF investment plan, can be examined under the five dimensions of transformational change, which collectively describe the processes and impacts necessary for transformation. Based on the evidence available from CTF’s EE investments in Turkey, advanced signals of change in the Relevance, Systemic Change, Speed, and

Box 2:

## DIMENSIONS OF TRANSFORMATIONAL CHANGE AND STAGES OF PROGRESS TOWARDS TRANSFORMATIONAL CHANGE

### The Dimensions of Transformational Change

-  **Relevance:** Alignment with and attentiveness to goals and context through time
-  **Systemic change:** Fundamental shifts in system structures and functions
-  **Speed:** Accelerate impacts to achieve the appropriate speed of change
-  **Scale:** Contextually large change processes and impacts
-  **Adaptive Sustainability:** Robustness, resilience, and adaptiveness of change.

### Emerging and Advanced Stages of Progress

**Emerging:** Suggests that transformational change processes are under way, although outcomes across both lower- and higher-level systems are not yet visible. Emerging signals of change include transformational outcomes within unconnected systems, as well as process signals that can facilitate fundamental shifts in systems, scaling between a lower- and higher-level system, or the durability of the transformational change.

**Advanced:** Signals of large-scale positive impacts (that is, changes identifiable in larger systems, such as at sectoral, national, and global levels), as well as fundamental changes in the structure, function, or interaction of a system. Advanced signals of change can also arise directly from specific project interventions, depending on their scale, ambition, or timing, or they may occur through the scaling and deepening of smaller demonstration interventions over time.

At a given time, progress may be at, or in between, these stages.

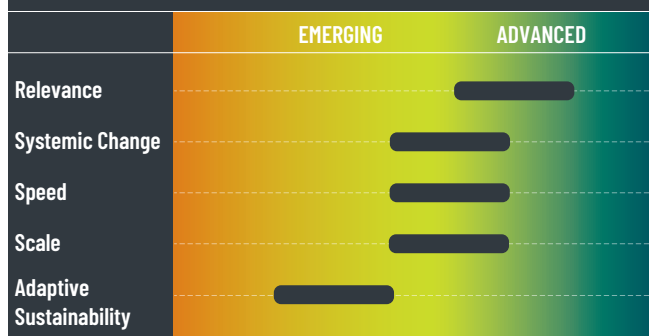
Scale dimensions are apparent, with strong emerging signals for the Adaptive Sustainability dimension (see Figure 2). Progress along each dimension is detailed in the following sections. The analysis focuses primarily on EE outcomes, as less evidence is available for the CTF RE projects (most of which began during the second phase of CTF support).

### RELEVANCE

Relevance involves the alignment of action to goals and context over time. CTF's focus on supporting SMEs, its provision of flexible financing, and the timing of its program activities were highly relevant to securing Turkey's national improvements in EE. Each of these areas of focus will be examined in greater detail below.

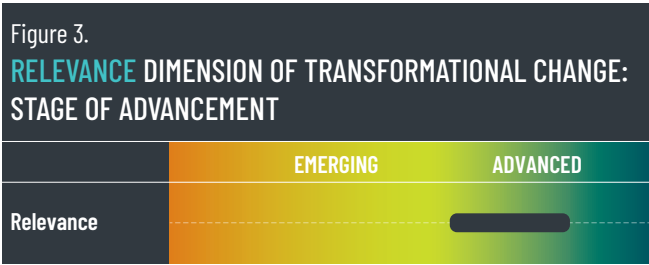
CTF supported SMEs specifically because they dominate the Turkish economy: based on 2017 data, there are over three million SMEs in Turkey, making up 99.8 percent of all businesses (as was the case 20 years ago).<sup>22</sup> In targeting this segment of the economy where there was latent demand for EE services, both the TurSEFF and CSEF interventions were designed to leverage this demand. SMEs have historically struggled to access debt finance; therefore, they constituted a highly relevant channel through which to help grow the economy while reducing GHG emissions. TurSEFF selected intermediary banks, favoring those with deep branch networks and an existing SME client base. In the case of CSEF,

Figure 2.  
PROGRESS TOWARDS TRANSFORMATIONAL CHANGE  
IN ENERGY EFFICIENCY IN TURKEY ACROSS THE FIVE  
DIMENSIONS





partnering with leasing companies that had strong networks with SMEs was an important innovation of the CTF portfolio, which helped secure its relevance.



Furthermore, CTF’s support maintained its relevance in an evolving EE market by providing flexible financing that encouraged learning and experimentation. From the beginning, the TurSEFF program adopted a flexible approach that was agnostic to different technologies, which enabled participating banks to expand into new markets. The experience built up through TurSEFF was adapted to cover additional market segments in the follow-on TuREEFF project, which extended credit facilities to the residential sector. The NØW program also helped expand the experience in the rollout of EE to the more comprehensive theme of the circular economy. The relevance of CTF’s financing support can also be demonstrated by the way the portfolio of projects addressed barriers identified in the 2009 investment plan—specifically, the commercial banks’ lack of familiarity with the financing of RE and EE projects, and more broadly a lack of awareness of the benefits to be gained from RE and EE investments among industry. TurSEFF addressed these barriers through the provision of grant finance for technical assistance.

The timing of the first CTF investments was also key to securing change, as the CTF investment plan responded to the new direction set out in the Ninth National Development Plan to promote private sector activity by improving the business environment. This is also an example of the interconnectedness of the dimensions of transformational change: the relevant timing of the investment plan enabled change to move at speed.

Finally, it is also important to highlight that CTF’s support for EE investments was relevant to several broader development challenges, as expressed through the Sustainable Development Goals (SDG) (see Box 3).

**Box 3. THE DEVELOPMENT IMPACTS OF CIF-SUPPORTED INVESTMENTS IN ENERGY EFFICIENCY**

The Sustainable Development Goals (SDGs) represent the global commitment towards securing a sustainable future. CTF’s support to EE investments in Turkey makes a direct contribution to SDG 7 (affordable and clean energy) and SDG 13 (climate action). Improvements in energy efficiency (EE) will contribute to Target 7.3 (by 2030, double the global rate of improvement in EE as well as Target 13.2 (integrate climate change measures into national policies, strategies, and planning). Furthermore, considering the interconnectedness of the SDGs, EE measures can also be considered to support the following additional SDGs:

- 
**SDG 8** (decent work and economic growth) through Target 8.4 (improve progressively, through 2030, global resource efficiency in consumption and production);
- 
**SDG 9** (industry, innovation, and infrastructure) through Target 9.4 (upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency); along with
- 
**SDG 11** (sustainable cities), through Target 11.b (substantively increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation, and adaptation to climate change).

In addition, where EE measures are used to improve the building stock of health care and educational facilities, their impact can be seen to contribute to the progress of SDG 2 (health) and SDG 3 (education). Thus, by using the SDG framework, it can be seen that the development impacts of CTF-supported EE investments are significant and broad-ranging, even where direct measurable attribution is lacking.



## SYSTEMIC CHANGE

Systemic change involves fundamental shifts in systems through the removal of barriers and the creation of enabling environments for change. CTF’s investments addressed two of the key barriers identified in the 2009 CTF investment plan that had been holding back transformation in the financial sector: a lack of familiarity with RE and EE projects, as well as a lack of financial resources and lending facilities, particularly for small-scale projects and SMEs. Through the provision of flexible, concessional finance, and grant-funded technical assistance, CTF investments in Turkey made two key changes in the finance system: the availability of a wider range of financial instruments and the strengthening of the institutional capacity of the banking sector.

Figure 4.

### SYSTEMIC CHANGE DIMENSION OF TRANSFORMATIONAL CHANGE: STAGE OF ADVANCEMENT



CTF-supported supply chain development activities, involving extensive training and outreach events across the country, helped partner financial intermediaries to forge and grow new business models to distribute low-carbon technologies and services. These included on-lending, guarantees, on-bill financing, and leasing to leverage new flows of private investment for RE and EE projects. Compared to the situation prior to CTF, a wider range of financial instruments is now available through national financial intermediaries to support climate-related investments made by the private sector.

An important characteristic of the CTF-supported projects was that, in addition to providing flexible, concessional finance, they helped to strengthen the institutional capacity of the partner banks through the

provision of grant-funded technical assistance. The training strengthened the capacities of national banks in the technical, environmental, and social aspects of RE and EE investments. Having strong national financial intermediaries is crucial for enabling donors and MDBs to reach market segments with otherwise high transaction costs due to the large volume of small projects. This course of action enabled CTF investments to reach and influence a wider network of SMEs.

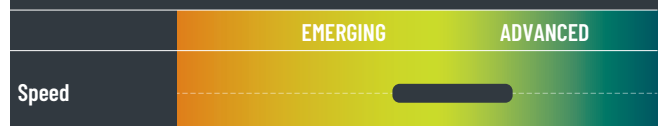


## SPEED

Concessional finance is a key aspect of CTF financing that distinguishes it from other international finance provisions. In Turkey, the utilization of CTF financing in 2012 enabled low-carbon investments to move forward quickly into the second phase of CTF support, after just three years. The involvement of national commercial banks and leasing companies in EE support for the private sector was boosted through the provision of CTF’s concessional finance, which led to many SMEs taking up the credit and leasing provisions offered by national financial intermediaries. This demand quickly established the business case for the subsequent commercial provision of financial and technical services provided by the same national financial intermediaries. This rapid rollout was assisted by the involvement of EBRD, IBRD, and IFC—the three MDBs possessing the expertise and knowledge to support the country’s low-carbon development trajectory.

Figure 5.

### SPEED DIMENSION OF TRANSFORMATIONAL CHANGE: STAGE OF ADVANCEMENT







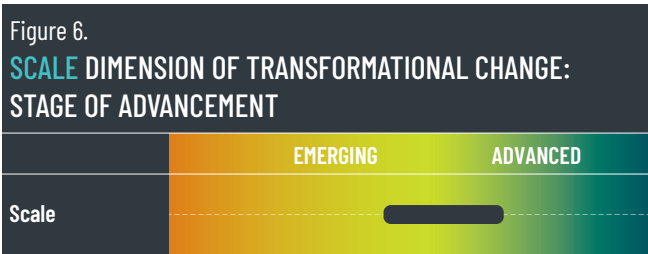
Advanced signals of transformational change exist regarding the move towards market-based approaches for low-carbon energy in Turkey. In terms of scaling-up EE deployment, both TurSEFF and CSEF project partners attracted follow-on credit lines from participating banks and leasing companies on fully commercial terms that enabled the expansion of EE investments.

The experience of TurSEFF spawned further, more specialized versions of the facility: the CIF-supported TuREEFF Facility targeting the residential sector and the European International Bank (EIB)/EU-supported MidSEFF focusing on larger investments of between USD5 million and USD50 million. By 2018, the EBRD financing of approximately USD2 billion under these three frameworks (TurSEFF, TuREEFF, and MidSEFF) had reached over 1,000 companies and 1,500 households.<sup>23</sup> As of 2021, the total annual energy savings delivered by TurSEFF, which have continued to grow since the original CTF support in 2010, are equivalent to the electricity consumed by almost a million households in Turkey every year.<sup>24</sup>



In the case of CSEF, CTF blended approximately USD21 million of its funds with USD100 million of IFC funds to scale up industrial EE finance through leasing. This project supported three major leasing companies. Following a USD25 million loan in 2010, one of the three companies—Yapi Kredi Leasing—was highly successful in scaling up its EE lending business. IFC negotiated a follow-on loan with Yapi Kredi in 2013 at 60 percent lower concessionality to that supported by CTF in 2010, and in 2014, it went on to agree to a fully commercial loan for a further USD96 million. This was IFC’s largest loan to the leasing sector globally at the time. The success of the leasing model in Turkey provided a template for catalyzing EE support to commercial and industrial customers. This was subsequently transferred to other developing countries’ markets, with IFC taking these lessons to countries, including Pakistan and Lebanon.<sup>25</sup>

There is a niche, yet meaningful, example of the scale-up effect supported by CTF in the geothermal sector. Since 2009, over 1,000 megawatts (MW) of geothermal capacity have been installed in the country, making Turkey the fastest-growing market in the world over this period. This installation has also helped put the Turkish geothermal industry (from exploration to field development and advisory services) at the forefront of the global industry.

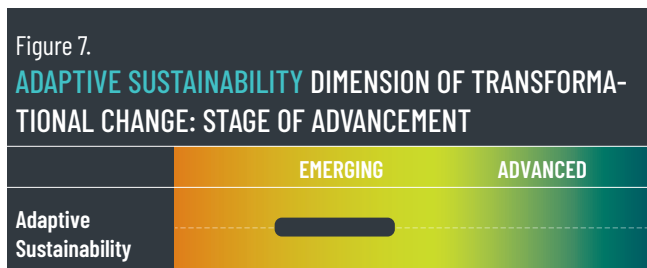




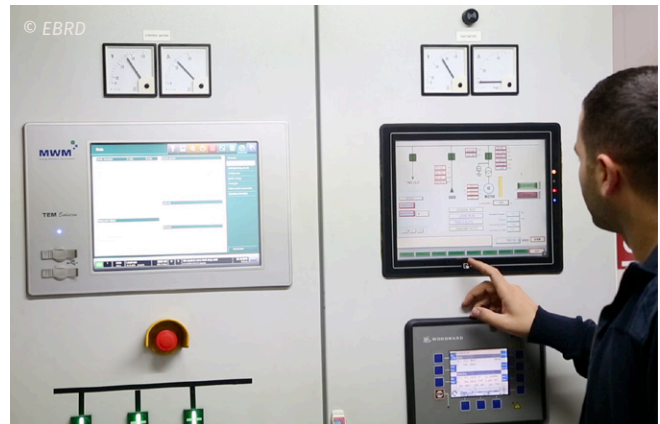
## ADAPTIVE SUSTAINABILITY

CTF helped the Turkish EE market achieve a more robust state of functioning. As of May 2021, 52 EE consulting companies are operating in Turkey in an energy service company (ESCO) market valued at more than USD20 million.<sup>26</sup> Government policies aim to grow the ESCO market so as to build the country’s capacity to prepare, implement, and monitor EE investments.

The leasing of energy-efficient equipment is now established in Turkey, with the growth of this sector demonstrated by the performance of the companies involved. For example, Yapi Kredi Leasing—the country’s largest leasing company by asset volume—continues to raise commercial lending in support of the company’s financing program for RE production and energy-efficient machinery.<sup>27</sup>



TurSEFF helped establish critical capacity to identify and lend to RE and EE projects at the partner banks’ branch level. Over time, the budget for technical assistance was reduced, with more responsibilities taken up by local experts and staff within the banks compared to international EBRD-employed consultants leading the training, as was the case at the project start-up. A key lesson to be drawn from this experience is that even in markets that appear relatively experienced at the outset, technical assistance is a fundamental feature to help strengthen the skills and capacity to nurture a new market, and these skills need to undergo continuous improvement until the market is self-sufficient.



GoT’s own policies are also ensuring a resilient future for EE and RE investments. Two major milestones occurred in 2015 and 2018, when the Turkish government adopted its first National Renewable Energy Action Plan (NREAP) and National Energy Efficiency Action Plan (NEEAP), 2017–2023, respectively.<sup>28</sup> NREAP reviewed Turkey’s RE targets for 2023, including 20 gigawatts (GW) of wind power, five GW of solar PV, and one GW of geothermal energy, by identifying mechanisms to eliminate barriers for implementation. NEEAP’s goal is to reduce primary energy consumption in Turkey by 14 percent in 2023 (representing a cumulative energy saving of 23.9 million tons of oil equivalent) compared to the business-as-usual scenario. The government has committed to securing both public and private investments of almost USD11 billion by 2023 for the EE measures set out in the plan.<sup>29</sup> If the actions under the plan are carried out, this will result in a major transformation of the energy sector, with an estimated cumulative saving of 66.6 million tons of CO<sub>2</sub> emissions expected by 2023.<sup>30</sup>





## 5. CURRENT STATUS AND LOOKING AHEAD

For a country where fossil fuels continue to dominate energy supply, the potential of securing the transformation in national energy usage to a low-carbon future requires the fast-tracking of EE investments that help reduce energy consumption, while promoting the development of RE sources. CTF's investment plan adopted, and then followed, this twin strategy through its investments.

The 2009 CTF investment plan led to significant new investments in EE and RE. In the context of Turkey, where SMEs drive economic activity, working through national financial intermediaries was highly relevant. This approach offered a critical change pathway for securing significant gains in EE and the deployment of RE at scale. In addition, by mobilizing the in-house expertise of MDB project implementers, CTF investments were able to support systemic change in the financial sector through capacity development and increased funding flows.

GoT is continuing to develop further opportunities with CTF and other MDBs that will accelerate and scale up the deployment of RE and EE technologies, which constitutes a signal of adaptive sustainability. These opportunities include two new investments funded through CIF's DPSP and implemented by EBRD:

the Climate Corporate Governance Financing Facility and the Turkey and Ukraine Green Cities Programme.<sup>31</sup> The adaptive sustainability of CTF's initiatives can also be seen in other MDB lending, such as the SME Energy Efficiency Project of IBRD. This project, whilst not receiving funding from CTF, followed on from the CTF-supported Private Sector RE-EE Project and adopted the earlier model of engagement with financial intermediaries.<sup>32</sup>

Further advancement and sustainability will rely on the government's own policies and practices to provide the enabling environment for continuing private sector action. The 2015 NREAP and 2018 NEEAP were important statements of policy intent. Significant steps have been achieved in meeting the RE targets (as of 2021, there are approximately 10 GW of wind power, seven GW of solar PV energy, and over 1.5 GW of geothermal installed capacity). However, challenges remain, with the International Energy Agency's (IEA) 2021 *Energy Policy Review of Turkey* reporting mixed progress so far toward the NEEAP's 2023 targets.<sup>33</sup> Therefore, the country's transformation toward a low-carbon economy will require continuing concerted action by government, the private sector, and international partners.

# ANNEX I: MILESTONES OF CHANGE

The events listed below represent some of the most significant events related to transforming the energy efficiency (EE) sector in Turkey. However, this list is not meant to be exhaustive, nor does it demonstrate causality between the Clean Technology Fund's (CTF) milestones and other events. For a visual timeline, see Figure 1.

YEAR	MONTH	MILESTONE	TYPE
2004	March	International Bank of Reconstruction and Development's (IBRD) Renewable Energy Project approved	MDB (non-CIF) investment/event
2004	May	Turkey became a Party to the United Nations Framework Convention on Climate Change (UNFCCC)	Major policy/political event/development
2005	May	Renewable Energy Law enacted	Major policy/political event/development
2006	June	Ninth National Development Plan	Major policy/political event/development
2007	Jan	First National Communication on Climate Change	Major policy/political event/development
2007	April	Energy Efficiency Law enacted	Major policy/political event/development
2009	Jan	Clean Technology Fund's (CTF) Investment Plan approved	CIF Project Event
2009	March	Private Sector Renewable Energy and Energy Efficiency Project approved	CIF Project Event
2009	Sept	Commercializing Sustainable Energy Finance Program (CSEF) approved	CIF Project Event
2010	Jan	Private Sector Sustainable Energy Financing Facility (TurSEFF) approved	CIF Project Event
2010	Jul	European Bank of Reconstruction and Development (EBRD) Medium-sized Sustainable Energy Financing Facility (MidSEFF) approved	MDB (non-CIF) investment/event
2012	Feb	National Energy Efficiency Strategy	Major policy/political event/development
2012	Nov	CTF's Updated Investment Plan approved	CIF Project Event
2013	Mar	IBRD Small and Medium-Sized Enterprise (SME) Energy Efficiency Project approved	MDB (non-CIF) investment/event
2013	May	Residential Energy Efficiency Finance Facility (TuREEFF) approved	CIF Project Event
2013	July	10 <sup>th</sup> National Development Plan	Major policy/political event/development
2014	Oct	CSEF II approved	CIF Project Event
2015	Jan	Early Stage Geothermal Support Framework (PLUTO) approved	CIF Project Event
2015	Feb	National Renewable Energy Action Plan	Major policy/political event/development
2015	March	Financial Innovation for Renewable Energy and Near Zero Waste (NØW) approved	CIF Project Event
2015	Sept	Geothermal Development Project approved	CIF Project Event
2015	Dec	Renewable Energy Integration Project approved	CIF Project Event
2016	Dec	Private Sector Renewable Energy and Energy Efficiency Project closure	CIF Project Event
2018	Jan	National Energy Efficiency Action Plan (2017–2023)	Major policy/political event/development
2019	June	DPSP III: Energy Efficiency in Public Buildings	CIF Project Event
2019	July	11th National Development Plan	Major policy/political event/development
2020	Feb	DPSP III: Climate Corporate Governance Financing Facility (Climate Stars) approved	CIF Project Event
2020	Jul	DPSP III: Turkey and Ukraine Green Cities Programme approved	CIF Project Event



# ACRONYMS

<b>CIF</b>	Climate Investment Funds
<b>CSEF</b>	Commercializing Sustainable Energy Finance Program
<b>CTF</b>	Clean Technology Fund
<b>DPSP</b>	Dedicated Private Sector Program
<b>EIB</b>	European Investment Bank
<b>EBRD</b>	European Bank for Reconstruction and Development
<b>EE</b>	Energy Efficiency
<b>ESCO</b>	Energy Service Company
<b>EU</b>	European Union
<b>GHG</b>	Greenhouse Gas
<b>GoT</b>	Government of Turkey
<b>IBRD</b>	International Bank for Reconstruction and Development
<b>IEA</b>	International Energy Agency
<b>IFC</b>	International Finance Corporation
<b>JBIC</b>	Japan Bank for International Cooperation
<b>MDB</b>	Multilateral Development Bank
<b>MidSEFF</b>	Medium-sized Sustainable Energy Financing Facility
<b>NEAAP</b>	National Energy Efficiency Action Plan
<b>NØW</b>	Near Zero Waste Program
<b>NREAP</b>	National Renewable Energy Action Plan
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>PLUTO</b>	Early Stage Geothermal Support Framework
<b>PV</b>	Photovoltaic
<b>RE</b>	Renewable Energy
<b>SDG</b>	Sustainable Development Goal
<b>SME</b>	Small and Medium-sized Enterprise
<b>TCLP</b>	Transformational Change Learning Partnership
<b>tCO<sub>2</sub></b>	Total Carbon Dioxide
<b>TFC</b>	Trust Fund Committee of the Climate Investment Funds
<b>TKYB</b>	Turkish Development Bank
<b>TSKB</b>	Turkish Industrial Development Bank
<b>TuREEFF</b>	Residential Energy Efficiency Finance Facility
<b>TurSEFF</b>	Private Sector Sustainable Energy Financing Facility
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change

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# THE CLIMATE INVESTMENT FUNDS

The Climate Investment Funds (CIF) was established in 2008 to mobilize resources and trigger investments for low carbon, climate resilient development in select middle and low income countries. 14 contributor countries have pledged over US\$8.5 billion to the funds. To date CIF committed capital has generated an additional US\$61 billion in co-financing for mitigation and adaptation interventions at an unprecedented scale in 72 recipient countries. CIF's large-scale, low-cost, long-term financing lowers the risk and cost of climate financing. It tests new business models, builds track records in unproven markets, and boosts investor confidence to unlock additional sources of finance. The CIF is one of the largest active climate finance mechanisms in the world.



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